

**Installing Options in Your IntelliStation Z Pro  
Professional Workstation**



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Professional Workstation**



**Note**

Before using this information and the product it supports, be sure to read the general information under Appendix D, "Notices" on page 78.

### **First Edition (February 1997)**

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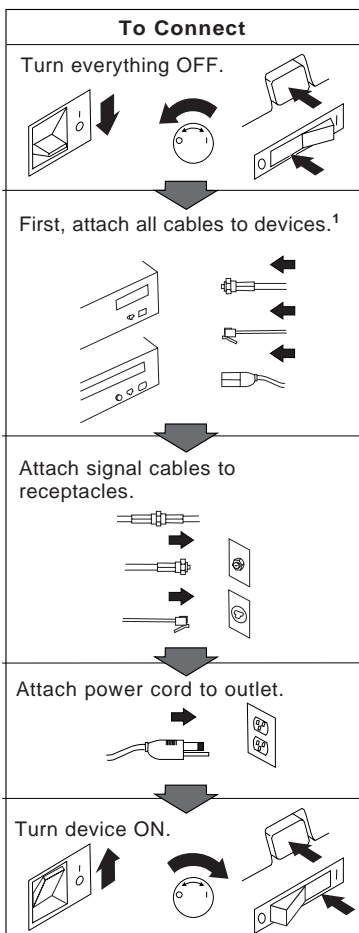
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## Safety Information

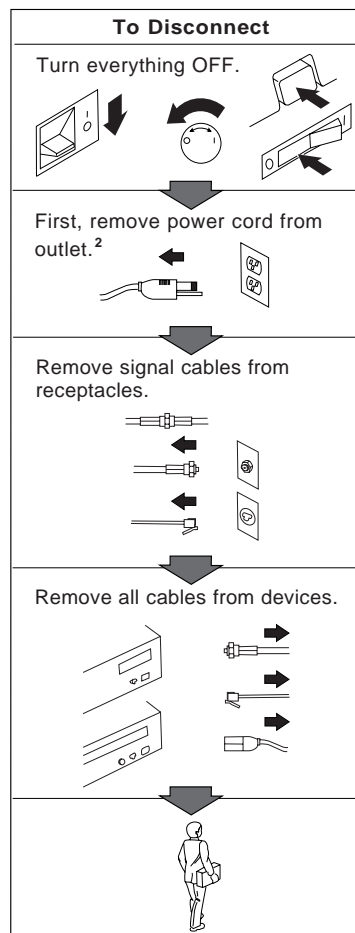


### DANGER:

Electrical current from power, telephone, and communication cables is hazardous. To avoid shock hazard, connect and disconnect cables as shown below when installing, moving or opening the covers of this product or attached devices. The power cord must be used with a properly grounded outlet.



<sup>1</sup> In the U.K., by law, the telephone cable must be connected after the power cord.



<sup>2</sup> In the U.K., by law, the power cord must be disconnected after the telephone line cable.

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## **Lithium Battery Notice**

### **CAUTION:**

**Danger of explosion if battery is incorrectly replaced.**

**When replacing the battery, use only IBM Part Number 33F8354 or an equivalent type battery recommended by the 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.**

### **ATTENTION**

**Danger d'explosion en cas de remplacement incorrect de la batterie.**

**Remplacer uniquement par une batterie IBM de type 33F8354 ou d'un type équivalent recommandé par le fabricant. La batterie contient du lithium et peut exploser en cas de mauvaise utilisation, de mauvaise manipulation ou de mise au rebut inappropriée.**

### ***Ne pas :***

- **Lancer ou plonger dans l'eau**
- **Chauffer à plus de 100°C (212°F)**
- **Réparer ou désassembler**

**Mettre au rebut les batteries usagées conformément aux règlements locaux.**



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## Laser Compliance Statement

Some IBM Personal Computer models are equipped from the factory with a CD-ROM drive. CD-ROM drives are also sold separately as options. The CD-ROM drive is a laser product. The CD-ROM drive is certified in the U.S. to conform to the requirements of the Department of Health and Human Services 21 Code of Federal Regulations (DHHS 21 CFR) Subchapter J for Class 1 laser products. Elsewhere, the drive is certified to conform to the requirements of the International Electrotechnical Commission (IEC) 825 and CENELEC EN 60 825 for Class 1 laser products.

When a CD-ROM drive is installed, note the following.

### **CAUTION:**

**Use of controls or adjustments or performance of procedures other than those specified herein might result in hazardous radiation exposure.**

Opening the CD-ROM drive could result in exposure to hazardous laser radiation. There are no serviceable parts inside the CD-ROM drive. **Do not open.**

Some CD-ROM drives contain an embedded Class 3A or Class 3B laser diode. Note the following.

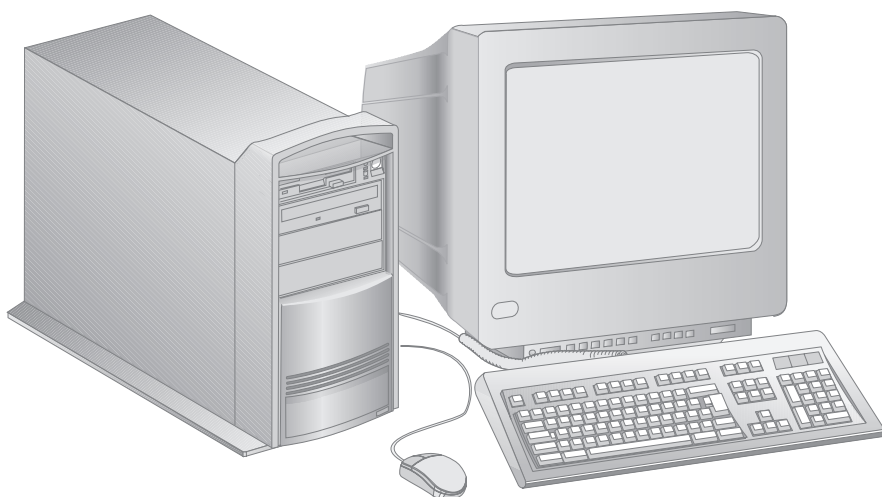
### **DANGER**

<p><b>Laser radiation when open. Do not stare into the beam, do not view directly with optical instruments, and avoid direct exposure to the beam.</b></p>
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## About This Book

Thank you for selecting an IBM IntelliStation Z Pro.



This book provides instructions for installing, removing, and replacing most options. Also, this book contains information to help you decide which options to add to your computer.

**Note:** The illustrations in this publication might be slightly different from your hardware.

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## How This Book Is Organized

This book contains the following chapters and appendixes:

- Chapter 1, “Overview” provides an introduction to the options and features for your computer. Safety precautions and handling techniques are discussed along with the required tools you will need to install and remove options.
- Chapter 2, “Preparing to Install and Remove Options” provides instructions for removing the cover and cables for your computer and for locating the components you want to work with.
- Chapter 3, “Working with Options on the System Board” provides instructions for locating, accessing, and working with options on the system board.
- Chapter 4, “Working with Adapters and Internal Drives” provides instructions for installing and removing adapters and drives.
- Chapter 5, “Working with Security Options” describes features such as the security U-bolt and erasing lost or forgotten passwords. Information on diskette-write protection is also provided.
- Chapter 6, “Completing the Installation” provides instructions for reassembling your computer after you have finished installing options. Information about using the Configuration/Setup Utility program is also provided.
- Appendix A, “Tips for Installing SCSI Devices” provides information about the SCSI adapter, SCSI cables, and SCSI devices. The SCSI adapter is standard in all computer models.
- Appendix B, “Changing the Battery” explains how to change your computer backup battery and the precautions you should take when handling and disposing of the battery.
- Appendix C, “Interrupt and DMA Resources” contains the default interrupt and direct memory access (DMA) resources for your computer.
- Appendix D, “Notices” contains IBM notices and trademark information.

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## Related Information

The following publications and README files, together with this book, contain information about your computer.

- *Setting Up Your IntelliStation Z Pro*  
This publication contains instructions to help you set up your computer.
- *Using Your IntelliStation Z Pro*  
This publication contains the following:
  - Instructions for configuring, operating, and maintaining your computer
  - Information on diagnosing and solving computer problems and how to get help and service
  - Warranty information
- *Understanding Your IntelliStation Z Pro*  
This online publication (provided only with computers that have IBM-preinstalled software) includes general information about using computers and in-depth information about the specific features of your computer. To purchase a printed copy of this publication, refer to the section on "Ordering Publications" in the "Getting Help, Service, and Information" chapter in *Using Your IntelliStation Z Pro*.
- *About Your Software*  
This publication (provided only with computers that have IBM-preinstalled software) contains information about the preinstalled software package.
- IBM Audio Feature *README file*  
This file, on the *Ready-to-Configure CD*, contains instructions for installing device drivers for the *IBM Audio Feature*.
- Ethernet Adapter *README file*  
This file, on the *Ready-to-Configure CD*, contains instructions for installing device drivers for the *Intel EtherExpress Pro/100 Adapter w/ Wake on Lan™*.
- Intergraph Intense 3D Graphics Adapter *README file*  
This file, on the *Ready-to-Configure CD*, contains instructions for installing device drivers for the *Intergraph Intense 3D Graphics Adapter* installed in some models.
- Matrox MGA Millennium Graphics Adapter *README file*  
This file, on the *Ready-to-Configure CD*, contains instructions for installing device drivers for the *Matrox MGA Millennium Graphics Adapter* installed in some models. Also, this file includes technical data and troubleshooting information for related video problems.

- *Adaptec SCSI Documentation*

This documentation includes information on configuring the adapter and instructions for installing and configuring SCSI devices.

- *Your Ready-to-Configure CD*

This publication contains information about the *Ready-to-Configure CD* that comes with your computer. The publication also contains instructions for starting the CD.

The following publications contain more information about your computer. Both publications can be found on the World Wide Web at <http://www.pc.ibm.com/cdt> or can be ordered from IBM. To purchase a printed copy of these publications, refer to the section on "Ordering Publications" in the "Getting Help, Service, and Information" chapter in *Using Your IntelliStation Z Pro*.

- *Hardware Maintenance Manual*

This separately purchased publication contains information for trained service technicians.

- *Technical Information Manual*

This separately purchased publication contains information for individuals who want to know more about the technical aspects of their computer.



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## Chapter 1. Overview

Adding hardware options to your computer is an easy way to increase its capabilities. Instructions for removing, installing, and replacing options and features are included in this book. When adding an option, use these instructions along with the instructions that come with the option. If you have installed options before, you might be able to perform some activities without detailed instructions.

This chapter provides a brief introduction to the options and features that are discussed in this book. Also, important information about required tools, electrical safety, and static-sensitive devices is discussed.

### **Important**

Before you install or remove any option, read the safety procedures and component-handling guidelines in this chapter. These precautions and guidelines will help you work safely.

Refer to *Using Your IntelliStation Z Pro* for general information on the use, operation, and maintenance of your computer. *Using Your IntelliStation Z Pro* also contains information to help you solve problems and get repair service or other technical assistance.

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## Available Options and Features

The following are some of the available options and features that are discussed in this book:

- System board components
  - System memory, called dual in-line memory modules (DIMMs)
  - Microprocessor upgrades
  - Switches for diskette-write protection
  - Jumper for erasing lost or forgotten passwords
  - Battery
- Adapters
  - Industry standard architecture (ISA) adapters
  - Peripheral component interconnect (PCI) adapters
- Cover lock
- Internal drives
- Security U-bolt

The following are some other available options and features for your computer. For more information, refer to the documentation that comes with the optional hardware.

- If your computer has an *Intergraph Intense 3D Graphics Adapter*, other optional features are available to enhance the performance of your adapter. Contact *Intergraph Computer Systems* for more information. Also, dual-screen capability is available by adding a second *Intergraph Intense 3D Graphics Adapter*.
- Adding an infrared transceiver allows wireless communication between your computer and other infrared-capable devices. Information about related software is included on the *Ready-to-Configure CD*. For more information on the transceiver, refer to the documentation that comes with it.
- To help with power management, you can add a modem and have your computer start when a ring is detected by the modem. Using an internal modem, you can use the Configuration/Setup Utility program to enable *Modem Ring Detect*, or using an external modem, you can enable *Serial Port Ring Detect*. For more information, see *Using Your IntelliStation Z Pro*.



For the latest information about available options:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your place of purchase, or your IBM reseller.
- Within Canada, call 1-800-565-3344 or 1-800-465-7999.
- Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

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## **Tools Required**

To install or remove options in your computer, you will need a flat-head screwdriver. Any additional tools needed depend on the specific option and are noted in the instructions that come with the option.

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## Electrical Safety

### CAUTION:

**Electrical current from power, telephone, and communication cables can be hazardous. To avoid any shock hazard, disconnect all power cords and cables as described in the following information.**

For your safety, always do the following *before* removing the cover:

1. Shut down all programs as described in your operating-system documentation.
2. Turn off the computer and any attached devices, such as printers, monitors, and external drives.

**Note:** Computer users in the United Kingdom who have a modem or fax machine attached to their computer must disconnect the telephone line from the computer *before* unplugging any power cords (also known as power cables). When the computer is reassembled, users must reconnect the telephone line *after* plugging in the power cords.

3. Unplug all power cords from electrical outlets.
4. Disconnect all communication cables from external receptacles.
5. Disconnect all cables and power cords from the back of the computer.

**Note:** Do not reconnect any cables or power cords until you reassemble the computer and put the cover back on.

### CAUTION:

**Never remove the cover on the power supply. If you have a problem with the power supply, have your computer serviced.**

---

## Handling Static-Sensitive Devices

Have you ever walked across a carpeted floor, then touched an object and received a small electrical shock? That's static electricity, and although harmless to you, it can seriously damage computer components and options.

### Important

When you add an option, do *not* open the static-protective package containing the option until you are instructed to do so.

When you handle options and other computer components, take these precautions to avoid static electricity damage:

- Limit your movement. Movement can cause static electricity to build up around you.
- Always handle components carefully. Handle adapters and memory-modules by the edges. Never touch any exposed circuitry.
- Prevent others from touching components.
- When you are installing a new option, touch the static-protective package containing the option to a metal expansion-slot cover or other unpainted metal surface on the computer for at least two seconds. This reduces static electricity in the package and your body.
- When possible, remove the option and install it directly in the computer without setting the option down. When this is not possible, place the static-protective package that the option came in on a smooth, level surface and place the option on it.
- Do not place the option on the computer cover or other metal surface.

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## Chapter 2. Preparing to Install and Remove Options

This chapter provides instructions for accessing and locating the options you want to install or remove.

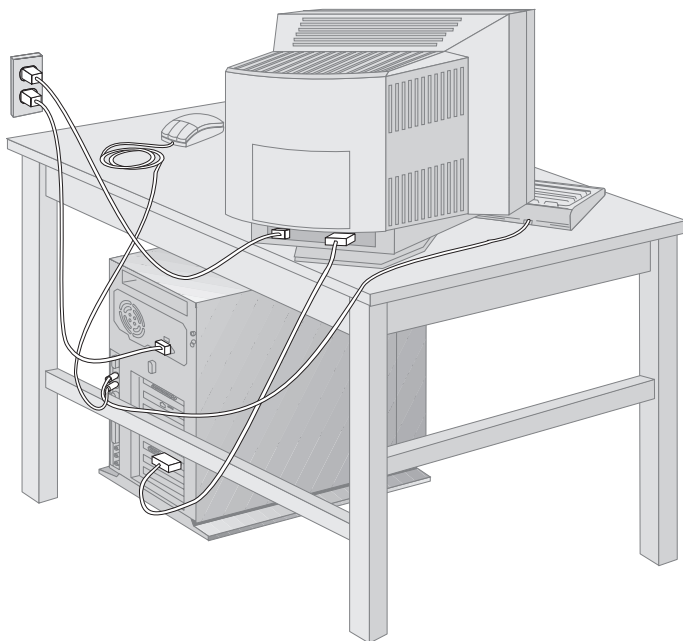
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### Disconnecting Cables and Removing the Cover

#### Before you begin

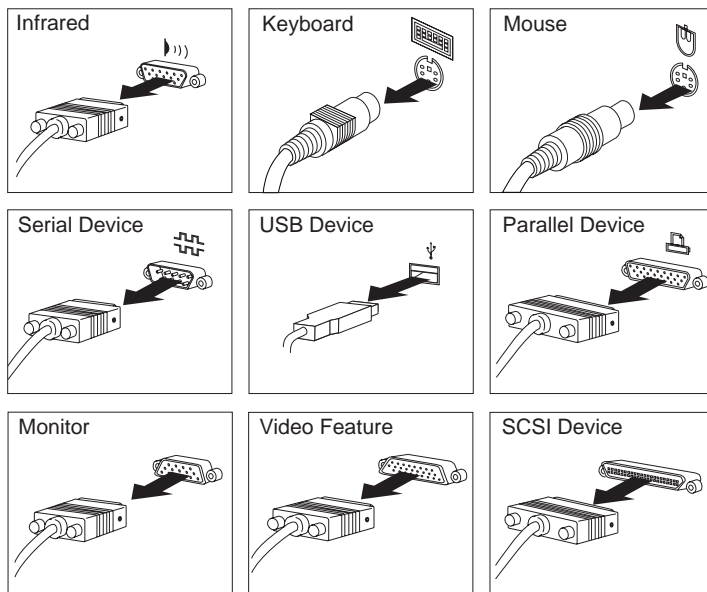
- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Remove any media (diskettes, compact discs, or tapes) from the drives, and then turn off all attached devices and the computer.

- 1** Disconnect all cables attached to the computer; this includes power cords, input/output (I/O) cables, and any other cables connected to the computer. The following illustrations show the rear of the computer and examples of some cables that must be disconnected.



**Notes:**

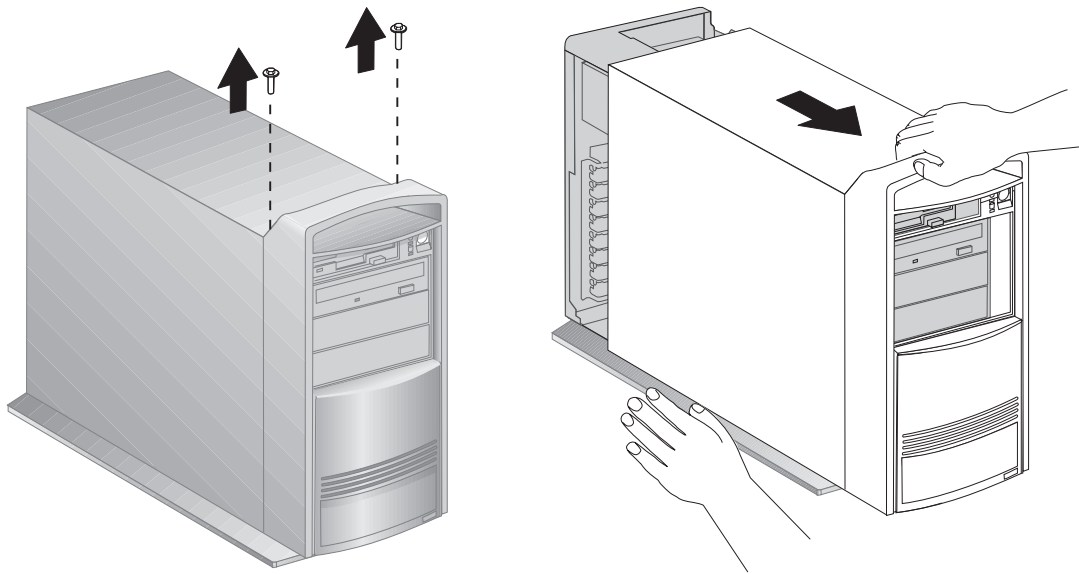
- a. Your computer might differ from the one shown. For more information on the rear connectors, see *Setting Up Your IntelliStation Z Pro*.
- b. For more information on ports, including infrared and universal serial bus (USB), refer to *Understanding Your IntelliStation Z Pro*<sup>1</sup>.



- 2** If necessary, unlock the computer cover.

<sup>1</sup> For more information on *Understanding Your IntelliStation Z Pro*, see “Related Information” on page x.

**3** Remove the two screws at the top near the handle.



**4** Slide the cover forward and completely remove it from the computer.

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## Locating Components

The following information helps you locate components and serves as a reference when you need to install options or connect input/output devices.

### Internal View

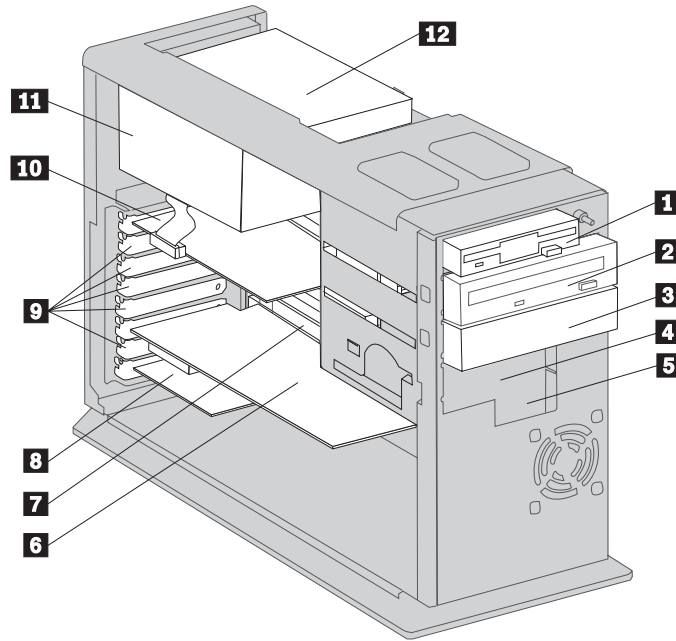
Your computer comes with the following adapters and devices preinstalled:

- A SCSI adapter
- An Ethernet LAN adapter
- A graphics adapter
- A diskette drive in drive bay 1
- A CD-ROM drive in drive bay 2
- A hard disk drive in drive bay 6

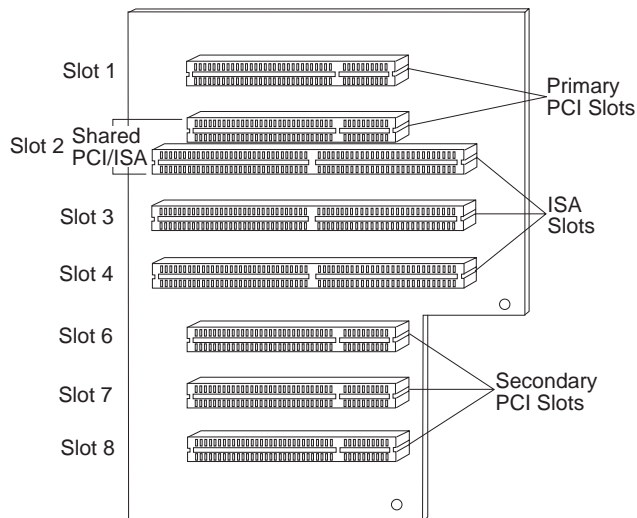
For more information on drive bays and the riser card, see “Adapters and the Riser Card” on page 33 and “Internal Drives” on page 40.

The following illustrations show the internal view of your computer, as seen from the front, and the slots on the riser card. For information on removing the cover, see “Disconnecting Cables and Removing the Cover” on page 6.

- 1** Diskette drive (bay 1)
- 2** CD-ROM drive (bay 2)
- 3** Drive bay 3
- 4** Drive bay 4
- 5** Drive bay 5
- 6** Graphics adapter
- 7** Riser card
- 8** Ethernet adapter
- 9** Option slots
- 10** SCSI adapter
- 11** Power supply
- 12** Hard disk (bay 6)



**Note:** Depending on your model, the graphics adapter is installed in either slot 2 or slot 6.

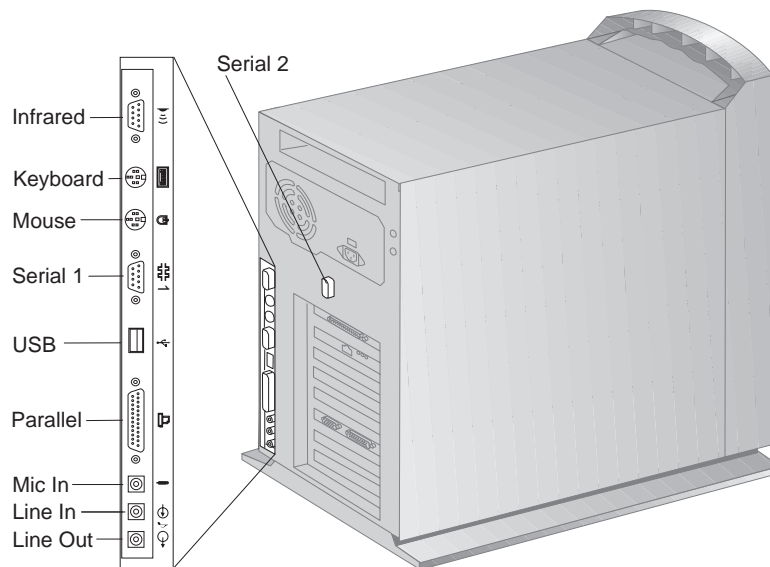




## Input/Output Connectors

Input/output (I/O) connectors provide ports for transferring information into and out of your computer. You can connect a variety of I/O devices to your computer, including a monitor, keyboard, mouse, and printer. For more information on the ports and their specific technologies, see *Understanding Your IntelliStation Z Pro*<sup>2</sup>.

At the rear of your computer is a panel that provides access to I/O connectors. Adapters installed in expansion slots might also provide I/O connectors. The following illustrations show the I/O connectors that come with your computer.



<sup>2</sup> For more information on *Understanding Your IntelliStation Z Pro*, see “Related Information” on page x.

---

## Chapter 3. Working with Options on the System Board

This chapter provides information about system board options discussed in this book.

The information in this chapter helps you identify parts on the system board. Also, instructions are provided for accessing the system board. To install some options, you must have access to the system board. For example, to install a second microprocessor you must remove drives that limit access to the microprocessor socket.

### Before you begin

Before you install, remove, or replace any option, always do the following:

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Read the instructions that come with the option you want to install or replace.
- Turn off the computer and all other connected devices.
- Disconnect all external cables and power cords.

This chapter also provides instructions for installing, removing, and replacing system board components, specifically system memory and the microprocessor. For information on other system board components, see the appropriate section.

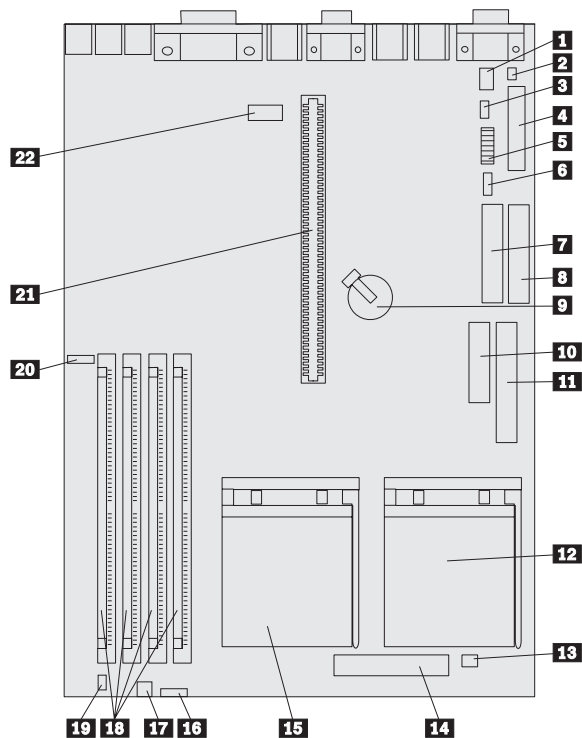
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## Identifying Parts on the System Board

The system board, also called the *planar* or *motherboard*, is the main circuit board in your computer. It provides basic computer functions and supports a variety of devices that are IBM-installed or that you can install later.

If you plan to install, remove, or replace hardware in your computer, you will need to know the layout of the system board. The following illustration shows the layout of the system board in your computer. The numbered pointers show the components that are discussed in this book.

- 1** 5 V auxiliary connector
- 2** Power switch connector
- 3** CMOS clear (password) jumper
- 4** Diskette drive connector
- 5** Switches for microprocessor speeds and diskette write protection
- 6** SCSI LED connector
- 7** Primary IDE connector
- 8** Secondary IDE connector
- 9** Battery
- 10** 3.3 V power connector
- 11** Main power connector
- 12** Second microprocessor connector
- 13** Fan connector for second microprocessor
- 14** Voltage regulator module (VRM) socket for second microprocessor
- 15** Primary microprocessor
- 16** Power LED connector
- 17** Front panel fan connector
- 18** System memory connectors
- 19** Internal speaker connector
- 20** CD-ROM audio connector
- 21** Riser card connector
- 22** Serial port 2 connector



**Note:** An illustration of the system board and additional information is provided on a label found inside, on the bottom of the computer.

---

## Accessing the System Board

**Note:** For information on removing the computer cover, see “Disconnecting Cables and Removing the Cover” on page 6.

To access the system board, it helps to place the computer on its side on a table as shown in the following illustrations. You might need to remove adapters, the riser card, or drives in bays 4 and 5. Also, you might need to remove cables that are attached to the system board. When disconnecting cables, it is important to note where they attach, so you can reattach them later.

The following examples describe when you might need to remove hardware:

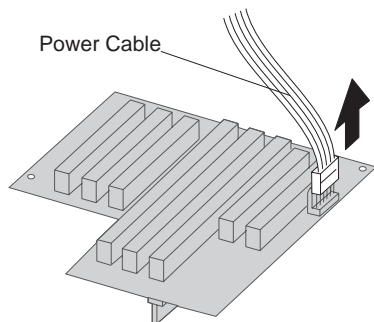
- When working with system memory modules (DIMMs), you might need to remove adapters from the riser card. For instructions on removing adapters, see “Removing Adapters” on page 38. Instructions for installing and removing memory modules are in this chapter.
- When replacing or upgrading the primary microprocessor or adding a second microprocessor, you might need to remove the drives in bays 4 and 5 as well as some of the adapters. For instructions, see “Accessing Drive Bays” on page 44 and “Removing Adapters” on page 38. Also, to access the switches for updating the settings for microprocessor speed, you will need to remove adapters, the riser card, and disconnect cables attached to the system board. Instructions for the microprocessor upgrade are in this chapter.
- When replacing the system battery, you must remove all adapters, the riser card, and any cables connected to the system board that impede your access. For instructions, see “Removing the Riser Card” on page 15 and “Removing Adapters” on page 38. Instructions for replacing the battery are in Appendix B, “Changing the Battery” on page 74.
- When changing jumper and switch settings, you will need to remove adapters, the riser card, and any cables connected to the system board that impede your access. For instructions, see “Removing the Riser Card” on page 15. Instructions for the jumper and switches are in “Setting the Diskette Write-Protect Switch” on page 60 and “Erasing Lost or Forgotten Passwords” on page 57.

## Removing the Riser Card

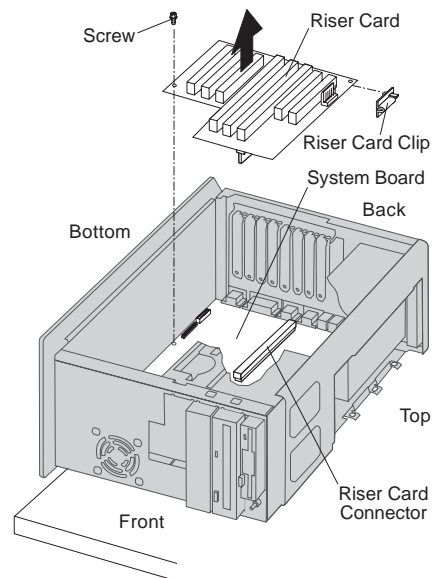
### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).
- See “Accessing the System Board” on page 14.

- 1** If any of your adapter cards have cable connections to the system board or to one of your drives, disconnect the cables. Take note of all cable connector locations so that you can reconnect them correctly.
- 2** Remove any adapters that are connected to the riser card. For instructions, see “Removing Adapters” on page 38.
- 3** Disconnect the power cable that is attached to the riser card; it is important to remember where this cable connects so you can reattach it later.



Take note of the interposer cards between the riser card and system board.



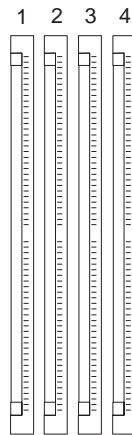
- 4** Remove the riser card screw and the riser card clip.
- 5** Lift the riser card straight up from the connector on the system board.

---

## Working with System Memory

The maximum amount of system memory your computer supports is 512 MB. You can add memory to your computer to increase system performance. Your computer has four connectors for installing system-memory modules.

**Note:** To locate the memory connectors inside your computer, see “Identifying Parts on the System Board” on page 13.



The memory modules your computer uses are *dual inline memory modules (DIMMs)*. The IBM-installed DIMMs that come with your computer are extended data output (EDO) error correcting code (ECC) modules. You can add extra memory or replace existing memory.

When installing or replacing DIMMs, the following rules apply:

- DIMMs have a maximum height of 3.05 cm (1.2 in.).
- Use only 3.3 V unbuffered DIMMs.
- You can mix EDO NP modules and EDO ECC modules; they will configure as nonparity/ECC.
- Install only EDO ECC modules to enable ECC.
- DIMMs must have a 60 nanosecond (ns), or faster, access speed.

## Memory Configuration

When you are adding or removing memory, any sequence of DIMM sizes is allowed. A basic rule to follow is to fill each system memory connector sequentially, starting at *Mem 1*.

The following table shows suggested memory configurations for your computer; this table and additional information can be found on a label located inside at the bottom of your computer. Again, alternate configurations are possible.

**Note:** Values in the following table are represented in megabytes (MB).

Total Memory	Mem 1	Mem 2	Mem 3	Mem 4
32	32	0	0	0
32	16	16	0	0
48	32	16	0	0
48	16	16	16	0
64	64	0	0	0
64	32	32	0	0
64	32	16	16	0
96	32	32	32	0
128	128	0	0	0
128	64	64	0	0
256	128	128	0	0
256	128	64	64	0
512	128	128	128	128

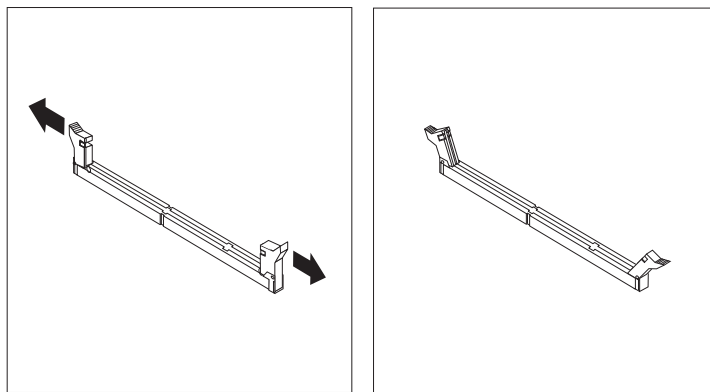
## Installing a DIMM

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Read the instructions that come with the new system memory.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).
- Read “Accessing the System Board” on page 14.

**Note:** For information on memory configuration, see Table 1 on page 17.

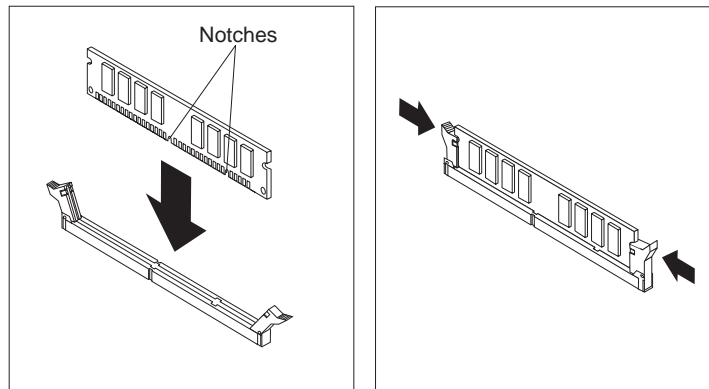
- 1** Be sure the retaining clips are in the open position, as shown in the right-hand illustration below. If the retaining clips are perpendicular with the connector, push outward on them until they click open.



- 2** Touch the static-protective package containing the DIMM to any *unpainted* metal surface in the computer, and then remove the DIMM.
- 3** Position the DIMM above the connector so that the two notches on the bottom edge of the DIMM align properly with the connector.



- 4** Firmly push the DIMM straight down into the connector until the retaining clips pop closed and snugly fit around both ends of the DIMM.



- 5** To install another DIMM, repeat steps 1—4.
- 6** Go to the device-record form in *Using Your IntelliStation Z Pro* and record the appropriate information.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

## Removing a DIMM

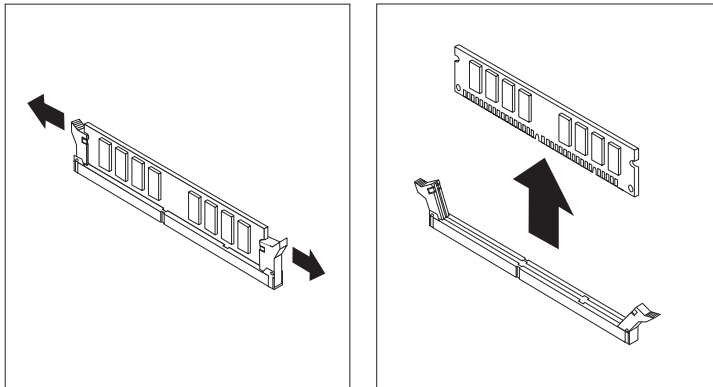
### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).
- Read “Accessing the System Board” on page 14.

**1** At both ends of the DIMM connector, push outward on the retaining clips until the DIMM is loosened.

**Note:** Be careful not to push too hard on the retaining clips because the DIMM may abruptly eject from the connector.

**2** Lift the DIMM out of the connector.



**3** Store the DIMM in a static-protective package.

### What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## Upgrading the Microprocessor

Your computer comes with an Intel Pentium Pro microprocessor installed in the primary connector. Future upgrades might be available for the primary microprocessor. For the latest information on microprocessor upgrades available for your computer, contact your place of purchase or your IBM reseller. If you do upgrade the primary microprocessor, use the instructions that come with the upgrade along with the instructions in this publication, “Replacing a Microprocessor” on page 22.

An important feature of your computer is support for dual processing. Dual processing allows you to add a second microprocessor to the system board. For those operating systems and applications that exploit it, dual processing provides a significant performance enhancement over single processing. Located on the system board, the connector for the second microprocessor is directly beside the primary microprocessor. See “Identifying Parts on the System Board” on page 13 for locating the microprocessor connectors.

**Note:** Only certain operating systems support dual processing. For a list of these operating systems, see *Using Your IntelliStation Z Pro*. For more information on dual processing, see *Understanding Your IntelliStation Z Pro*<sup>3</sup>.

A dual-processor upgrade kit is an available option from IBM. This kit includes a second Pentium Pro microprocessor with a fan sink and a voltage regulator module (VRM) that plugs directly into the system board. The VRM provides the necessary voltage for the second microprocessor. When adding a second microprocessor, refer to the instructions in this chapter. (See “Adding a Second Microprocessor” on page 26.) **Do not use** the instructions that come with the upgrade kit.

### Important

The speed of the second microprocessor must be equal to or higher than the speed of the primary microprocessor. If you add a second microprocessor with a higher speed, it will run at the lower speed of the primary microprocessor.

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<sup>3</sup> For more information on *Understanding Your IntelliStation Z Pro*, see “Related Information” on page x.

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## Replacing a Microprocessor

### Before you begin

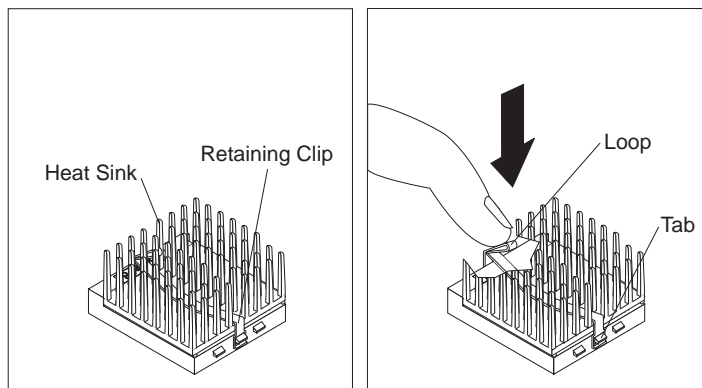
- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Use the instructions that come with the upgrade along with the instructions in this publication.
- Turn off the computer.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).
- Read “Accessing the System Board” on page 14.

### CAUTION:

When removing the heat sink and the microprocessor, be careful not to scrape any system board component. Also, the retaining clip is under tension and may disengage suddenly if it is not held while it is being removed.

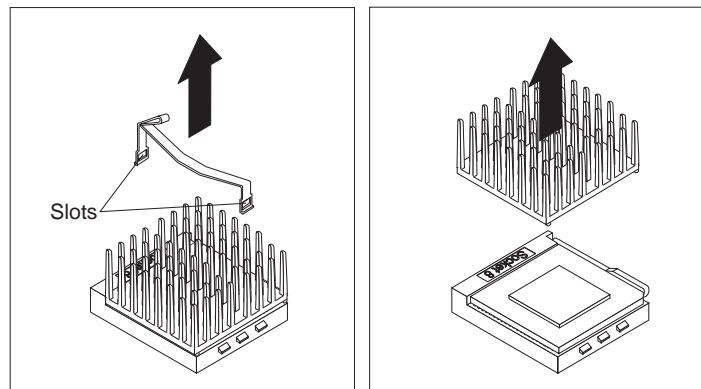
- 1 The slots on the ends of the retaining clip hook over the tabs found on the microprocessor connector. At the top of the clip is a "loop" to help with removal.

To remove the retaining clip, simultaneously press down on the loop and unhook the nearest tab from the slot, then unhook the tab on the other side.

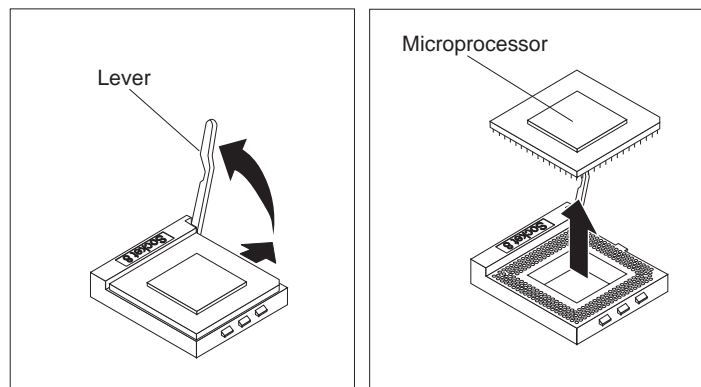


**Note:** A thermal grease is used to seal the heat sink to the microprocessor. If the heat sink is permanently cemented to the microprocessor, you can remove both the heat sink and the microprocessor after you lift the lever in step 3. Also, be careful not to get the grease on your skin. If the grease touches your skin, wash the area with soap and water.

- 2** Remove the retaining clip and the heat sink.



- 3** Release the lever on the side of the microprocessor connector and lift it all the way up. This releases the microprocessor. Lift the microprocessor out of the socket.

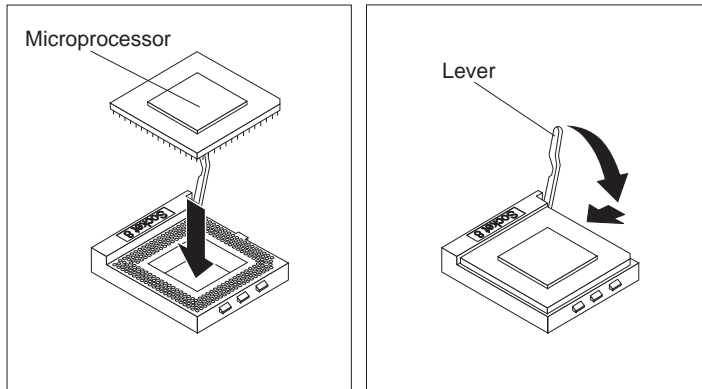


- 4** Store the old microprocessor in a static-protective package.
- 5** Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface in the computer, and then remove the new microprocessor.

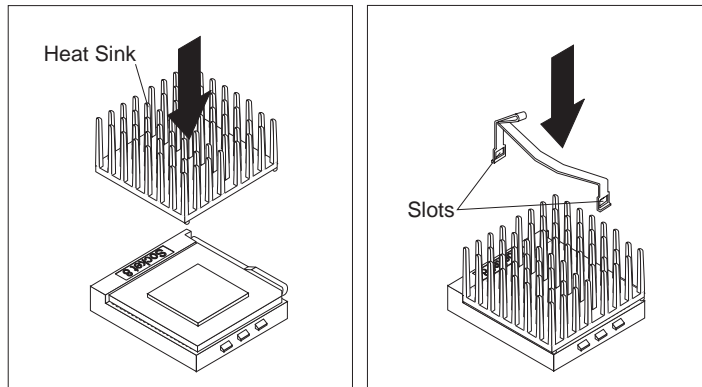
**6** Align the pins of the new microprocessor with the socket and insert the microprocessor until it is properly seated.

**Note:** Be careful when inserting the microprocessor into the socket, because the pins of the microprocessor connect only one way.

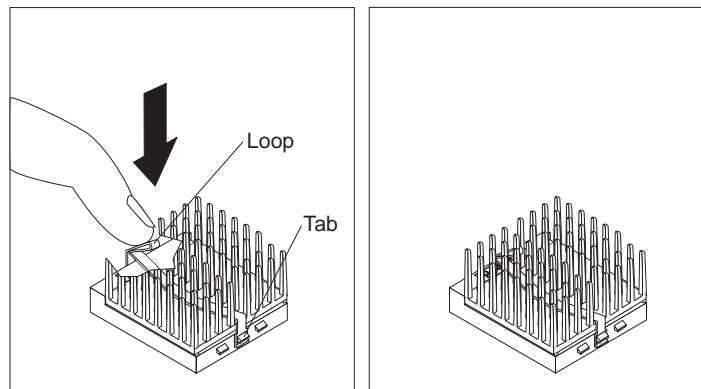
Lower the lever to lock the microprocessor into position.



**7** Replace the heat sink and clip.



**8** Press down on the loop to rehook the clip to the tabs on the connector.



**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## Adding a Second Microprocessor

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- **Do not use** the instructions that come with the new microprocessor. Use the following instructions.
- Turn off the computer.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).
- Read “Accessing the System Board” on page 14.

When you install a second microprocessor, your computer operates as a symmetric multiprocessing (SMP) computer. With SMP, certain operating systems and application programs can distribute the processing load between both microprocessors. This enhances performance for applications such as database transactions, graphics, or computer-aided-design (CAD) programs, as well as modeling or simulation programs.

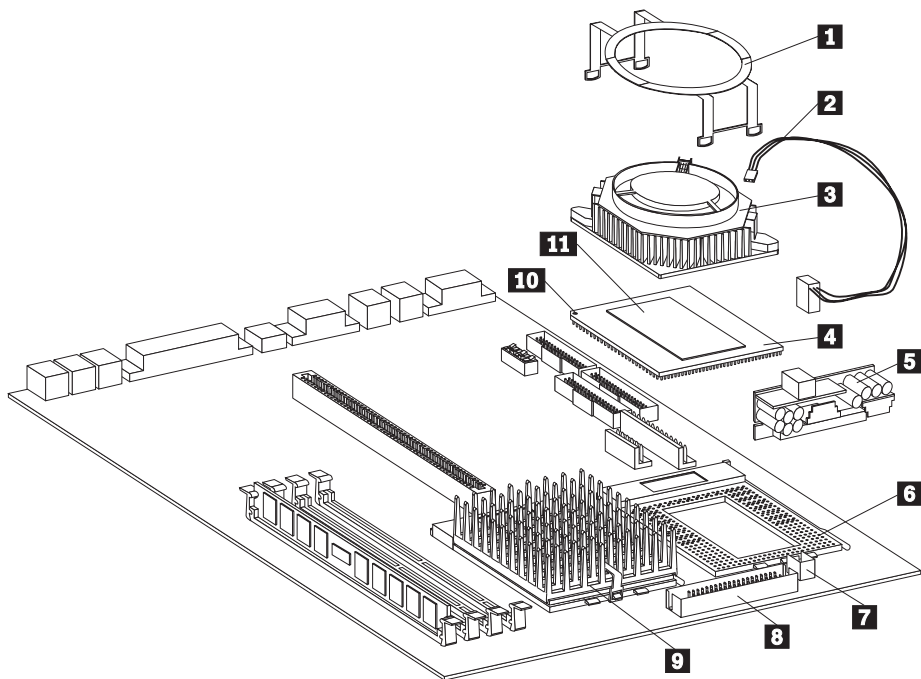
**Note:** The speed (MHz) of a second microprocessor must be equal to or higher than the speed of the primary microprocessor. If you add a second microprocessor with a higher speed, it will run at the lower speed of the primary microprocessor.

### Attention:

- When adding a second microprocessor, **Do not use** the instructions that come with the microprocessor. Refer to the instructions in this chapter.
- The voltage regulator module (VRM) plugs into a connector on the system board. Because each microprocessor has specific power and voltage requirements, be sure to use the VRM that comes with the microprocessor kit.
- The pins on the microprocessor are delicate and susceptible to damage from static electricity and physical mishandling. Do not touch or bend the exposed pins. Protect the pins while handling the microprocessor and during installation.
- The fan-sink retaining clip is under tension. Do not let the clip scrape against the system board, connectors, or other components when installing or removing the microprocessor assembly.



You will work with the following components while installing the microprocessor. Take a few moments to become familiar with the parts, locations, and terminology before you start the installation procedure.



- 1** Fan-sink retaining clip
- 2** Fan power cable
- 3** Fan sink
- 4** Microprocessor
- 5** Voltage regulator module (VRM)
- 6** Secondary microprocessor connector (empty) with lever in locked position
- 7** Fan power-cable connector
- 8** VRM connector
- 9** Primary microprocessor connector with lever in locked position
- 10** Pin 1 location
- 11** Heat spreader

To install the second microprocessor:

- 1** Locate the secondary microprocessor connector on the system board; then lift the lever (located on the side of the connector) until it is fully opened, in a vertical position.
- 2** Attach the fan sink to the microprocessor.
  - a. Touch the static-protective package containing the new microprocessor to any *unpainted* metal surface on the computer; then remove the microprocessor from the package. Place it pin-side down on the static-protective foam on which it was shipped.



- b. Remove the fan sink assembly from its package.
  - c. Look at the bottom of the fan sink:
    - If a blue peel-off protective film is attached, remove the film. Refer to the illustration on page 27 for the correct orientation of the microprocessor and fan sink. Align the edges of the microprocessor and fan sink; then press firmly. Continue with step 4 on page 29.
    - If a blue protective film is not attached, continue with the following step.
  - d. Open the thermal grease packet, and empty the contents evenly across the heat spreader (the raised, gold area on the top of the microprocessor).
- Note:** The thermal grease is used to seal the fan sink to the microprocessor. If thermal grease touches your skin, wash the skin area with soap and water.

- e. Refer to the illustration on page 27 for the correct orientation of the microprocessor and fan sink.
- f. Position the fan sink above the microprocessor; then slide the fan sink back and forth across the microprocessor several times to ensure that the thermal grease fully covers the heat spreader.
- g. Align the edges of the microprocessor and fan sink; then press firmly.

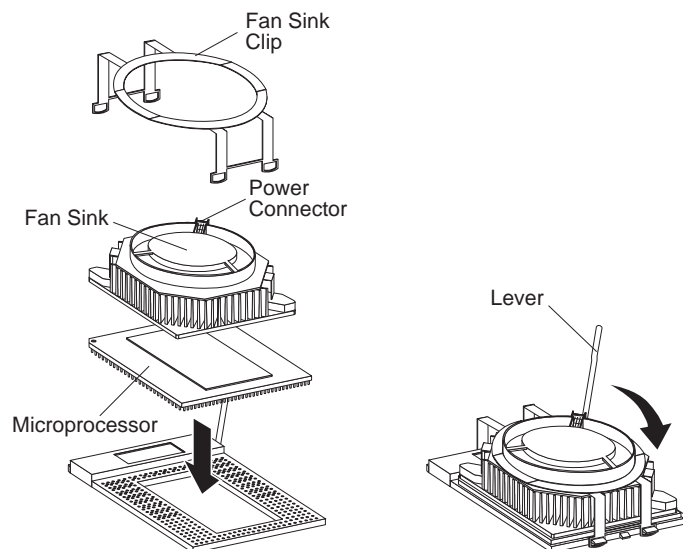
**3** Slide the fan-sink clip under the fan's power connector; then center the clip over the fan sink.

**Note:** When you move the microprocessor/fan sink assembly to the connector on the system board, hold the assembly by the sides.

**4** Insert and lock the microprocessor/fan sink assembly into the secondary microprocessor connector on the system board.

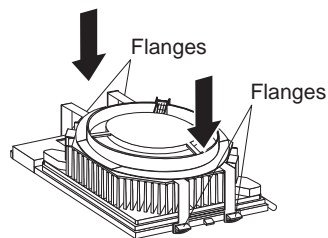
- a. Center the microprocessor over the connector on the system board. Note the pattern of the pins on the microprocessor; align the pins with the corresponding holes on the connector.
- b. Carefully insert the microprocessor into the connector, ensuring that the pins on the microprocessor align with the holes in the connector.

**Attention:** Do not force the pins into the connector. If you feel any resistance, remove the microprocessor and check the orientation and alignment.



- c. Press the microprocessor firmly into the connector to ensure proper seating; then move the lever downward until the microprocessor is completely locked into the connector. Make sure the lever is in the fully closed position.

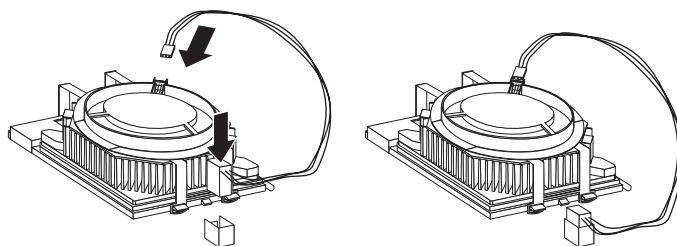
- 5** Connect the fan-sink retaining clip to the flanges on the microprocessor connector by carefully pressing down on the fan-sink clip until the clip snaps over all four flanges on the microprocessor connector.



- 6** Connect the fan power cable to the connector on the fan sink and the system board.

- a. Attach the smaller connector on the power cable to the power connector on the fan sink.

**Note:** If you have difficulty connecting a cable, turn the cable connector over and try again; cable connectors are keyed and connect only one way.

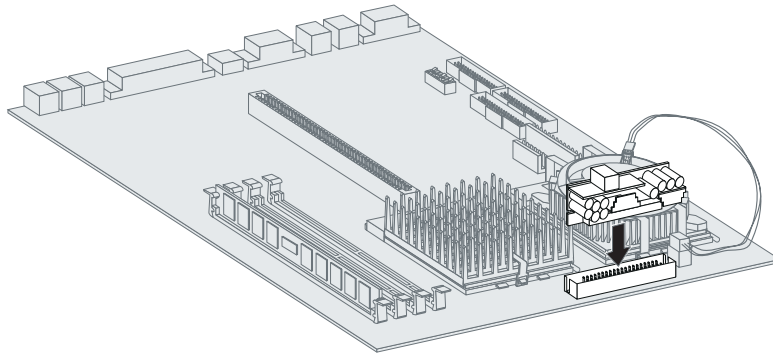


- b. Connect the other end of the power cable to the secondary microprocessor fan connector on the system board.

- 7** Install the voltage regulator module (VRM) into the VRM connector on the system board.

- a. Position the VRM above the VRM connector (shown in the illustration).

- b. Press the VRM firmly into the connector.



**8** Go to *Using Your IntelliStation Z Pro* and update the *Microprocessor 2* information in the Device Records section of Appendix A.

**9** Because you installed a new microprocessor in your computer, you might need to make changes to your operating system.

- If your operating system does not support SMP, you may want to install one of the SMP operating systems supported on your computer.
- If your operating system does support SMP, refer to your operating system documentation. You might need to make changes so that the operating system recognizes the new microprocessor.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## Chapter 4. Working with Adapters and Internal Drives

This chapter provides information and instructions for installing and removing adapters and internal drives.

When you are installing or removing adapters, it is important to resolve any resource conflicts that might arise. For example, if you install an ISA legacy adapter, you might need to manually configure the adapter by setting a variety of switches on the adapter and by using the Configuration/Setup Utility program.

Many adapters now use *Plug and Play* technology which enables the computer to automatically configure the adapter, provided that the required resources are available. Refer to the instructions that come with your adapter to determine if it is Plug and Play. For more information, see “Adapter Configuration” on page 34.

When you are installing an internal drive, it is important to note what kind of drive you can install in each bay and the height restrictions imposed by each drive bay. Also, it is important to correctly connect the internal drive cables to the installed drive. For more information, see “Internal Drives” on page 40.

### Before you begin

Before you install, remove, or replace any option, you should always do the following:

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Read the instructions that come with the option you want to install or replace.
- Turn off the computer and all other connected devices.
- Disconnect all external cables and power cords.

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## Adapters and the Riser Card

Your computer uses a riser card for expansion. The riser card contains expansion slots that connect adapters to the industry standard architecture (ISA) and peripheral component interconnect (PCI) buses.

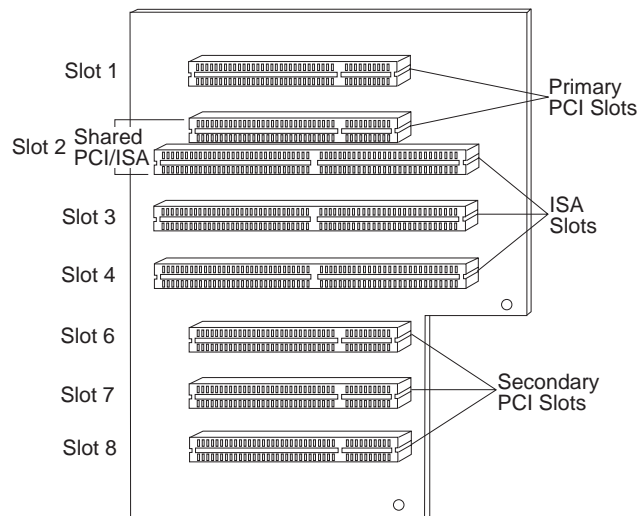
You can add a variety of adapters to the expansion slots on the riser card. Your computer comes with an IBM-installed graphics adapter, a SCSI adapter, and an Ethernet adapter in three of the available expansion slots. For information on locating the riser card, see “Locating Components” on page 9. To install or remove the riser card, see “Removing the Riser Card” on page 15.

The riser card installed in your computer has four PCI slots, two ISA slots, and one shared PCI/ISA slot. You can install only one adapter in the shared PCI/ISA slot.

### Important Information

Some older adapters do not function correctly when connected to the primary PCI slots (the top two). If you experience a problem when adding a PCI adapter to one of these slots, try moving it to a secondary slot (the three on the bottom). If the PCI slots on the bottom are being used by other PCI adapters, move one of them to a primary slot.

The following illustrations show the expansion slots on the riser cards.



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## Adapter Configuration

Along with the documentation that comes with your adapter, use the following information to help with adapter configuration.

### Plug and Play Adapters

*Plug and Play* is a configuration method that makes expanding your computer easier. Support for Plug and Play is built into the system board of your computer.

If an adapter is Plug and Play, then there are no switches or jumpers that must be set on the adapter. A Plug and Play adapter comes with configuration specifications set in memory to provide installation information to the computer during startup. When you install or remove Plug and Play adapters, this information is interpreted by the *basic input/output system (BIOS)*, which supports Plug and Play technology. If the required resources are available, then the BIOS software automatically configures the adapter around the resources already in use by other devices.

Adapters designed for PCI slots are Plug and Play devices; many ISA adapters are not Plug and Play devices. (These non-PNP ISA adapters are referred to as legacy adapters.)

**Note:** See the *Using Your IntelliStation Z Pro* for information on error messages resulting from resource conflicts.



## Legacy Adapters

Adapters that are not Plug and Play are known as *legacy* adapters. If you install a legacy adapter, you must manually configure it by setting switches or jumpers on the adapter and by reserving its resources using the Configuration/Setup Utility program.

In the Configuration/Setup Utility program, the ISA Legacy Resources screen shows the computer resources that are typically required by adapters:

- Memory resources
- I/O port resources
- DMA resources
- Interrupt resources

From the appropriate screens, you can select available resources for the adapter you are installing. Resources not being used by ISA legacy adapters are listed as **[Available]**. You must set the resources used by the newly installed ISA legacy adapter to **[Not available]**. This notifies the plug and play software that these resources are in use.

Just as you change system resources for installed adapters, you must also change resources when you remove an ISA legacy adapter. If you remove a legacy adapter, change the resources it formerly used to **[Available]**. This allows the Plug and Play software to automatically use these resources for future configurations, or you can use these resources for future manual configurations.

**Note:** Refer to the documentation that comes with the adapter for information on required system resources.

For information on configuring ISA legacy adapters, see “Configuring an ISA Legacy Adapter” on page 69 or refer to *Using Your IntelliStation Z Pro*. For more information on error messages from resource conflicts, see *Using Your IntelliStation Z Pro*.

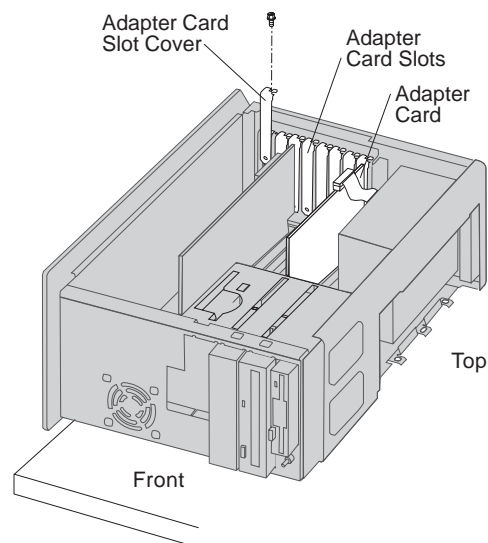
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## Installing Adapters

### Before you begin

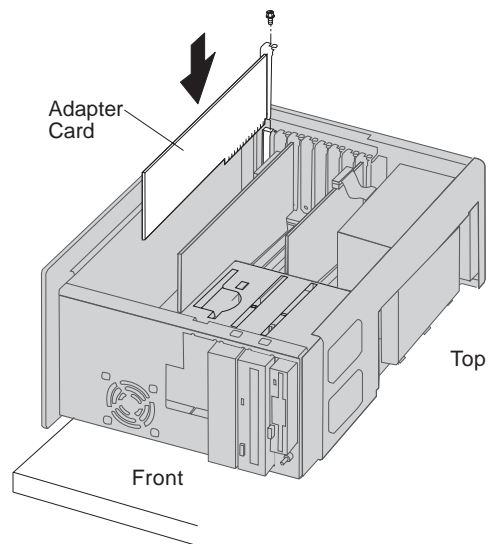
- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Read the instructions that come with the new adapter.
- Turn off the computer and all other connected devices.
- Disconnect all cables attached to the computer and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).

- 1** Review the instructions that come with the adapter to determine if it must be installed in an ISA or PCI slot.
- 2** Remove the screw and cover for the appropriate expansion slot.



- 3** Touch the static-protective package containing the adapter to any *unpainted* metal surface in the computer, then remove the adapter from the package.

- 4 Install the adapter into the appropriate slot on the riser card. The components of a PCI adapter face toward the bottom of the computer and the components of an ISA adapter face toward the top of the computer. If a component in the computer or on the adapter interferes with the installation, use another slot.



- 5 Go to the device-record form in *Using Your IntelliStation Z Pro*, and write the adapter name next to the slot into which you installed it.

**Note:** Adding an adapter uses more system resources. If you add an ISA legacy adapter, you must use the Configuration/Setup Utility program to set some previously [Available] resources to [Not Available]. For more information, see “Legacy Adapters” on page 35.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

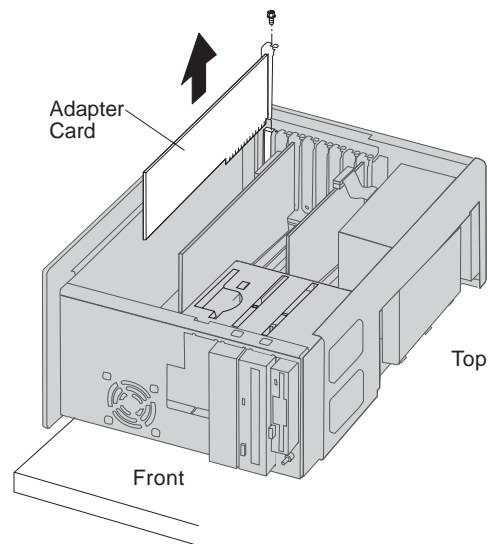
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## Removing Adapters

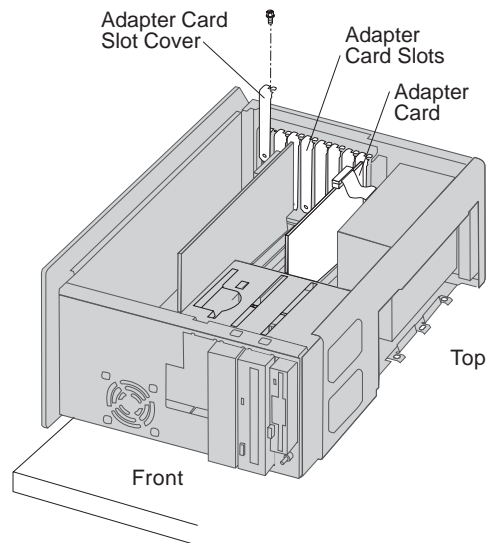
### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all external cables and power cords, and then remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).

- 1** Locate the adapter and remove the screw.
- 2** Remove the adapter and insert it into a static-protective package. The following illustrations show an adapter being removed from a PCI slot.



- 3** If you are not installing another adapter in this slot, install an expansion-slot cover. The following illustrations show the expansion-slot cover being installed.



- 4** Go to the device-record form in *Using Your IntelliStation Z Pro* and delete the name of the adapter you removed.

**Note:** Removing an adapter frees up system resources. If you remove an ISA legacy adapter, you must use the Configuration/Setup Utility program to set the previously used resources to **[Available]**. For more information, see “Legacy Adapters” on page 35.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## Internal Drives

Internal drives are devices that your computer uses to read and store data. You can add drives to your computer to increase storage capacity and to enable your computer to read other types of media. Some of the different drives available for your computer are:

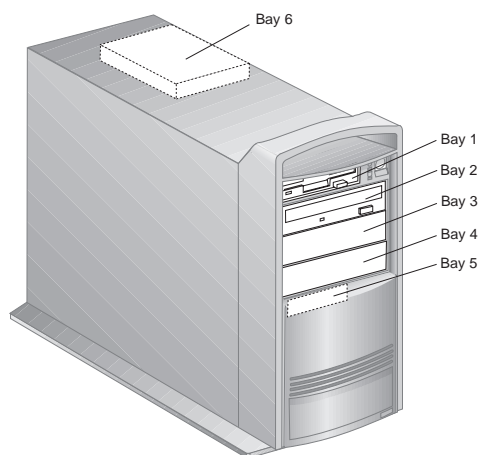
- Diskette drives
- Hard disk drives
- Tape drives
- CD-ROM drives

Internal drives are installed in *bays* at the front or top of your computer. Within this book, the bays are referred to as bay 1, bay 2, and so on.

Your computer comes with the following IBM-installed drives:

- A 3.5-inch diskette drive in bay 1.
- A *16X Max* CD-ROM drive in bay 2.
- A 3.5-inch SCSI hard disk drive in bay 6.

The following illustration shows the location of the drive bays in your computer.



## Drive Specifications

The following table describes the drives you can install in each bay and their height requirements.

Bay	Drives	Max. Height mm (in.)
1	3.5-inch diskette, hard disk, or tape drive	25.4 (1.0)
2	CD-ROM drive 3.5-inch or 5.25-inch diskette drive 3.5-inch or 5.25-inch Tape backup drive 3.5-inch or 5.25-inch Hard disk drive	41.3 (1.6)
3	CD-ROM drive 3.5-inch or 5.25-inch diskette drive 3.5-inch or 5.25-inch Tape backup drive 3.5-inch or 5.25-inch Hard disk drive	41.3 (1.6)
4	3.5-inch Hard disk drive 3.5-inch diskette drive 3.5-inch Tape backup drive	41.3 (1.6)
5	3.5-inch Hard disk drive (N/A if 2nd processor is installed)	25.4 (1.0)
6	3.5-inch Hard disk drive	25.4 (1.0)

**Notes:**

- Drives that are greater than 41.3 mm (1.6 in.) high cannot be used.
- Drives that require removable media (diskettes, tapes, or CDs) must be installed in the accessible bays: bays 1, 2, 3, or 4.
- To properly mount a 3.5-inch drive into bay 2 or 3, you must use a 3.5-inch conversion kit for a 5.25-inch bay. For more information, see your place of purchase or IBM reseller.

## Power and Signal Cables

Your computer uses cables to connect integrated drive electronics (IDE) and SCSI drives to the power supply and system board. The following cables are provided:

- Four-wire *power cables* connect most 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 riser card and system board.
- Flat *signal cables* for connecting IDE and diskette drives to the system board; signal cables are sometimes called *ribbon cables*. There are two sizes of ribbon signal cables that come with your computer:
  - The wider signal cable has three connectors. One of these connectors is attached to the CD-ROM drive, one is a spare, and the third attaches to the primary IDE connector on the system board.
  - The narrower signal cable has two connectors for attaching the diskette drive to the diskette-drive connector on the system board.
- A flat *signal cable* for connecting SCSI devices to the SCSI adapter; this signal cable is also sometimes called a *ribbon cable*. For more information on the SCSI cable, see “SCSI Cable” on page 43.

**Note:** To locate connectors on the system board, see “Identifying Parts on the System Board” on page 13.

The following are some important points to remember when connecting power and signal cables to internal drives:

- The diskette drive, hard disk drive, and CD-ROM drive 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 a drive is installed, ensure that the drive connector at the end of the signal cable is always connected to a drive; also, ensure that the drive connector at the other end is connected to the system board. This reduces electronic noise from the computer.
- If two IDE devices are used on a single cable, one must be designated as the primary or master device and the other a secondary or subordinate device; otherwise, some of the IDE devices might not be recognized by the system. The primary or secondary designation is determined by switch or jumper settings on each IDE device.



- To optimize performance when installing more than two IDE hard disk drives, be sure to attach IDE hard disk drives with faster data transfer speeds (Mode 1 or higher) to the primary hard disk drive signal cable (hard disk drives 0 and 1).
- To install more than two IDE hard disk drives, you must purchase an additional signal cable. The cable must meet the following specifications:
  - Maximum length: 0.46 meters (18 inches)
  - Wire size: 28 AWG
  - Cable capacitive loading: 200 pF maximum
- If you want to install more than one diskette drive, you must purchase a four-wire, Y-cable that provides two power connectors.
- To attach an external drive, you must install an appropriate adapter in the computer.

## SCSI Cable

Your computer is equipped with a SCSI adapter and a ribbon cable that is connected to the internal SCSI devices. This cable provides five identical connectors for attaching the SCSI adapter and internal SCSI devices.

For more information on connecting SCSI devices, see Appendix A, “Tips for Installing SCSI Devices” on page 72 and the *Adaptec SCSI Documentation* provided with your computer.

For help in selecting drives, cables, and other options for your computer, do one of the following:

- Within the United States, call 1-800-IBM-2YOU (1-800-426-2968), your place of purchase, or your IBM reseller.
- Within Canada, call 1-800-565-3344 or 1-800-465-7999.
- Outside the United States and Canada, contact your IBM reseller or IBM marketing representative.

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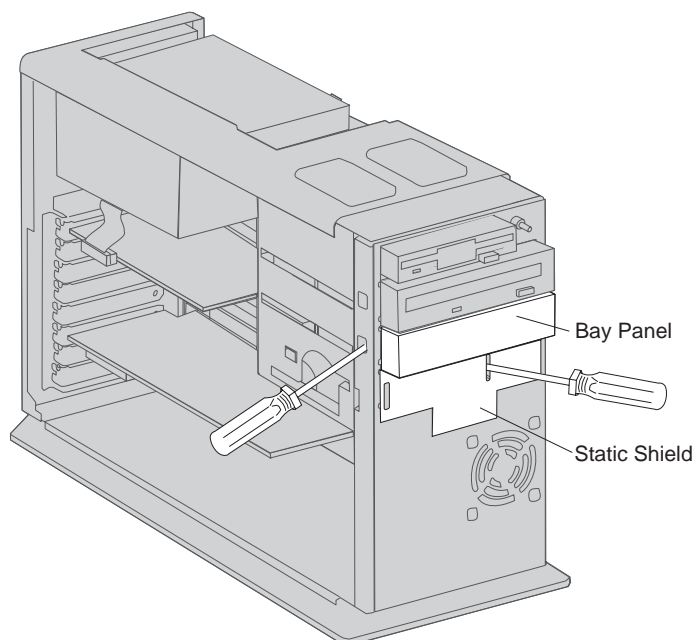
## Accessing Drive Bays

### Notes:

1. Drive bays 1, 2, and 6 come with drives preinstalled.
2. Drive bay 3 has a bay panel installed that includes a static shield.
3. Drive bay 4 has a bay panel mounted in the cover. This only needs to be removed when installing a drive with removable media.
4. If you remove a drive which has removable media from a bay and you do not intend to install a new drive immediately, replace the bay panel or static shield.

To access a drive bay, follow these steps:

- 1** Remove the computer cover, if installed. For these instructions, see “Disconnecting Cables and Removing the Cover” on page 6.
- 2** With the front of the computer facing you, remove the bay panel or the static shield that covers the bay you want to use as shown in the following illustration:



To replace a bay panel, follow these steps:

- 1** Align the tabs on the panel to the openings in the frame.
- 2** Push the panel into place until you hear the latches click.

To replace the static shield that covers bay 4 and bay 5, follow these steps:

- 1** Align the tabs on the static shield to the openings in the frame.
- 2** Flex the shield just enough to allow it to snap into place.

## Installing a drive in bay 1, 2, 3, or 4

- Bays 1 and 4 can hold up to a 3.5-inch drive, such as a diskette, hard disk, or tape drive.
- Bays 2 and 3 can hold up to a 5.25-inch drive, such as a CD-ROM, diskette, hard disk, or tape drive.
- Drives that are greater than 41.3 mm (1.6 in.) high cannot be used.
- Drives that require removable media (diskettes, tapes, or CDs) must be installed in the accessible bays: bays 1, 2, 3, or 4.

### Notes:

1. For information on installing SCSI drives, refer to Appendix A, “Tips for Installing SCSI Devices” on page 72 and the *Adaptec SCSI Documentation* provided with your computer.
2. To install a 3.5-inch drive into drive bay 2 or 3, you must install a conversion kit. For information on purchasing a 3.5-inch conversion kit for a 5.25-inch bay, see your place of purchase or an IBM reseller.

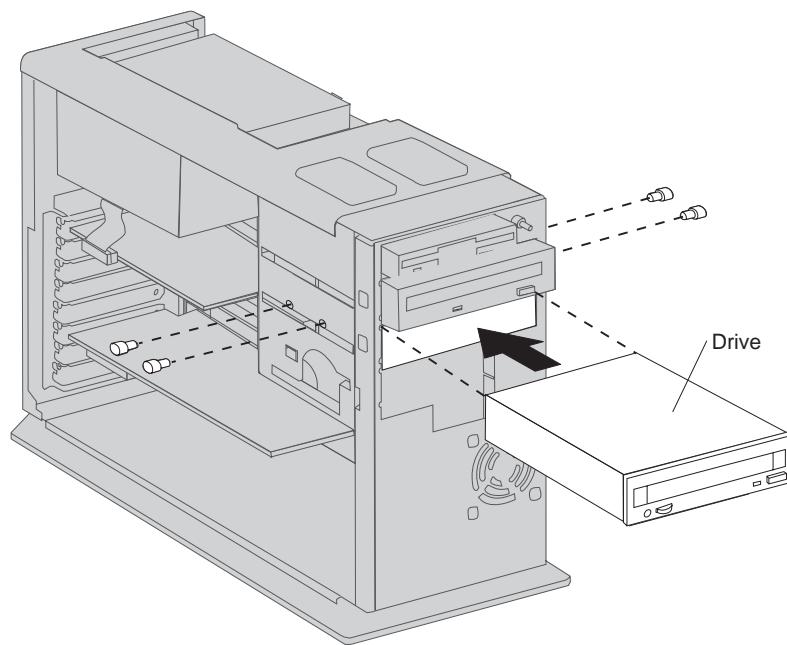
### Before you begin

- Read “Internal Drives” on page 40
- Read the documentation that comes with the drive.

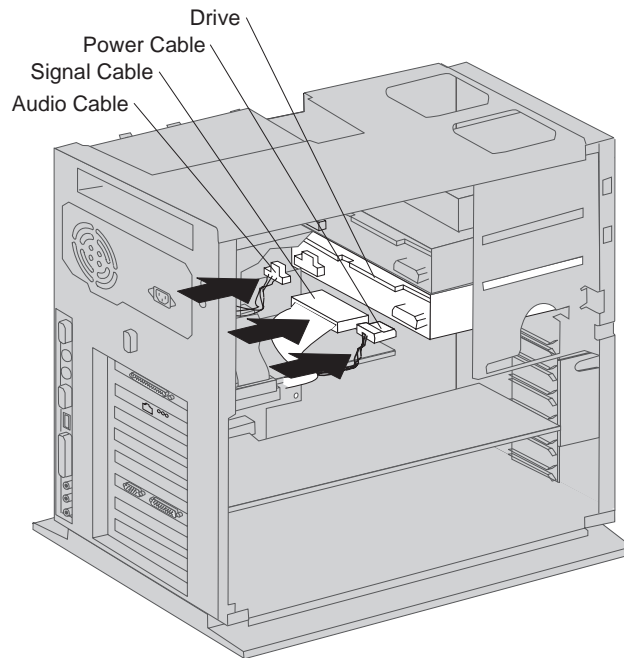
- 1** Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.
- 2** See “Accessing Drive Bays” on page 44 if you have not removed the static shield or bay panel to access the drive bay.

**3** Insert the drive into the bay. Align the screw holes and insert the four screws.

**Note:** Bay 4 uses only 3 screws.



**4** Connect the power and signal cables to the drive.



**5** If the drive that was installed does not have removable media, replace the bay panel or static shield that was removed previously. See “Accessing Drive Bays” on page 44.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

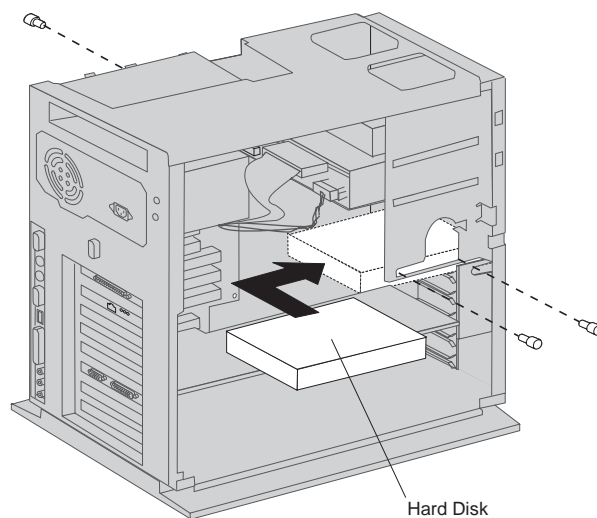
## Installing a drive in bay 5

Bay 5 can hold a 3.5-inch hard disk drive.

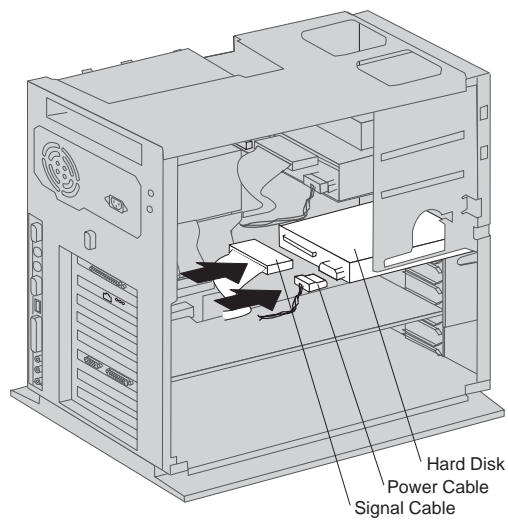
### Before you begin

- Read “Internal Drives” on page 40
- Read the documentation that comes with the drive.
- For information on installing SCSI drives, refer to Appendix A, “Tips for Installing SCSI Devices” on page 72 and the *Adaptec SCSI Documentation* provided with your computer.

- 1** Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.
- 2** Remove the adapter in the top slot (slot 1). See “Removing Adapters” on page 38.
- 3** Insert the drive into the bay from the rear. Align the screw holes and insert the three screws.



**4** Connect the power and signal cables to the drive.



**5** Replace the adapter for slot 1. See “Installing Adapters” on page 36.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.



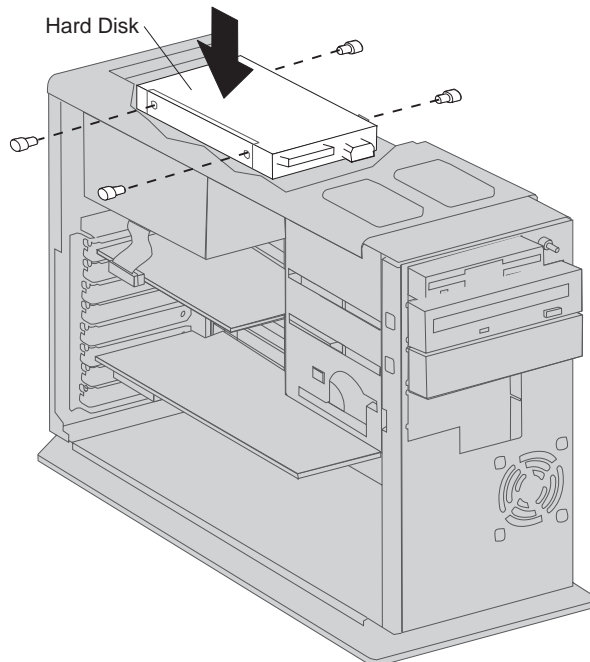
## Installing a drive in bay 6

Bay 6 can hold a 3.5-inch hard disk drive.

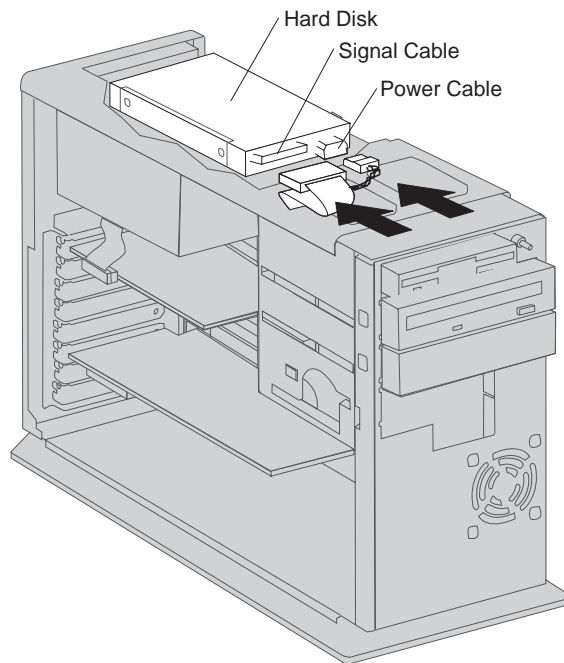
### Before you begin

- Read “Internal Drives” on page 40.
- Read the documentation that comes with the drive.
- For information on installing SCSI drives, refer to Appendix A, “Tips for Installing SCSI Devices” on page 72 and the *Adaptec SCSI Documentation* provided with your computer.

- 1** Touch the static-protective package containing the new drive to any *unpainted* metal surface and then remove the drive.
- 2** Insert the drive into the bay. Align the screw holes and insert the four screws.



**3** Connect the power and signal cables to the drive.



**What to do next**

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## Chapter 5. Working with Security Options

This chapter describes some of the security options that are available for your computer.

- To help prevent hardware theft, there is a cover lock and you can add a security U-bolt and cable to your computer.
- To erase lost or forgotten passwords in order to set up password protection, you can move the CMOS clear (password) jumper on the system board.

### Important

Clearing CMOS memory erases the configuration of your computer. Therefore, you must, reconfigure the computer after clearing CMOS memory. If possible, record the configuration information of your computer *before* altering the CMOS jumper.

**Note:** Use the Configuration/Setup Utility program to set, change, or delete passwords. For more information, see *Using Your IntelliStation Z Pro*.

- To help prevent software and data theft, you can set the diskette write-protect switch on the system board.

The following list is a quick reference to these procedures:

- “Installing a U-bolt” on page 54
- “Erasing Lost or Forgotten Passwords” on page 57
- “Setting the Diskette Write-Protect Switch” on page 60

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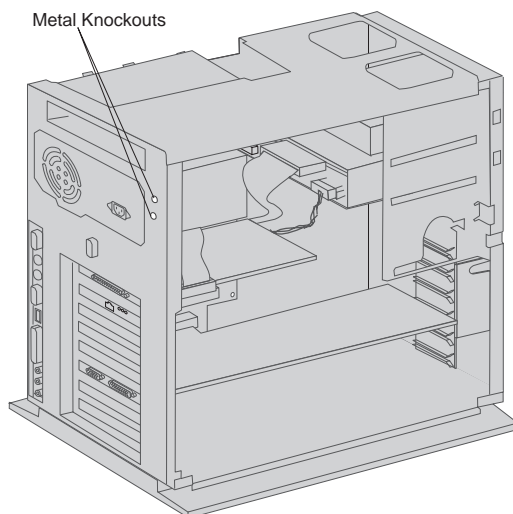
## Installing a U-bolt

You can add a U-bolt to the rear of your computer. Adding a U-bolt enables you to add a security cable and lock which helps prevent hardware theft. After you add the security cable, make sure that it does not interfere with other cables that are connected to the computer.

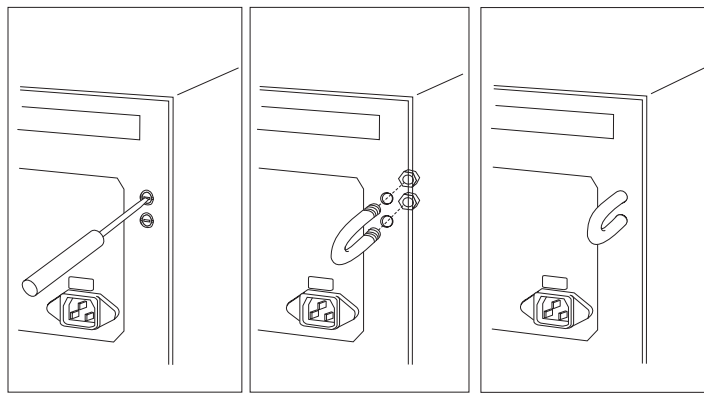
### Before you begin

- Obtain the following:
  - A 19-mm (3/4 in.) U-bolt and threaded nuts that fit the U-bolt
  - A security cable
  - A lock, such as a combination lock or padlock
  - An appropriately sized or adjustable wrench
  - A flat-bladed screwdriver
- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all external cables and power cords, and remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).

- 1** Use a tool, such as a screwdriver, to remove the two metal knockouts.



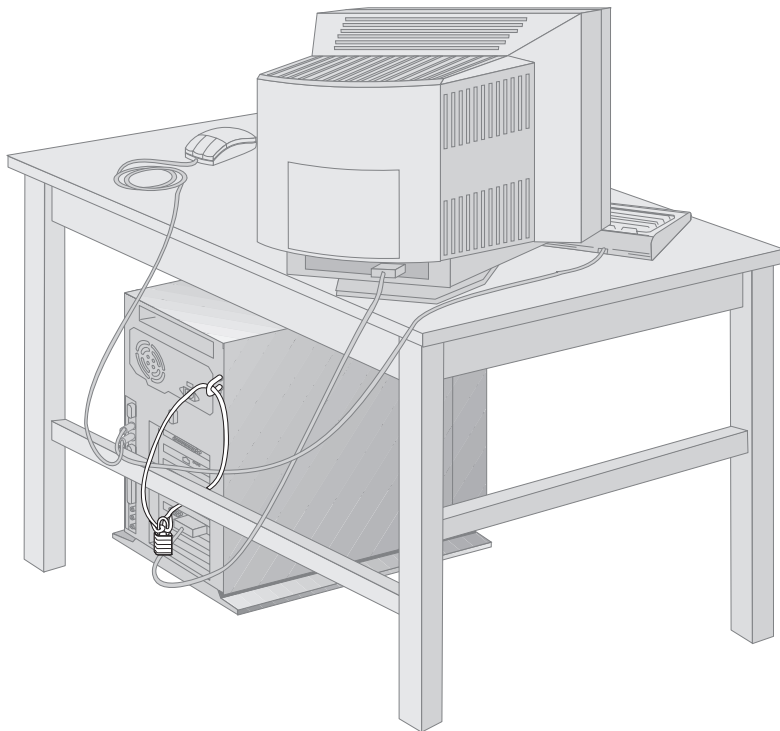
- 2 Insert the U-bolt through the rear panel, then attach and tighten the nuts with an appropriately sized or adjustable wrench.



- 3 Replace the computer cover. For more information, see “Replacing the Cover and Connecting the Cables” on page 63.



- 4 Thread the cable through the U-bolt and around an object that is not a part of or permanently secured to the building structure or foundation, and from which it cannot be removed; then fasten the cable ends together with a lock.  
The following illustration shows an example of how this might work.



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## Erasing Lost or Forgotten Passwords

**Note:** To set, change, or delete a password, see *Using Your IntelliStation Z Pro*.

Your computer uses *complementary metal-oxide semiconductor (CMOS)* memory on the system board for storing configuration and setup information. CMOS memory maintains information about:

- Date and time
- Security features
- Power-management devices
- Storage devices
- Keyboard and mouse
- ISA legacy configuration information
- Plug and Play configuration information
- Port assignments
- I/O addresses and interrupts
- Other selectable features

Within the security features are the settings for the power-on and administrator passwords. If you need to *erase* a lost or forgotten password, you must erase all of the configuration and setup information by moving the jumper designated for CMOS memory.

The jumper is located on the system board with the label *CMOS clear*. To locate this jumper, see “Identifying Parts on the System Board” on page 13 or see the label inside on the bottom of the computer; (on the label, the jumper is referred to as the *password jumper*).

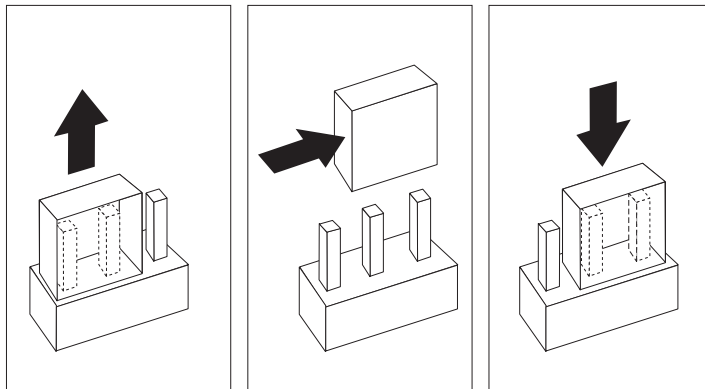
### **Important**

Clearing CMOS memory erases the configuration of your computer. Therefore, you must, reconfigure the computer after clearing CMOS memory. If possible, record the configuration information of your computer *before* altering the CMOS jumper.

### Before you begin

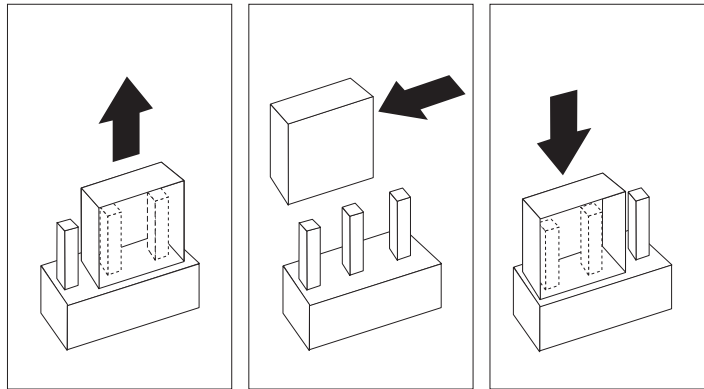
- Using the Configuration/Setup Utility program, record all configuration information.
- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer.
- Disconnect all cables attached to the computer, and then remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).

- 1** Remove the riser card. For more information, see “Removing the Riser Card” on page 15.
- 2** Locate the CMOS-clear jumper on the system board. For more information, see “Identifying Parts on the System Board” on page 13 or see the label inside on the bottom of the computer which refers to the jumper as the *password jumper*.
- 3** Move the jumper from its normal position pins (1 and 2) to pins 2 and 3. It might be helpful to use needle-nose pliers to move the jumper, but be careful not to scrape any system board components or crush the jumper.





- 4** Wait one minute and then move the jumper back to its normal position (pins 1 and 2). This clears CMOS memory.



**What to do next**

- After clearing CMOS memory, you must reconfigure the computer. After reassembling the computer (go to Chapter 6, “Completing the Installation” on page 61), use the Configuration/Setup Utility program to reset the date and time, reset any passwords, and reconfigure the computer. For more information, refer to “Setting Passwords” on page 71 and *Using Your IntelliStation Z Pro*.

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## Setting the Diskette Write-Protect Switch

The diskette write-protect switch controls whether you can write information to a diskette using a diskette drive. The ability to prevent writing to a diskette is particularly useful if you are concerned about the security of information that can be obtained through a network.

**Note:** This switch does not affect the ability to read information from a diskette.

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Turn off the computer and all other connected devices.
- Disconnect all external cables attached to the computer, and then remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6).

- 1** Locate the configuration switches on the system board. For more information, refer to the label inside on the bottom of the computer or see “Identifying Parts on the System Board” on page 13.
- 2** For normal diskette operation or for read-only diskette operation, set switch 8 as illustrated below. It might be helpful to use the end of a small screwdriver to set the switch.

Normal Diskette Operation



Read-Only Diskette Operation



### What to do next

- To work with another option, go to the appropriate section.
- To complete the installation, go to Chapter 6, “Completing the Installation” on page 61.

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## **Chapter 6. Completing the Installation**

After working with options, you need to install any removed parts, replace the cover, and reconnect any cables, including power cords and telephone lines. Also, depending on the option installed, you might need to update information in the Configuration/Setup Utility program.

The following list is a quick reference to these procedures:

- “Installing the Riser Card” on page 62
- “Replacing the Cover and Connecting the Cables” on page 63
- “Updating the Computer Configuration” on page 65

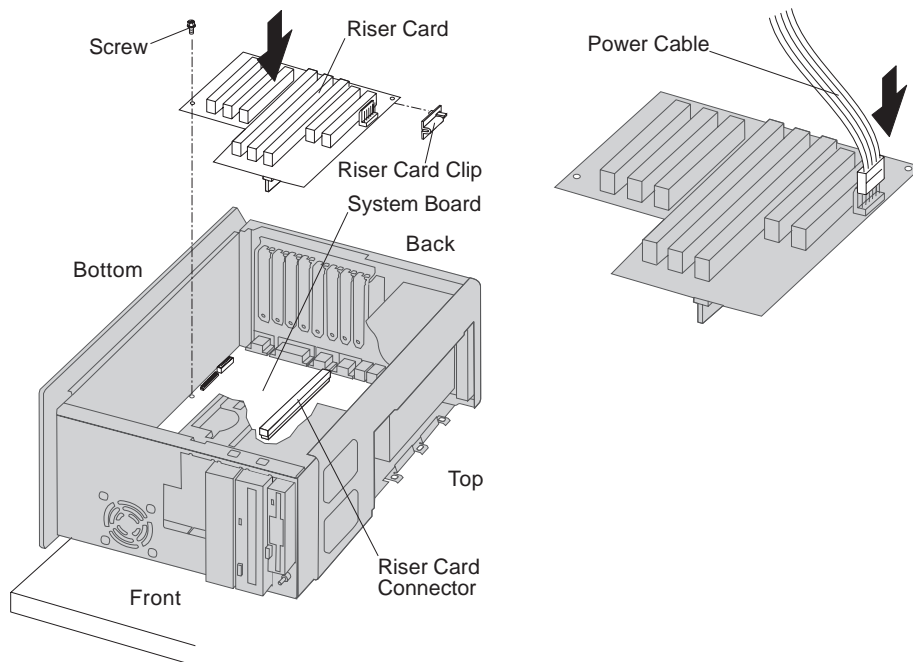
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## Installing the Riser Card

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.

- 1** Position the riser card so that the interposer cards are properly aligned with the connectors on the bottom of the riser card and the system board.
- 2** Push the riser card straight down into the system board connector.
- 3** Secure the riser card by inserting the screw.
- 4** Replace the riser card clip.



- 5** Reconnect the power cable to the riser card.
- 6** Reinstall the adapters. For information on installing adapters, see “Installing Adapters” on page 36.

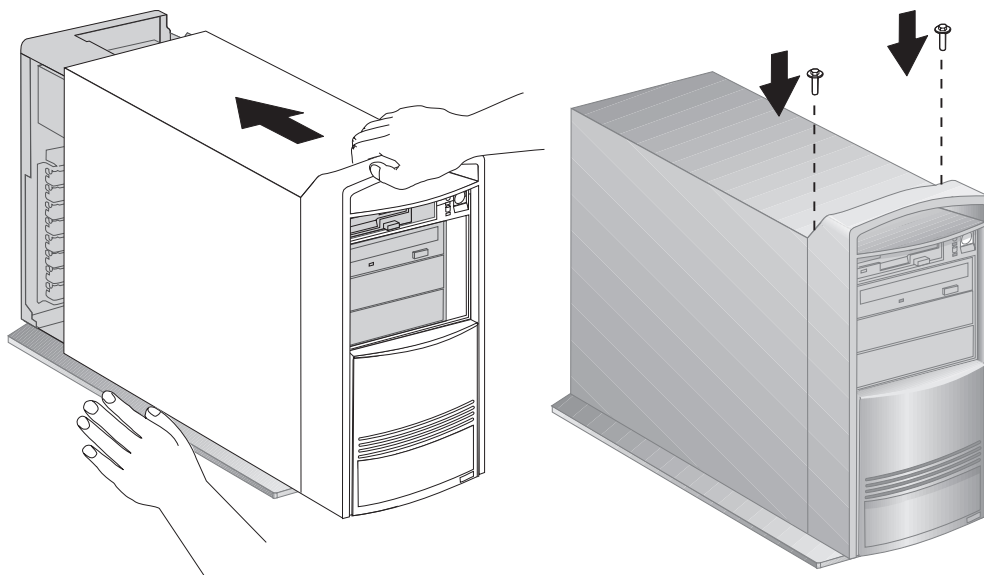
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## Replacing the Cover and Connecting the Cables

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.

- 1** Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your computer.
- 2** Clear any cables that might impede the replacement of the cover.
- 3** Place the cover on the computer frame as shown in the following illustrations. Secure the cover by sliding it forward and replacing the two screws at the top.



- 4** If desired, lock the cover. For more information on locking the computer cover, see *Using Your IntelliStation Z Pro*.

**Important Information**

In the United Kingdom, by law, the telephone cable must be connected after the power cord.

- 5** Reconnect the external cables and cords to the computer.
- 6** If you have a modem or fax machine attached to the computer, and you are not in the U.K., reconnect the telephone line to the wall outlet and the computer and plug the power cords into properly grounded electrical outlets. If you are in the U.K., plug the power cords first and then connect the telephone line to the wall outlet and the computer.

---

## Updating the Computer Configuration

### Important

The configuration information in this section applies to installing options. For more information on using the Configuration/Setup Utility program, see *Using Your IntelliStation Z Pro*.

Also, you may need to install device drivers after updating the configuration settings. For more information, see the instructions that come with the option to determine if device drivers are required and how to install them. Also, video, SCSI, and Ethernet device drivers are on the *Ready-to-Configure CD*.

After adding, removing, or replacing options, the configuration settings will need to be updated. This reconfiguration is performed automatically by the computer or *manually* by you. When the computer automatically configures an option, it uses system programs. If the system programs do not update the settings, you can use the Configuration/Setup Utility program to reconfigure the appropriate settings.

For example, when you start your computer after adding most internal hard disk drives, the settings are automatically updated, and you use the Configuration/Setup Utility program to save those changes. However, if a resource conflict arises after an ISA legacy adapter is installed or removed, you must manually update the computer configuration and save the information.

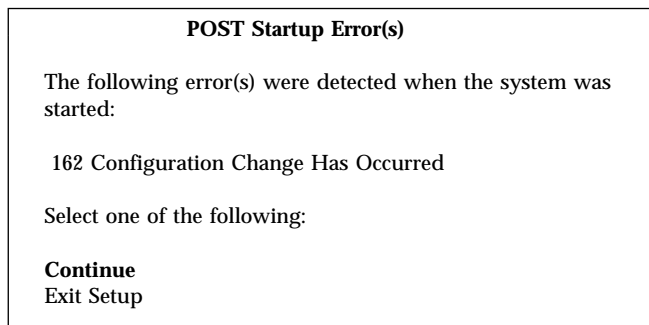
### Notes:

1. Make a record of all customized settings before you perform any of the following steps.
2. For more information on error messages from resource conflicts, see *Using Your IntelliStation Z Pro*.

## Starting the Configuration/Setup Utility Program

When you restart the computer for the first time after working with most options, a message appears indicating that a configuration change has occurred. You are then prompted to enter the Configuration/Setup Utility program to manually update the configuration settings or to confirm and save the settings that were automatically updated by the system programs.

After you change an option and restart the computer, the following screen might appear.



**Note:** Depending on the configuration changes that occurred, the error message you see might be different from the one shown here.

If the preceding screen appears, select **Continue** until you reach the Configuration/Setup Utility menu.

If the preceding screen does not appear, then use the following procedures to access the Configuration/Setup Utility menu.



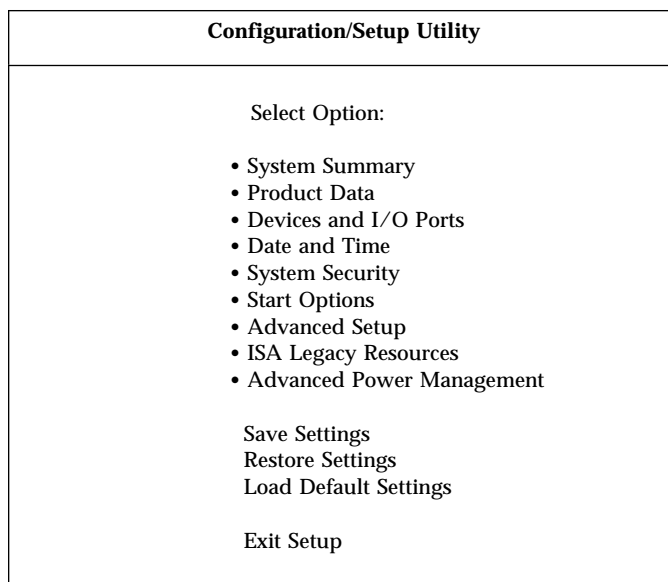
To access the Configuration/Setup Utility program:

**1** Turn on the computer.

If your computer is on when you start this procedure, you must shut down the operating system, turn off the computer and wait a few seconds, and then restart the computer. Do not use **Ctrl+Alt+Del** to restart the computer.

**2** When the Configuration/Setup Utility prompt appears in the lower left corner of the screen, press **F1**.

- a. If you have *not* set an administrator password, the Configuration/Setup Utility program menu appears. If you have set an administrator password, type the administrator password and press **Enter**.
- b. If you have set both an administrator and a power-on password, you can type either of the passwords at the password prompt. However, if you type your power-on password, you can *view* limited information in the Configuration/Setup Utility program, but you cannot *change* settings. To change settings in the Configuration/Setup Utility program, type your administrator password at the password prompt.



**Note:** The menu you see on your computer might look slightly different from the menu shown here, but it will operate the same way.

## Changing Settings and Exiting

In the Configuration/Setup Utility menus, you can accept the configuration changes by viewing and saving the changes, or you can make manual changes and then save the settings.

The following is a quick reference for identifying symbols in the Configuration/Setup Utility program. For information on the function of keys, see *Using Your IntelliStation Z Pro*.

- If a bullet (•) is beside a menu item, then an additional menu is available.
- Most information enclosed in brackets ([ ]) can be changed. You cannot change information that is not surrounded by [ ].
- A right arrowhead (▶) beside a menu item indicates that a configuration change occurred in that category. The ▶ might also appear in subsequent menus.
- If an asterisk (\*) is beside a menu item, then a resource conflict is detected.

When you complete your changes or finish viewing information, return to the Configuration/Setup Utility menu and select **Save Settings** to save the changes. From this location, you can exit the Configuration/Setup Utility program.

To exit from the Configuration/Setup Utility program, follow these steps:

- 1** From the Configuration/Setup Utility menu, press **Esc**.
- 2** The Exit Setup menu appears. You can save your changes, exit from the Configuration/Setup Utility program without saving your changes, or return to the Configuration/Setup Utility menu. Use the arrow keys to select the desired option and press **Enter**.

## Configuring an ISA Legacy Adapter

To configure an installed ISA legacy adapter, you might need to alter switch or jumper settings on the adapter. Also, you must use the Configuration/Setup Utility program to inform the system BIOS of the ISA legacy resource information, such as memory locations, I/O assignments, and DMA and interrupt assignments.

**Note:** For more information about required resources and switch settings, refer to the documentation that comes with the adapter.

To store the legacy resource information for an installed adapter:

- 1** Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 66).
- 2** Select **ISA Legacy Resources** from the Configuration/Setup Utility menu.
- 3** As needed, select **Memory Resources**, **I/O Port Resources**, **DMA Resources**, or **Interrupt Resources**.
- 4** Set the appropriate resource to **Not available**.
- 5** Remember to save the changes when you exit from the Configuration/Setup Utility program.

If you remove an ISA legacy adapter, you must set to **Available**, the system resources that are no longer being used. To do this, follow the above procedures and select **Available** at step 4.

**Note:** For more information on adapters and resolving conflicts, see “Adapter Configuration” on page 34 and Appendix C, “Interrupt and DMA Resources” on page 76.

## Configuring Startup Devices

Startup devices are devices where the computer looks for an operating system when it is powered on. After adding new devices to the computer, you might want to change the sequence of the startup devices. You can use the Configuration/Setup Utility program to configure startup devices.

To configure startup devices:

- 1** Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 66).
- 2** Select **Start Options** from the Configuration/Setup Utility menu.
- 3** Select **First Startup Device**.
- 4** Use the arrow keys to make your selection.
- 5** If necessary, repeat the above steps for **Second Startup Device**, **Third Startup Device**, and **Fourth Startup Device**.
- 6** Remember to save the changes when you exit from the Configuration/Setup Utility program.

## Setting Passwords

**Note:** For more information on password protection and setting the date and time, see *Using Your IntelliStation Z Pro*.

To set the power-on or administrator passwords:

- 1** Start the Configuration/Setup Utility program (see “Starting the Configuration/Setup Utility Program” on page 66).
- 2** Select **System Security** from the Configuration/Setup Utility menu.
- 3** Select **Administrator Password** or **Power-on Password**.
- 4** Follow the instructions to change the password. For more information, see the passwords section of *Using Your IntelliStation Z Pro*.
- 5** Remember to save the changes when you exit from the Configuration/Setup Utility program.

If you used the CMOS-clear jumper to erase the computer configuration and setup information, you must reconfigure the computer, set the date and time, and reset the power-on or administrator passwords.

**Note:** For information on clearing CMOS memory, see “Erasing Lost or Forgotten Passwords” on page 57.

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## Appendix A. Tips for Installing SCSI Devices

Along with the *Adaptec SCSI Documentation* shipped with your computer, use the following information when you are installing SCSI devices.

- 1** Prepare each SCSI device *before* installation.
  - a. Ensure that the proper SCSI identification (ID) number is set. SCSI IDs range from 0 to 15, and the SCSI ID is automatically or manually set. The default setting for the AHA-2940*Ultra* Wide adapter is 7. If the SCSI device you are installing supports the SCSI Configured AutoMatically (SCAM) protocol, you do not need to manually assign the ID. However, if the device does not support the SCAM protocol, use the documentation that comes with the device to manually set the SCSI ID.
  - b. Ensure that the devices are properly terminated. Devices attached to either end of the SCSI cable must have their terminators enabled. Devices attached to the middle connectors must have their terminators disabled. The termination setting is automatically set for the SCSI adapter. Enabling or disabling the termination of a SCSI device is usually controlled by a jumper or switch on the device. To enable or disable termination, refer to the documentation that comes with the device.
- 2** Use the instructions in Chapter 4, “Working with Adapters and Internal Drives” on page 32 to install internal SCSI devices. These instructions are for the general installation of an internal drive in your computer.
- 3** Ensure that the SCSI cables are set up properly.
  - a. The cables attach only one way to the connectors on the adapter. Refer to the *Adaptec SCSI Documentation* for more information.
  - b. Three cables can connect to the adapter: a 68-pin, internal SCSI cable; a 68-pin, external SCSI cable; and a 50-pin, internal SCSI cable. Your computer is shipped with the 68-pin, *internal* SCSI cable that connects the preinstalled SCSI hard disk drive to the SCSI adapter.

- c. Although the physical specifications of your computer limit the number of internal devices you can install, it is possible to add up to 15 internal and external devices to the SCSI adapter. For information on extra cables, contact your place of purchase or an IBM reseller.
  - d. Restrictions apply to the total length of all cables. For more information, refer to the *Adaptec SCSI Documentation* shipped with your computer.
- 4** If necessary, use the *SCSISelect* utility program to change settings for the AHA-2940 *Ultra Wide* adapter. For information on the default settings and how to use *SCSISelect*, refer to the *Adaptec SCSI Documentation* provided with your computer.

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## Appendix B. Changing the Battery

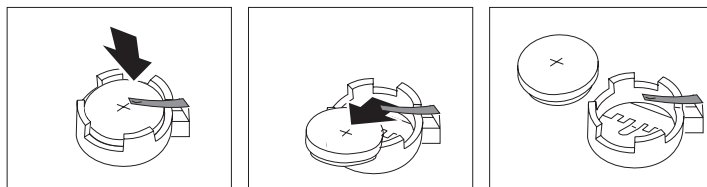
If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.

### Before you begin

- Read “Electrical Safety” on page 4 and “Handling Static-Sensitive Devices” on page 5.
- Read the instructions that come with the replacement battery.
- Turn off the computer and all other connected devices.
- Disconnect all external cables attached to the computer and then remove the computer cover (see “Disconnecting Cables and Removing the Cover” on page 6 if you need additional information).

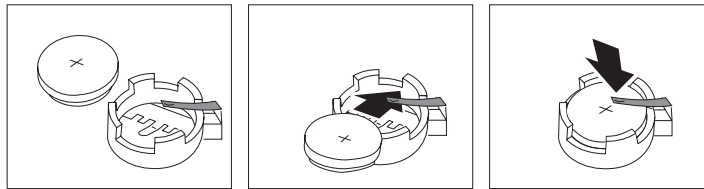
For information on locating the battery, see “Identifying Parts on the System Board” on page 13.

- 1** Remove the adapters installed in the option slots on the riser card. For instructions, see “Removing Adapters” on page 38.
- 2** Remove the riser card. For instructions, see “Removing the Riser Card” on page 15.
- 3** Disconnect any cables from the system board that might impede access to the battery.
- 4** Read “Lithium Battery Notice” on page vi.
- 5** Remove the old battery as shown in the following illustrations.





**6** Install the new battery as shown in the following illustrations.



**Note:** When the computer is turned on for the first time after battery replacement, an error message might be displayed. This is normal after replacing the battery.

**What to do next**

- To work with another option, go to the appropriate section.
- To complete the replacement, go to Chapter 6, “Completing the Installation” on page 61.
- Use the Configuration/Setup Utility program to set the date and time and any passwords. For information on setting the date and time, refer to *Using Your IntelliStation Z Pro*. For information on setting passwords, see “Setting Passwords” on page 71.
- Dispose of the old battery as required by local ordinances or regulations.

---

## Appendix C. Interrupt and DMA Resources

This appendix lists the settings for the default interrupt and direct memory access (DMA) resources for your computer.

**Note:** The interrupt and DMA settings might change under configuration control.

<b>Interrupt Request</b>	<b>System Resource</b>
0	Timer
1	Keyboard
2	Reserved
3 <sup>4</sup>	Serial Port 2/Infrared
4 <sup>4</sup>	Serial Port 1
5	Available
6	Diskette
7 <sup>4</sup>	Parallel Port
8	Real Time Clock
9	Available
10	Available
11	Available
12	Mouse
13	Coprocessor
14	IDE Drives on primary channel
15	IDE Drives on secondary channel

**Note:** The Advanced Programmable Interrupt Controller (APIC) manages additional hardware interrupts to the system BIOS. The following interrupts are available to the I/O APIC.

<b>Interrupt Request</b>	<b>System Resource</b>
16	PCI Device
17	PCI Device
18	PCI Device
19	PCI Device
20	Not available
21	Not available
22	Not available
23	Not available
24	SMI (System Management Interrupt)

---

<sup>4</sup> Can be modified to alternative settings or disabled.

*Table 4. DMA Resources*

<b>DMA Request</b>	<b>Data Width</b>	<b>System Resource</b>
0	8 bits	Available
1 <sup>5</sup>	8 bits	Infrared
2	8 bits	Diskette
3	8 bits	Available
4	–	Reserved
5	16 bits	Available
6	16 bits	Available
7	16 bits	Available

---

<sup>5</sup> Can be modified to alternative settings or disabled.

---

## Appendix D. Notices

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