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## Using This Guide

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The *PowerMate Pro150 User's Guide* provides a quick reference to information about your computer.

The guide contains the following information:

- Chapter 1, Product Description, provides a summary of the system unit features and system board components.
- Chapter 2, Installing Your System, gives you a look at the front and back features of the system and tips on setting it up.
- Chapter 3, Using the Setup Program, provides information on BIOS settings and how to customize the configuration.
- Chapter 4, Taking Your System Apart, describes how to take apart and reassemble the major assemblies of the computer.
- Chapter 5, Installing and Configuring System Board Options, contains jumper information procedures on installing optional components. This chapter also provides information on replacing the CMOS battery.
- Chapter 6, Solving Problems, contains troubleshooting tips for solving simple problems. See Appendix C, 24-Hour Information Services if you cannot solve a problem yourself.
- Chapter 7, Technical Reference, list the system specifications and provides system board connector locations and pin assignments.
- Appendix A, BIOS Update and Recovery, tells you how to use the BIOS upgrade utility and how to recover the BIOS if corrupted.

## WARNING

Prolonged or improper use of a computer workstation may pose a risk of serious injury. To reduce your risk of injury, set up and use your computer in the manner described in Appendix B, Setting Up a Healthy Work Environment.

- Appendix B, Setting Up a Healthy Work Environment, contains guidelines to help you use your computer productively and safely. This appendix also instructs you on how to set up and use your computer to reduce your risk of developing nerve, muscle, or tendon disorders.
- Appendix C, 24-Hour Information Services, lists the services available to you for information and help and describes how to access the services.

This appendix also provided information on how to use the NEC FastFacts™. NEC FastFacts is an automated service that sends the latest information about NEC and its products directly to a fax machine. The service is available 24 hours a day, 7 days a week.

## Text Conventions

Warnings, cautions, and notes have the following meanings:

### WARNING

Warnings alert you to situations that could result in serious personal injury or loss of life.



### CAUTION

Cautions indicate situations that can damage the hardware or software.

### ⇒ Note

Notes give important information about the material being described.



## WARNING

**Prolonged or improper use of a computer workstation may pose a risk or serious injury. To reduce your risk of injury, set up and use your computer in the manner described in Appendix B, Setting Up a Healthy Work Environment.**

The PowerMate® Pro150 system is based on the Intel Pentium® Pro microprocessor. This chapter describes the principal system features.

After unpacking the system, make sure the following items are present and in good condition:

- System unit
- Power cord
- Disk drive mounting hardware kit.

If any item is damaged or missing, contact your system supplier. Save all boxes and packing material to repack the system in the future.

## Feature Summary

- Intel Pentium Pro microprocessor running at 150 MHz
- Intel 82450 PCI chipset used for PCI/ISA, memory, and peripheral control
- PC87306B Ultra I/O controller (integrates serial ports, parallel port, floppy disk interface, real time clock, CMOS RAM, keyboard controller, and support for an IrDA-compatible infrared interface)
- PCI and ISA peripheral connectors on the system board
- Support for up to 128 MB of DRAM installed in single in-line memory modules (SIMMs)

- AMIBIOS in a flash memory device supports system setup and PCI auto-configuration
- Expansion slots for up to six add-in boards
  - Three dedicated PCI slots
  - Two dedicated ISA-bus slots
  - One "combination" slot for either a PCI or an ISA add-in board
- 180 watt continuous (200 watt peak) power supply switch-selectable for 115 and 230 V ac operation
- Two RS-232C-compatible 9-pin serial connectors
- One multimode, 25-pin Centronics®-compatible parallel port
- Two peripheral bays:
  - One bay that holds up to three 3.5-inch drives (one externally-accessible, two internal access only)
  - One externally accessible bay for installing 5.25-inch drives (up to three half-height drives *or* one half-height plus one full-height drive)
- One 1.44 MB, 3.5-inch high-density diskette drive installed
- PS/2®-style keyboard and mouse connector
- Speaker mounted on the chassis
- Password protection and padlock slot for system security

Most models include a:

- 1.6 GB IDE hard disk drive installed
- Six-speed CD-ROM reader installed
- Pair of external speakers
- Microphone
- Graphics controller card installed
- Audio/sound card installed
- SCSI interface card installed.

Some models include additional cards and peripherals.

## Central Processing Unit (CPU)

The system is designed to operate with a 150 MHz Intel Pentium Pro microprocessor. The Pentium Pro microprocessor, in addition to its expanded data and addressing capabilities, includes the following features:

- Next generation Pentium Pro OverDrive® processor ready, including a zero insertion force Socket 8
- Backward compatibility with Intel microprocessor architecture
- Onchip numeric coprocessor (compatible with the Pentium® processor and compliant with ANSI/IEEE standard 754-1985)
- Onchip 16 KB cache (8 KB for data, 8 KB for code)
- Burst-mode bus cycles

Chapter 5 tells how to upgrade the CPU.

## System Memory

The system supports base (conventional) and extended memory. Operating systems such as MS-DOS®, Windows® 95, Windows NT, and all application programs use base memory. For better performance many applications use extended memory. For the system memory map, see Chapter 7.

The system supports up to 128 MB of DRAM. DRAM is implemented through 72-pin single in-line memory modules (SIMMs). The system board contains four SIMM sockets. Chapter 5 describes how much memory and which type of SIMM you can install to get the total amount of DRAM you want.

## Cache Memory

The Pentium Pro microprocessor includes 16 KB of cache on the chip. A 256 KB secondary (L2) cache device is contained in the same package as the Pentium Pro microprocessor.



## IDE Peripheral Interface

The onboard 82450 PCI chipset provides a high speed, 32-bit PCI/IDE interface. The PCI/IDE interface supports:

- Up to four PCI/IDE hard drives on the PCI bus
- Enhanced Mode 3 and Mode 4 support
- Logical block addressing (LBA) of hard drives larger than 528 MB
- Extended Cylinder Head Sector (ECHS) translation modes
- ATAPI devices (such as CD-ROMs) on both IDE interfaces

## System I/O

The onboard I/O controller (PC87306B) integrates the functions for the serial ports, parallel port, diskette drives, and keyboard. This component provides:

- Multimode bi-directional parallel port
  - Standard mode: Centronics-compatible operation
  - High-speed mode: support for enhanced capabilities port (ECP) and enhanced parallel port (EPP)
- Two RS-232C 116550A-compatible 9-pin serial ports
- Integrated real time clock with an accuracy of  $\pm 13$  minutes/year
- A 242-byte battery-backed CMOS RAM
- Integrated 8042 compatible keyboard controller
- Flexible IRQ and DMA mapping to support Windows 95
- Support for an IrDA-compatible infrared interface. The infrared interface supports data transfer rates of up to 115 Kbaud with either half- or full-duplex operation. In full-duplex mode, both the transmitter and receiver are enabled simultaneously for higher throughput.
- Industry standard diskette drive controller that supports 720 KB, 1.44 MB, and 2.88 MB 3.5-inch drives (at 135 tracks per inch); and 360 KB and 1.2 MB 5.25-inch drives

The system supports up to six drives. The system ships with one 1.44 MB diskette drive installed in the 3.5-inch bay. The 5.25-inch bay can hold up to three half-height 5.25-inch drives. The 3.5-inch drive bay can hold up to three 3.5-inch drives.

If you are using third-party controllers or non-IDE hard disk drives, each of the controller functions can be disabled in Setup (Chapter 3).

## **System BIOS**

The system BIOS, from American Megatrends Incorporated (AMI), provides ISA and PCI compatibility. The BIOS is contained in a flash memory device on the system board. The BIOS provides the power-on self test (POST), the system Setup program, a PCI and IDE auto-configuration utility, and BIOS recovery code. Note that Power Management is not supported.

The system BIOS is always shadowed. Shadowing allows any BIOS routines to be executed from fast 32-bit onboard DRAM instead of from the slower 8-bit flash device.

## **PCI Auto-configuration**

The PCI auto-configuration utility works in conjunction with the Setup program to support using PCI add-in boards in the system. When you turn on the system power after installing a PCI board, the BIOS automatically configures interrupts, DMA channels, I/O space, and so on. Since PCI add-in boards use the same interrupt resources as ISA add-in boards, you must specify the interrupts used by ISA boards in the Setup program. Chapter 3 tells how to use the Setup program. The PCI auto-configuration program complies with version 2.1 of the PCI BIOS specification.

## **IDE Auto-configuration**

If you install an IDE drive in the system, the IDE auto-configuration utility automatically detects and configures the drive for operation in the system. This utility eliminates the need to enter the Setup program after you install an IDE drive.

## ISA Plug and Play Capability

This provides auto-configuration of Plug and Play ISA cards and resource management for legacy (non Plug and Play) ISA cards when used with the ISA Configuration Utility (ICU) or a Plug and Play compatible operating system like Windows 95.

## BIOS Upgrades

Because the BIOS is stored in a flash memory device, you can easily upgrade the BIOS without having to disassemble the system. The flash upgrade process can be done by running a utility from a diskette or hard disk, or over a network.

Appendix A tells how to run the BIOS upgrade utility and, if needed, the recovery utility. For information about the latest BIOS update, contact your service representative.

## Expansion Slots

The system has two 16-bit ISA/AT-compatible and three PCI-compatible expansion slots. One expansion slot is a "combination" slot and can be used by **either** a PCI or an ISA board. Full-length add-in cards may be installed any slot. See Chapter 4 for more information about expansion slots and installing add-in boards.

## Power Supply

The system has a 180 watt continuous (200 watt peak) power supply to provide power for onboard resources, add-in boards, and drives. A switch on the system back panel sets the power supply to operate at either:

- 115 V ac (in the range of 100-120 V ac; 4.0 A, maximum input current)
- 230 V ac (in the range of 200-240 V ac; 2.0 A, maximum input current).

For power supply output ratings, see Chapter 7.

## System Security

The system BIOS provides a password option that you can enable through the Setup program (see Chapter 3). The system also includes a padlock slot that makes it possible to lock the system cover in place to prevent unauthorized access to the system jumpers and other internal components (a padlock is not included).

## Keyboard/Mouse Controller

The onboard I/O controller stores the keyboard and mouse controller code. PS/2-style connectors for the keyboard and mouse are located on the back panel.

## Real-Time Clock and CMOS RAM

The onboard I/O controller provides a real-time clock and CMOS RAM. Chapter 5 provides information about replacing the battery.

You can set the time for the clock and the CMOS values by using the system BIOS Setup program, described in Chapter 3.

## Power Supply Fan

For cooling, a fan is attached to the power supply, at the rear of the system chassis. This fan draws air in through the vents in the power supply and provides air flow across the CPU. A second fan can be installed in the card guide module at the front of the chassis to provide additional cooling. Refer to Chapter 4 for instructions.

## Internal Speaker

A speaker is mounted inside the chassis. The speaker provides audible error code information (beep codes) during the power-on self test (POST) if the system cannot use the video interface. See Chapter 6 for beep code information.

A speaker can be installed in the card guide module. See Chapter 4 for installation instructions. If you install a speaker, remove the jumper that enables the onboard speaker (Chapter 7).

## **External Speakers**

Most systems come with a pair of high-quality stereo speakers that you can arrange to suit your work environment. The speaker set features a power button, power lamp, bass control, treble control and volume knob.

An AC adapter comes with the system. Set up the speakers with the AC adapter. The speakers connect to the back of the system unit. Adjust the speaker volume by using the volume control on the front of the right speaker.

# Installing Your System **2**

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This chapter explains how to set up your system, including:

- Selecting a site
- Checking the input voltage setting and power cord
- Installing optional devices
- Location of back panel and front panel connectors and controls
- Resetting the system
- Turning on the system at first start-up
- Setting up drives

## Selecting a Site

The system is designed to operate in a typical commercial environment. Choose a site that is:

- Located near a grounded, three-pronged power outlet. For the United States and Canada, this means a NEMA 5-15R outlet for 115 V ac or a NEMA 6-15R outlet for 230 V ac. For other regions, this means a grounded, three-pronged power outlet approved by the electrical code of the region.
- Clean and dust-free.
- Well ventilated and away from sources of heat including direct sunlight.
- Away from sources of vibration or physical shock.
- Isolated from strong electromagnetic fields produced by electrical devices (such as air conditioners, large fans, large electric motors, radio and TV transmitters, and high-frequency security devices).

For information about complying with electromagnetic interference regulations, see “Electromagnetic Compatibility” in Chapter 7.



### Note

In geographic regions that are susceptible to electrical storms, we highly recommend you plug your system into a surge suppresser.



### WARNING

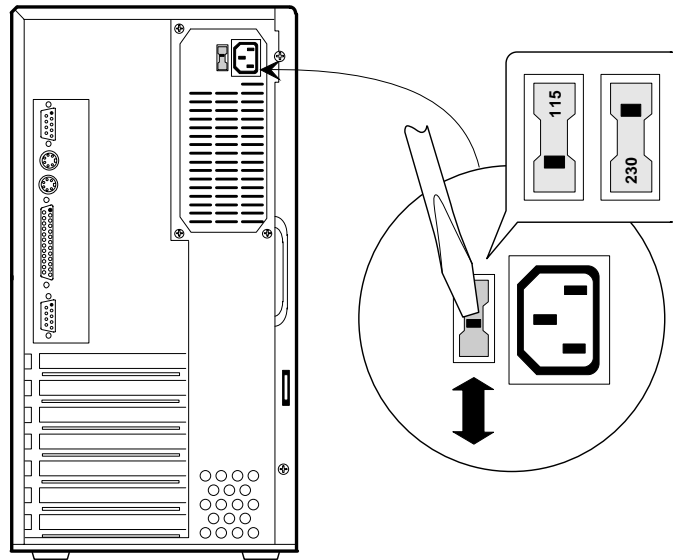
**The circuitry in the power supply operates at hazardous energy and voltage levels. To avoid the risk of electric shock, avoid this area of the system, and refer any power supply maintenance to qualified service persons.**

## Checking the Input Voltage Setting

The power supply provides power for onboard resources, add-in boards, and drives. A switch on the system back panel (Figure 2-1) can be used to set the power supply to operate at:

- 115 V ac (in the range of 100-120 V ac), or
- 230 V ac (in the range of 200-240 V ac)

To verify that your system has the correct setting for your environment, check the input power selection switch. For power supply output ratings, see Chapter 7.



OM04193

**Figure 2-1. Check the Input Voltage Setting**



## Checking the Power Cord



### WARNING

**Do not attempt to modify or use the supplied AC power cord if it is not the exact type required.**

In some cases, the power cord supplied with this system might not be compatible with the AC wall outlet in your region. If this is true, you must obtain a suitable power cord that meets the following criteria:

- The cord must be rated for use at the AC voltage available, with a current rating that is at least 125% of the current rating of the product.
- The AC plug end must be terminated in a grounding-type male plug designed for use in your region. The cord must be labeled or marked to indicate it has been certified by an agency acceptable in your region.
- The connector at the product end must be an IEC 320, sheets C13-14, female connector (or the equivalent EN 60 320 connector).
- The cord must be less than 14.8 feet (4.5 meters) long and be created with <HAR> (harmonized) or VDE certified cordage.

## Connecting Devices When Configuring the System

To configure the system, you must add a monitor and keyboard to the system. If the system normally operates without a monitor or keyboard (for example, as a network server), you may remove these devices after running Setup (described in Chapter 3).

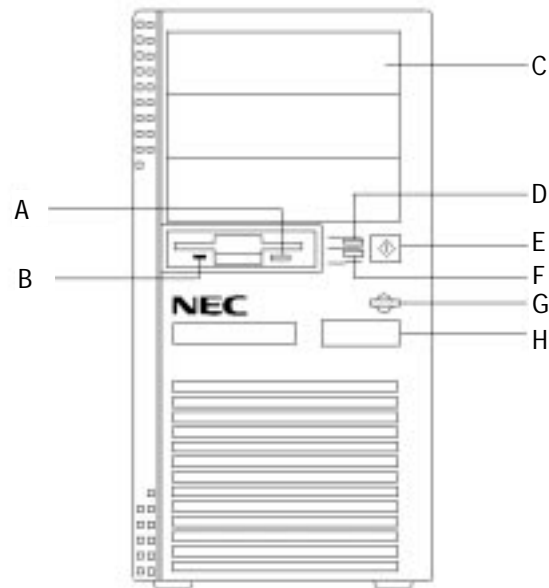
## Before Installing Optional Items

Before installing other option, such as optional boards and software, connect the keyboard and monitor and let the power-on self test (POST) run. Then, when first start-up is successful, add your drives, boards, system board components, and software.

- Chapter 3 describes how to run the Setup program. Run Setup at first start-up and at any time when you change the configuration by adding or removing optional parts.
- Chapter 4 describes how to take apart and reassemble the system.
- Chapter 5 describes how to install and configure system board options.

If the POST is not successful, see "Turning on the System at First Startup" in this chapter and "Problems at Initial System Start-up" in Chapter 6.

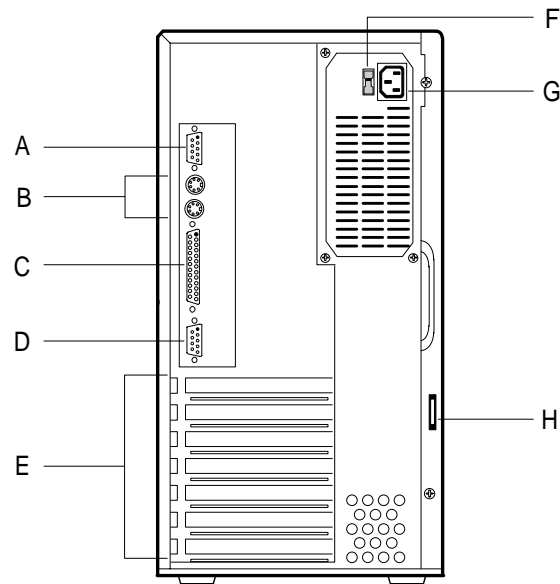
## Front Panel Controls and Indicators



**Figure 2-2. Front Panel Controls and Indicators**

- A. Diskette eject button. Press to eject a diskette from the drive.
- B. Diskette drive light. Illuminates when the system reads or writes data to the floppy disk.
- C. Bays for 5.25-inch devices, CD-ROM reader (not shown) installed in the bottom slot.
- D. Power on/off light. Illuminates when the system power is on.
- E. Power on/off button. Press to turn the system power on or off.
- F. Hard disk light. Illuminates when the system reads or writes data to a hard disk.
- G. Reset button. Use this button to reset the system.
- H. IR Window. The infrared (IR) window is for wireless communication. The interface uses infrared as the transmission medium instead of a traditional cable. The IR window lets you transfer files to or from portable devices such as laptops and personal digital assistance (PDA) products using application software supporting IrDA data transfer.

## Back Panel Connectors and Features



OM04192

**Figure 2-3. Back Panel Connectors and Features**

- A. Serial port 1 connector
- B. PS/2-style keyboard/mouse connectors
- C. Parallel port connector
- D. Serial port 2 connector
- E. Add-in board expansion slots (standard installed boards are not shown)
- F. Input voltage select switch
- G. Socket for AC power cord
- H. Padlock slot



**Note**

You can plug the mouse and keyboard into either of the PS/2-style connectors. The system automatically detects the presence of the keyboard and mouse at boot up.

## Resetting the System

Resetting the system:

- Clears the system memory
- Restarts the power-on self test (POST)
- Reinitializes all peripherals
- Loads the operating system

There are three ways to reset the system:

- Press <Ctrl + Alt + Del>
- Press the reset button
- Cycle the system power. To do this:
  1. Press the power on/off button to turn off system power.
  2. Wait at least 20 seconds.
  3. Press the power on/off button to turn on system power. The system powers up and begins the power-on self test (POST).

## Turning on the System at First Start-up

To power up the system for the first time, do the following procedure:

1. All connections should be done while the system is off. Connect the female end of the AC power cord into the AC power input socket at the rear of the system.
2. Plug the male end of the power cord into a grounded electrical outlet.
3. Connect components such as a keyboard and video monitor.
4. Press the power on/off button (the power light on the front panel will go on). The system immediately begins the power-on self test (POST).

When you boot the system, the POST checks the settings stored in CMOS RAM against the actual hardware configuration. During the memory test, the POST displays the amount of memory that it has tested. The POST can take up to 30 seconds to complete. If you do not want to wait for the memory test to complete, you can stop the test after it starts by pressing the <Esc> key. If you want to go into the Setup program, press the <F1> key after the POST starts the memory test, but before the system boots up (see Setup, Chapter 3).

After booting the system, the POST may find the following possibilities.

What happens	What to do
If the settings in CMOS RAM <i>match</i> the hardware configuration, and if the POST does not find any errors, the power-on testing continues.	No action needed.
If the POST finds a fatal error (an error that prevents the system from continuing the boot process), it generates a series of beeps. A specific number of beeps indicates a certain error message.	Record the number of beeps. See Chapter 6 for a description of the system beep codes and troubleshooting procedures.
If the POST finds a non-fatal error (an error that doesn't stop the boot process from continuing), the system displays a message in the following format:  Error Message Line 1  Error Message Line 2  Press <F1> for Setup,  <Esc> to Boot	Locate the error message in Chapter 6, and take action as indicated under the explanation for the error message. If needed, run the Setup program.
If you need to reconfigure the system setup, start the Setup program.	Reboot the system and press <F1> as soon as you see the message "Press <F1> Key if you want to run SETUP." You have about five seconds to press <F1> to enter Setup before the boot process continues.
If you need to begin again, reboot the system.	Press <Ctrl + Alt + Del>.

## Setting Up Drives

See Chapter 4 for information about physically installing a drive. The Setup program (Chapter 3) includes information about the drive types installed. If you install an IDE hard disk drive, you do not have to run Setup. The system BIOS automatically configures IDE drives during the boot up process. If you are installing a non-IDE hard disk drive, see the manufacturer's instructions and Chapter 3 in this manual for information about specifying your drive.



### **Note**

The hard disk drive comes installed in the system. You must install an operating system.



# Using the Setup Program **3**

---

This chapter tells how to use the Setup program that is built into the system BIOS. The Setup program makes it possible to change configuration information (such as the types of peripherals that are installed) and the boot-up sequence for the system. The Setup information is stored in CMOS random access memory (RAM) and is backed up by a battery when power to the system is off.

If the system does not operate as described here, see the chapter titled “Solving Problems” for problem descriptions and error messages.

If you want to go into the Setup program, reboot the system and press <F1> as soon as you see the message “Press <F1> Key if you want to run SETUP.” You have about five seconds to press <F1> to enter Setup before the boot process continues.

## **Make a Record of the Setup Configuration**

To make sure you have a reference to the Setup values for your system, we recommend you write down the current settings and keep this record up-to-date.



## Overview of the Setup Menu Screens

The Setup program initially displays the Main menu screen. In each screen there are options for modifying the system configuration. Select a menu screen by pressing the left <←> or right <→> arrow keys. Use the up <↑> or down <↓> arrow keys to select items in a screen. Use the <Enter> key to select an item for modification. For certain items, pressing <Enter> brings up a subscreen. After you have selected an item, use the arrow keys to modify the setting.

Setup Menu Screen	Description
Main	For setting up and modifying basic options, such as time, date, diskette drives, and hard drives.
Advanced	For modifying the more advanced features, such as peripheral configuration and advanced chipset configuration.
Security	For specifying passwords that can be used to limit access to the system.
Exit	For saving or discarding changes.

Setup Subscreen	Description
Floppy Options	For configuring diskette drives.
Primary/Secondary IDE Master/Slave Configuration	For configuring IDE hard drives.
Boot Options	For modifying options that affect the system boot up, such as the boot sequence.
Peripheral Configuration	For modifying options that affect the serial ports, the parallel port, and the disk drive interfaces.
Advanced Chipset Configuration	For modifying options that affect memory and system busses.
Plug and Play Configuration	For modifying options that affect the system's Plug and Play capabilities.

## Overview of the Setup Keys

The following keys have special functions in the BIOS Setup program.

Setup Key	Description
<F1>	Pressing the <F1> key brings up a help screen for the current item.
<Esc>	Pressing the <Esc> key takes you back to the previous screen. Pressing <Esc> in the Main, Advanced, Security, or Exit screen allows you to Exit Discarding Changes (see later in this chapter).
<Enter>	Pressing the <Enter> key selects the current item or option.
<↑>	Pressing the up arrow <↑> key changes the selection to the previous item or option.
<↓>	Pressing the down arrow <↓> key changes the selection to the next item or option.
<←> <→>	Pressing the left <←> or right arrow <→> keys in the Main, Advanced, Security, or Exit menu screens changes the menu screen. Pressing either key in a subscreen does nothing.
<F5>	Pressing the <F5> key allows you to Load Setup Defaults (see later in this chapter).
<F6>	Pressing the <F6> key allows you to Discard Changes (see later in this chapter).
<F10>	Pressing the <F10> key allows you to Exit Saving Changes (see later in this chapter).

## **Main BIOS Setup Screen**

This section describes the Setup options found on the main menu screen. If you select certain options from the main screen (e.g., Primary IDE Master), the Setup program switches to a subscreen for the selected option.

### **System Date**

Specifies the current date. Select the month from a pop-up menu.

### **System Time**

Specifies the current time.

### **Floppy Options**

When selected, this pops up the Floppy Options subscreen.

### **Primary IDE Master**

Reports if an IDE device is connected to the Primary IDE Master interface. When selected, this brings up the Primary IDE Master Configuration subscreen.

### **Primary IDE Slave**

Reports if an IDE device is connected to the Primary IDE Slave interface. When selected, this brings up the Primary IDE Slave Configuration subscreen.

### **Secondary IDE Master**

Reports if an IDE device is connected to the Secondary IDE Master interface. When selected, this brings up the Secondary IDE Master Configuration subscreen.

### **Secondary IDE Slave**

Reports if an IDE device is connected to the Secondary IDE Slave interface. When selected, this brings up the Secondary IDE Slave Configuration subscreen.

## **Language**

Specifies the language of the text strings used in the Setup program and the BIOS. The options are any installed languages.

## **Boot Options**

When selected, this brings up the Boot Options subscreen.

## **Video Mode**

Reports the video mode. There are no options.

## **Mouse**

Reports if a mouse is installed or not. There are no options.

## **Base Memory**

Reports the amount of base memory. There are no options.

## **Extended Memory**

Reports the amount of extended memory. There are no options.

## **Floppy Options Subscreen**

### **Floppy A:**

Reports if a diskette drive is connected to the system. There are no options.

### **Floppy B:**

Reports if a second diskette drive is connected to the system. There are no options.

## **Floppy A: Type**

Specifies the physical size and capacity of the diskette drive. The options are Disabled, 360 KB, 5.25-inch; 1.2 MB, 5.25-inch; 720 KB, 3.5-inch; 1.44/1.25 MB, 3.5-inch; 2.88 MB, 3.5-inch. The default is 1.44/1.25 MB, 3.5-inch.

## **Floppy B: Type**

Specifies the physical size and capacity of the diskette drive. The options are Disabled, 360 KB, 5.25-inch; 1.2 MB, 5.25-inch; 720 KB, 3.5-inch; 1.44/1.25 MB, 3.5-inch; 2.88 MB, 3.5-inch. The default is Disabled.

## **Primary/Secondary IDE Master/Slave Configuration Screens**

There are four subscreens used to enable IDE devices: Primary IDE Master, Primary IDE Slave, Secondary IDE Master, and Secondary IDE Slave. All four subscreens contain the same eight fields described below.

### **IDE Device Configuration**

Used to manually configure the hard drive or have the system auto configure it. The options are Auto Configured, User Definable, and Disabled. The default is Auto Configured. If you select User Definable, the Number of Cylinders, Number of Heads, and Number of Sectors items can be modified. If you select Disabled, the BIOS will not scan for a drive on that interface.

### **Number of Cylinders**

If Hard Disk Type is set to User Definable, you must type the correct number of cylinders for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of cylinders for your hard disk and cannot be modified.

### **Number of Heads**

If Hard Disk Type is set to User Definable, you must type the correct number of heads for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of heads for your hard disk and cannot be modified.

## Number of Sectors

If Hard Disk Type is set to User Definable, you must type the correct number of sectors for your hard disk. If Hard Disk Type is set to Auto Configured, this reports the number of sectors for your hard disk and cannot be modified.

## Maximum Capacity

Reports the maximum capacity of your hard disk. It is calculated from the number of cylinders, heads, and sectors. There are no options here.

## IDE Translation Mode

Specifies the IDE translation mode. The options are Standard CHS (standard cylinder head sector — less than 1024 cylinders), Logical Block, Extended CHS (extended cylinder head sector — greater than 1024 cylinders), and Auto Detected (BIOS detects IDE drive support for LBA). The default is Auto Detected.



### **CAUTION**

Do not change this from the option selected when the hard drive was formatted. Changing the option can result in corrupted data.

## Multiple Sector Setting

Sets the number of sectors transferred by an IDE drive per interrupt generated. The options are Disabled, 4 Sectors/Block, 8 Sectors/Block, or Auto Detected. The default is Auto Detected. Check the specifications for your hard disk drive to determine which setting provides optimum performance for your drive.

## Fast Programmed I/O Modes

Sets how fast transfers on the IDE interface occur. The options are Disabled or Auto Detected. The default is Auto Detected. If set to Disabled, transfers occur at a less than optimized speed. If set to Auto Detected, transfers occur at the drive's maximum speed.

## **Boot Options Subscreen**

This section describes the options available on the Boot Options subscreen.

### **First Boot Device**

Sets which drive the system checks first to find an operating system to boot from. The options are Disabled, Floppy, Hard Disk, CD-ROM, and Network. The default is Floppy.

### **Second Boot Device**

Sets which drive the system checks second to find an operating system to boot from. The options are Disabled, Floppy, Hard Disk, CD-ROM, and Network. The default is Hard Disk.

### **Third Boot Device**

Sets which drive the system checks third to find an operating system to boot from. The options are Disabled, Floppy, Hard Disk, CD-ROM, and Network. The default is CD-ROM.

### **Fourth Boot Device**

Sets which drive the system checks fourth to find an operating system to boot from. The options are Disabled, Floppy, Hard Disk, CD-ROM, and Network. The default is Disabled.

### **System Cache**

Enables or disables both the primary and the secondary cache memory. The options are Enabled or Disabled. The default is Enabled.

### **Boot Speed**

Sets the system's boot speed. The options are Deturbo and Turbo. The default is Turbo. If Turbo is selected, boot-up occurs at full speed. If Deturbo is selected, the board operates at a slower speed.

## Num Lock

Sets the beginning state of the Num Lock feature on your keyboard. The options are On and Off. The default is Off.

## Setup Prompt

Turns on (or off) the “Press <F1> Key if you want to run Setup” prompt during the power-up sequence. The options are Enabled and Disabled. The default is Enabled.



### Note

This option has no effect on your ability to access the Setup program. It only toggles the prompt.

## Typematic Rate Programming

Sets the typematic rates. The options are Default and Override. The default is Default. Choosing Override enables Typematic Rate Delay and Typematic Rate.

## Typematic Rate Delay

Sets how long it takes for the key-repeat function to start when you hold down a key on the keyboard. The options are 250, 500, 750, and 1000 millisecond delays. The default is 250. If Typematic Rate Programming is set to Default, this option will not be visible.

## Typematic Rate

Sets the speed at which characters repeat when you hold down a key on the keyboard. The higher the number, the faster the characters repeat. The options are 6, 8, 10, 12, 15, 20, 24, and 30 characters per second. The default is 6. If Typematic Rate Programming is set to Default, this option will not be visible.



## **Advanced Screen**

This section describes the Setup options found on the Advanced menu screen. If you select certain options from the Advanced screen (e.g., Peripheral Configuration), the Setup program switches to a subscreen for the selected option. Subscreens are described in the sections following the description of the Advanced screen options.

### **Processor Type**

Reports the CPU type. There are no options.

### **Processor Speed**

Reports the CPU clock speed. There are no options.

### **Cache Size**

Reports the size of the secondary cache. There are no options.

### **Peripheral Configuration**

When selected, this brings up the Peripheral Configuration subscreen.

### **Advanced Chipset Configuration**

When selected, this brings up the Advanced Chipset Configuration subscreen.

### **Plug and Play Configuration**

When selected, this brings up the Plug and Play Configuration subscreen.

## **Peripheral Configuration Subscreen**

This section describes the screens for the peripheral configuration subscreen.

## Configuration Mode

Enables you to choose between setting the peripheral configuration yourself, or having the system do it. The options are Auto and Manual. The default is Auto.

When Auto is selected, the system peripherals are automatically configured during power up. The options below for PCI IDE Interface, Floppy Interface, Serial Port 1 and Serial Port 2 Addresses, Serial Port 2 IR Mode, and the Parallel Port Address cannot be modified. The settings displayed for those options reflect the current state of the hardware.

## PCI IDE Interface

Enables or disables the PCI IDE hard disk interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

## Floppy Interface

Enables or disables the diskette drive interface. The options are Enabled and Disabled. The default is Enabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

## Serial Port 1 Address

Selects the address and IRQ of serial port 1. The options are Disabled; COM1, 3F8h, IRQ4; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. The default is COM1, 3F8h, IRQ4. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM1, 3F8h, IRQ4) as the serial port 1 address and IRQ, regardless of what is selected under the Serial Port 1 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

## Serial Port 2 Address

Selects the address and IRQ of serial port 2. The options are Disabled; COM2, 2F8h, IRQ3; COM3, 3E8h, IRQ4; and COM4, 2E8h, IRQ3. The default is COM2, 2F8h, IRQ3. If the Configuration Mode is set to Auto, the Setup program assigns the first free COM port (normally COM2, 2F8h, IRQ3) as the serial port 2 address and IRQ, regardless of what is selected under the Serial Port 2 Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

**Note**

If either serial port address is set, the address it is set to will not appear in the options dialog box of the other serial port. If an ATI *mach32*<sup>i</sup> or an ATI *mach64*<sup>i</sup> video controller is active, the COM4, 2E8h, IRQ3 address will not appear in the options dialog box of either serial port.

**Serial Port 2 IR Mode**

Makes Serial Port 2 available to infrared applications. The options are Enabled and Disabled. The default is Disabled. (If Configuration Mode is set to Auto, this option cannot be modified.)

**Parallel Port Address**

Selects the address and IRQ of the parallel port. The options are Disabled; LPT3, 3BCh, IRQ7; LPT1, 378h, IRQ7; LPT1, 378h, IRQ5; and LPT2, 278h, IRQ5. The default is LPT1, 378h, IRQ7. If the Configuration Mode is set to Auto, the setup program assigns LPT1, 378h, IRQ7 as the parallel port address, regardless of what is selected under the Parallel Port Address option. (If Configuration Mode is set to Auto, this option cannot be modified.)

**Parallel Port Mode**

Selects the mode for the parallel port. The options are Compatible, Bi-directional, EPP, and ECP. The default is Compatible. Compatible means the parallel port operates in AT-compatible mode. Bi-directional means the parallel port operates in bi-directional PS/2-compatible mode. EPP and ECP mean the parallel port operates high-speed, bi-directionally. This option is not affected by the Configuration Mode field above.

**Advanced Chipset Configuration Subscreen**

This section describes the options available on the Advanced Chipset Configuration Subscreen.

**Base Memory Size**

Sets the size of the base memory. The options are 512 KB and 640 KB. The default is 640 KB.

## **ISA LFB Size**

Sets the size of the linear frame buffer. The options are Disabled, 1 MB, 2 MB, and 4 MB. The default is Disabled. If this is set to anything other than Disabled, the ISA LFB Base Address field will appear.

## **ISA LFB Base Address**

Reports the base address of the LFB. There are no options. This field will not appear if the ISA LFB Size is set to Disabled.

## **Video Palette Snoop**

Controls the ability of a primary PCI graphics controller to share a common palette with an ISA add-in video card. The options are Enabled and Disabled. The default is Disabled.

## **Latency Timer (PCI Clocks)**

Sets the length of time an agent on the PCI bus can hold the bus when another agent has requested the bus. Valid numbers are between 0 and 256. The default is 66.

## **ECC Support**

Reports the presence or absence of ECC support. If parity SIMMs are installed on the system board, the field reports Detected and ECC is enabled. If non-parity SIMMs are installed, the fields reports Not Detected and ECC is not enabled. This field is information only; there are no options.

## **Plug and Play Configuration Subscreen**

This section describes the options found on the Plug and Play configuration subscreen.

## **Configuration Mode**

Sets how the BIOS gets information about ISA cards that do not have Plug and Play capabilities. The options are Use Setup Utility and Use ICU (ISA Configuration Utility). The default is Use Setup Utility.

If Use ICU is selected, the BIOS will depend on run-time software to ensure that there are no conflicts between ISA boards with Plug and Play capabilities and those without. Only Boot With PnP OS will be visible.

## **Boot with PnP OS**

Enables the PC to boot with an operating system capable of managing Plug and Play add-in cards. The options are None, Other, and Windows 95. The default is Windows 95.

## **ISA Shared Memory Size**

Enables you to specify a range of memory addresses that will be directed to the ISA bus rather than on-board memory. The options are Disabled, 16 KB, 32 KB, 48 KB, 64 KB, 80 KB, and 96 KB. The default is Disabled. If this is set to Disabled, the ISA Shared Memory Base Address (described below) will not be visible.

This field should be set to Enabled only when a non Plug and Play ISA card (legacy card) that requires non-ROM memory space is used. LAN cards that have on-board memory buffers are one example of this; video capture cards that have video buffer memory are another.

By default, allocation of upper memory is as follows: memory from C0000-C7FFF is automatically shadowed. (This memory range is typically reserved for video BIOS.) Memory from C8000-DFFFFh is initially unshadowed. The BIOS scans this range for any ISA expansion card BIOSes that may be present and notes their location and size. The BIOS will then autoconfigure the PCI and Plug and Play devices, shadowing the ROM requirements (other than video) into the area above E0000h until that area is full. It will then assign additional PCI and Plug and Play expansion cards to the area between C8000h and DFFFFh. If an ISA legacy card has non-ROM memory requirements, the autoconfigure routine may write into an area that is needed by the ISA expansion card. The ISA Shared Memory Size parameter signifies the autoconfigure routine that this block of memory is reserved and should not be shadowed.

Shadowing is a technique that copies a block of memory from an add-in card's ROM to the same address in system DRAM memory. This provides faster access and achieves higher performance.

## ISA Shared Memory Base Address

Sets the base address for the ISA Shared Memory. The options are C8000h, CC000h, D0000h, D4000h, D8000h, and DC000h. The default is C8000h. This setting could affect the ISA Shared Memory Size item. The value entered in the ISA Shared Memory Size item cannot extend to the E0000h address. For example, if a size of 64K was selected, options D4000h, D8000h, and DC000h will not be available.

## IRQ 5, 9, 10, 11

Sets the status of the IRQ. The options are Available and Used By ISA Card. The default is Available. The PCI auto-configuration code looks here to see if these interrupts are available for use by a PCI add-in board. If an interrupt is available, the PCI auto-configuration code can assign the interrupt to be used by the system. If your system contains an ISA add-in card that uses one of these interrupts, select Used By ISA Card for that interrupt.



### Note

IRQs 5, 9, 10, and 11 are the default user available IRQs. Depending on your configuration, this screen might show more interrupts than those listed here. If you have disabled the parallel port or either of the serial ports, or have not installed a PS/2 mouse, more IRQs will be available. See Chapter 7 for information on reserved and available IRQs.

## Security Screen

This section describes the two access modes that can be set using the options found on the Security screen, and then describes the Security screen options themselves.

### Administrative and User Access Modes

The options on the Security screen menu make it possible to restrict access to the Setup program by enabling you to set passwords for two different access modes: Administrative mode and User mode.

In general, Administrative mode has full access to the Setup options, whereas User mode has restricted access to the options. Thus, by setting separate Administrative and User passwords, a system administrator can limit who can change critical Setup values. The actual limitations depend on whether either the Administrative or User passwords or both are set. (See the table below for a description of how the passwords actually work together.)

To limit access to who can boot the system, set the User password. This is the password that the system asks for before booting. If only the Administrative password is set, the system boots up without asking for a password. If both passwords are set, you can enter either password to boot the system.

The following table shows the effects of setting the Administrative and User passwords. (The table is for reference only, and is not shown on the Security screen.) In the table, the statement “Can change a limited number of options” means you can change the system date and time, the User password, the security hot key, and unattended start.

## Administrative and User Password Functions

<b>Password Set</b>	<b>Administrative mode can . . .</b>	<b>User mode can . . .</b>	<b>Password Required During Boot Process</b>
Neither	Can change all options*	Can change all options*	None
Administrative only	Can change all options	Can change a limited number of options	None
User only	N/A	Can change all options	User
Both	Can change all options	Can change a limited number of options	Administrative or User

\* If no password is set, any user can change all Setup options.

## Security Screen Options

### User Password is

Reports if there is a User password set. There are no options.

### Administrative Password is

Reports if there is an Administrative password set. There are no options.

### Set User Password

Sets the User password. The password can be up to seven alphanumeric characters.

### Set Administrative Password

Sets the Administrative password. The password can be up to seven alphanumeric characters.



## Unattended Start

Controls when the security password is requested. The options are Enabled and Disabled. The default is Disabled. The User password must be enabled before you can enable this option. If Enabled is selected, the system boots, but the keyboard will be locked until the User password is entered.

## Security Hot Key (CTRL-ALT-)

Sets a hot key that, when pressed, locks the keyboard until the User password is entered. The Keyboard LEDs flash to indicate that the keyboard is locked. When you enter the User password, you do not have to press the <Enter> key.

## Exit Screen

This section describes the different ways to exit and save or not save changes made in the Setup program.

### Exit Saving Changes

Saves the changes to CMOS RAM and exits the Setup program. You can also press the <F10> key anywhere in the Setup program to do this.

### Exit Discarding Changes

Exits the Setup program without saving any changes. This means that any changes made while in the Setup program are discarded and **NOT SAVED**. Pressing the <Esc> key in any of the four main screens will do this.

### Load Setup Defaults

Resets all of the setup options to their defaults. You can also press the <F5> key anywhere in the Setup program to do this.

This selection loads the default Setup values from the ROM table.

### Discard Changes

Discards any changes you made during the current Setup session without exiting the program. This selection loads the CMOS RAM values that were present when the system was turned on. You can also press the <F6> key anywhere in the Setup program to do this.

# Taking Your System Apart **4**

---

This chapter describes how to take apart and reassemble the major parts of the system. Chapter 5 describes how to remove and install system board options.

⇒ **Note**

Your system model may include add-in boards and peripherals that are intentionally not shown in the figures.

## Before You Begin

- Be sure to do each procedure in the correct order.
- The procedures (and warnings) for removing and reinstalling the system cover are assumed to precede all other procedures described in this chapter.
- Set up an equipment log to record the system model and serial numbers, all installed options, and other information about the system. If you need this information, it will be easier to consult the log than to open up and examine the system.
- You will need a Phillips screwdriver (#2 bit) and a medium flat-bladed screwdriver. We recommend that you use an antistatic wrist strap and a conductive foam pad when working on the system.



**WARNING**

**Disconnect the system from its power source and from any telecommunications systems, networks or modems before doing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks, or modems before you open the system or do any procedures can result in personal injury or equipment damage. Hazardous voltage, current, and energy levels are present in this product.**



### **WARNING**

**The procedures are written for system integrators, engineers, and service technicians and should be done only by technically qualified personnel. The procedures assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.**

**Do not operate the system with the cover removed.**

**Always replace the cover before turning on the system.**



### **CAUTIONS**

Electrostatic discharge (ESD) can damage disk drives, add-in boards, and other components. Do the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the system, place the board flat on a grounded, static-free surface, component-side up. Use a conductive foam pad if available, but not the board wrapper. Do not slide the board over any surface.

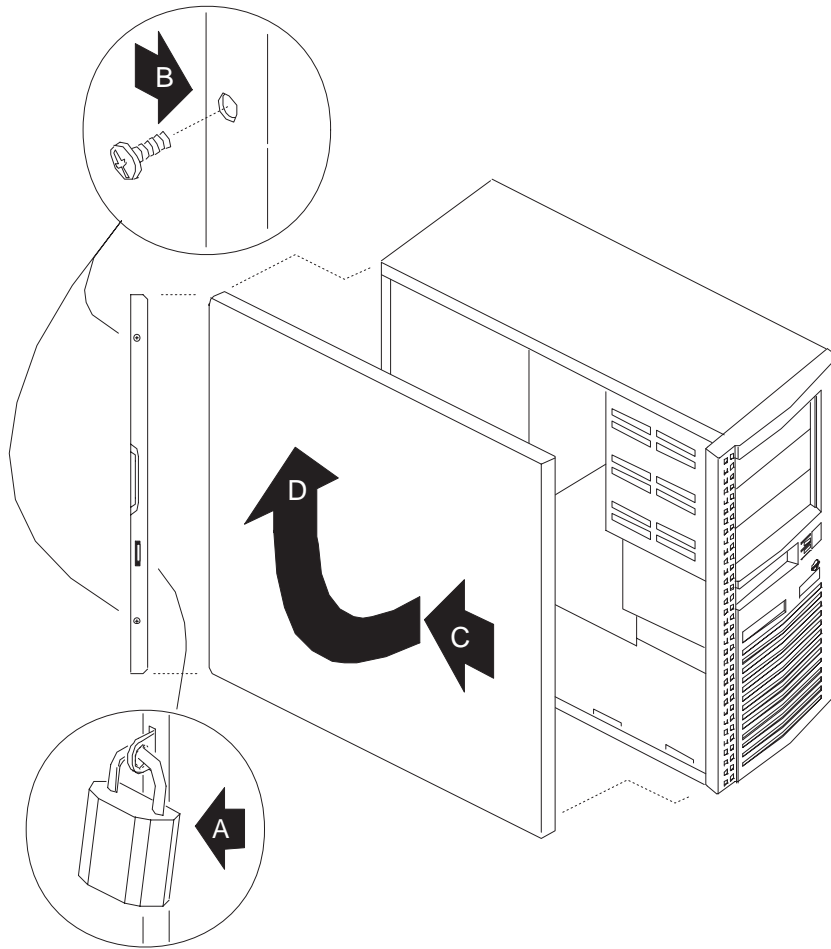
## Removing the System Cover



### CAUTION

For proper cooling and airflow, do not operate the system with the cover removed. Always replace the cover before turning on the system.

1. Observe the precautions in “Before You Begin.”
2. Turn the system power off with the on/off push-button switch on the front panel and unplug the AC power cord from the back of the chassis.
3. Put identification tags on all cables attached to the system.
4. Disconnect the cables from the system.
5. If you installed a padlock on the back of the system, unlock the padlock and remove it (Figure 4-1, A).
6. The system cover on the left side of the system (as viewed from the front) is secured with two screws at the rear of the system. Remove the screws (Figure 4-1, B).
7. Pull the cover so it slides backwards (Figure 4-1, C). Make sure the cover clears the padlock slot.
8. Pull the bottom of the cover out (like it was hinged at the top) until the bottom metal tabs clear their slots.
9. Slide the cover up until it comes free of the chassis (Figure 4-1, D).



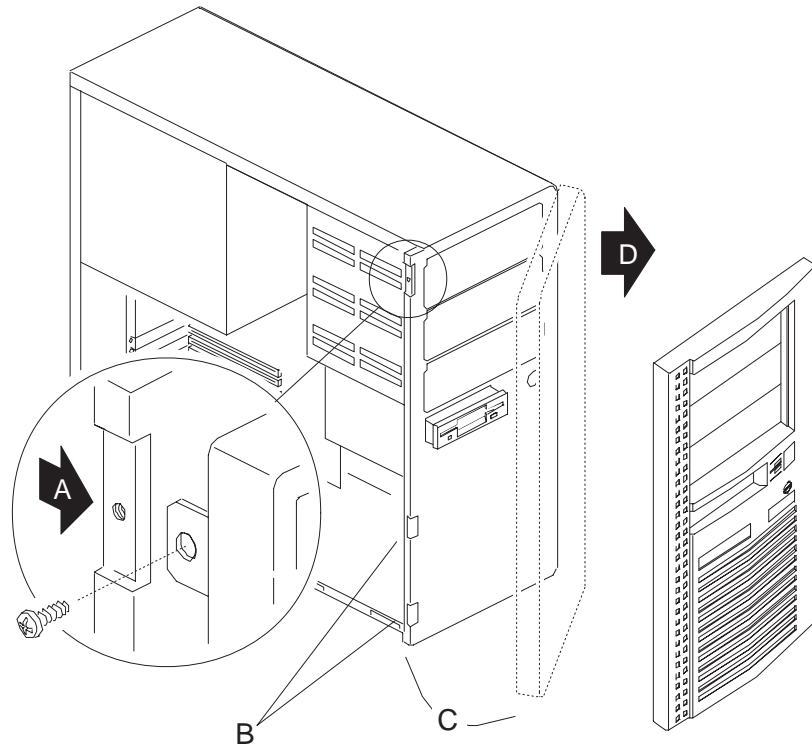
**Figure 4-1. Removing the System Cover**

## Replacing the System Cover

1. Observe the precautions in “Before You Begin.”
2. Check that you have not left any tools or loose parts inside the system. Check that everything is properly installed and tightened.
3. Insert the metal tabs on the top of the system cover into their slots on the chassis.
4. Insert the metal tabs on the bottom of the system cover into their slots on the chassis.
5. Slide the cover forward as far as it will go.
6. Replace and tighten the screws securing the system cover to the chassis.
7. For security, you can install a padlock on the system to prevent unauthorized removal of the cover from the chassis.
8. Reconnect all cables to the system.

## Removing the Bezel

1. Observe the precautions in “Before You Begin.”
2. Remove the system cover.
3. Remove the screw securing the bezel to the chassis (Figure 4-2, A).
4. Squeeze the two tabs so they clear their slots (Figure 4-2, B).
5. Pull the left side of the bezel out (like it was hinged on the right side) until the retaining screw tab, and the power button clear the chassis (Figure 4-2, C).
6. Slide the bezel to the right until it comes free.



**Figure 4-2. Removing the Bezel**

## **Replacing the Bezel**

1. Observe the precautions in “Before You Begin.”
2. Insert the metal tabs on the right side into their slots.
3. Squeeze the bezel and the chassis together along the left side so the tabs snap into their slots.
4. Replace and tighten the bezel retaining screw.

## Add-in Board Considerations

The next few procedures tell how to remove and install slot covers and add-in boards. As an aid to installing boards in your system, this section describes the arrangement and numbering conventions for the slot connectors on the system board.

Figure 4-3 shows the numbering convention for the connectors on the system board and for the slot openings on the back panel. Figure 4-3, A shows the slot openings on the system back panel, and Figure 4-3, B the connectors on the system board. The numbers are for reference only and are not actually printed on the system board or the back panel. There are two slot connectors numbered 3 in Figure 4-3 because slot opening 3 in the back panel can hold either a PCI or an ISA board (but not both at the same time). Due to the physical arrangement of the PCI and ISA slot connectors, slot opening 7 in the back panel is never used.

ISA-compatible add-in boards can be installed in any of the system board ISA slots. PCI-compatible add-in boards can be installed in any of the PCI slots. There are no board-length limitations; you can install full length add-in boards in any slot.

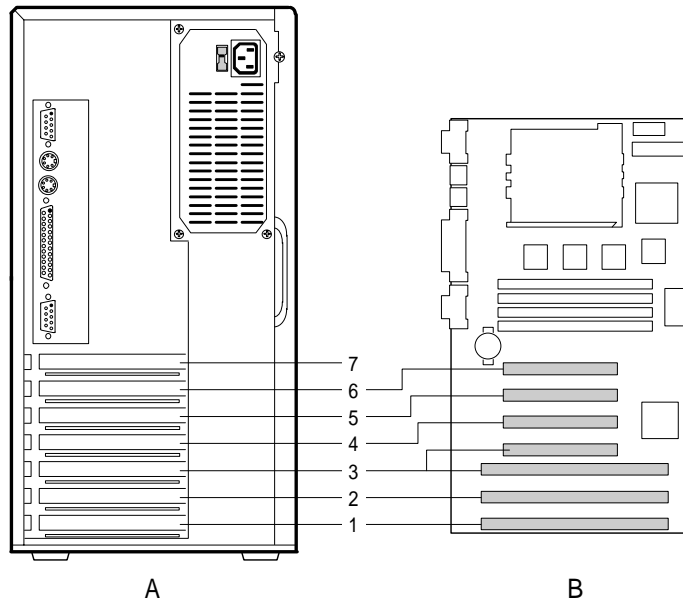


### CAUTION

Do not overload the system board by installing add-in boards that draw excessive current. The system is designed to provide 2 A (average) of +5 V power for each board in the system. The total +5 V current draw for add-in boards in a fully-loaded system (all six add-in board slots filled) must not exceed 12 A.

Add-in boards can be extremely sensitive to ESD and always require careful handling. Hold the board by the edges only; do not touch the electronic components or gold connectors. After removing a board from its protective wrapper or from the system, place it flat on a grounded, static-free surface, component-side up. Do not slide the board over any surface.



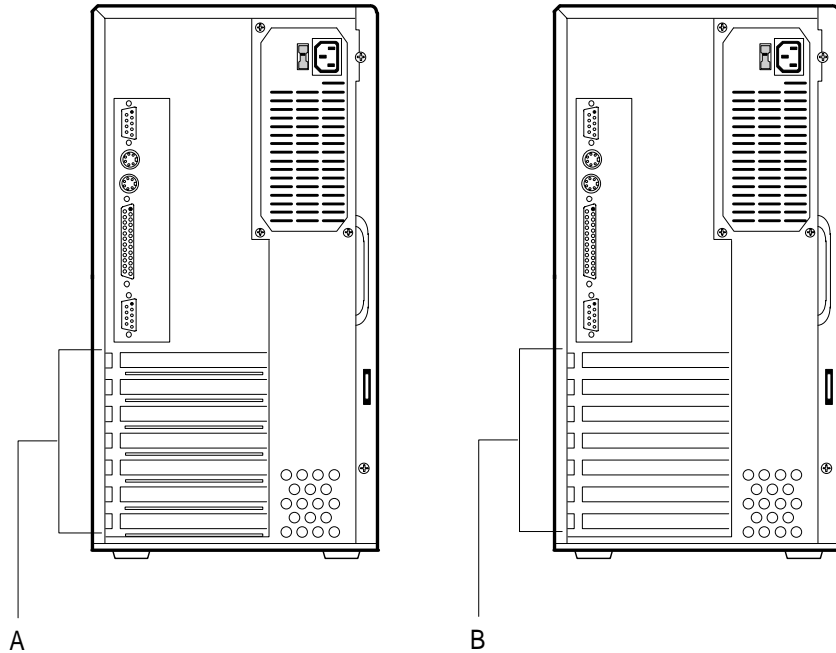


OM04173

**Figure 4-3. System Slot Numbering Convention**

## Removing Expansion Slot Covers

There are two types of chassis: those with breakout slot covers (Figure 4-4, A) and those with standard slot covers (Figure 4-4, B). This procedure tells how to remove both types of expansion slot covers.



OM04334

**Figure 4-4. Expansion Slot Cover Types**

## Removing Breakout Slot Covers

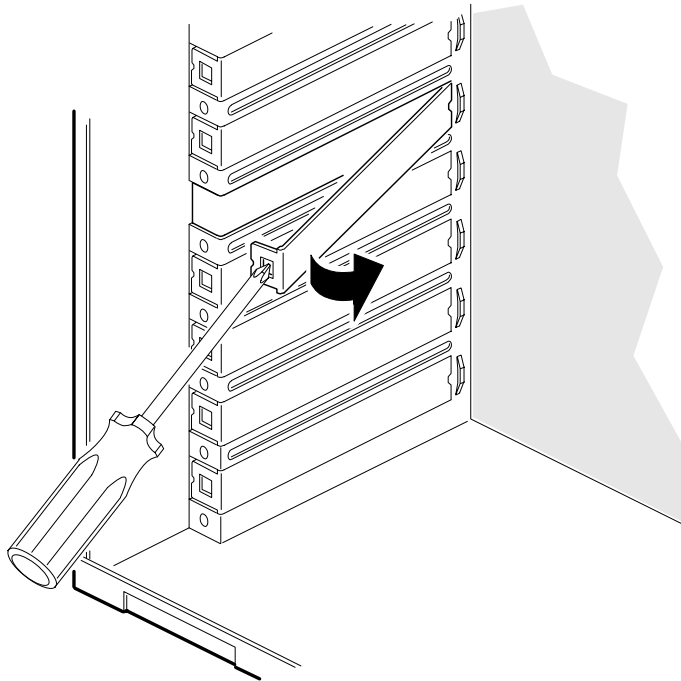
1. Observe the precautions in “Before You Begin.”



### CAUTION

Be careful to not damage components on the system board or add-in boards when doing this procedure. You may need to remove add-in boards that are next to the slot cover you want to remove.

2. Insert a #2 bit Phillips screwdriver into the top of the slot cover. Move the screwdriver and slot cover toward the inside of the chassis until the slot cover breaks away from the chassis (Figure 4-5). Lift the slot cover up and out.



OM04335

**Figure 4-5. Removing a Breakout Expansion Slot Cover**

## Removing Standard Slot Covers

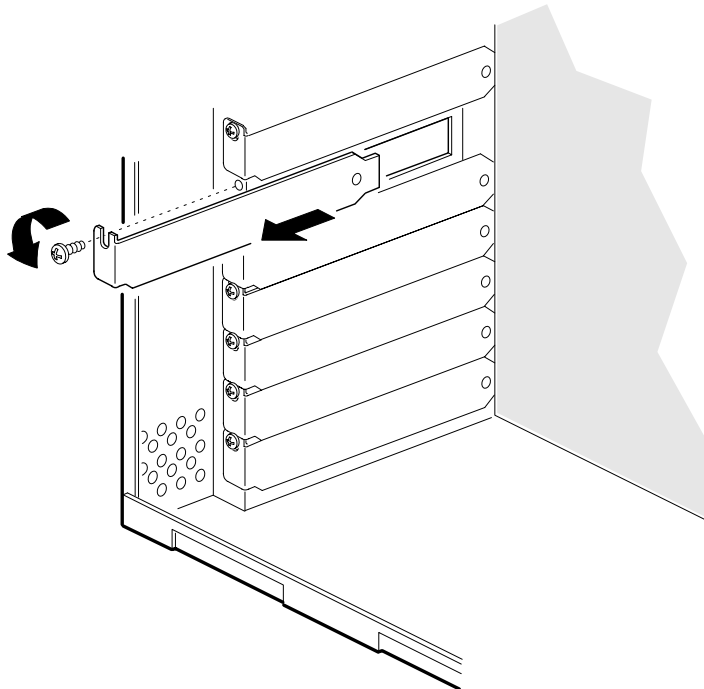
1. Observe the precautions in “Before You Begin.”



### CAUTION

Be careful to not damage components on the system board or add-in boards when doing this procedure. You may need to remove add-in boards that are next to the slot cover you want to remove.

2. Remove the expansion slot screw from the top of the slot cover (Figure 4-6). Lift the cover up and out. Save the slot cover in case you remove the board later.



OM04178

**Figure 4-6. Removing a Standard Expansion Slot Cover**

## Installing an Expansion Slot Cover

1. Observe the precautions in “Before You Begin.”
2. Using a standard metal slot cover, insert the cover into the slot at the base of the chassis and secure it with a screw.

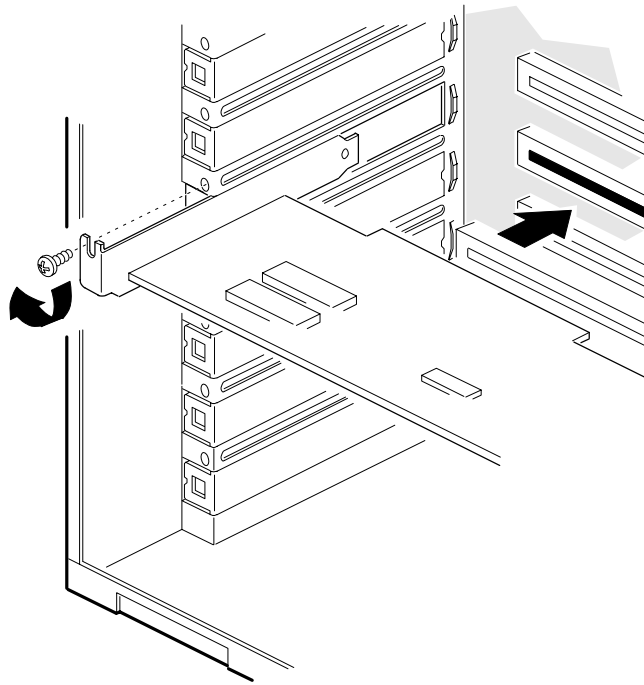


### Note

The bottom end of the cover fits *inside* the chassis, flush with the chassis wall, and the top end secures to the board guide with a screw.

## Installing an Add-in Board

1. Observe the precautions in “Before You Begin.”
2. Remove the screw and expansion slot cover from the slot you plan to use. If your chassis uses standard expansion slot covers (Figure 4-4, B), save the cover to reinstall if you decide not to install a board in that slot.
3. Remove the board from its wrapper and place it on a grounded, static-free surface.
4. Set any board jumpers or switches according to the manufacturer’s instructions.
5. Hold the board by its top edge or upper corners and firmly press the board into the connector on the system board (Figure 4-7).
6. Align the rounded notch in the retaining bracket with the threaded hole in the expansion slot frame (Figure 4-7). The retaining bracket fits into the space that was occupied by the expansion slot cover.
7. Insert a screw, but push the notch against the screw before tightening. Otherwise the bracket may interfere with the bracket of an adjacent slot cover or with another add-in board.
8. Connect cables (if any are needed) to the installed board.



OM04179

**Figure 4-7. Installing an Add-in Board**

## Removing an Add-in Board



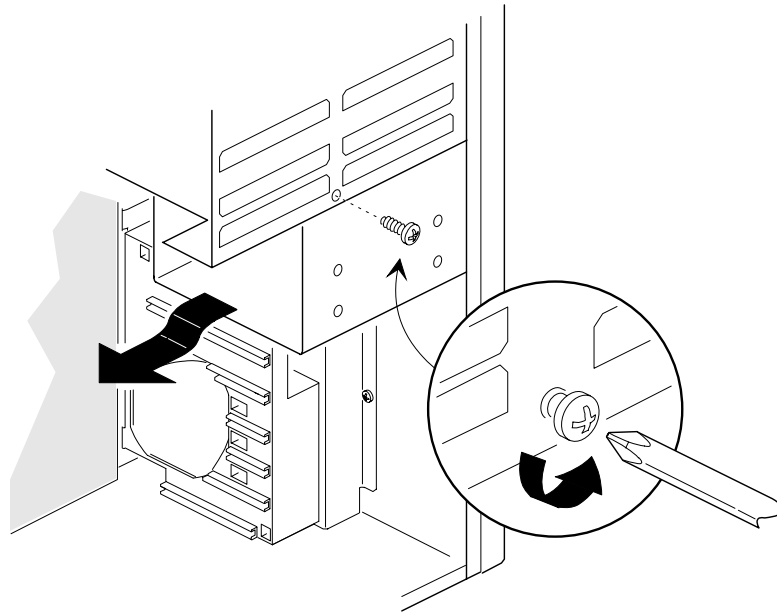
### Note

Expansion slot covers must be installed on all vacant slots to maintain the electromagnetic emissions characteristics of the system and to ensure proper cooling of the system components.

1. Observe the precautions in “Before You Begin.”
2. Disconnect any cables attached to the add-in board you are removing.
3. Remove the screw that holds the board retaining bracket to the chassis.
4. Hold the board at each end, and carefully rock it back and forth until the edge connectors pull free. Make sure that you do not scrape the board against other components.
5. Store the board in an antistatic wrapper.
6. If you disconnected cables from the board and you are not reinstalling this board or one like it, remove the cables from the system.
7. Install an expansion slot cover over the vacant slot.

## Removing the 3.5-inch Drive Bay

1. Observe the precautions in “Before You Begin.”
2. Disconnect the power cables and the ribbon data cables from any drives in the bay.
3. Remove the screw that secures the carrier to the 5.25-inch drive bay (Figure 4-8).
4. Slide the carrier back until the tabs hit their stops (Figure 4-8).
5. Pull the carrier away from the 5.25-inch drive bay and remove it from the chassis.



OM04197

**Figure 4-8. Removing the 3.5-inch Drive Bay**

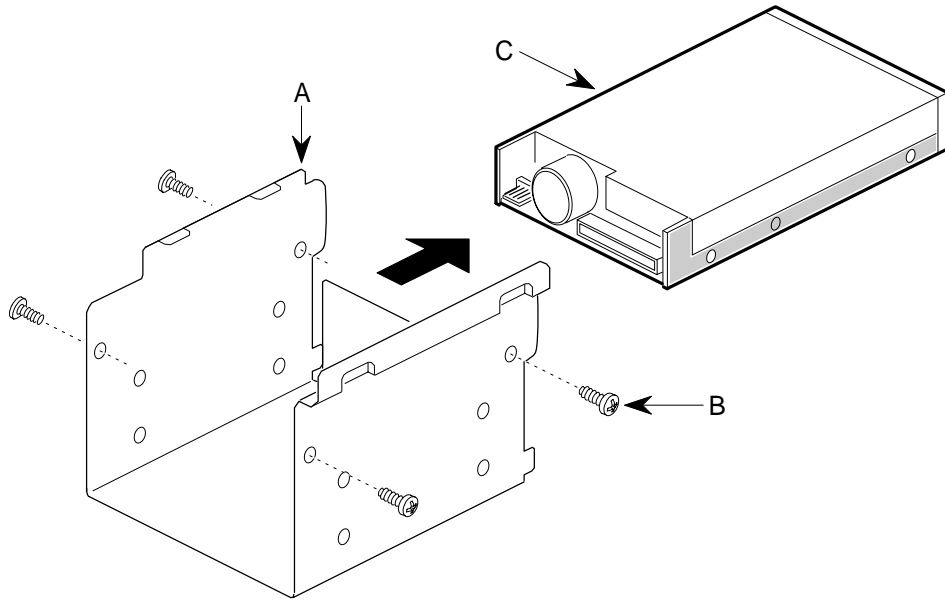


## Installing the 3.5-inch Drive Bay

1. Observe the precautions in “Before You Begin.”
2. Insert the tabs on the carrier into their slots on the bottom and side of the 5.25-inch drive bay.
3. Slide the carrier all the way forward until the screw hole in the 5.25-inch drive bay and the hole in the carrier line up.
4. Insert the screw that secures the carrier to the 5.25-inch drive bay into its hole and tighten it.
5. If there is a drive in the carrier, attach the power cable and the ribbon data cable to the drive.

## Removing the 3.5-inch Diskette Drive

1. Observe the precautions in “Before You Begin.”
2. Remove the 3.5-inch drive bay (Figure 4-9, A).
3. Remove the four screws holding the drive to the drive carrier (Figure 4-9, B).
4. Slide the drive out of the drive bay (Figure 4-9, C).
5. If you do not plan to replace the drive you just removed, and there are no other diskette drives on the same data cable, disconnect the cable from the system board.
6. Replace the carrier in the system and run Setup (Chapter 3) to specify that the diskette drive is not installed.



OM04081

**Figure 4-9. Removing the 3.5-inch Diskette Drive**

## Installing a 3.5-inch Diskette Drive

1. Observe the precautions in “Before You Begin.”
2. Remove the 3.5-inch drive bay.
3. Remove the floppy disk drive from its protective wrapper and place it on an antistatic surface.
4. Set any drive jumpers or switches according to the manufacturer’s instructions.
5. Slide the floppy drive into the floppy drive carrier. Line the holes on the carrier up with the screw holes on the drive.
6. Insert and tighten four screws of the appropriate type and length (not supplied).
7. Install the 3.5-inch drive bay.
8. Attach the power cable and the data cable to the drive.

## Installing a Drive in the 3.5-inch Drive Bay

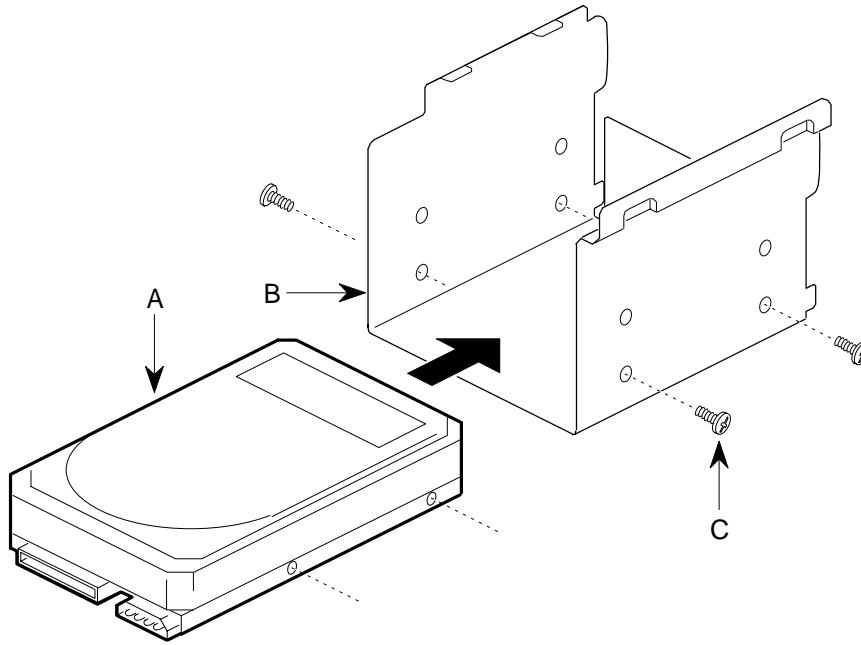
1. Observe the precautions in “Before You Begin.”
2. Remove the 3.5-inch drive bay.
3. Remove the 3.5-inch disk drive from its protective wrapper and place it on an antistatic surface.
4. Set any drive jumpers, switches, or terminating resistors according to the manufacturer’s instructions.
5. Slide the drive into the drive carrier until the screw holes line up.
6. Secure the drive to the bay with four screws of the appropriate type and length (Figure 4-10).
7. Connect a power cable from the power supply to the drive. If the drive is an IDE type, connect the data cable between the drive and the one of the PCI/IDE headers on the system board. If the drive is a non-IDE type, refer to the drive manufacturer’s instructions for connecting a data cable and interface board and for configuring the drive.



### Note

The system board provides two PCI/IDE headers for connecting IDE hard drives. You can connect up to two IDE drives (on the supplied cable) to each PCI/IDE header. If one PCI/IDE header already has two drives connected to it, you can connect additional IDE drives to the second PCI/IDE header.

8. Replace the 3.5-inch drive bay.
9. If you install a non-IDE drive or a different type of drive, run Setup to specify the drive type. You do not have to run Setup if are installing an IDE drive, or if you are replacing a drive with the same size and type of drive that was already configured in the system.



OM04078

**Figure 4-10. Installing an Internal Drive**

## **Removing a Drive from the 3.5-inch Drive Bay**

1. Observe the precautions in "Before You Begin."
2. Disconnect the data cables and power cables from any drives in the 3.5-inch drive bay.
3. Remove the 3.5-inch drive bay.
4. Remove the four screws that attach the drive to the 3.5-inch drive bay.
5. Remove the drive from the bay and place it on an antistatic surface.
6. Replace the 3.5-inch drive bay.
7. Replace the data cables and power cables on any remaining drives in the 3.5-inch drive bay.

## Installing a 5.25-inch Device

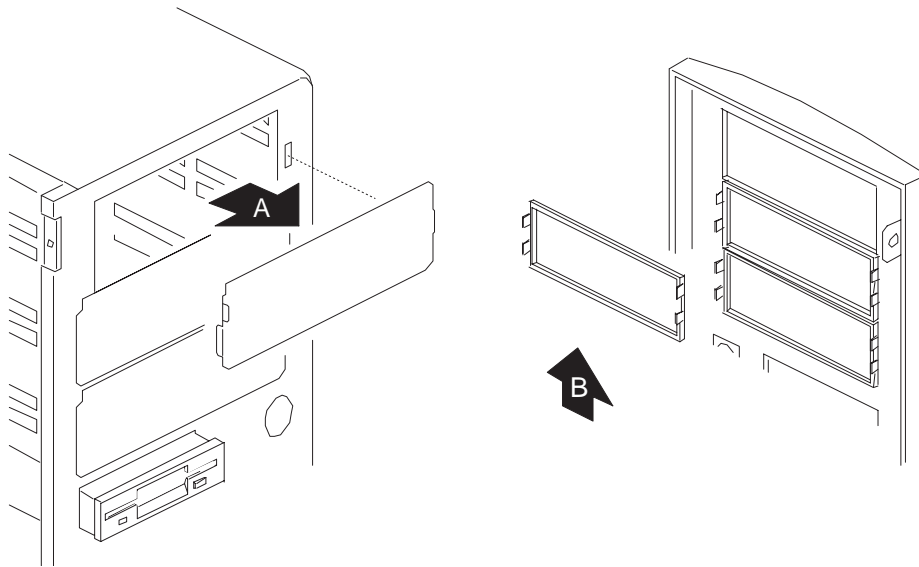
8. Observe the precautions in “Before You Begin.”
9. Remove the bezel.
10. Remove the snap-in EMI shield from the desired 5.25-inch bay by pushing the tab on the left side to the right and pulling the shield forward (Figure 4-11, A). Save the shield in case you need to replace it later.
11. If the device will be accessible from the front, release the tabs securing the panel to the bezel (Figure 4-11, B). Remove the filler panel.



### Note

If you are installing a device that is not accessible from the front, do not remove the plastic filler panel.

When removing a plastic filler panel, be careful not to break the panel or its tabs. Save all EMI shields, filler panels, and screws for reuse if necessary.



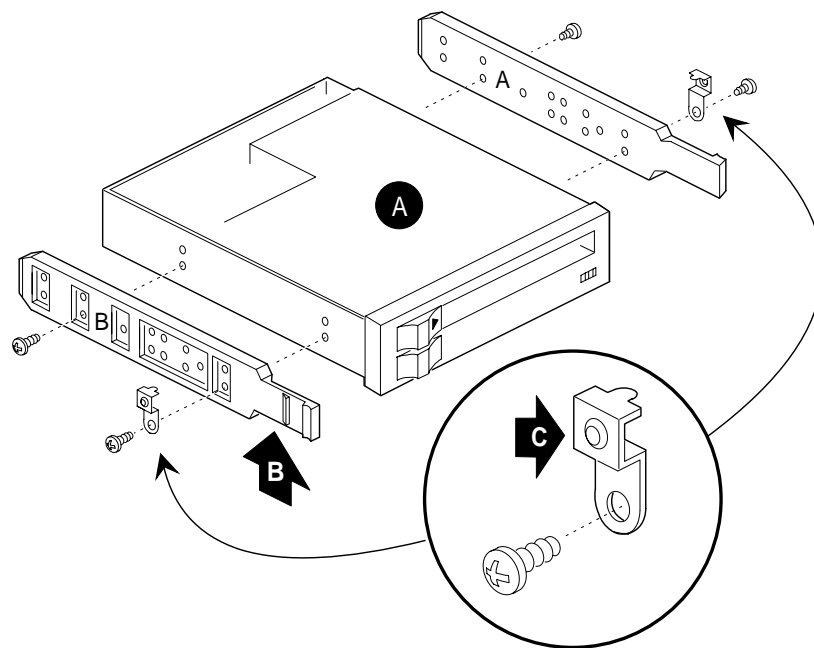
**Figure 4-11. Removing EMI Shields and Filler Panels**

5. Remove the device from its protective wrapper and place it on an antistatic surface. Record the model and serial number in the equipment log.
6. Set any device jumpers or switches according to the manufacturer's instructions.
7. Using four screws (not supplied) and two EMI/ESD grounding clips, attach a plastic, snap-in slide rail to each side of the device (Figure 4-12, A, B, C). Install the grounding clip under the screw head near the front of the device (Figure 4-12, C).



**Note**

The plastic slide rails come in left/right pairs (labeled A and B as shown); take care to position the rails on the drive as shown in Figure 4-12.

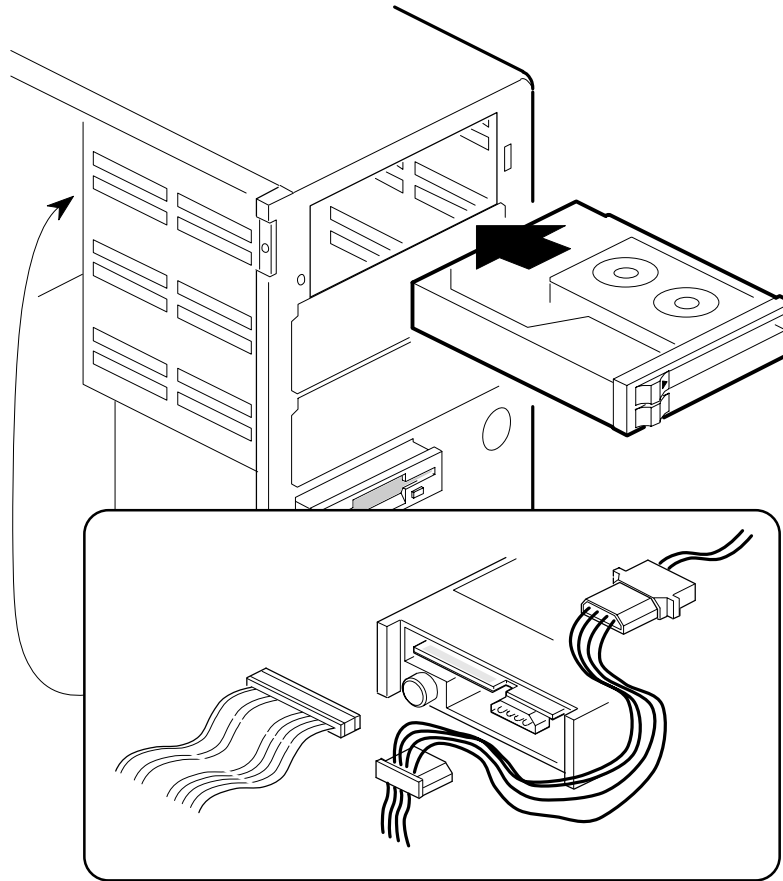


OM04180

**Figure 4-12. Installing the Snap-In Slide Rails**

8. Position the drive so that the plastic slide rails on each side of the device engage the front peripheral bay guide rails.

9. Push the drive into the bay until the slide rails lock in place.
10. Connect power and data cables to the device.



OM04080

**Figure 4-13. Installing a 5.25-inch Device**

11. Replace the bezel.
12. If you are installing a new or different type of drive, instead of replacing a drive already configured in the system, run Setup to specify the drive type. However, you do not have to run Setup if you install an IDE drive. The system automatically configures the IDE drive when you boot the system.

## Removing a 5.25-inch Device

1. Observe the precautions in “Before You Begin.”
2. Remove the bezel.
3. Disconnect the power and data cables attached to the device.
4. While squeezing the protruding plastic snap-in rails attached to the device towards each other (Figure 4-13), carefully slide the device out of the bay.
5. Replace the snap-in EMI shield.
6. Replace the filler panel and secure it to the bezel with two screws.
7. Replace the bezel.



## Removing the Power Supply



### **WARNING**

**This procedure should be done only by technically qualified personnel. Unplug the system before doing the procedures described here. Failure to disconnect the power before you open the system can result in personal injury or equipment damage.**

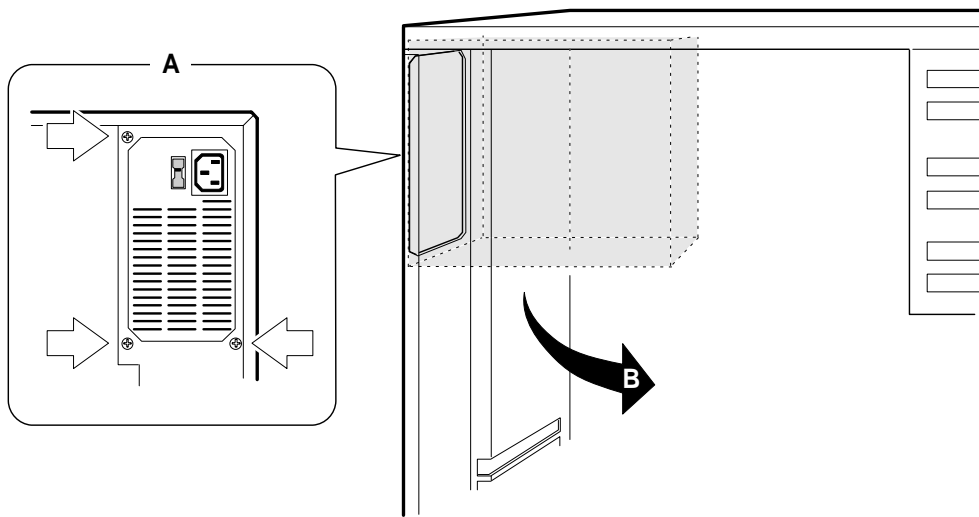
1. Observe the precautions in “Before You Begin.”
2. Label and disconnect power connectors from all peripheral devices.
3. Label and disconnect the power connector from the system board.
4. Remove the three screws securing the power supply to the chassis (Figure 4-14, A).



### **CAUTION**

Hold the power supply while removing the last screw to prevent the power supply from falling and damaging other system components.

5. Slide the power supply away from the rear of the chassis and lift it out of the chassis (Figure 4-14, B).



OM04198

**Figure 4-14. Removing the Power Supply**

## Installing the Power Supply



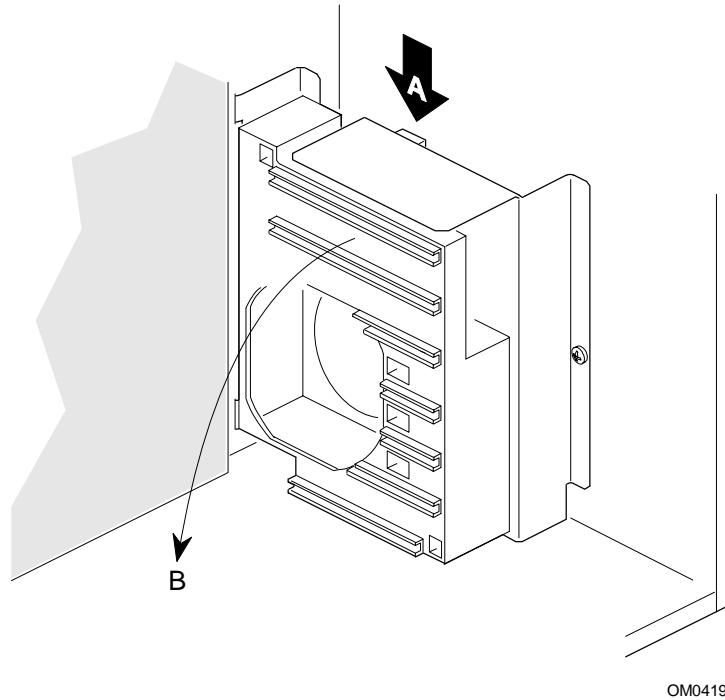
### **WARNING**

**This procedure should be done only by technically qualified personnel. Unplug the system before doing the procedures described here. Failure to disconnect the power before you open the system can result in personal injury or equipment damage.**

1. Observe the precautions in “Before You Begin.”
2. Place the power supply in the chassis.
3. Slide the power supply to the rear of the chassis until it is flush with the back panel.
4. Insert and tighten the three screws that secure the power supply to the back panel.
5. Connect the power connector to the system board.
6. Connect the power connectors to any peripherals.

## Removing the Card Guide Module

1. Observe the precautions in “Before You Begin.”
2. Remove any installed add-in boards.
3. Press in on the plastic clip that secures the card guide module to the bracket (Figure 4-15, A). Swing the module away from the bracket (Figure 4-15, B).



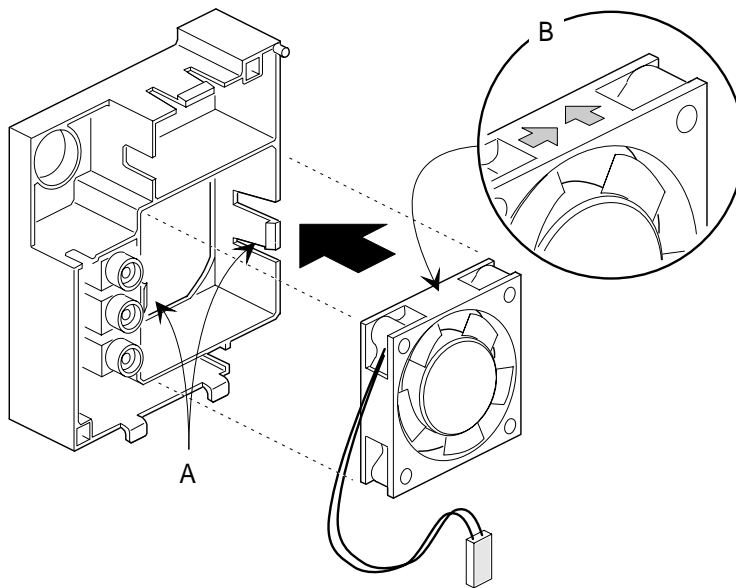
**Figure 4-15. Removing the Card Guide Module**

## Installing the Card Guide Module

1. Observe the precautions in “Before You Begin.”
2. Hook the bent plastic tabs on the card guide module in the holes in the bracket. Swing the module against the bracket and secure the module to the bracket by pressing the plastic clip on the module into the slot in the bracket.

## Installing an Optional Fan

1. Observe the precautions in “Before You Begin.”
2. Remove the card guide module.
3. Insert the fan in the card guide module with the arrows pointing as shown in Figure 4-16, B. The fan is held in the module by two plastic clips on the sides of the module (Figure 4-16, A).
4. Dress the fan and speaker wires inside the module so the cables won't be pinched when you install the module on the bracket.
5. Install the card guide module in the chassis.
6. Attach the fan's power connector to pins 1-3 of the card slot fan connector on the system board. See Chapter 7 for the location of the card slot fan connector.

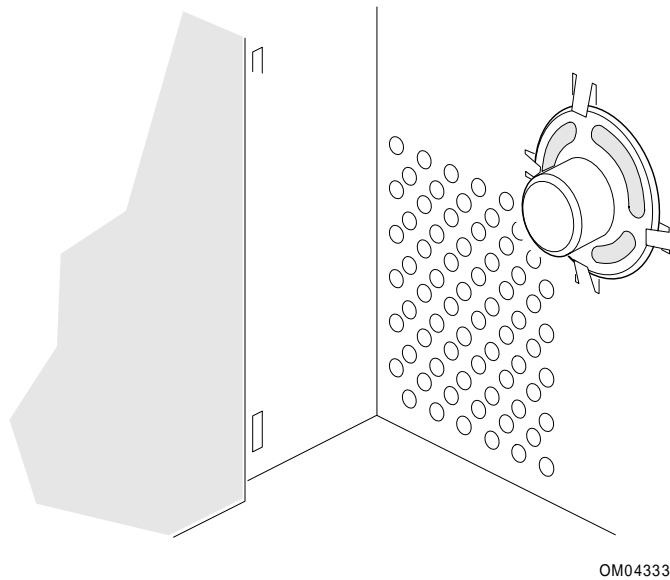


OM04332

**Figure 4-16. Installing a Fan**

## Installing an Optional Speaker

1. Observe the precautions in “Before You Begin.”
2. Remove the card guide module.
3. Insert the speaker in the location shown (Figure 4-17).
4. Install the card guide module.
5. Remove the on-board speaker jumper on the system board. See Chapter 7 for the location of the speaker connector.
6. Attach the speaker wires to the speaker connector on the system board.



**Figure 4-17. Installing the Speaker**

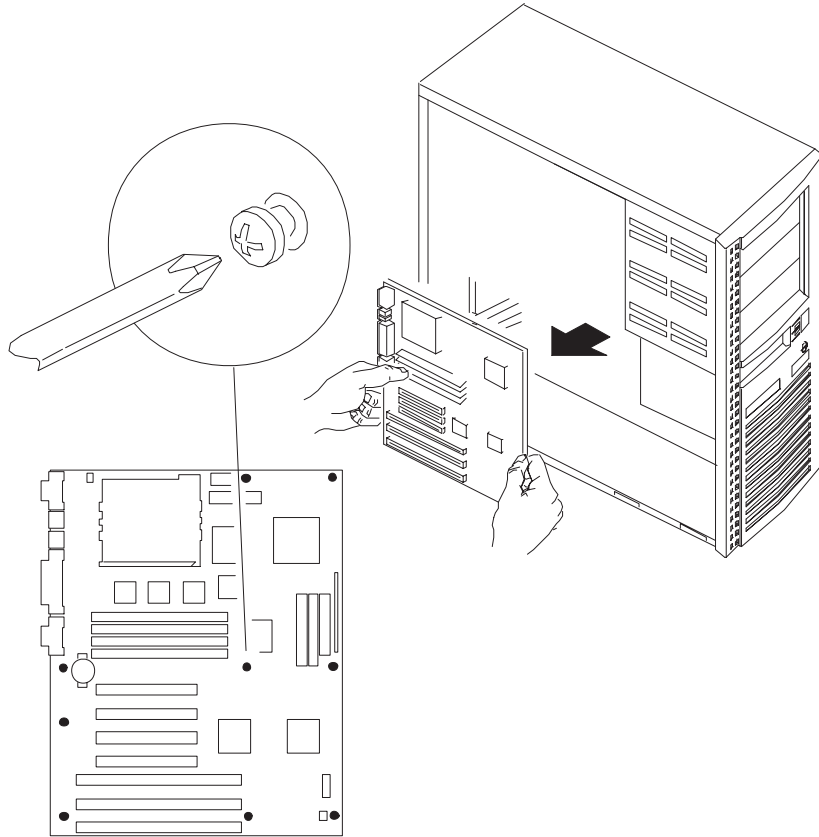
## Removing the System Board

1. Observe the precautions in “Before You Begin.”
2. Disconnect all internal cables connected to any add-in boards installed in the expansion slots.
3. Remove all add-in boards.
4. Disconnect all internal cables connected to the system board. Make note of wire colors and positions for later reinstallation.
5. Remove the power supply and set it aside.
6. Remove the nine retaining screws and set them aside (Figure 4-18).
7. Lift the board out of the chassis (Figure 4-18), being careful not to flex the board.



### **CAUTION**

Be careful not to scrape any board components. Do not flex the board. Place the board on a grounded, static-free surface or in an antistatic protective wrapper.



**Figure 4-18. Removing the System Board**

## **Installing the System Board**

1. Observe the precautions in “Before You Begin.”
2. Insert the board carefully, aligning the I/O connectors with the rear gasket.
3. Secure the board to the chassis with nine screws (Figure 4-18).
4. Reinstall the power supply.
5. Connect all internal cables to the system board.
6. Install any add-in boards.
7. Connect all internal cables that go to the add-in boards installed in the expansion slots.





# Installing and Configuring System Board Options **5**

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This chapter describes the following:

- Jumper block locations and functions
- Procedures to remove and install optional components
- Information about replacing the battery.

## **Before You Begin**

- Be sure to do each procedure in the correct order.
- The procedures (and warnings) for removing and reinstalling the system cover are assumed to precede all other procedures described in this chapter. Chapter 4 tells how to remove and install the system cover.
- Set up an equipment log to record the system model and serial numbers, all installed options, and other information about the system. If you need this information, it will be easier to consult the log than to open up and examine the system.
- You will need a Phillips screwdriver (#2 bit), a medium flat-bladed screwdriver, and a jumper removal tool, such as a pair of fine needle-nosed pliers. We recommend that you use an antistatic wrist strap and a conductive foam pad when working on the system.



### **WARNINGS**

**The procedures in this chapter assume familiarity with the general terminology associated with personal computers and with the safety practices and regulatory compliance required for using and modifying electronic equipment.**

**The power supply in this system contains no user-serviceable parts. To avoid personal injury or damage to your equipment, refer repair or replacement of the power supply to qualified personnel only. All other areas and components of this system are considered user-accessible.**

**Disconnect the system from its power source and from any telecommunications links, networks or modems before doing any of the procedures described in this chapter. Failure to disconnect power, telecommunications links, networks or modems before you open the system or do any procedures can result in personal injury or equipment damage. Some circuitry on the system board may continue to operate even though the front panel power button is off.**

**Do not operate the system with the cover removed. Always replace the cover before turning on the system.**

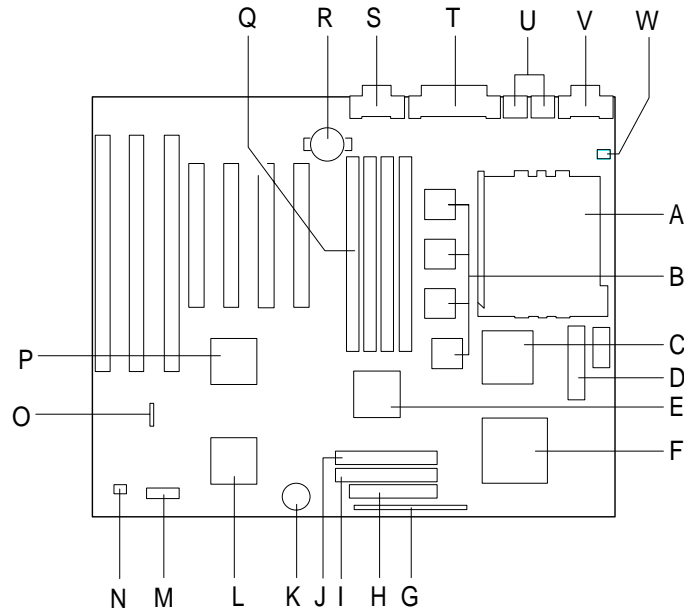


### **CAUTIONS**

Electrostatic discharge (ESD) can damage disk drives, add-in boards, and other components. Do the procedures described in this chapter only at an ESD workstation. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis.

Add-in boards can be extremely sensitive to ESD and always require careful handling. After removing the board from its protective wrapper or from the system, place the board flat on a grounded, static-free surface, component-side up. Use a conductive foam pad if available, but not the board wrapper. Do not slide the board over any surface.

# System Board Components



OM04089

**Figure 5-1. System Board Components**

- |                                     |                                       |
|-------------------------------------|---------------------------------------|
| A. Pentium Pro microprocessor       | M. Configuration jumper block         |
| B. MIC Memory interface components  | N. Card slot fan connector            |
| C. Memory controller data path chip | O. Auxiliary hard drive LED connector |
| D. Power connector                  | P. PIIX PCI ISA/IDE accelerator       |
| E. OMC DRAM control chip            | Q. SIMM sockets                       |
| F. OPB PCI Bridge component         | R. Battery                            |
| G. Front panel I/O connectors       | S. Serial port 2 connector            |
| H. Floppy drive connector           | T. Parallel port connector            |
| I. Primary PCI IDE connector        | U. PS/2 Keyboard/Mouse connectors     |
| J. Secondary PCI IDE connector      | V. Serial port 1 connector            |
| K. On-board speaker                 | W. CPU Fan Connector                  |
| L. I/O controller                   |                                       |

## Jumper Block Overview

The system board in your computer contains a 27-pin block of configuration jumpers in a 3 x 9 array. The jumper block makes it possible to change the system configuration. For instance, you can prevent access to the system Setup program by moving a jumper. If you forget your system password, you can clear the password by moving a jumper. The system has been properly configured at the factory. Normally, the only time you will ever change a jumper is if you need to:

- Change the system operating speed
- Clear the User or Administrator password
- Reset the CMOS RAM settings to the default values
- Disable or enable access to the Setup program
- Recover from a corrupted BIOS during a BIOS upgrade

Figure 5-2 shows the location of the jumper block on the system board. Descriptions of how to change the jumpers follow Figure 5-2.



### CAUTION

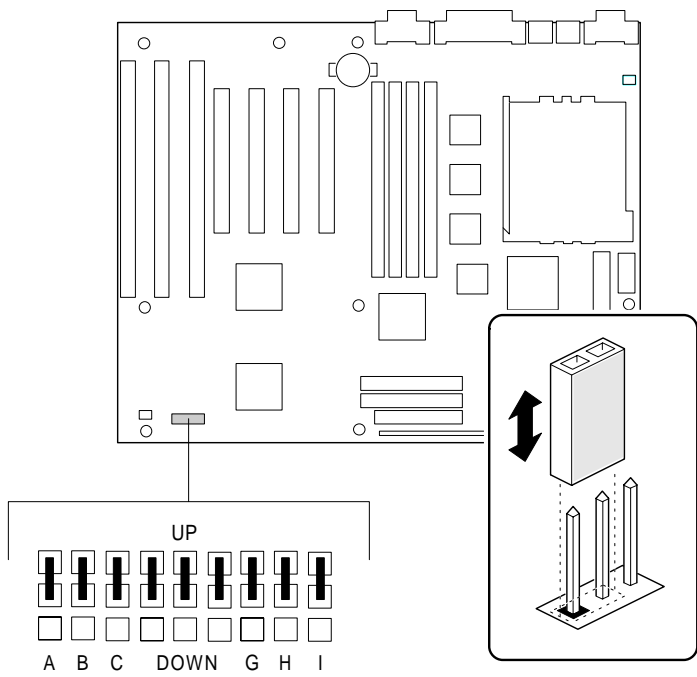
Do not squeeze the pliers or other tool you use to remove a jumper, or you might bend or break the pins.



### Notes

A jumper is a small plastic-encased conductor that slips over jumper pins, as shown in Figure 5-2. To change a jumper setting, use a pair of fine needle-nosed pliers to remove the jumper from its current location and slide it onto the new pins to obtain the desired setting.

The Recovery Boot enable jumper is briefly described in this chapter. The jumper is intended to be used only if the BIOS has been corrupted during a BIOS upgrade. A description of how to use the jumper is found in Appendix A "BIOS Update and Recovery."



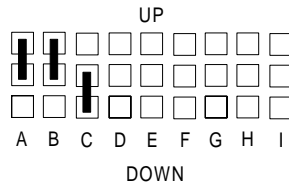
OM04100

**Figure 5-2. Location of Jumper Block**

## CPU / Bus Speed / Clock Ratio Jumpers

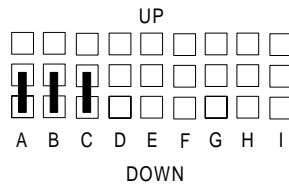
These jumpers set the CPU, PCI, and ISA bus frequencies and the clock ratio. The jumpers should be changed only when you upgrade the CPU.

### For 166 MHz CPU



Bus frequency = 66.48 MHz  
Clock ratio = 5/2  
PCI frequency = 33 MHz  
ISA frequency = 8.31 MHz

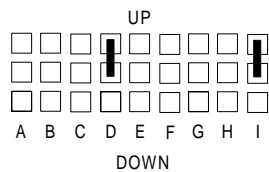
### For 150 MHz CPU



Bus frequency = 60.14 MHz  
Clock ratio = 5/2  
PCI frequency = 30 MHz  
ISA frequency = 7.51 MHz

## Factory Configuration Jumpers

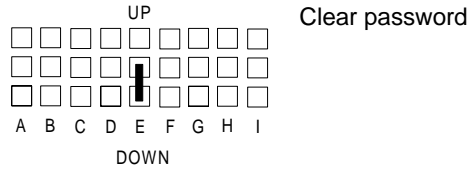
These are factory-installed jumpers. Do not change them from the factory setting.



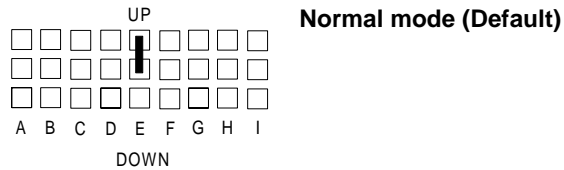
## How to Clear the User Password

This procedure should only be done if the user password has been forgotten.

1. Turn off power and remove the system cover.
2. Move the jumper to the position shown below.



3. Turn on power and allow the system to boot.
4. Turn off power.
5. Move the jumper to the position shown below to restore normal operation.



6. Replace the system cover and turn the power back on.



## How to Clear CMOS RAM

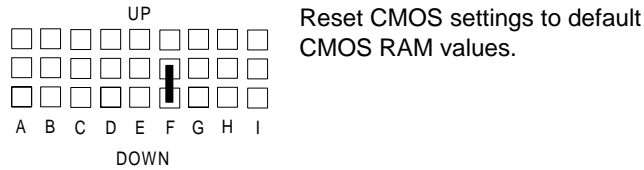
This procedure should be done after the system BIOS is updated.



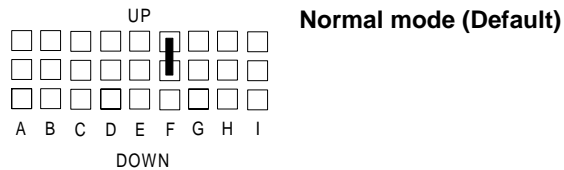
### CAUTION

Do not use this procedure if your system is running Windows 95. Clearing CMOS RAM after a BIOS upgrade erases the Plug and Play data in the CMOS RAM. To clear CMOS RAM on a Windows 95 system, press the <F5> key from anywhere in the Setup program. This resets all Setup options to their defaults. See Chapter 3 for information on the Setup program.

1. Turn off power and remove the system cover.
2. Move the jumper to the position shown below.



3. Turn on power and allow the system to boot.
4. Turn off power.
5. Move the jumper back to the default position shown below to restore normal operation.

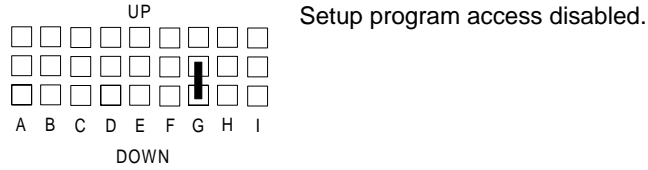


6. Replace the system cover and turn the power back on.

## How to Disable Access to the Setup Program

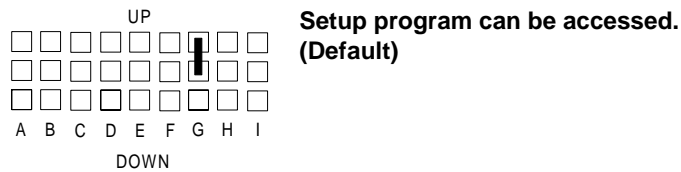
To prevent access to the Setup program, do the following:

1. Turn off power and remove the system cover.
2. Move the jumper to the position shown below.



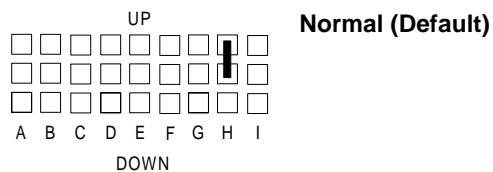
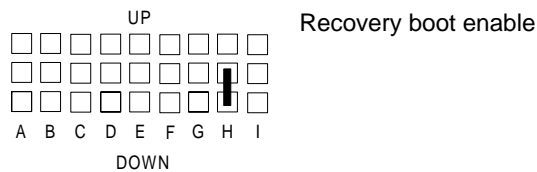
3. Replace the system cover and turn power back on.

To enable access to the setup program, move the jumper to the position shown below.



## Recovery Boot Enable Jumpers

If the BIOS is corrupted during a BIOS upgrade, this jumper enables you to boot the system and recover the BIOS. Appendix A tells how and when to use the recovery boot enable jumpers.



## Installing an OverDrive® Processor

This section tells how to install an OverDrive processor upgrade in your system. The OverDrive processor comes with a heat sink and fan mounted on top.

### Installing the Upgrade



#### Note

If the system contains several add-in boards and peripherals, it may be easier to access the CPU if you remove the power supply. The steps for removing the power supply can be found in Chapter 4.

To install the upgrade, do the following:

1. Observe the precautions in “Before You Begin.” We recommend you take the following steps to reduce the risk of electronic discharge damage to the processor and system board components:
  - Touch the metal chassis before touching the processor or system board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor.
  - Avoid moving around needlessly.
2. Turn off all peripheral devices connected to the system, and turn off the system.



#### WARNING

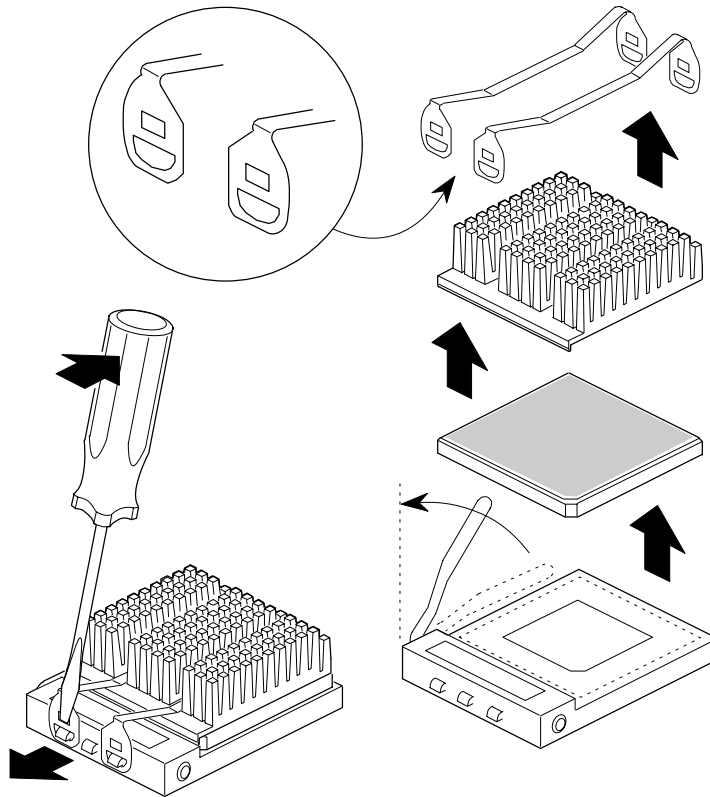
**The microprocessor and heat sink will be hot if the system has been running. To avoid the possibility of a burn, if the system has been running let the processor and heat sink cool for 10 minutes before continuing with this procedure.**

3. Figure 5-1 shows the location of the processor socket. You must first remove the two clamps over the heat sink and CPU. Insert a small flat-bladed screwdriver into the slot on the end of each clamp. Release the clamp by pushing outward on the blade of the screwdriver as shown in Figure 5-3. As you move the clamp away from the socket, ease the clamp up and away from the processor and heat sink. When you remove the clamps, the heat sink will slide off the CPU.

**CAUTION**

When you remove the CPU clamps, avoid scraping the clamps against any system board components.

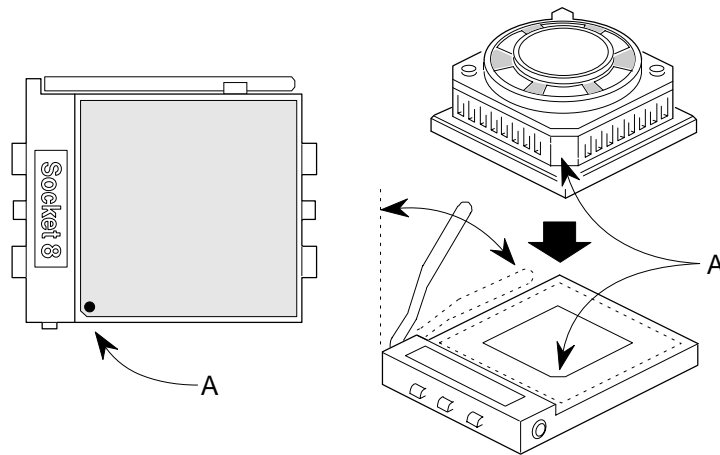
4. Push the lever on the processor socket down and out until it pulls up freely. Lift the lever until it stands straight up. Remove the processor from the socket. Do not touch or bend the pins.
5. Place the processor in a piece of conductive foam and store it in an antistatic package.



OM04228

**Figure 5-3. Removing the Spring Clamps and the CPU**

6. Remove the upgrade processor from its antistatic package; do not touch or bend the pins.
7. With the processor in place, lower it gently, being careful not to bend the pins. Push the lever on the ZIF socket forward until it snaps into place.
8. If the upgrade processor has a fan power cord, attach the cord to the CPU fan connector.
9. \*If for any reason you need to reinstall the original processor, do steps 1 through 8 above.



OM04229

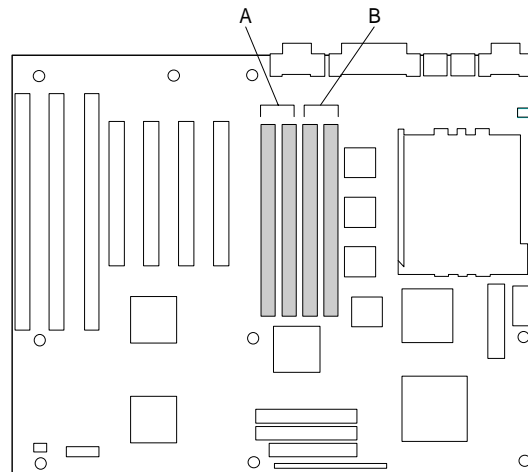
**Figure 5-4. Installing a Processor Upgrade**

## Installing SIMMs

The system board contains four 72-pin, tin lead SIMM sockets. The sockets are arranged as socket pair 1 (Figure 5-5, A) and socket pair 0 (Figure 5-5, B). Two SIMMs make up one socket pair. The types of SIMMs that can be installed are listed in Table 5-1. When adding memory, follow these guidelines:

- When you install SIMMs, you must completely fill at least one socket pair; that is, you must install SIMMs in both sockets of the socket pair.
- The computer automatically detects the installed memory, so it doesn't matter which socket pair is used, as long as both sockets in the pair are filled. If you are installing SIMMs in only one socket pair, install them in socket pair 1. This will make it easier to add additional SIMMs in socket pair 0 later.
- All SIMMs must be the same size; do not mix SIMM types. For example, don't install 4 MB SIMMs in socket pair 0 and 8 MB SIMMs in socket pair 1.
- When adding SIMMs, use only tin lead, 72-pin, 60 ns fast page-mode DRAM. Faster devices will not improve system performance.

You can configure the system memory from 16 MB to 128 MB. Table 5-2 lists the possible combinations of SIMM types and the resulting amount of system memory. The instructions for installing SIMMs follow Table 5-2.



OM04196

**Figure 5-5. Location of SIMM Sockets**

**Table 5-1. Supported SIMM Sizes**

<b>Total Memory Size of SIMM</b>	<b>SIMM configuration (without parity)</b>	<b>SIMM configuration (with parity)</b>
4 Mbytes	1M x 32	1M x 36
8 Mbytes	2M x 32	2M x 36
16 Mbytes	4M x 32	4M x 36
32 Mbytes	8M x 32	8M x 36



**Notes**

The board supports parity (x 36) or non-parity (x32) SIMMs. Your system ships with non-parity SIMMs. Error checking and correction (ECC) is supported with parity SIMMs. There is no ECC with non-parity SIMMs.

All SIMMs must be tin lead, 72-pin, with 60 ns fast page-mode DRAMs.

All SIMM socket sites must contain the same size SIMMs.

**Table 5-2. Memory Options for SIMM Sockets**

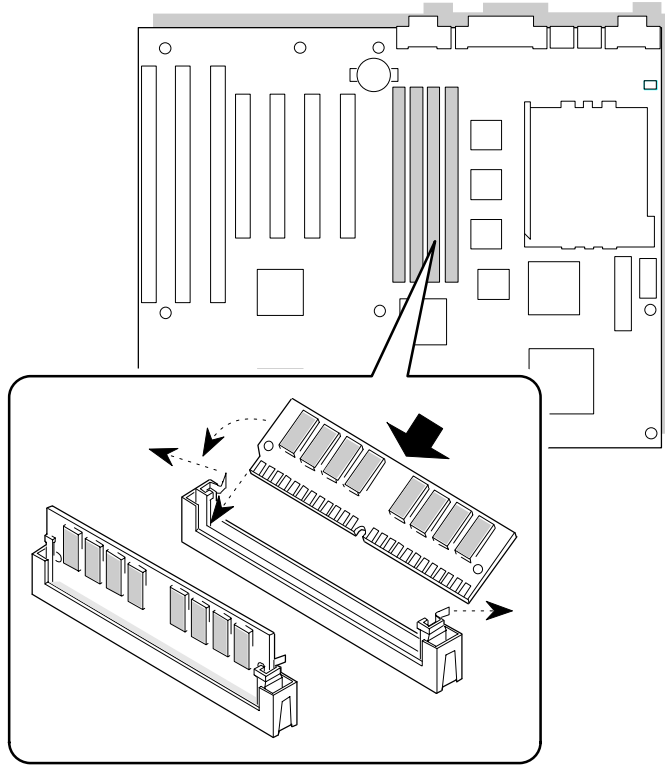
<b>For a total system memory of</b>	<b>Install a 72-pin SIMM of the following size in both sockets of socket pair 1</b>	<b>Install a 72-pin SIMM of the following size in both sockets of socket pair 0</b>
8 MB	4 MB (8 MB total in socket pair 1)	Empty
16 MB	4 MB (8 MB total in socket pair 1)	4 MB (8 MB total in socket pair 0)
16 MB	8 MB (16 MB total in socket pair 1)	Empty
32 MB	8 MB (16 MB total in socket pair 1)	8 MB (16 MB total in socket pair 0)
32 MB	16 MB (32 MB total in socket pair 1)	Empty
64 MB	16 MB (32 MB total in socket pair 1)	16 MB (32 MB total in socket pair 0)
64 MB	32 MB (64 MB total in socket pair 1)	Empty
128 MB	32 MB (64 MB total in socket pair 1)	32 MB (64 MB total in socket pair 0)

Before you can install or remove SIMMs, you must remove the system cover. After you are finished, replace any components you removed and the system cover. See Chapter 4 for the cautions and procedures related to removing and replacing the system cover and components.

To install SIMMs, do the following procedure:

1. Holding the SIMM only by the edges, remove it from its antistatic package.
2. Position the SIMM at about a 45° angle relative to the system board. Make sure the small notch in the middle of the bottom edge of the SIMM aligns with the notch in the SIMM socket.
3. Insert the bottom edge of the SIMM into the SIMM socket and make sure it is seated firmly.
4. When the SIMM seats correctly, hold it at each end and gently push the top edge towards the retaining clips of the connector until the SIMM snaps into place (Figure 5-6). If the SIMM does not install correctly, gently spread the retaining clips just enough so that you can pull away the top edge of the SIMM and try again.





OM04088

**Figure 5-6. Installing a 72-Pin SIMM**

## Removing SIMMs

To remove a SIMM, do the following:

1. Observe the precautions in "Before You Begin."
2. Turn off all peripheral devices connected to the system.
3. Turn off the system.
4. To gain access to the SIMM sockets, remove the system cover.
5. Gently spread the retaining clip at each end of the SIMM, just enough to allow you to rotate the top edge of the SIMM downward to an angle of about 45°.
6. Holding the SIMM only by the edges, lift it away from the socket, and store it in an antistatic package.
7. Reinstall and reconnect any parts you removed or disconnected to gain access to the SIMM sockets.

## Replacing the Clock/CMOS RAM/Battery

A lithium battery, installed in a socket on the system board, provides power for the real-time clock and CMOS RAM. Figure 5-1 shows the location of the battery.

The battery has an estimated life expectancy of seven years. When the battery starts to weaken, it loses voltage; when the voltage drops below a certain level, the system settings stored in CMOS RAM (for example, the date and time) may be wrong. If the battery fails, replace it with an equivalent battery.

As long as local ordinance permits, you may dispose of individual batteries as normal trash. Do not expose batteries to excessive heat or fire. Keep all batteries away from children.



### **CAUTION**

Danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the equipment manufacturer. Discard used batteries according to manufacturer's instructions.



### **ATTENTION**

Il y a danger d'explosion s'li y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un type recommandé par le constructeur. Mettre au rebut les batteries usagées conformément aux instructions du fabricant.



### **ADVARSEL!**

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.



### **ADVARSEL**

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

**WARNING**

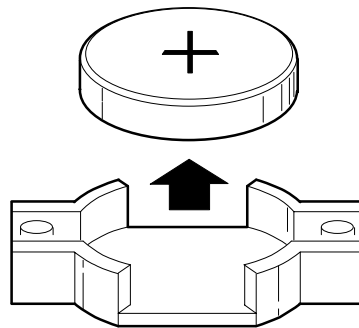
Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

**VAROITUS**

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

To replace the battery, do the following:

1. Observe the precautions in "Before You Begin."
2. Turn off all peripheral devices connected to the system.
3. Turn off the system.
4. Remove any components that are blocking access to the battery.
5. Figure 5-1 shows the battery location. Gently pry the battery free from its socket, taking care to note the "+" and "-" orientation of the battery (Figure 5-7).
6. Install the new battery in the socket.



OM03774

**Figure 5-7. Replacing the Battery**

# Solving Problems **6**

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The first part of this chapter helps you identify and solve problems that might occur when the system is in use. The second part lists error code messages that might display.

## Resetting the System

There are two ways to reset the system:

- Press <Ctrl + Alt + Del>
- Cycle the system power. To do this:
  1. Press the power on/off button to turn off system power.
  2. Wait at least 20 seconds.
  3. Press the power on/off button to turn on system power. The system powers up and immediately begins the power-on self test (POST).

Resetting the system:

- Clears the system memory
- Restarts the power-on self test (POST)
- Reinitializes all peripherals
- Loads the operating system

## Troubleshooting Procedure

This section provides a step-by-step troubleshooting procedure to identify a problem and locate its source.



### **CAUTION**

Turn off the system and any peripheral devices before you disconnect peripheral cables from the system. Otherwise, you can permanently damage the system or the peripheral devices.

1. Turn off the system and any peripheral devices. Disconnect all external peripherals from the system, except for the keyboard and the video display.
2. Make sure the system is plugged into a properly grounded power outlet.
3. Make sure your keyboard and video display are correctly connected to the system. Turn on the video display, and turn up its brightness and contrast controls to at least two-thirds of the maximum (refer to the documentation supplied with the video display).
4. If the operating system normally loads from the hard disk drive, make sure there is no diskette in the diskette drive. If the operating system normally loads from a diskette, insert the operating system diskette into the drive.
5. Turn on the system. If the power indicator does not light, but the system seems to be operating normally, the indicator is probably defective.

6. Monitor the power-on self test (POST) execution. Each time you turn on the system, the POST checks the system board, memory, keyboard, and certain peripheral devices.



**Note**

During the memory test, the POST displays the amount of memory it has tested. Depending on the amount of memory installed, the POST can take up to 30 seconds to complete.

Check the following during the POST:

- a. If the POST does not detect any errors, the system beeps once and boots up.
- b. Errors that do not prevent the boot process (*non-fatal* errors) display a message that looks similar to the following:

```
Error Message Line 1
Error Message Line 2
Press <F1> for Setup,
<Esc> to Boot
```

You can note the error and press <Esc> to resume the boot-up process, or <F1> to enter Setup.

- c. Errors that prevent the boot process from continuing (*fatal* errors), are communicated by a series of audible beeps. If this type of error occurs, refer to the error codes and messages listed at the end of this chapter.
7. Confirm that the operating system has loaded.

## Problems at Initial System Start-up

Problems that occur at initial start-up are usually caused by incorrect installation or configuration. Hardware failure is a less frequent cause.

- \_\_\_ Are all cables correctly connected and secured?
- \_\_\_ Are the configuration settings correct in Setup? See Chapter 3.
- \_\_\_ Are all drivers properly installed?
- \_\_\_ Are the jumpers on the system board correct if changed from the default settings? See Chapter 5 for defaults.
- \_\_\_ Are all jumper and switch settings on add-in boards and peripheral devices set correctly? For the valid settings, see the documentation shipped with these devices. Ensure that there are no conflicts, for example, two add-in boards sharing the same interrupt.
- \_\_\_ Is the power supply set to the proper input voltage? See Chapter 2.
- \_\_\_ Are add-in boards and disk drives installed correctly? See Chapter 4.
- \_\_\_ Is there a keyboard attached?
- \_\_\_ Is a bootable diskette installed in drive A?
- \_\_\_ If the system has a hard disk, is it properly formatted or defined?
- \_\_\_ Are all SIMMs installed correctly? Try reseating the SIMMs. See Chapter 5.
- \_\_\_ Is the operating system properly loaded? See the operating system documentation.
- \_\_\_ Is the power-on light flashing but the system is not booting up? If so, the CPU might be defective or one of the IDE cables has been improperly installed.



## Problems After the System Has Been Running Correctly

After the system hardware and software have been running correctly, problems often indicate equipment failure. Go through the checklist below to see if the situation is one that may be easily corrected.

If the problem recurs after you have checked and corrected all of these items, refer to the troubleshooting procedures (see "Troubleshooting Procedure" in this chapter).

- \_\_\_ If you are running the software from a diskette, try using a new copy.
- \_\_\_ If you are running the software from a hard disk, try running it from a diskette. If the software runs correctly, there could be a problem with the copy on the hard disk. Reinstall the software on the hard disk and try again. Make sure all the necessary files are installed.
- \_\_\_ Try clearing CMOS RAM (Chapter 5) and running Setup (Chapter 3).
- \_\_\_ If the problems are intermittent, there could be a loose cable, dirt in the keyboard (if keyboard input is incorrect), a marginal power supply, or other random component failures.
- \_\_\_ A transient voltage spike, power outage, or brownout could have occurred. Symptoms of voltage spikes include a flickering video display, unexpected system reboots, and the system not responding to user commands. Exit the application you are running, reboot the system, and try again.
- \_\_\_ Voltage spikes can occasionally cause the heads of the disk drive to contact the disk. This can corrupt or destroy data files. If you are experiencing voltage spikes on the power line, install a surge suppresser between the power outlet and the system power cord.
- \_\_\_ Try reseating the SIMMs.
- \_\_\_ If the fan fails, the CPU can overheat. If the CPU's thermal sensor engages, it will shut the power supply and system down to protect them from permanent damage. Wait 15 minutes for the system to cool, then switch the power on again. If the system does not successfully power up, make sure the power supply fan is blowing cool air onto the CPU heatsink.

## Problems Running New Application Software

Problems that occur when you run new application software are usually related to the software. Faulty equipment is much less likely, especially if other software runs correctly. Go through the checklist below to see if the situation is one that may be easily corrected. If the problem persists after you have checked and corrected all of these items, contact the software vendor's customer service representative.

- Does the system meet the minimum hardware requirements for the software? Refer to the software documentation.
- Is the software an authorized copy? Unauthorized copies often do not work. Obtain an authorized copy of the software.
- If you are running the software from a diskette, is it a good copy?
- If you are running the software from a hard disk, is the software correctly installed? Were all necessary procedures followed and files installed?
- Are the correct device drivers installed?
- Are the correct video drivers installed?
- Is the software correctly configured for the system?
- Are you using the software correctly?

## Problems Operating Add-in Boards

Problems related to add-in boards are usually related to improper board installation or interrupt and address conflicts. Go through the checklist below to see if you can correct the problem. If the problem persists after you have checked and corrected all of these items, contact the board vendor's customer service representative.

- \_\_\_ Did you install the add-in board according to the manufacturer's instructions? Check the documentation that came with the board.
- \_\_\_ Are all cables installed properly?

The following items are suggestions for troubleshooting problems related to ISA legacy (non-Plug and Play) add-in boards.

- \_\_\_ If the ISA legacy board uses an interrupt, run Setup and set the interrupt that is being used by the ISA board to Used by ISA Card. In the Advanced screen, select the Plug and Play Configuration subscreen and then select the "Use Setup Utility" option. Another option in the Plug and Play Configuration subscreen is to select the "Use ICU option."
- \_\_\_ If the ISA legacy board uses memory space between 80000H - 9FFFFH, run Setup and set conventional memory to 512 K.
- \_\_\_ If the ISA legacy board uses shared memory between C8000H - DFFFFH, run Setup and enable shared memory for the appropriate memory space.

## Problems and Suggestions

Contact your service representative if the suggested actions don't solve the problem.

<b>What happens</b>	<b>What to do</b>
Application software problems	<p>Make sure all cables are installed correctly.</p> <p>Verify that the system board jumpers are set properly.</p> <p>Verify that your system hardware configuration is set correctly. In Setup, check the values against the system settings you recorded previously. If an error is evident (wrong type of drive specified, for example), make the change in Setup and reboot the system. Record your change.</p> <p>Make sure the software is properly configured for the system. Refer to the software documentation for information.</p> <p>Try a different copy of the software to see if the problem is with the copy you are using.</p> <p>Try running the software in a different speed mode. See "Using Keyboard Shortcuts" in Chapter 2.</p> <p>If other software runs correctly on the system, contact the vendor of the software that fails.</p> <p>If you check all of the above with no success, try clearing CMOS RAM (Chapter 5) and reconfiguring the system. Make sure you have your list of system settings available to re-enter, because clearing CMOS RAM sets the options to their default values.</p>
Graphics or characters on-screen are distorted or incorrect	<p>Make sure the brightness and contrast controls are properly adjusted.</p> <p>Make sure the video signal cable and power cables are properly installed.</p> <p>Make sure your monitor is compatible with the video mode you have selected.</p>

Continued

<b>What happens</b>	<b>What to do</b>
Characters do not appear on screen	<p>Make sure the video display is plugged in and turned on.</p> <p>Check that the brightness and contrast controls are properly adjusted.</p> <p>Check that the video signal cable is properly installed.</p> <p>Make sure a video board is installed, enabled, and jumpered correctly.</p> <p>Reboot the system.</p>
CMOS RAM settings are wrong	<p>If system settings stored in CMOS RAM change for no apparent reason (for example, the time of day develops an error), the backup battery may no longer have enough power to maintain the settings. Replace the battery (Chapter 5).</p>
Diskette drive light does not go on when drive is in use or is tested by POST	<p>Make sure the power and signal cables for the drive are properly installed.</p> <p>Check that the drive is properly configured and enabled in Setup.</p>
Hard drive light does not go on when drive is in use or is tested by POST	<p>Make sure the power and signal cables for the drive are properly installed.</p> <p>Make sure the front panel LED connector is securely attached to the system board headers.</p> <p>Check that the drive is properly configured and enabled in Setup.</p> <p>Check the drive manufacturer's manual for proper configuration for remote hard disk drive activity.</p>
Power-on light does not go on	<p>If the system is operating normally, check the connector between the system board and the front panel. If OK, the light may be defective.</p>
Power-on light flashes	<p>If the system was running and the power-on light flashes, the system is in sleep-mode. Press a key to wake the system up.</p> <p>If the power-on light flashes and the system won't boot up, the CPU might be defective or one of the IDE cables was improperly installed.</p>

Continued

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<b>What happens</b>	<b>What to do</b>
Prompt doesn't appear after system boots	See "Problems at Initial System Start-up".
Setup, can't enter	If you can't enter Setup to make changes, check the jumper that disables entry into Setup (Chapter 5). If the jumper is set to allow entry into Setup, you might need to clear CMOS RAM to the default values (Chapter 5) and reconfigure the system in Setup (Chapter 3).
System halts before completing POST	This indicates a fatal system error that requires immediate service attention. Note the screen display and write down any beep code emitted. Provide this information to your service representative.

---

## Error and Information Messages

The rest of this chapter describes beep codes and error messages that you might encounter when you start up the system.



### Note

In all cases, if the problem persists, call your service representative.

## Beep Codes

Beeps	Error Message	Description
1	Refresh Failure	The memory refresh circuitry on the motherboard is faulty.
3	Base 64 KB Memory Failure	Memory failure in the first 64 KB.
4	Timer Not Operational	Memory failure in the first 64 KB of memory, or Timer 1 on the motherboard is not functioning.
5	Processor Error	The CPU generated an error.
6	8042 - Gate A20 Failure	The keyboard controller may be bad. The BIOS cannot switch to protected mode.
7	Processor Exception Interrupt Error	The CPU generated an exception interrupt.
8	Display Memory Read/Write Error	The system video adapter is either missing or its memory is faulty. This is not a fatal error.
9	ROM Checksum Error	The ROM checksum value does not match the value encoded in the BIOS.
10	CMOS Shutdown Register Read/Write Error	The shutdown register for CMOS RAM failed.
11	Cache Error	The cache is faulty.

## Error and Information Messages

Error Message	Explanation
Address Line Short!	Error in the address decoding circuitry on the motherboard.
Cache Memory Failure, Do Not Enable Cache!	Cache memory is defective; the CPU has failed. Call for service.
CMOS Battery Failed	CMOS RAM is powered by a battery. The battery power is low. Replace the battery.
CMOS Checksum Invalid	After CMOS RAM values are saved, a checksum value is generated for error checking. The previous value is different from the current value. Run Setup.
CMOS System Options Not Set	The values stored in CMOS RAM are either corrupt or nonexistent. Run Setup.
CMOS Time and Date Not Set	Run Setup to set the date and time in CMOS RAM.
Diskette Boot Failure	The boot disk in floppy drive A: is corrupt. It cannot be used to boot the system. Use another boot disk and follow the screen instructions.
DMA Controller Error	Error in the DMA Controller.
Drive Not Ready Error	The BIOS cannot access the floppy drive. Check all the appropriate connections after the system is powered down.

Continued



<b>Error Message</b>	<b>Explanation</b>
Floppy Disk Controller Failure	The BIOS cannot communicate with the floppy disk drive controller. Check all appropriate connections after the system is powered down.
Floppy Drive A: Failure	The BIOS cannot access Drive A:. Check all the appropriate connections after the system is powered down.
Floppy Drive B: Failure	The BIOS cannot access Drive B:. Check all the appropriate connections after the system is powered down.
Gate - A20 Error	Gate A20 on the keyboard controller is not working. Call for service.
Invalid Boot Diskette	The BIOS can read the disk in floppy drive A:, but cannot boot the system. Use another boot disk.
Keyboard Controller Error	The keyboard controller has failed during POST.
Keyboard is Locked ...Please Unlock It	Some systems have an electronic key that enables the user to lock the keyboard.
Keyboard Stuck Key Detected	There is a key pressed down.
Master DMA Controller Error	Error in the master DMA channel.
Master Interrupt Controller Error	Master Interrupt Controller failed during POST.
Memory Size Decreased	The amount of memory on the system board is less than the amount in CMOS RAM. Check for mismatched SIMM sizes. (All SIMMs must be the same size.) Run Setup.

Continued

Error Message	Explanation
Off Board Parity Error	<p>Parity error in memory installed in an expansion slot. The format is:</p> <p>OFF BOARD PARITY ERROR ADDR (HEX) = (XXXX)</p> <p>XXXX is the hex address where the error occurred.</p>
Slave DMA Controller Error	Error in the slave DMA channel.
Slave Interrupt Controller Error	Slave Interrupt Controller failed during POST.
System Memory Size Mismatch	<p>The amount of memory on the system board is different than the amount in CMOS RAM. Check for mismatched SIMM sizes. (All SIMMs must be the same size.) Run Setup.</p>
Timer Channel 2 Error	Most systems include two timers. There is an error in timer 2.

## PCI Configuration Status and Error Messages

The following PCI messages are displayed as a group with bus, device and function information.

Message	Explanation
Bad PnP Serial ID Checksum	The Serial ID checksum of a Plug and Play card was invalid.
Floppy Disk Controller Resource Conflict	The floppy disk controller has requested a resource that is already in use.
NVRAM Checksum Error, NVRAM Cleared	The ESCD data was reinitialized because of an NVRAM checksum error. Try rerunning the ICU.
NVRAM Cleared By Jumper	The "Clear CMOS" jumper has been moved to the "Clear" position and CMOS RAM has been cleared.
NVRAM Data Invalid, NVRAM Cleared	Invalid entry in the ESCD.
Parallel Port Resource Conflict	The parallel port has requested a resource that is already in use.
PCI Error Log is Full	This message is displayed when more than 15 PCI conflict errors are detected. No additional PCI errors can be logged.
PCI I/O Port Conflict	Two devices requested the same resource, resulting in a conflict.
PCI IRQ Conflict	Two devices requested the same resource, resulting in a conflict.
PCI Memory Conflict	Two devices requested the same resource, resulting in a conflict.
Primary Boot Device Not Found	The designated primary boot device (hard disk drive, diskette drive, or CD-ROM drive) could not be found.
Primary IDE Controller Resource Conflict	The primary IDE controller has requested a resource that is already in use.

Continued

<b>Message</b>	<b>Explanation</b>
Primary Input Device Not Found	The designated primary input device (keyboard, mouse, or other, if input is redirected) could not be found.
Secondary IDE Controller Resource Conflict	The secondary IDE controller has requested a resource that is already in use.
Serial Port 1 Resource Conflict	Serial port 1 has requested a resource that is already in use.
Serial Port 2 Resource Conflict	Serial port 2 has requested a resource that is already in use.
Static Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.
System Board Device Resource Conflict	A non Plug and Play ISA card has requested a resource that is already in use.

# Technical Reference **7**

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## Safety Compliance

This equipment meets or exceeds requirements for safety in the US (UL 1950 1st Edition), Canada (CSA 950), and Europe (TUV to EN60950, IEC 950).

## Dimensions

Dimensions	Specification
Width	21 cm (8.3 inches)
Depth	42.5 cm (17 inches)
Height (with feet installed)	39 cm (15.5 inches)
Weight (without peripherals)	9.79 kg (21.4 pounds)

## System Environment

Parameter	Specification
Operating temperature	10 to 35 °C (50 to 95 °F)
Non-operating temperature	-40 to 70 °C (-40 to 158 °F)
Operating humidity (no hard disk drive)	80% RH @ 36 °C
Non-operating humidity	95% RH @ 30 °C
Shock, operating	2.0g, 11ms, 1/2 sine
Shock, non-operating	30.0g, 11 ms, trapezoidal

## Power Supply Specifications

Following are the specifications for the power supply.



### WARNING

To avoid damage to the system board or power supply, do not exceed a total of 180 watts of continuous power draw, or a 200 watt surge for a maximum of 12 seconds. Do not overload the system board by installing add-in boards that draw excessive current. The system is designed to provide 2 A of + 5 V current for each add-in board in the system. The total + 5 V current draw for add-in boards in a fully-loaded system (all six add-in board slots filled) must not exceed 12 A.

### AC Input

Voltage (Input frequency 50/60 Hz)	Current
115 V (100–120 V)	4.0 A
230 V (200–240 V)	2.0 A

### Power Supply Output

DC Voltage	Current (Maximum Continuous)
+12 V	6.0 A
+5 V	22.0 A
+3.3 V	14.0 A
-5 V	0.5 A
-12 V	0.8 A



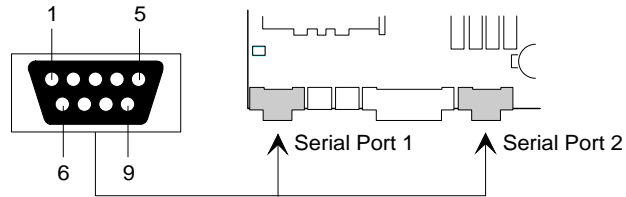
### Note

Due to load sharing among the power supply outputs, the maximum continuous current outputs of all voltages cannot be achieved simultaneously.

## Board Connectors

This section provides the pinouts for the system board connectors. Chapter 5 shows the location of the connectors (Figure 5-1).

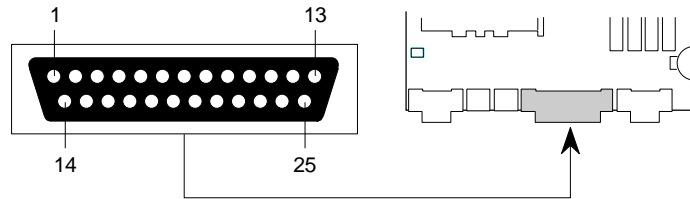
### Serial Port Connectors



OM04083

Pin	Signal Name
1	DCD
2	Serial In#
3	Serial Out#
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

## Parallel Port Connector

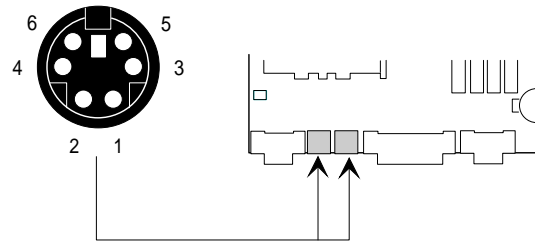


OM04084

Pin	Signal Name	Pin	Signal Name
1	Strobe#	14	Auto Feed#
2	Data Bit 0	15	Fault#
3	Data Bit 1	16	INIT#
4	Data Bit 2	17	SLCT IN#
5	Data Bit 3	18	Ground
6	Data Bit 4	19	Ground
7	Data Bit 5	20	Ground
8	Data Bit 6	21	Ground
9	Data Bit 7	22	Ground
10	ACK#	23	Ground
11	Busy	24	Ground
12	Error	25	Ground
13	Select		



## Keyboard and Mouse Connectors



OM04330

## PS/2-style Keyboard/Mouse Connectors

Pin	Signal Name
1	Data
2	No connect
3	Ground
4	+5 V (fused)
5	Clock
6	No Connect

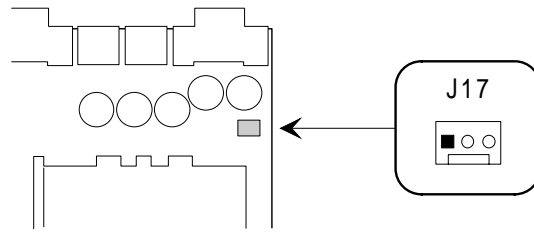


### Note

You can plug the mouse and keyboard into either of the PS/2-style connectors. The system automatically detects the presence of the keyboard and mouse at boot up.

## CPU Fan Connector

Connector on the end of the wires attached to the system board.

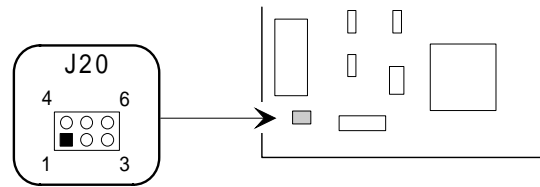


OM04097

Pin	Signal Name
1	Ground
2	+12 V
3	No connect

## Card Slot Fan Connector

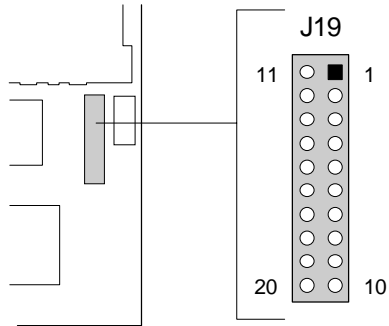
Connector on the end of the wires attached to the system board.



OM04098

Pin	Signal Name
1	Ground
2	Fast fan (+12 V)
3	Ground
4	Ground
5	Slow fan (<12 V)
6	Ground

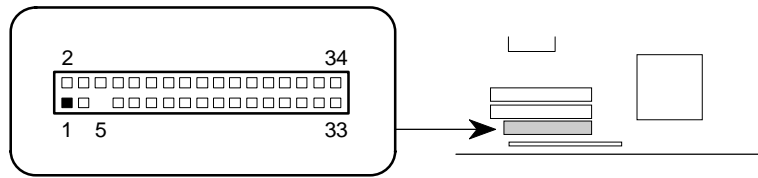
## Power Connector



OM04085

Pin	Signal Name	Function	Pin	Signal Name	Function
1	3.3 V	+3.3 V DC	11	3.3 V	+3.3 V DC
2	3.3 V	+3.3 V DC	12	-12 V	-12 V DC
3	COM	Ground	13	COM	Ground
4	5 V	+5 V DC	14	PS-ON	DC Remote Enable
5	COM	Ground	15	COM	Ground
6	5 V	+5 V DC	16	COM	Ground
7	COM	Ground	17	COM	Ground
8	POK	Power Good	18	-5 V	-5 V DC
9	5VSB	Standby voltage	19	5 V	+5 V DC
10	12 V	+12 V DC	20	5 V	+5 V DC

## Diskette Drive Connector

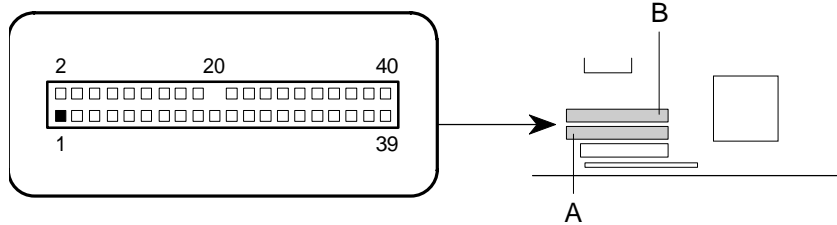


OM04086

Pin	Signal Name	Pin	Signal Name
1	Ground	2	DENSEL
3	Ground	4	Reserved
5	Key	6	FDEDIN
7	Ground	8	Index#
9	Ground	10	Motor Enable A#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor Enable B#
17	MSEN1	18	DIR#
19	Ground	20	STEP#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 00#
27	MSEN0	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Side 1 Select#
33	Ground	34	Diskette Change#

## IDE Connectors

The pinouts for the two connectors are the same, except for the signal names in brackets, which are for the secondary connector. The primary IDE connector is at location A; the secondary IDE connector is at location B.

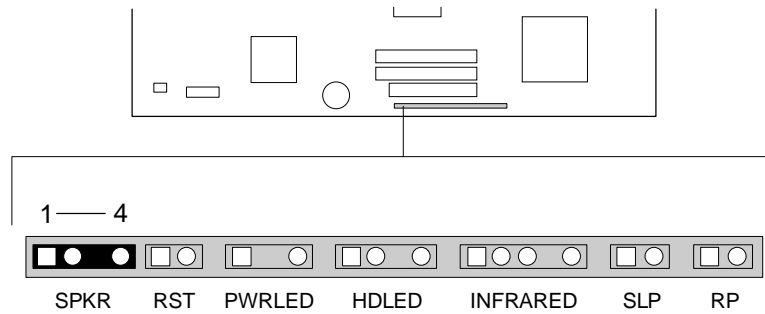


OM04087

Pin	Signal Name	Pin	Signal Name
1	Reset IDE	2	Ground
3	Host Data 7	4	Host Data 8
5	Host Data 6	6	Host Data 9
7	Host Data 5	8	Host Data 10
9	Host Data 4	10	Host Data 11
11	Host Data 3	12	Host Data 12
13	Host Data 2	14	Host Data 13
15	Host Data 1	16	Host Data 14
17	Host Data 0	18	Host Data 15
19	Ground	20	Key
21	DRQ0 [DRQ1]	22	Ground
23	I/O Write#	24	Ground
25	I/O Read#	26	Ground
27	IOCHRDY	28	Ground
29	DDACK0# [DDACK1#]	30	Ground
31	IRQ14 [IRQ15]	32	VCC pull-up
33	Addr 1	34	No Connect
35	Addr 0	36	Addr 2
37	Chip Select 1P# [Chip Select 1S#]	38	Chip Select 3P# [Chip Select 3S#]
39	Activity#	40	Ground

## Speaker Connector

Connector for external speaker. By default, there is a jumper installed on pins 1 and 2 that enables the on-board speaker.

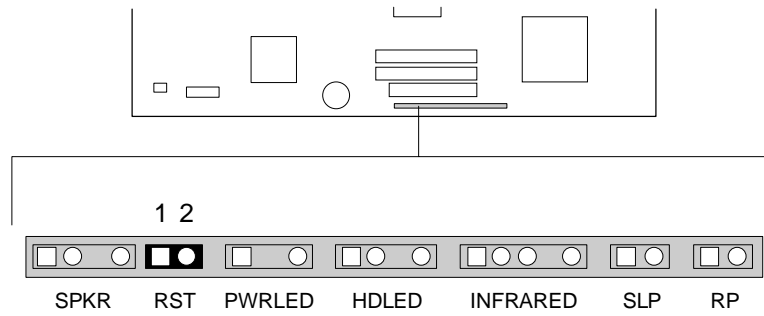


OM04090

Pin	Signal Name	System Harness Wire Color
1	SPKR_DAT#	Black
2	On-board speaker	
3	Key	
4	+5V Vcc	Red

## Reset Switch Connector

Connector for a front panel reset switch.



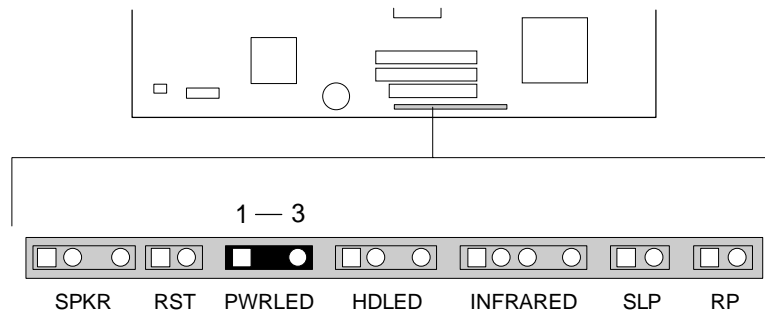
OM04091

Pin	Signal Name
1	Reset#
2	Ground



## Power LED Connector

Connector on the end of the power LED wires attached to the system board.

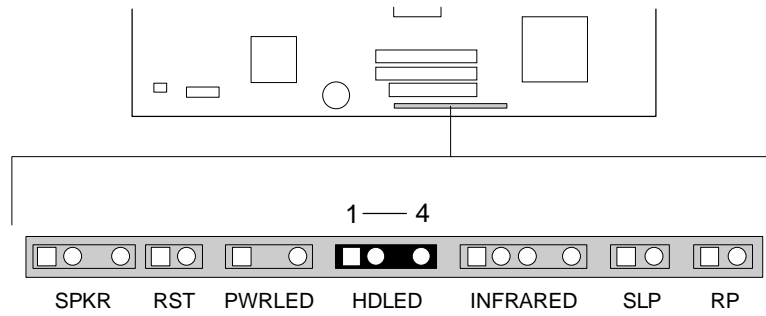


OM04092

Pin	Signal Name	System Harness Wire Color
1	LED_PWR	Green
2	Key	
3	Ground	Blue

## Hard Drive LED Connector

Connector on the end of the hard drive LED wires attached to the system board.

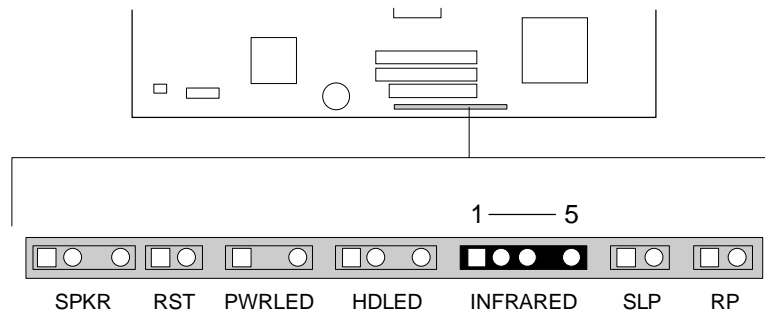


OM04093

Pin	Signal Name	System Harness Wire Color
1	+5 V	White
2	HD ACTIVE#	Yellow
3	Key	
4	+5 V	

## Infrared Connector

Connector for optional infrared port.

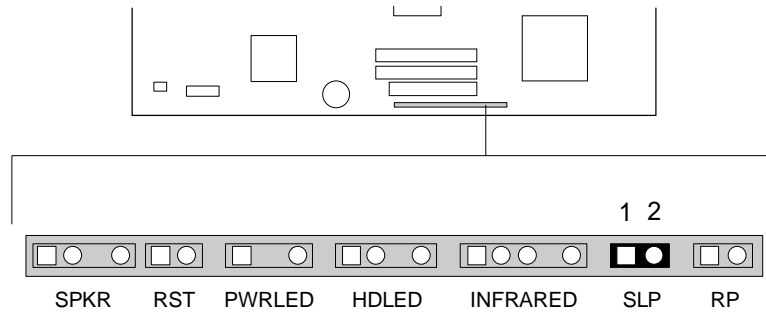


OM04094

Pin	Signal Name
1	IRTX
2	Ground
3	IRRX
4	Key
5	+5 V

## Sleep Switch Connector

Connector for optional sleep switch.

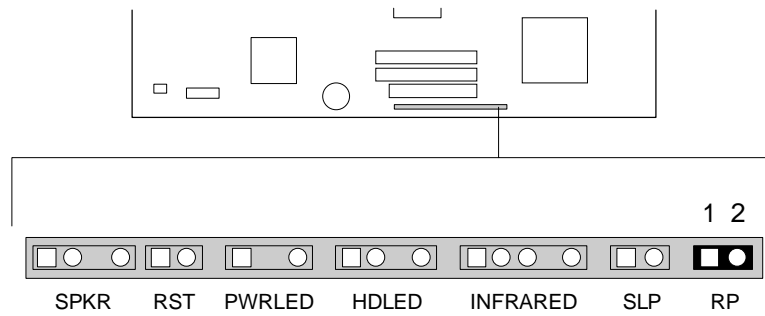


OM04095

Pin	Signal Name
1	+5 V
2	Sleep Request

## Remote On/Off Switch Connector

Connector on the end of the power on/off switch wires.

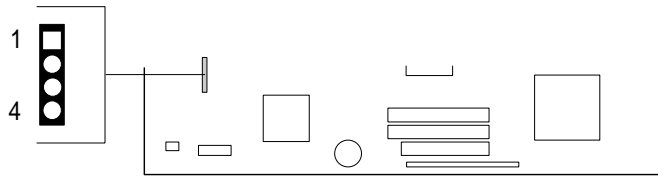


OM04096

Pin	Signal Name	System Harness Wire Color
1	Ground	Red
2	Power on #	Red

## Auxiliary Hard Drive LED Connector

LED connector for a SCSI adapter or an external IDE adapter.



OM04331

Pin	Signal Name
1	N/C
2	HD ACTIVE#
3	HD ACTIVE#
4	N/C

## ISA Connectors

Pin	Signal Name	Pin	Signal Name
B1	GND	A1	IOCHK#
B2	RSTDRV	A2	SD7
B3	Vcc	A3	SD6
B4	IRQ9	A4	SD5
B5	-5V	A5	SD4
B6	DRQ2	A6	SD3
B7	-12 V	A7	SD2
B8	0WS#	A8	SD1
B9	+12 V	A9	SD0
B10	GND	A10	IOCHRDY
B11	SMEMW#	A11	AEN
B12	SMEMR#	A12	SA19
B13	IOW#	A13	SA18
B14	IOR#	A14	SA17
B15	DACK3#	A15	SA16
B16	DRQ3	A16	SA15
B17	DACK1#	A17	SA14
B18	DRQ1	A18	SA13
B19	REFRESH#	A19	SA12
B20	SYSCLK	A20	SA11
B21	IRQ7	A21	SA10
B22	IRQ6	A22	SA9
B23	IRQ5	A23	SA8
B23	IRQ5	A23	SA8
B24	IRQ4	A24	SA7

Continued

## ISA Connectors

Pin	Signal Name	Pin	Signal Name
B25	IRQ3	A25	SA6
B26	DACK2#-	A26	SA5
B27	TC	A27	SA4
B28	BALE	A28	SA3
B29	Vcc	A29	SA2
B30	OSC	A30	SA1
B31	GND	A31	SA0
KEY		KEY	
D1	MEMCS16#	C1	SBHE#
D2	IOCS16#	C2	LA23
D3	IRQ10	C3	LA22
D4	IRQ11	C4	LA21
D5	IRQ12	C5	LA20
D6	IRQ15	C6	LA19
D7	IRQ14	C7	LA18
D8	DACK0#	C8	LA17
D9	DRQ0	C9	MEMR#
D10	DACK5#	C10	MEMW#
D11	DRQ5	C11	SD8
D12	DACK6#	C12	SD9
D13	DRQ6	C13	SD10
D14	DACK7#	C14	SD11
D15	DRQ7	C15	SD12
D16	Vcc	C16	SD13
D17	Master#	C17	SD14
D18	GND	C18	SD15



## PCI Connectors

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A1	GND	B1	-12 V	A32	AD16	B32	AD17
A2	+12 V	B2	No Connect	A33	3.3 V	B33	CBE2#
A3	No Connect	B3	GND	A34	FRAME#	B34	GND
A4	No Connect	B4	No Connect	A35	GND	B35	IRDY#
A5	Vcc	B5	Vcc	A36	TRDY#	B36	3.3 V
A6	PCIINT3#	B6	Vcc	A37	GND	B37	DEVSEL#
A7	PCIINT1#	B7	PCIINT2#	A38	STOP#	B38	GND
A8	Vcc	B8	PCIINT4#	A39	3.3 V	B39	PLOCK#
A9	Reserved	B9	No Connect	A40	SDONE	B40	PERR#
A10	Vcc	B10	Reserved	A41	SBO#	B41	3.3 V
A11	Reserved	B11	No Connect	A42	GND	B42	SERR#
A12	GND	B12	GND	A43	PAR	B43	3.3 V
A13	GND	B13	GND	A44	AD15	B44	CBE1#
A14	Reserved	B14	Reserved	A45	3.3 V	B45	AD14
A15	SPCIRST#	B15	GND	A46	AD13	B46	GND
A16	Vcc	B16	PCLKE	A47	AD11	B47	AD12
A17	GNT#	B17	GND	A48	GND	B48	AD10
A18	GND	B18	REQA#	A49	AD9	B49	GND
A19	Reserved	B19	Vcc	A50	KEY	B50	KEY
A20	AD30	B20	AD31	A51	KEY	B51	KEY
A21	3.3 V	B21	AD29	A52	CBE0#	B52	AD8

Continued

## PCI Connectors

Pin	Signal Name	Pin	Signal Name	Pin	Signal Name	Pin	Signal Name
A22	AD28	B22	GND	A53	3.3 V	B53	AD7
A23	AD26	B23	AD27	A54	AD6	B54	3.3 V
A24	GND	B24	AD25	A55	AD4	B55	AD5
A25	AD24	B25	3.3 V	A56	GND	B56	AD3
A26	AD22 (IDSEL)	B26	CBE3#	A57	AD2	B57	GND
A27	3.3 V	B27	AD23	A58	AD0	B58	AD1
A28	AD22	B28	GND	A59	Vcc	B59	Vcc
A29	AD20	B29	AD21	A60	SREQ64#	B60	SACK64#
A30	GND	B30	AD19	A61	Vcc	B61	Vcc
A31	AD18	B31	3.3 V	A62	Vcc	B62	Vcc

## System I/O Addresses

Address Range (Hexadecimal)	Size (Decimal)	Description
0000 - 000F	16 bytes	PIIX - DMA 1
0020 - 0021	2 bytes	PIIX - Interrupt Controller 1
002E - 002F	2 bytes	Ultra I/O Configuration Registers
0040 - 0043	4 bytes	PIIX - Timer 1
0048 - 004B	4 bytes	PIIX - Timer 2
0060	1 byte	Keyboard Controller Data Byte
0061	1 byte	PIIX - NMI, speaker control
0064	1 byte	Keyboard Controller, CMD/STATUS Byte
0070, bit 7	1 bit	PIIX - Enable NMI
0070, bits 6:0	7 bits	PIIX - Real Time Clock, Address
0071	1 byte	PIIX - Real Time Clock, Data
0078	1 byte	Reserved - Board Configuration
0079	1 byte	Reserved - Board Configuration
0080 - 008F	16 bytes	PIIX - DMA Page Register
00A0 - 00A1	2 bytes	PIIX - Interrupt Controller 2
00C0 - 00DE	31 bytes	PIIX - DMA 2
00F0	1 byte	Reset Numeric Error
0170 - 0177	8 bytes	Secondary IDE Channel
01F0 - 01F7	8 bytes	Primary IDE Channel
0278 - 027B	4 bytes	Parallel Port 2 or 3 (Note 1)
02F8 - 02FF	8 bytes	On-Board Serial Port 2

Continued

## System I/O Addresses

Address Range (Hexadecimal)	Size (Decimal)	Description
0376	1 byte	Secondary IDE Channel Command Port
0377	1 byte	Secondary IDE Channel Status Port
0378 - 037F	8 bytes	Parallel Port 1 or 2 (Note 1)
03BC - 03BF	4 bytes	Parallel Port x (Note 2)
03E8 - 03EF	8 bytes	Serial Port 3
03F0 - 03F5	6 bytes	Floppy Channel 1
03F6	1 byte	Primary IDE Channel Command Port
03F7 (Write)	1 byte	Floppy Channel 1 Command
03F7, bit 7	1 bit	Floppy Disk Change Channel 1
03F7, bits 6:0	7 bits	Primary IDE Channel Status Port
03F8 - 03FF	8 bytes	On-Board Serial Port 1
LPT + 400H	8 bytes	ECP Port, LPT + 400H
4D0 - 4D1	2 bytes	Edge/level INTR Control Register
0CF8 (Note 3)	4 bytes	PCI Configuration Address Register
0CF9	1 byte	Turbo and Reset Control Register
0CFC - 0CFF (Note 3)	4 bytes	PCI Configuration Data Register
FF00 - FF07	8 bytes	IDE Bus Master Register

Notes:

- Depends on the presence of a parallel port at address 03BC.  
 If two ports are used, the addresses are:
 

0378	Parallel Port 1
0278	Parallel Port 2

 If three ports are used, the addresses are:
 

03BC	Parallel Port 1
0378	Parallel Port 2
0278	Parallel Port 3
- If this address is used, this will be parallel port 1.
- Only accessible by DWORD accesses.

## Memory Map

Address Range (Decimal)	Address Range (Hexadecimal)	Size	Description
1024K-131072K	100000-8000000	130048 K	Extended Memory
960K-1023K	F0000-FFFFFF	64 K	AMI System BIOS
952K-959K	EC000-EFFFF	16 K	FLASH Boot Block (Available as UMB)
948K-951K	EA000-EBFFF	8K	ECSD (Plug and Play configuration area)
944K-947K	E8000-E9FFF	8 K	OEM LOGO (available as UMB)
896K-943K	E0000-E7FFF	32 K	BIOS RESERVED (currently available as UMB)
800K-895K	C8000-DFFFF	96 K	Available High DOS memory (open to ISA and PCI bus)
640K-799K	A000-C7FFF	160 K	Off-board video memory and BIOS
639K	9FC00-9FFFF	1 K	Extended BIOS Data (moveable by QEMM, 386MAX)
512K-638K	80000-9FBFF	127 K	Extended conventional
0K-511K	00000-7FFFF	512 K	Conventional

## Board Interrupts

Interrupt Request	System Resource
NMI	I/O Channel Check (Note)
0	Reserved, Interval Timer
1	Reserved, Keyboard buffer full
2	Reserved, Cascade interrupt from slave PIC
3	Serial Port 2
4	Serial Port 1
5	User available (or second parallel port)
6	Floppy
7	Parallel Port 1
8	Real Time Clock
9	User available
10	User available
11	User available
12	On-board mouse port (available if no PS/2 mouse)
13	Reserved, Math coprocessor
14	Primary IDE
15	Secondary IDE if enabled, else user available

Note:

When using parity SIMMs, this interrupt indicates that multiple ECC errors have occurred. This interrupt can also indicate a PCI or ISA bus error.

## DMA

DMA Channel	Data Width	System Resource
0	8- or 16-bits	Open
1	8- or 16-bits	Open
2	8- or 16-bits	Floppy
3	8- or 16-bits	Parallel port (for ECP/EPP option)
4	—	Reserved - Cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

# Electromagnetic Compatibility

## Electromagnetic Compatibility Notice (USA)

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment. The customer is responsible for ensuring compliance of the modified product.

Only peripherals (computer input/output devices, terminals, printers, etc.) that comply with FCC class B limits may be attached to this computer product. Operation with noncompliant peripherals is likely to result in interference to radio and TV reception.

All cables used to connect to peripherals must be shielded and grounded. Operation with cables, connected to peripherals, that are not shielded and grounded may result in interference to radio and TV reception.



### **Note**

If a Class A device is installed within this system, then the system is to be considered a Class A system. In this configuration, operation of this equipment in a residential area is likely to cause harmful interference.



## Electromagnetic Compatibility Notices (International)

この装置は、第二種情報装置（住宅地域又はその隣接した地域において使用されるべき情報装置）で住宅地域での電波障害防止を目的とした情報処理装置等電波障害自主規制協議会（VCCI）基準に適合しております。

しかし、本装置をラジオ、テレビジョン受信機に近接してご使用になると、受信障害の原因となることがあります。

取扱説明書に従って正しい取り扱いをして下さい。

(English translation of the notice above)

This equipment is in the 2nd Class category (information equipment to be used in a residential area or an area adjacent thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Data Processing Equipment and Electronic Office Machines aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

-----  
The system has been tested and found to be compliant with CISPR 22 Class B, and VCCI Class II regulations.

-----  
Cet appareil numérique respecte les limites bruits radioélectriques applicables aux appareils numériques de Classe B prescrites dans la norme sur le matériel brouilleur: "Appareils Numériques", NMB-003 édictée par le Ministre Canadian des Communications.

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the interference-causing equipment standard entitled "Digital Apparatus", ICES-003 of the Canadian Department of Communications.

### **Declaration of the Manufacturer or Importer**

The Performance/AU ATX Desktop system is compliant with EU directive 89/336/EEC, using the EMC standards EN55022 and EN50082-1.

## **Recycling Statement**

This computer is not intended to be discarded as ordinary trash, but is designed to be recycled. Recycling extends the useful life of the product and reduces the impact the product has on the environment. If you plan to dispose of this computer, we suggest you first try to donate it to a charitable organization or a used computer dealer. This computer may also be recycled by an electronic equipment recycler. Check your telephone directory for a list of local organizations and businesses that provide recycling services. Local computer dealers may also provide you with names of suitable recycling organizations. Most recyclers require the entire unit for recycling. Do not remove parts required for unit to perform its basic function.

# BIOS Update and Recovery **A**

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## BIOS Update

The system BIOS resides on a flash component. You can upgrade a flash BIOS through software, without taking the system apart or replacing the flash component. This appendix tells how to upgrade your system BIOS from a diskette. The appendix also tells how to recover from an interrupted upgrade.

If you have access to a modem, the NEC Bulletin Board Service (BBS) can be used to provide you with the latest BIOS information. The BBS allows you to download files (video drivers, printer drivers, BIOS updates, etc.) for system enhancements and upgrades (see Appendix C)

The BBS can also be accessed through the CompuServe online service.

## Using the Upgrade Utility

1. Write down the Setup selections currently set on your system (Chapter 3 tells about the Setup program).
2. Insert the upgrade diskette in your system's diskette drive.
3. Reboot the system.
4. When the flash upgrade menu appears, choose "Update Flash Memory Area from a file."
5. When the menu asks you to enter a path/filename, use the arrow keys to select the *.bio* file, and press <Enter>.
6. The utility asks for a confirmation that you want to load the new flash into memory. Select "Continue with Programming."
7. After the upgrade completes, remove the upgrade disk.
8. Reboot the system and start the Setup program. Press <F5> to reset the BIOS defaults. Then, use the copy of the Setup selections you made at the beginning of this procedure to set the options.

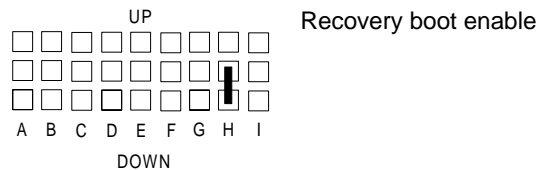
## BIOS Recovery

It is unlikely that anything will interrupt the Flash upgrade process. However, if an interruption occurs that prevents continuing with the upgrade, it is possible the BIOS could be left in an unusable state. The steps below tell how to recover from this kind of problem.

⇒ **Note**

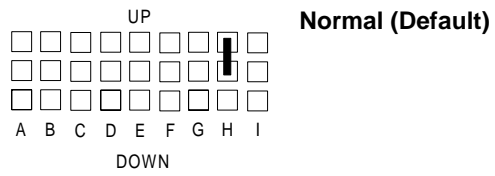
Because of the small amount of code available in the non-erasable boot block area, no video is available to direct the procedure. You must monitor the flash recovery by listening to the speaker.

1. Turn off power and remove the system cover.
2. Move the jumper to the position shown below (see Chapter 5 for the location of the jumper block).



3. Install the bootable upgrade diskette into diskette drive A.
4. Reboot the system.
5. Listen to the speaker. You should hear beeps in the following sequence:
  - a) After you reboot the system, the speaker beeps once. This beep marks the beginning of the power on self test (POST).
  - b) After a short delay (less than 10 seconds), the speaker beeps again, but at a higher frequency. This marks the beginning of the recovery process. At this point, the system is copying the recovery code into the flash device.
  - c) After about 30 seconds, the speaker beeps twice (again at the higher frequency), marking the end of the recovery process.
6. Turn the system off.

7. Move the jumper back to the Normal position as shown below.



8. Replace the system cover.
9. Leave the upgrade floppy in drive A, and turn the system on.
10. Continue with the original upgrade.

# Setting Up a Healthy Work Environment **B**

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## **WARNING**

**Prolonged or improper use of a computer workstation may pose a risk of serious injury. To reduce your risk of injury, set up and use your computer in the manner described in this appendix.**

**Contact a doctor if you experience pain, tenderness, swelling, burning, cramping, stiffness, throbbing, weakness, soreness, tingling and/or numbness in the hands, wrists, arms, shoulders, neck, back, and/or legs.**

## **Making Your Computer Work For You**

Computers are everywhere. More and more people sit at computers for longer periods of time. This appendix explains how to set up your computer to fit your physical needs. This information is based on ergonomics — the science of making the workplace fit the needs of the worker.

Some nerve, tendon, and muscle disorders (*musculoskeletal disorders*) may be associated with repetitive activities, improper work environments, and incorrect work habits. Examples of musculoskeletal disorders that may be associated with certain forms of repetitive activities include: carpal tunnel syndrome, tendinitis, tenosynovitis, de Quervain's tenosynovitis, and trigger finger, as well as other nerve, tendon, and muscle disorders.

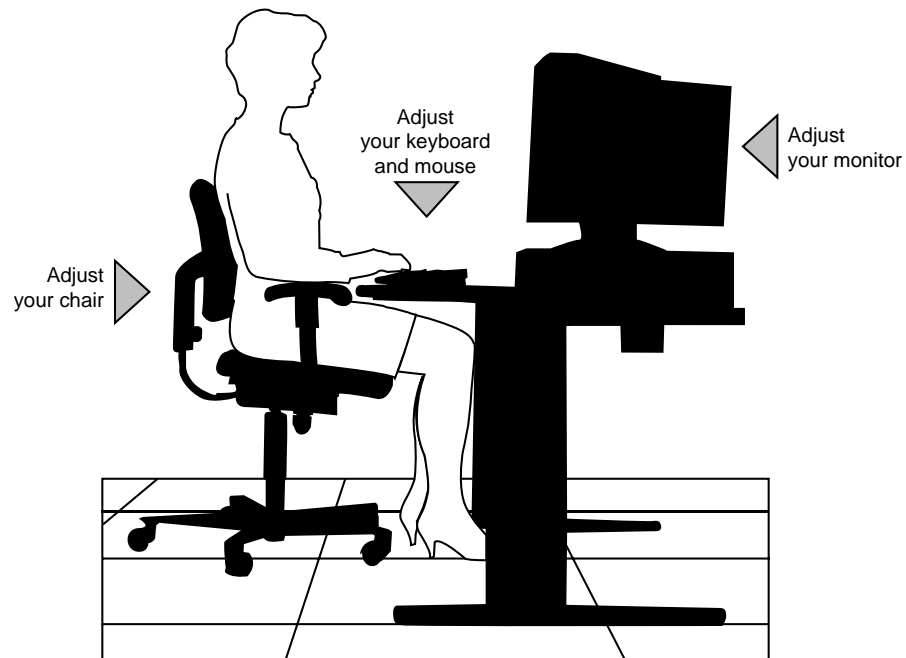
Although some studies have shown an association between increasing hours of keyboard use and the development of some musculoskeletal disorders, it is still unclear whether working at a computer causes such disorders. Some doctors believe that using the keyboard and mouse may aggravate existing musculoskeletal disorders.

Some people are more susceptible to developing these disorders due to pre-existing conditions or psychosocial factors (see “Pre-existing Conditions and Psychosocial Factors” later in the appendix).

To reduce your risk of developing these disorders, follow the instructions in this appendix. If you experience discomfort while working at your computer or afterwards, even at night, contact a doctor as soon as possible. Signs of discomfort might include pain, tenderness, swelling, burning, cramping, stiffness, throbbing, weakness, soreness, tingling and/or numbness in the hands, wrists, arms, shoulders, neck, back, and/or legs.

## ARRANGE YOUR EQUIPMENT

Arrange your equipment so that you can work in a natural and relaxed position. Place items that you use frequently within easy reach. Adjust your workstation setup to the proper height (as described in this appendix) by lowering the table or stand that holds your computer equipment or raising the seat height of your chair. To create more desk space, you can put your computer base on the floor.



## Adjust Your Chair

Your chair should be adjustable and stable. Vary your posture throughout the day.



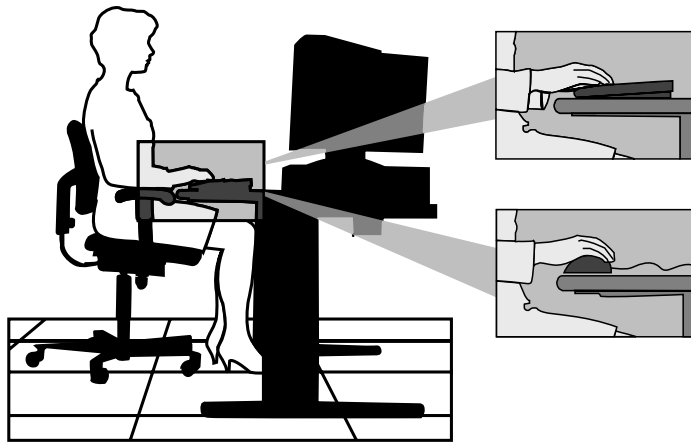
Check the following:

- Keep your body in a relaxed yet upright position. The backrest of your chair should support the inward curve of your back.
- Use the entire seat and backrest to support your body. Tilt the backrest slightly backwards. The angle formed by your thighs and back should be 90° or more.
- Your seat depth should allow your lower back to comfortably contact the backrest. Make sure that the backs of your lower legs do not press against the front of the chair.
- Extend your lower legs slightly so that the angle between your thighs and lower legs is 90° or more.



- Place your feet flat on the floor. Only use a footrest when attempts to adjust your chair and workstation fail to keep your feet flat.
- Be sure that you have adequate clearance between the top of your thighs and the underside of your workstation.
- Use armrests or forearm supports to support your forearms. If adjustable, the armrests or forearm supports should initially be lowered while all the other adjustments discussed in this appendix are made. Once all these adjustments are completed, raise the armrests or adjust the forearm supports until they touch the forearms and allow the shoulder muscles to relax.

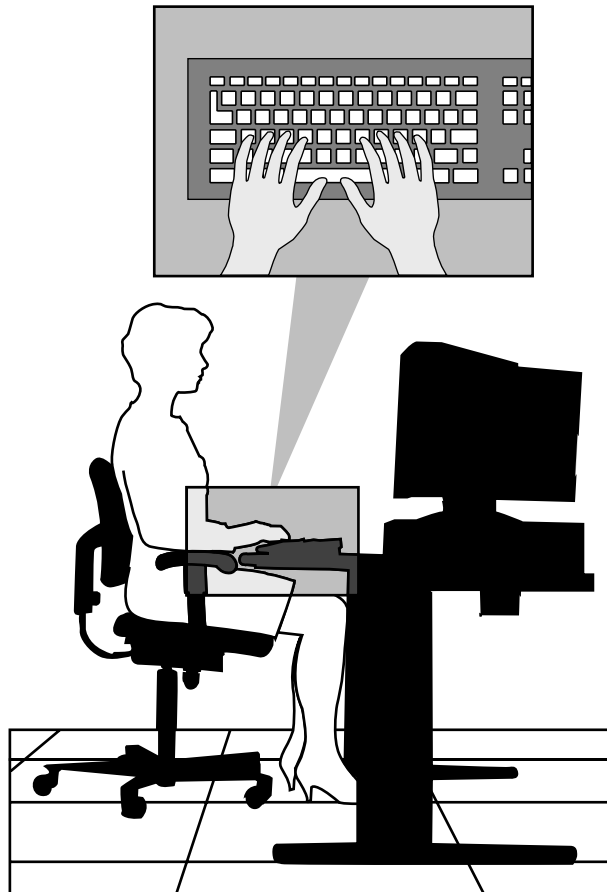
### Adjust Your input devices



Follow these points in positioning your keyboard and mouse.

- Position your keyboard directly in front of you. Avoid reaching when using your keyboard or mouse.
- If you use a mouse, position it at the same height as the keyboard and next to the keyboard. Keep your wrists straight and use your entire arm when moving a mouse. Do not grasp the mouse tightly. Grasp the mouse lightly and loosely.

- Adjust the keyboard height so that your elbows are near your body and your forearms are parallel to the floor, with your forearms resting on either armrests or forearm supports, in the manner described previously. If you do not have armrests or forearm supports, your upper arms should hang comfortably at your sides.
- Adjust your keyboard slope so that your wrists are straight while you are typing.

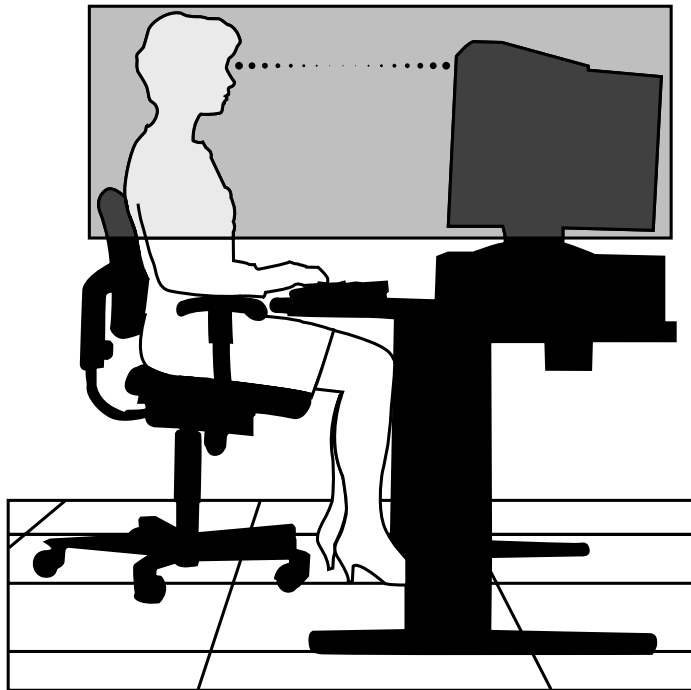


- Type with your hands and wrists floating above the keyboard. Use a wrist pad only to rest your wrists between typing. Avoid resting your wrists on sharp edges.

- Type with your wrists straight. Instead of twisting your wrists sideways to press hard-to-reach keys, move your whole arm. Keep from bending your wrists, hands, or fingers sideways.
- Press the keys gently; do not bang them. Keep your shoulders, arms, hands, and fingers relaxed.

## Adjust Your Monitor

Correct placement and adjustment of the monitor can reduce eye, shoulder, and neck fatigue. Check the following when you position the monitor.



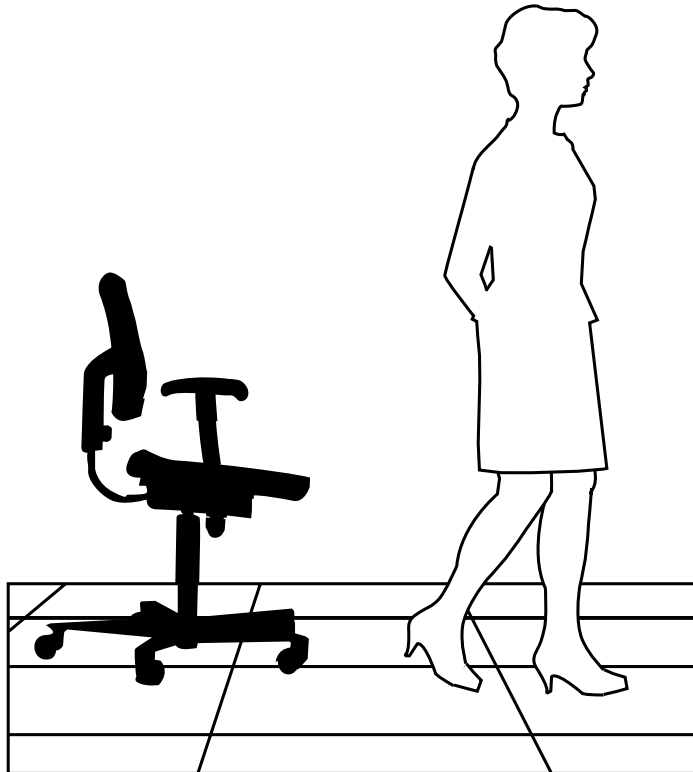
- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.
- Position your monitor no closer than 12 inches and no further away than 28 inches from your eyes. The optimal distance is between 14 and 18 inches.

- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.
- Position the monitor at a 90° angle to windows and other light sources to minimize glare and reflections. Adjust the monitor tilt so that ceiling lights do not reflect on your screen.
- If reflected light makes it hard for you to see your screen, use an anti-glare filter.
- Clean your monitor regularly. Use a lint-free, non-abrasive cloth and a non-alcohol, neutral, non-abrasive cleaning solution or glass cleaner to minimize dust.
- Adjust the monitor's brightness and contrast controls to enhance readability.
- Use a document holder placed close to the screen.
- Position whatever you are looking at most of the time (the screen or reference material) directly in front of you to minimize turning your head while you are typing.
- Get regular eye check-ups.

## Vary Your Workday

If you use your computer for prolonged periods, follow these instructions.

- Vary your tasks throughout the day.
- Take frequent short breaks that involve walking, standing, and stretching. During these breaks, stretch muscles and joints that were in one position for an extended period of time. Relax muscles and joints that were active.



- Use a timer or reminder software to remind you to take breaks.
- To enhance blood circulation, alter your sitting posture periodically and keep your hands and wrists warm.

⇒ **Note**

For more information on workstation setup, see the American National Standard for Human Factors Engineering of Visual Display Terminal Workstations. ANSI/HFS Standard No. 100-1988. The Human Factors Society, Inc., P.O. Box 1369, Santa Monica, California 90406

## **Pre-existing conditions and Psychosocial factors**

Pre-existing conditions that may cause or make some people more susceptible to musculoskeletal disorders include the following: hereditary factors, vascular disorders, obesity, nutritional deficiencies (e.g., Vitamin B deficiency), endocrine disorders (e.g., diabetes), hormonal imbalances, connective tissue disorders (e.g., arthritis), prior trauma (to the hands, wrists, arms, shoulders, neck, back, or legs), prior musculoskeletal disorders, aging, fluid retention due to pregnancy, poor physical conditioning and dietary habits, and other conditions.

Psychosocial factors associated with these disorders include: workplace stress, poor job satisfaction, lack of support by management, and/or lack of control over one's work.

Contact a doctor if you experience pain, tenderness, swelling, burning, cramping, stiffness, throbbing, weakness, soreness, tingling and/or numbness in the hands, wrists, arms, shoulders, neck, back, and/or legs.

## **Checking Your Comfort: How Do You Measure Up?**

Use this checklist to see if you are setting up your work environment to fit your physical needs.

### **Checking Your Chair**

- Do you sit in an upright position with the backrest supporting your lower back?
- When sitting, are your feet flat on the floor?
- Do you periodically adjust your chair and your posture?

### **Checking Your Keyboard**

- Is your keyboard angled so your wrists are straight when you type?
- Is your keyboard directly in front of you?

- Do you avoid resting your wrists on sharp edges?
- Do you press the keys gently and not bang on them?

### **Checking Your Mouse**

- Is your mouse at the same height as the keyboard and next to the keyboard?
- Are your wrists straight and your touch light when moving the mouse?

### **Checking Your Monitor**

- Did you adjust your monitor so that the top of the screen is at or slightly below eye level?
- Do you periodically rest your eyes by blinking often or looking away from the screen?
- Is your monitor no closer than 12 inches and no further away than 28 inches from your eyes?
- Do you use a document holder placed close to the screen?

### **Checking You**

- Is your work area set up to promote a natural and relaxing working position with frequently used work items within close reach?
- Do you take frequent short breaks?
- Do you stretch and walk during your breaks?
- Do you vary your tasks during the day?
- Do you have regular eye checkups?
- Do you contact your doctor if you feel any sustained discomfort?

*For more information on workstation setup, see the American National Standard for Human Factors Engineering of Visual Display Terminal Workstations. ANSI/HFS Standard No. 100-1988. The Human Factors Society, Inc., P.O. Box 1369, Santa Monica, California 90406*

*This appendix was prepared in consultation with Dr. David Rempel of the University of California/San Francisco Ergonomics Program and Mr. M.F. Schneider of HUMANTECH, Inc., Ann Arbor, Michigan.*

# 24-Hour Information Services



NEC has made it easy for you to get information and help when you need it. We offer 24-hour information services via:

- NEC's FastFacts™ Service
- NEC's Bulletin Board Service
- America Online® Service
- CompuServe® Online Service
- AT & T Interchange™ Online Service
- E-mail to NEC's Technical Support Services through a commercial online service or Internet
- Fax Service to NEC's Technical Support Services
- Internet World Wide Web and NEC's ftp Site
- NEC's Technical Support Services.

If you have access to a modem and/or fax machine (telephone for Technical Support), you can use the above services to obtain information about your system at any time, day or night, seven days a week.

Not only do these services provide general information about your system, they can also be used to answer your questions and help solve any problems you may have with your system, should that ever be necessary.

## NEC's FastFacts Service

NEC's FastFacts service is a self-help, automated electronic information service for obtaining up-to-date product application notes, installation procedures, troubleshooting tips, data sheets, technical information bulletins, illustrated parts lists, part numbers, and other information about your system.

Using a fax machine, you can obtain information from FastFacts 24 hours a day, 7 days a week. You simply call the FastFacts number on your touch-



tone telephone, order the information you want by following the voice prompts, and FastFacts will automatically fax the information to you.

If you are new to FastFacts, you should first order one of the following catalogs. Each catalog lists the available documents and their document numbers. Current catalogs include:

- Catalog 1, NEC Graphics Products
- Catalog 2, NEC CD-ROM, Printers, and Disk Drive Products
- Catalog 3, NEC Computer Products
- Catalog 4, NEC Products for the Macintosh
- Catalog 5, NEC Factory Refurbished Product List
- Catalog 6, NEC Select Direct Pricing
- Catalog 7, NEC Technical Support Notes, Technical Information Bulletins, Illustrated Parts Lists
- Catalog 9, NEC Product and Configuration Manual Index.

Order information from FastFacts as follows. If you would like instructions for using FastFacts, request document number 63233469 when prompted.

1. Be sure that your fax machine or fax/modem is on. Have the document number ready for the document you want.
2. At your touch-tone telephone, enter 800-366-0476 (U.S. and Canada only).

For international use, enter the international long distance access number, the U.S. country code, and the U.S. telephone number (708-238-7800).

3. Listen to the instructions provided by the voice prompts.

Press **1** if you do not want an introduction to FastFacts. Follow the automated instructions for ordering your document or catalog.

Press **2** if you want an introduction to FastFacts. Follow the automated instructions for ordering your catalog or document.

4. When prompted, enter your fax number and name.

For international use, first enter the international long distance access number (011), your country code, your area code or city code, then your fax number.

The information you requested will be automatically sent to your fax machine. Please wait for the ordered document to arrive at your fax machine before calling to order more documents. If FastFacts attempts to send the second order before the first order is completed, the order may be canceled. After three tries, FastFacts assumes that your line is busy and terminates any further processing of the order.

## NEC Bulletin Board Service

If you have access to a modem, the NEC Bulletin Board Service (BBS) can be used to provide you with the latest information on hardware and software. The BBS allows you to download files (video drivers, printer drivers, BIOS updates, etc.) for system enhancements and upgrades.

The BBS can also be accessed through the CompuServe online service.

Log onto the BBS as follows.

1. From the Windows for Workgroups Program Manager, select Accessories and double click on Terminal.

⇒ **Note**

If you have Windows 95, see the online help or your Windows 95 documentation to set the NEC BBS parameters and dial the BBS phone number.

2. From the Settings menu, click on Communications, check that the settings match the following BBS parameters, and click OK when done.
  - Baud rate: select any baud rate that matches your modem, up to 14.4 kbps (select 19200 if using 14.4 kbps)
  - Parity: none
  - Data bits: 8
  - Stop bits: 1
  - Flow control: Xon/Xoff (select Hardware if using 14.4 kbps)
3. From the Phone menu, click on Dial, enter the BBS phone number (508-635-4706), and click OK. Your business phone system and/or location might require a 9 1 or 1 prefix.

⇒ **Note**

The first time that you use the BBS, you will be requested to provide information for a new user.

4. Press Enter twice
5. Enter your first name, last name, and password. Press Enter after each.
6. Follow the screen prompts until the NECTECH Main Menu is displayed.
7. At the Main Menu, select J to join a conference. Select Conference 1 for the desktop conference.
8. From the Main Menu, press F and Enter for the File menu.
9. At the File menu, select F for a list of downloadable files. Follow the prompts to select a file for downloading.



#### **CAUTIONS**

Executable files automatically format your diskette when you download files from the BBS. Formatting destroys any data on the diskette. Before you download files from the BBS, check that you do not have information on the diskette that you need.

After you complete downloading your file, log off the BBS as follows.

1. Press **Enter** (to continue)
2. Press **G** (command for Goodbye/Hangup).
3. Press **Enter**.

### **America Online Service**

If you subscribe to America Online, you can use the service to obtain information about NEC and its products. You can use America Online to E-mail technical questions to NEC's Technical Support staff, post technical questions and messages on the Message Board, and access the NEC Software Library to download files

Use the following steps to access America Online and NEC's online information services.

1. Log onto America Online.
2. At the opening screen, click on Go To in the Main Menu.
3. At the Go To menu, click Keyword.

4. At the prompt, type either NECTECH or NEC, then either press **Enter** or click on Go.
5. At the NEC menu, double-click on one of the following topics, then follow the prompts:
  - About NEC
  - Terms and Conditions
  - News
  - Product Information
  - Questions and Answers
  - NEC Promotions
  - Message Board
  - Software Library.
6. Exit anytime by double-clicking on the rectangle in the upper left corner of the screen.

## **CompuServe Online Service**

If you subscribe to CompuServe, you can use the service to obtain information about NEC and its products. You can use CompuServe to E-mail technical questions to NEC's Technical Support staff, post technical questions and messages on the Bulletin Board, and access NEC's BBS to download files.

Use the following steps to access CompuServe and NEC's online information services.

1. Log onto CompuServe.
2. At the opening screen, click on Service, type in NECTECH at the prompt, and click OK.
3. At the NEC menu, double-click on one of the following topics, then follow the prompts:
  - NEC Bulletin Board
  - Information About This Service

- Access NEC BBS
  - Access CompuServe Information Services
  - Exit.
4. Exit anytime by double-clicking on the rectangle in the upper left corner of the screen.

## **AT & T Interchange**

If you subscribe to the AT&T Interchange online service, you can use the service to obtain information about NEC and its products. You can use the AT&T Interchange to obtain NEC corporate and product information, and participate in online discussions pertaining to NEC products.

Use the following steps to access the AT&T Interchange and NEC's online information services.

1. Log onto the AT&T Interchange.
2. At the opening screen, click on Interchange, enter your password at the prompt, and click on Connect.
3. At the Main Menu, click on Companies on Line.
4. At the Companies on Line menu, scroll down to and double-click on NEC Technologies.
5. At the NEC Technologies menu, double-click on one of the following topics, and follow the prompts:
  - Corporate Information
  - Latest News
  - Product Information
  - Discussions
  - Download Library.
6. Exit anytime by double-clicking on the rectangle in the upper left corner of the screen.

## **E-Mail/Fax Technical Support Service**

The NEC Technical Support Center offers technical support by E-mail over the Internet network if you have a modem. The Internet address is:

**tech-support@nectech.com**

You can also fax technical questions to the NEC Technical Support Center if you have access to a fax machine or fax/modem. The fax number is:

**(508) 635-4666**

When using the E-mail or fax support service, you should include the following words in the subject field for prompt response from the appropriate technical person:

- Desktop (desktop or minitower systems)
- Monitor
- CD-ROM
- Printer
- Notebook.

You should provide as much specific information about your questions as possible. Also, if you are sending a fax, please include your voice telephone number and your fax number with the question. You will receive a response to your questions within one business day.

## **Internet**

If you have a modem, you can access NEC's Home Page on the Internet World Wide Web. You can do this through a commercial online service or through your Internet account. NEC's Home Page contains general information about NEC products.

You can also use the Internet to access NEC's ftp (file transfer protocol) Site to download various files (video drivers, printer drivers, BIOS updates). The files are essentially the same files as on NEC's Bulletin Board Service.

To access the World-Wide-Web NEC Home Page, enter the following Internet Uniform Resource Locator (URL) through your service:

**<http://www.nec.com>**

To access NEC's ftp Site, enter the following Internet ftp address through your service:

**<ftp.nectech.com>**

Once in the file menu, follow the prompts to choose and download the file(s) you want.

## **NEC Technical Support Services**

NEC also offers direct technical support through its Technical Support Center.

Direct assistance is available 24 hours a day, seven days a week. Call the NEC Technical Support Center, toll free, at 1-800-632-4525.

Please have available your system's name, model number, serial number, and as much information as possible about your system's problem before calling.