PROPRIETARY NOTICE AND LIABILITY DISCLAIMER

Contents

6   **6-19**

Adding Options   **6-19**

6   **6-37**

Adding Options   **6-37**

6   **6-51**

Adding Options   **6-51**

7   **7-1**

Setting System Board Jumpers   **7-1**

8   **8-1**

Solving Problems   **8-1**

A   **A-1**

Setting Up a Healthy Work Environment   **A-1**

Using This Guide

The *PowerMate® VP Series User's Guide* is a comprehensive source of information about your computer. Before using this guide, read and follow the instructions in the PowerMate VP Series *Quick Setup* sheet that comes with your system.

To get the most out of your system, read Chapters 1,2,3, and 4 in this guide. See

■ Chapter 1, Using Your Computer, to familiarize yourself with system components and system operation.

■ Chapter 2, Setting System Parameters, to change your system configuration and to customize the system with security features.

■ Chapter 3, Using NEC Utilities and Drivers, for mouse, video, and Flash utility information. This chaption includes information on the NEC Bulleting Board service.

■ Chapter 4, Maintaining Your Computer, to extend the life and optimize the condition of your computer. This chapter provides protective measures, tips for routine care, and guidelines for moving your computer.

■ Chapter 5, Removing the System Unit Cover, contains procedures for removing and replacing the system unit cover.

■ Chapter 6, Adding Options, provides comprehensive procedures for adding expansion options to the system. The chapter includes important device preparation and cabling information.

The chapter also includes procedures for connecting external peripheral devices such as a printer, serial device, telephone line, speakers, and a microphone.

■ Chapter 7, Setting System Board Jumpers, provides a description of system board jumper settings and explains how to change jumper settings.

■ Chapter 8, Solving Problems, provides a checklist of conditions to determine and solve a problem that might occur. This chapter also describes the assistance available to you if you cannot solve the problem.

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

■ Appendix A, 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 B, Specifications, provides a comprehensive list of system specifications by component.

■ Appendix C, CD-ROM Reader Configuration, contains connector and jumper setting information for the system's CD-ROM reader.

■ Appendix D, Sound Board Jumper Settings, provides jumper and connection information for configuring the sound board.

Use this guide with the other documentation that comes with your system (see "Related Documentation" in this preface).

TEXT CONVENTIONS

This guide uses the following text conventions.

■ Warnings, cautions, and notes have the following format:

> **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 particularly important information about the material being described.

■ Names of keyboard keys are printed as they appear on the keyboard, for example, **Ctrl**, **Alt**, or **Enter**.

■ Text or keystrokes that you enter appear in boldface type. For example, type **return** and press **Enter**.

■ File names are printed in uppercase letters.

RELATED DOCUMENTS

In addition to this guide, the following printed documenta-
tion ships with your system.

- *Quick Setup*
  Contains information for quickly getting your system
  up and running. Read this information before you set
  up the system for the first time.

- *Windows for Workgroups and MS-DOS User's Guide*
  Provides a comprehensive source of information for
  using Microsoft® Windows™ for Workgroups,
  Windows, and MS-DOS®.

> **NOTE** MS-DOS and Windows for Workgroups
> are preinstalled on the hard disk in hard disk system
> configurations.

- *Ensemble User's Guide* (multimedia systems only)
  Contains detailed information about using the sound
  board installed in multimedia models.

- *Fax/Modem User's Guide* (multimedia systems with
  fax/modem only)
  Describes how to connect and use the fax/modem in
  fax/modem models. This guide includes procedures for
  sending and receiving a fax with Delrina™ WinFax
  LITE™.

- *Network Interface Board User's Guide*
  (network-ready systems only)
  Provides network configuration information for
  connecting the system to a network.

Your system might ship with additional documentation.
See the label on the shipping carton for a complete list.

In addition to the documentation that ships with the system, the following documentation is available from NEC:

- *PowerMate VP Series Service and Reference Manual* (part number 819-181170-000) which provides information for maintaining, troubleshooting, and repairing the system. This guide also includes hardware and interface information for programmers, engineers, and others who need to know how the system is designed.

    To purchase the service and reference manual (available in the U.S. and Canada), call NEC at 1-800-632-4525, press **3** at the prompt, and provide the document name and part number.

- 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.

    With FastFacts, you can obtain product literature and technical information bulletins. By using FastFacts, you can be kept up-to-date on the latest technical information for your PowerMate V486 Series system.

    See "FastFacts" in Chapter 8 for information about using FastFacts.

1 Using Your Computer

After completing the steps on the *Quick Setup* sheet that comes with your PowerMate VP Series computer, your system is ready to use (hard disk models only).

NEC recommends that you perform the following procedures once your system is up and running:

■ Read Appendix A, Setting Up a Healthy Work Environment, for guidelines that help you use your computer productively and safely. Information includes how to set up and use your computer to reduce your risk of developing nerve, muscle, or tendon disorders.

■ Run the system's Setup utility to check your computer's current time and date (see Chapter 2). Be sure that the system's clock is set for your time zone.

The following sections describes system features and procedures that you will use regularly to operate your computer. Information includes:

■ system unit, keyboard, and mouse features
■ startup/shutdown and reset procedures
■ integrated system technologies.

SYSTEM FEATURES

The PowerMate VP75 system comes in a variety of configurations. Information in this manual applies to all configurations unless otherwise stated. All configurations are Energy Star compliant and are listed below.

- Diskette drive only configuration (no hard disk) with 8 MB of system memory

- Hard disk drive configuration; including a diskette drive, hard disk drive, and 8 MB of system memory

- Multimedia configuration; including a diskette drive, hard disk drive, quadruple speed CD-ROM reader, sound board, speakers, microphone, and 16 MB of system memory

- Network configuration; including a diskette drive, hard disk drive, network board and 8 MB of system memory

Front Panel

Controls, lamps, and a 3 1/2-inch diskette drive are conveniently located on the front panel of the system units.

The desktop has two accessible 5 1/4-inch slots and a 3 1/2-inch hard disk drive slot behind the front panel.

Minitower configurations have three accessible 5 1/4-inch slots and two internal 3 1/2-inch hard disk drive slots.

The following figure shows the front panel features. Descriptions of these features follow the figure.

Desktop system controls and storage slots

Minitower system controls and storage slots

Power Button

The power button controls power to the system unit. Press the button once to turn on the power and again to turn off the power. The power button is almost flush with the front panel when power is off and indented further when power is on.

See "Startup/Shutdown" later in this chapter for information about powering on and off.

Lamps

The front panel contains two lamps, power and disk.

■ The power lamp (green) indicates that the system unit is powered on. When in suspend mode, the power lamp on the front panel changes from green to amber.

A green lamp indicates that the system is in a Full Power On mode of operation. An amber lamp indicates that the system is in Suspend mode with full power reduction.

See "Power Management" later in this chapter for information about power saving modes of operation.

■ The disk lamp (green) indicates when a hard disk is performing a read or write operation.

> ⚠ **CAUTION:** Do not turn off the system, unless absolutely necessary, while the disk lamp is lit or in suspend mode. To do so can damage your hard disk or data.

Suspend Button

After the system has been powered on, the suspend button lets you put your computer into an instant suspend or "Sleep" mode when it is pressed. This suspend mode is a power saving mode that shuts down all installed devices, video signal to the monitor, and processor without powering off the system.

When in suspend mode, the power lamp on the front panel changes from green to amber. Exit the suspend mode by moving the mouse or pressing a key on the keyboard. See "Power Management" in this chapter for more information.

Diskette Drive

Your system comes with a 3 1/2-inch 1.44-MB diskette drive — which is assigned as drive A.

Desktop diskette drive controls

Minitower diskette drive controls

Diskette drive A is your primary "bootable" drive. Use this drive if you need to load and start programs from a diskette.

Diskette drive features include a release button and a drive busy lamp.

■ The diskette release button lets you release an inserted diskette from the drive. Press this button to release a diskette.

■ The diskette drive busy lamp lights when the drive is reading from or writing to a diskette.

> ⚠ **CAUTION:** To prevent damage to your diskette drive and data, do not turn off the system or remove a diskette while the diskette drive busy lamp is lit.

Insert diskettes into the diskette drive with the label side facing up (see "Diskette Loading" later in this chapter).

Diskette Loading

Use the following procedure to insert a 3 1/2-inch diskette in the standard diskette drive.

1. Holding the diskette by the label side, insert it, label side up, into the diskette drive (see the following figure).

Inserting a 3 1/2-inch diskette in the desktop system

Inserting a 3 1/2-inch diskette in the minitower system

2. Insert the diskette all the way into the drive until you
hear a click.

NOTE You must format a new diskette before storing information on it. Use the MS-DOS FORMAT command. See your MS-DOS documentation for information about formatting a diskette.

CAUTION: Do not format your hard disk drive, this will erase all preinstalled applications.

To remove a diskette from the diskette drive, press the release button on the 3 1/2-inch drive.

CAUTION: Do not remove a diskette from the diskette drive when the diskette drive lamp is lit. To do so can damage both the data on the diskette and the drive.

Do not turn off the system power while the diskette is being accessed.

Do not reset the system (except as a last resort) when the diskette drive is in use.

Hard Disk

Your computer supports up to four intelligent drive electronics (IDE) devices. A 3 1/2-inch, IDE hard disk comes standard in hard disk configurations. The hard disk is assigned as drive C in your system and is selected as the master device on the system board's primary PCI/IDE connector.

The hard disk drive in your system is formatted and the applications have been installed for you.

CAUTION: Do not format the hard disk. Formatting the hard disk destroys all of the data on the disk.

CD-ROM Reader

Systems come with a CD-ROM reader. The reader is assigned as drive E in your system and is selected as the master device on the system board's secondary PCI/IDE connector. The CD-ROM reader features quadruple speed technology.

The CD-ROM reader operates at different speeds depending on whether the CD you are using contains data or music. This allows you to get your data faster and to see smoother animation and video.

Use the CD-ROM reader to load and start programs from a compact disc (CD). You can also use the CD-ROM reader to play your audio CDs. The CD-ROM reader is fully compatible with Kodak Multisession Photo CDs™ and standard audio CDs.

Features for the CD-ROM reader are shown in the following figure. Descriptions of these features follow.

CD-ROM reader controls and indicators

The CD-ROM reader has the following features:

■ A jack for connecting headphones. Use headphones with a stereo mini-jack plug.

■ A volume control knob for adjusting the headphone volume.

> **NOTE** The volume control has no effect on the audio outputs from the CD-ROM reader's audio connector.

■ A busy indicator that lights during read operations.

■ An eject/retract button to open or close the CD tray when the power is on.

■ A hole in the front panel to access the emergency eject screw. If power is unavailable and you need to eject the CD tray, insert a jeweler's screw driver and turn the screw counterclockwise to open the CD tray. Turn the screw clockwise to close the tray again.

■ A CD tray that ejects and retracts when the eject/retract button is pressed.

CD Loading

Use the following procedure to load a CD into the CD-ROM reader.

1. Press the eject/retract button to eject the tray.

2. With the printed side facing up, hold the CD by its edges and place it into the tray.

Loading a CD into the desktop system

Loading a CD into the minitower system

3. Press the eject/retract button to close the tray.

To remove the CD, press the eject/retract button to eject the tray.

Audio Support

The 16-bit sound board in multimedia systems provide stereo CD-quality sound.

The system's audio board, stereo speakers, and microphone offer exceptional sound capabilities for multimedia applications, games, or audio CDs.

The audio board supports upgrades for Wave Blaster and Advanced Signal Processor (ASP) options. Wave Blaster is a MIDI synthesizer with capabilities for producing extremely high fidelity stereo music for computer audio systems. See your *Ensemble Software User's Guide* for information on playing audio CDs.

Rear Panel

The rear panel provides connectors for setting up the system and system options. This section shows and describes these features. The following figures identify the system I/O ports.

Desktop system I/O connectors

Minitower system I/O connectors

15-Pin VGA Monitor Port

The monitor port supports a video graphics array (VGA)-compatible monitor. Connect the monitor's 15-pin signal cable to this connector.

This high-performance VGA-compatible connector is integrated on the system board's Peripheral Component Interconnect (PCI) local bus.

The integrated video hardware supports standard, super, and high-resolution graphics modes. The system ships with Microsoft Windows for Workgroups video drivers pre-installed on the hard disk.

See "Integrated Technologies" in this chapter for more information about your computer's video capabilities.

Printer Port

The printer port is the system's parallel interface connector. Use this port to connect a parallel printer with a 25-pin connector to the system. See "Parallel Printer" in Chapter 6 for printer connection information.

MS-DOS refers to this port as LPT1. The LPT1 assignment identifies the port for software installations. See Chapter 2 for printer port settings.

Serial Ports

These ports allow the connection of up to two RS-232C serial devices with 9-pin connectors, such as a pointing device or a serial printer, to the system. See "RS-232C Devices" in Chapter 6 for connection information. See Chapter 2 for serial port settings.

Keyboard Port

The keyboard port supports a PS/2-compatible, 101-key keyboard (in the U.S. and Canada) or a 102-key keyboard (in the United Kingdom and Germany) with a 6-pin miniDIN connector. Attach the keyboard that comes with your computer to this port.

⚠ **CAUTION:** Always turn off system power before connecting or disconnecting the mouse or keyboard. Failure to do so can damage the device or the system.

Before you attach the mouse or keyboard cable to the appropriate port, carefully align the cable connector with the port.

Mouse Port

The mouse port supports a personal system (PS)/2®-compatible mouse. Attach the mouse that comes with your computer to this port.

Expansion Slot Covers

Expansion slot covers are removable, allowing installation of up to four expansion boards to the system. Desktop systems have three slots for 16-bit industry-standard architecture (ISA)-compatible boards and one shared slot for either an ISA board or a 32-bit PCI-compatible board.

Minitower systems have three slots for 16-bit ISA boards, one shared slot for either an ISA or a PCI board, and one dedicated slot far a PCI board. See Chapter 6 for information about installing an expansion board.

Sound Board Jacks

Systems configured with multimedia components come with a sound board. The sound board provides jacks for connecting a microphone and external speakers to your system. See "Multimedia Setup" in Chapter 6 for detailed connection information.

Desktop sound board connectors

Minitower sound board connectors

■ Line In Jack

The Line In Jack allows you to connect devices such as a cassette, DAT, or Minidisc player to your sound board for playback or recording.

■ Microphone In Jack

The Microphone In (MIC) Jack allows you to connect a microphone for voice input.

■ Line Out Jack

The Line Out Jack allows you to bypass your sound board's internal amplifier to connect powered speakers or an external amplifier for audio output. (Use this jack for the speakers shipped with your system.)

■ Speaker Jack

The Speaker Jack allows you to connect speakers for audio output from the sound board's built-in power amplifier. The built-in amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power. (Use this jack if you connect unamplified speakers or headphones.)

■ MIDI/Joystick Connector

The MIDI/Joystick Connector allows you to connect a joystick or MIDI kit to your sound board.

The joystick connector on your sound board is identical to that on a standard PC game control adapter or game I/O connector. You can connect any analog joystick with a 15-pin D-sub connector. It also works well with any application that is compatible with the standard PC joystick. To use two joysticks, you need a Y-cable splitter.

NOTE The installation of a game card in your system will conflict with the joystick connector on your sound board.

To avoid a conflict, either remove the game card or disable the joystick connector on your sound board by removing the JYEN jumper on the sound board (see Appendix D).

The optional MIDI kit contains a MIDI adapter with a joystice connector so that you can plug in a joystice and a MIDI device simultaneously. The kit also comes with sequencing software that allows you to record, play back, and edit MIDI files.

Network Connectors

Network-ready models come with an Ethernet network interface board. The board allows you to connect the system to an Ethernet network and communicate with other computers.

A network-ready system is preconfigured to use in a Windows for Workgroups environment immediately after you connect it to an existing Windows for Workgroups network. See the *Quick Setup* sheet that comes with your system for connection information.

The network interface board, also referred to as a network interface card (NIC), provides three connectors for coaxial and twisted-pair network cabling:

■ BNC — supports thin coaxial cables.

■ AUI connector — supports thick coaxial cables.

■ RJ-45 connector — supports twisted-pair 10BASE-T cables.

Desktop network board connectors

Minitower network board connectors

Power Supply

The desktop system uses a 145-watt (W) power supply. A 200-W power supply is installed in the minitower system. The following figure identifies the power supply features.
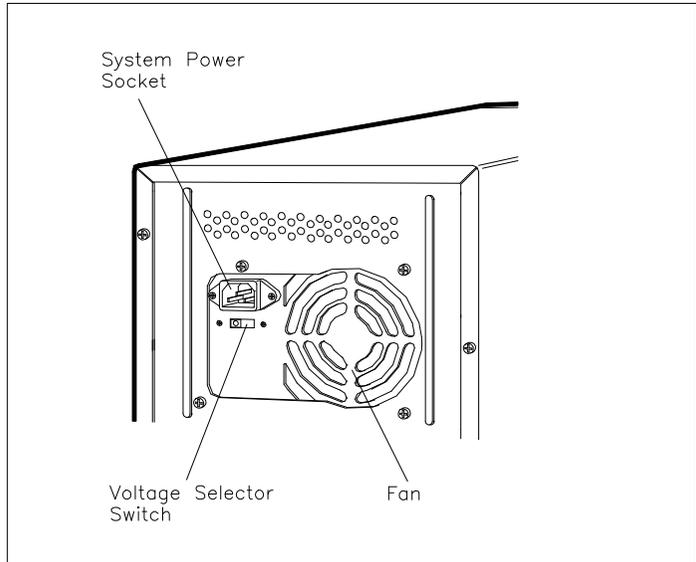
Minitower power supply features

Cooling Fans

Two cooling fans in your system provide proper ventilation to cool system components and prevent overheating. One fan is in the power supply. The second fan is next to the Pentium™ processor, inside the system. For proper ventilation, keep these areas clear.

Voltage Selector Switch

The voltage selector switch sets the voltage for your system to 115 volts (V) or 230 V. Be sure that the switch is set correctly for the voltage in your area. Most outlets in the United States, Canada, and Taiwan are 115 V. Most outlets in Europe, Australia, and Asia are 230 V.

CAUTION: Be sure that the voltage selector switch is set correctly for the voltage in your area (115 V or 230 V).

System Power Socket

The system power socket is the connector for the system unit power cord. This is the connection for alternating current (AC) from your wall outlet to the system unit.

Keyboard

An industry-standard, membrane keyboard comes with your computer. The keyboard is detachable and has adjustable supports.

Keyboard key functions depend on the operating system or software application program you use. See the documentation that comes with your operating system or software. A general description of keyboard features follows.

NOTE Most of the keys have a repeat function. When you hold down a key, the character or function repeats until you release the key.

You can set keyboard auto-repeat and delay rates in the Setup utility (see Chapter 2).

Function Keys

The function of these keys is specific to your particular software application or operating system.

Status Lamps

The status lamps indicate the status of the Num (Numeric) Lock, Caps (Capital) Lock, and Scroll Lock keys.

Numeric Keypad/Cursor Control Keys

These keys work like a numeric keypad. In Numeric Keypad mode, the Num Lock lamp is on.

To use the keys to control the direction of the cursor, press the Num Lock key (Num Lock lamp goes off). To return to the Numeric Keypad mode, press the Num Lock key again.

To use a keypad cursor key while in Numeric Keypad mode, press the Shift key and the keypad cursor key.

NOTE The system enables Numeric Keypad mode at power-on. You can set the Numeric Keypad mode off at power-on with the Setup utility (see Chapter 2).

Standard Cursor Control Keys

These keys control the direction of the cursor. The Num Lock state (Num Lock lamp is lit) does not affect the operation of these keys.

Typewriter Keys

These keys function as standard typewriter keys.

Mouse

A PS/2-compatible mouse comes standard with your system. A mouse is a hand-held pointing device that helps you use Windows for Workgroups-based application software more easily and efficiently. It is fast, accurate, and simple to use. Your mouse lets you take full advantage of applications with a Graphical User Interface (GUI).

For best results with your mouse, use it on a mouse pad.

CAUTION: To prevent damage to your mouse and to the system, turn off the system power before you connect or disconnect your mouse.

Also, the system fails to recognize that a mouse is attached if you connect the mouse after system power is on.

Speakers

Multimedia configurations come with a pair of high-quality stereo speakers. The speaker set features a volume control, treble boost, bass boost, and a power-on button. The speakers connect to the Line Out jack on the back of the system unit. See "Multimedia Setup" in Chapter 6 for connection information.

Microphone

the microphone that comes with multimedia configurations allows you to record voice and sound into your computer data files. See "Multimedia Setup" in Chapter 5 for connection information.

SYSTEM OPERATION

The following sections describe how to start up, shut down, or reset your computer.

Startup/Shutdown

When you power on your computer, it looks for specific files that contain the configuration information it needs to operate properly. The system accesses the following files:

■ CONFIG.SYS
This text file tells the computer where in memory to load the operating system (MS-DOS), what device drivers to install, and what memory management features to activate.

For example, CONFIG.SYS directs the computer to load the video drivers that identify your monitor type and the mouse driver that activates the mouse. When the system boots and accesses CONFIG.SYS, MS-DOS is activated, device drivers are loaded, and memory management features are executed.

■ AUTOEXEC.BAT
This file is a batch program that MS-DOS runs imme-
diately after it executes the commands in the
CONFIG.SYS file. AUTOEXEC.BAT contains com-
mands that define the characteristics of the hard-
ware devices.

For example, AUTOEXEC.BAT identifies the port
to which your printer is connected, customizes how
MS-DOS information is displayed on your screen,
and starts memory resident programs and applications.
AUTOEXEC.BAT contains the commands that auto-
matically start the Windows program when your com-
puter boots.

> ⚠ **CAUTION:** Do not delete either the
> CONFIG.SYS or AUTOEXEC.BAT file. Doing so will
> keep your computer and applications from running
> properly.
>
> Copy the CONFIG.SYS and AUTOEXEC.BAT files
> to a diskette in case they are accidentally deleted or
> corrupted.

Use the following procedures to start up and shut down
your computer.

Powering On

Starting up (or powering on) your computer initiates an
automatic routine called a cold boot. A cold boot performs
diagnostic tests, sets system parameters last saved by the
Setup program, loads the operating system, and prepares
the computer for use. A cold boot reinitializes all devices.

Power on (boot) your computer as follows.

1. Check that the power cables from the monitor and system unit are connected to a wall outlet.

⚠ **CAUTION:** Be sure that the voltage selector switch is set correctly for the voltage in your area (115 V or 230 V).

2. If you are booting from the hard disk, make sure that the diskette drive is empty.

   To boot from the diskette drive, be sure that you have a diskette in drive A containing operating system files. See your operating system documentation for information about creating system diskettes.

NOTE The system looks for the drive containing operating system files. If you have a diskette with MS-DOS or another operating system's files in drive A, the system boots from the diskette drive. If you do not have a diskette in drive A, the system boots from the hard disk.

A diskette without operating system files in drive A prevents a system boot and displays the error message, "Non-system disk or disk error. Replace and press any key when ready."

   Booting from a diskette can be disabled for virus protection in the Setup utility (see Chapter 2).

3. Turn on power to the system unit by pressing the power button on the front panel.

4. Turn on the power to the monitor.

At power-on, the system unit's power lamp lights and the power-on screen appears. If necessary, adjust the contrast and brightness controls on the monitor.

The system performs Power-On Self-Test (POST) diagnostic tests that check major hardware components, such as memory and interface circuits. It compares the hardware it finds with parameters last saved by the Setup program.

Several configuration messages appear on the screen.

If POST finds any discrepancies between the parameters it finds and the parameters last saved, it displays an error message. The system then prompts you to run the Setup program to correct the configuration.

If POST does not find any discrepancies in its configuration test, the computer loads system files into memory. It then loads Microsoft Windows in hard disk configurations. Your computer is ready for use.

Powering Off

Use the following steps to shut down (power off) your computer.

1. Check that your system is in a Full-Power On Mode of operation. A green power lamp indicates a Full-Power On mode of operation.

   If the power lamp is amber, press any key or move your mouse to "wake up" the system to a Full-Power On mode of operations.

2. Save your work. See the documentation that comes with your application program.

3. Exit the application program.

If you are in Windows, exit the Program Manager by positioning the mouse pointer on the block at the upper left corner of the monitor, and double click the left button on the mouse. Select "OK" at the prompt to exit Windows.

4. Make sure that the hard disk and diskette drives are not in use. The "C:\>" should now be displayed on the monitor. A lit hard disk lamp or diskette drive busy lamp indicates that a drive is in use.

5. Turn off power to your monitor.

6. Power off the system by pressing the system unit power button.

⚠ **CAUTION:** Wait until a program is finished running before powering off the system.

Unless absolutely necessary, never power off the system when the hard disk lamp or diskette drive busy lamp is lit. Information on the hard disk or diskette might be lost or damaged.

System Reset

A system reset restarts your computer after it is powered on. You might need to restart your system if your system power is on and you have trouble using your computer.

⚠ **CAUTION:** Resetting the system removes information from RAM disks, volatile system memory, and application programs. Information saved in files on disk, like program and data files, are not usually affected by a system reset.

You can reset the system in two ways:

> ⚠ **CAUTION:** Unless absolutely necessary, do not reset the system when the power lamp is amber or when the hard disk lamp or diskette drive busy lamp is on. Information on the hard disk or diskette might be lost or damaged.

■ With a "warm boot."
Press and hold **Ctrl**, **Alt**, and **Del**. When all three keys are pressed, the system resets.

A warm boot is a software reset. A warm boot clears volatile system memory and reloads the operating system.

■ With a "cold boot."
Turn the power off using the system unit power switch, wait at least five seconds, and then turn the power on.

A "cold boot" is a hardware reset. It checks the hardware and reloads the operating system (see "Powering On" in this chapter).

> **NOTE** When possible, use a warm boot to restart your computer. A warm boot is quicker and less wearing on the computer than a cold boot.

Situations that might require a system reset include the following conditions:

■ The monitor is on but the system does not respond to keyboard input or mouse movement (requires a cold boot).

■ You cannot exit from an application program. In this case, first try a warm boot in Windows.

■ You change the system configuration after editing the CONFIG.SYS file.

■ You change your system configuration settings or operating system and you want to start the system with the new settings.

■ The monitor screen is black. If your screen is black, it might only need a simple adjustment. Before you reset the system, check the following:

— Move the mouse or press the space bar to see if the screen is blank because you have power management features enabled.

— Check the system unit power lamp. If the power lamp is amber, press a key or move the mouse. You might only need to change the mode of operation from Suspend mode to a Full-Power On mode to solve your problem.

— Adjust the contrast and brightness controls on the monitor.

— Check that your monitor is properly connected and the monitor power is on.

INTEGRATED TECHNOLOGIES

NEC designed your computer with technologies that help you get the most out of your computer. Key integrated features include:

■ Intel 75-MHz Pentium™ microprocessor

■ A 320-pin zero insertion force (ZIF) OverDrive™ socket

■ 256-KB secondary write-back or write-through cache memory

- 8 MB or 16 MB of system memory, upgradeable to 128 MB

- System Setup program built into the BIOS

- Flash ROM for fast economical BIOS upgrades

- System I/O controller integrating serial ports, parallel port, hard disk, and diskette drive controllers

- PCI local bus for high-speed bus performance and data transfers

- Extended super-VGA controller with 1 MB of video dynamic random-access memory (DRAM), upgrade-able to 2 MB

- Plug and Play support for easy board installation

- Power saving features for conserving power and re-ducing operating cost.

Processor Subsystem

The system uses a 64-bit, Intel Pentium P54C micro-processor. The processor has 16 KB of write-back internal cache, 8 KB for instructions and 8 KB for data. Integrated into the processor is a math coprocessor.

To use the Pentium processor's power, the system features an optimized 64-bit memory interface and complementary 256-KB burst-mode secondary cache.

The Pentium processor cache design uses 15-ns static ran-dom access memory (SRAM) that allows data to be sent or received from cache with one wait burst.

The Pentium processor is compatible with all 8-, 16-, and 32-bit software written for the Intel386™, Intel486™, and Pentium microprocessors.

To protect your investment and to accommodate future technologies and work requirements, the Pentium processor comes installed a 320-pin zero insertion force (ZIF) processor socket. The socket provides an upgrade path to the next generation of OverDrive™ processors.

System Memory

Your system comes standard with 8 MB (16 MB in multimedia configurations) of memory, 640 KB of base memory and 7 MB of extended memory. System memory can be expanded up to 128 MB, using optional single in-line memory modules (SIMMs) installed in SIMM sockets.

System BIOS

The system BIOS provides ISA and PCI compatibility. The BIOS contains the system's power-on self-test, setup, PCI auto configuration utility, and BIOS recovery programs. The BIOS is flashable for easy upgrades.

Flash ROM

NEC's Flash ROM allows fast, economical BIOS upgrades. NEC Flash ROMs are reprogrammable system and video EPROMs.

With NEC's Flash ROM, a ROM BIOS change:

- is fast and easily done using a BIOS Update utility.

- eliminates the expensive replacement of ROM BIOS chips and reduces system maintenance costs.

- reduces inadvertent system board damage that can take place when replacing ROMs.

- facilitates adopting new technology while maintaining industry standards.

- gives network administrators company-wide control of BIOS revisions.

Power Management

Each computer system is Energy Star compliant and incorporates power management features. These features lower power consumption when there is no activity detected from the keyboard, mouse, diskette drive, or hard disk drive after a predefined period of time. As soon as activity is detected the system resumes where it left off.

> ⚠ **CAUTION:** Do not turn off the system while the power lamp is amber, the system is in suspend mode. To do so can damage your hard disk or data.

You can manually initiate a power-saving mode instantly or you can set power management features to start automatically. To enable Power Management, see Chapter 2, Setup. The computer's power-saving functions shut down all installed devices, video signals to the monitor, and processor.

Your system has three different power consumption states:

■ Full-Power On mode
  In Full-Power On mode, the system is in a fully active mode of operation. Power to all components, such as the monitor and hard disk drive, is on. When you power on your computer, your system is in a Full-Power On mode. A green system unit power lamp indicates that the system is in a Full-Power On mode.

■ Standby mode
Standby is a power-saving mode. When the system goes into Standby mode, it automatically turns power off to individual system components after a preset period of system inactivity. If you do not use the components, such as your keyboard, mouse, or drives, for the preset time, your screen goes blank and the system goes into a power-saving mode of operation.

■ Suspend mode
Suspend mode is a power-saving mode. In Suspend mode, the system turns off power to all possible system devices. The system saves data and system status before it shuts off power.

The following sections describe how to use Standby and Suspend power management modes.

Using Standby Mode

In Setup, you can enable or disable the Standby mode to start automatically. You can also set the period of inactivity to initiate the component to power off. This period of activity is the "timeout" parameter in Setup.

When in Standby mode, the power lamp on the front panel lights amber. Standby mode returns to a Full-Power On mode of operation when you press a key or move the mouse or when there is system activity through an I/O port.

See "Power Menu" in Chapter 2 for information about setting the Standby parameters.

Using Suspend Mode

Suspend mode provides the greatest power savings by putting the system in a maximum power shutdown. When the system goes into Suspend mode, it saves data and system status and then shuts off power to all possible components. Suspend mode lets you save power without first saving your work.

You can initiate Suspend mode in two ways:

■ Manually by pressing the suspend button. Pressing the suspend button is a convenient way of conserving energy when you are going to be away from your system for a short period of time.

■ Automatically by setting the Suspend timeout in Setup. The Suspend timeout is activated after a period of system inactivity has occurred in Standby mode.

Press a key or move the mouse to wake up the system and resume system operation. System power and system status returns to where you left it.

An amber system unit power lamp indicates that the system is in a Suspend mode of operation.

See "Power Menu" in Chapter 2 for information about setting the Suspend mode in Setup.

Plug and Play

Your system comes with Plug and Play system support already installed. With this support, your system automatically configures newly added Plug and Play boards. You simply insert the board in the system.

Plug and Play boards are industry-standard architecture (ISA) boards with the new configuration capability. Most currently available ISA boards do not have the new capability. However, you can include them with Plug and Play boards in your system.

To work in a system, boards often use a variety of dedicated resources. If two boards try to use the same resource, one board might not work or the system might not function in the way you expect.

> **NOTE** Generally, a resource can be used by only one board or device. However, some boards can share the same DMA or IRQ resources. The board manufacturer's documentation tells you whether a board supports shared resources.

If an ISA board does not support shared resources and a Plug and Play board is not aware that the ISA board is using the same resource it has selected, an ISA Configuration Utility (ICU) is needed. The ICU is used to eliminate the guess work from the configuration procedure. Although most Plug and Play boards come with an ICU, an ICU can be obtained from the NEC Bulletin Board Service (see Chapter 2).

Plug and Play boards are dynamic in nature — the system allocates resources to these boards upon system boot. Some device drivers support this dynamic board configuration, but some do not.

Device drivers that do not support the dynamic board configuration are also known as static device drivers. If you are using a static device driver, you need to permanently associate resources with a Plug and Play board, instead of relying on the default Plug and Play behavior. Otherwise, the device driver might not be able to find the board the next time the system boots.

System I/O Controller

The system I/O controller integrates, on one chip, the controller functions for the system's two serial ports, bidirectional parallel port, and diskette drives.

The enhanced parallel port supports Enhanced Capabilities Port and Enhanced Parallel Port (EPP) modes for devices that require ECP or EPP protocols. These protocols allow high-speed bidirectional transfer over a parallel port and increase parallel port functionality by supporting more devices.

The two buffered high-speed serial ports use a fast 16550 UART, which supports transfer rates up to 19.2 kilobytes (KB) per second. These ports allow the installation of high-speed serial devices for faster data transfer rates.

PCI Local Bus

The industry-standard PCI bus is a highly integrated I/O interface that offers the highest performance local bus available for the Pentium processor. The PCI bus supports burst modes that send large chunks of data across the bus, allowing fast displays of high-resolution images.

The high bandwidth PCI local bus eliminates the data bottleneck found in traditional systems, maintains maximum performance at high clock speeds, and provides a clear upgrade path to future technologies.

PCI Auto Configuration

Your system comes with a PCI auto-configuration utility that operates in conjunction with the system's Setup utility. The utility automatically configures interrupts, DMA channels, I/O space, and other parameters to allow addition of optional PCI boards with minimal intervention on your part.

Video Features

The system's high-performance PCI video controller with graphics accelerator and standard 1 MB of video memory supports the following resolutions:

Resolutions supported with the standard 1 MB of video DRAM are as follows.

- 640 by 480 with 16 colors
- 640 by 480 with 256 colors
- 640 by 480 with 64,000 colors
- 640 by 480 with 16.8 million colors
- 800 by 600 with 16 colors
- 800 by 600 with 256 colors
- 800 by 600 with 64,000 colors
- 1024 by 768 with 16 colors

- 1024 by 768 with 256 colors
- 1280 by 1024 with 16 colors

Resolutions supported with the optional 2 MB of video DRAM are as follows.

- 640 by 480 with 16 colors
- 640 by 480 with 256 colors
- 640 by 480 with 64,000 colors
- 640 by 480 with 16.8 million colors
- 800 by 600 with 16 colors
- 800 by 600 with 256 colors
- 800 by 600 with 64,000 colors
- 800 by 600 with 16.8 million colors
- 1024 by 768 with 16 colors
- 1024 by 768 with 256 colors
- 1024 by 768 with 64,000 colors
- 1280 by 1024 with 16 colors
- 1280 by 1024 with 256 colors

In addition to the standard VGA connector, a VESA-compliant feature connector is provided.

DESKTOP MANAGEMENT INTERFACE

The Desktop Management Interface (DMI) is the new standard for managing computer systems. DMI is an interface between management applications and managed components such as systems, network boards, and printers used with or without networked computers.

DMI allows a computer running a network management application to retrieve system tracking information such as memory capacity, disk capacity, expansion board settings, or applications. It is easy to get the status of each system via DMI even if the network consists of computers from different manufacturers. DMI also supplies Plug and Play capability. DMI is not a protocol but an interface. It complements network protocols like the Simple Network Management Protocol (SNMP).

The DMI provides support for attributes such as system serial number, product model number, and BIOS revision number.

DMI Components

The NEC DMI consists of two major functional components:

- the Component Interface (CI) module

- the NEC DMI Browser.

The CI module provides the instrumentation and interface between the BIOS and the DMI Service Layer (SL). The DMI Browser displays and manages existing attributes in the Management Information Format (MIF) database. The Desktop Management Task Force (DMTF) provides the DOS Service Layer and MIF database.

Manageable Products

Manageable products are hardware, software, or peripherals that occupy or are attached to a desktop computer or network server. These can be hard disks, word processors, CD-ROMs, printers, operating systems, graphics boards, modems, etc. Manageable products or components can come with the system or be added later. Each component supplies information to the MIF database by means of a MIF file that contains the product's pertinent management information.

CI Module

The CI module is a Windows Direct Interface application provided by NEC Technologies, Inc. The module uses the CI to communicate with the SL and provides management for a set of components defined in the PC system group standard MIF. The NEC implementation of this MIF provides management for a variety of attributes. Windows starts the CI module which must be running in the background. The module is added to the Windows Start-Up program group during DMI setup.

DMI Browser

The NEC DMI Browser is a Windows application provided by NEC Technologies. The Browser uses the MI to provide access to MIF attributes and their respective values and to provide the ability to set attributes and manage DMI components.

The Browser is a local application; it only accesses the local MIF database. The Browser lets you access MIF attributes according to the structure defined by the DMTF. It is not intended to be a general PC management application. If a more comprehensive management application is desired, use a product such as Intel®'s LanDesk Manager™.

The NEC DMI Browser has a graphical user interface. It displays components in a hierarchical tree structure. Use it to install or remove MIF files to and from the database and to inspect or manage components already present in the database.

By pointing and clicking, components can be expanded and collapsed. To obtain specific attributes, simply double click on an attribute and retrieve the associated value.

You can also use the toolbar to manipulate or obtain information on the MIF file.

The buttons are defined as follows (starting at the left):

■ Install — to install a new MIF file. Use to add a component, such as a printer that supports DMI, to the MIF database.

■ Remove — to remove a MIF file. Use to remove a component from the MIF database. Only remove the system component when it needs to be replaced.

■ Expand — to expand a component.

■ Collapse — to collapse a component.

■ View Component Detail —to review the selected component's details.

■ View Group Detail — to review the selected group's details.

■ View Attribute Detail — to review the selected attribute's details.

Upon exiting the Browser, the program saves the current viewing configuration. The next time you use the Browser, it restores all the viewing screens to the last known position.

> **NOTE** Users are not expected to Install/Remove components on a regular basis or on day-to-day operations. These two functions are provided to expand the functionality of the NEC DMI interface.
>
> The functions provide a mechanism for installing/removing new components from other vendors, for example, an NIC card, printers, and so on.

Usage

To start the Browser, simply double click on the NEC DMI Browser icon in the NEC Information group in Windows. The Browser is very easy to use. For example, to obtain the serial number, first position the cursor over the NEC

system component and double click to expand it. Position the cursor over the Component ID group and double click to expand it. Position the cursor over the Serial Number attribute and click once; the serial number is given in the value field.

Troubleshooting

If you experience trouble using the NEC DMI Browser, here are a few suggestions on how to clear up the problem.

Reboot the system after installation, otherwise you may have problems running the NEC DMI Browser.

If the product name, serial number, system boot time or other NEC attribute returns a N/A, check the following:

■ Look at the AUTOEXEC.BAT file to see if the line DMIDIR%\WIN16\BIN\NECDMI.EXE is present.

■ Make sure the file NECDMI.DAT is located in the DMIDIR%\WIN16\BIN subdirectory.

■ Check that NECCI.EXE is running.

2 Setting System Parameters

This chapter describes the Setup utility program that allows you to enter system configuration information and control special features of the system.

> **NOTE** Your system ships from the factory with the correct system parameters for your configuration. Unless you add optional hardware, you do not need to run Setup to operate your system.
>
> However, you might wish to run the Setup utility to set features that customize your system, such as security features.

System configuration information is stored in a complementary metal-oxide semiconductor (CMOS) chip backed up by a battery in the real-time clock (RTC) chip on the system board.

> **NOTE** NEC recommends that you print out or write down your current Setup parameters and store the information in a safe place. This lets you restore your system to the current parameters if you ever need to replace the battery.

THE SETUP UTILITY

The Setup utility lets you view and set system parameters. Use the Setup utility program

- to set the time and date.

- to update or check system parameters when you add or remove expansion options.

- to change or set power management features.

- to correct a hardware discrepancy when the Power-On Self-Test (POST) displays an error message and prompts you to run Setup.

- to check the installation of optional memory by comparing the amount of memory installed with the amount of memory displayed by Setup.

- to change certain system operating parameters, such as boot device sequence and keyboard parameters.

- to configure system connections for peripherals such as your diskette drive, hard disks, and devices connected to the printer port and serial ports.

- to customize your system with security features such as passwords, diskette drive restriction, virus check reminder and system backup reminder.

- to set system parameters in the event that your system board was replaced.

HOW TO START SETUP

To start the Setup utility, follow these steps:

1. Turn on or reboot your system. Setup displays the following message:

   Press <F2> to enter SETUP

2. Press **F2**. Setup's Main Menu window appears similar to the following screen.

```
PhoenixBIOS Setup — Copyright 1992-95 Phoenix Technologies Ltd.

    Main      Advanced    Security     Power      Exit

      System Time:             [10:19:20]          Item Specific Help
      System Date:             [03/12/1995]
      Diskette A:              [1.44 MB, 3 ½"]    <Tab>, <Shift-Tab>, or
      Diskette B:              [Not Installed]    <Enter> selects field.
   >  IDE Adapter 0 Master:    C: 540 Mb
   >  IDE Adapter 0 Slave:     None
   >  IDE Adapter 1 Master:    None
   >  IDE Adapter 1 Slave:     None
      Video System:            [EGA/VGA]
   >  Memory Shadow:           [Enabled]
   >  Boot sequence:           [A: then C:]
   >  Numlock:                 [Auto]
      System Memory:           640 KB
      Extended Memory:         7 MB

  F1   Help    ↑↓  Select Item   -/+  Change Values    F9  Setup Defaults
  ESC Exit     ←→  Select Menu    Enter Select > Sub-Menu  F10 Previous Values
```

Main Menu

HOW TO USE SETUP

The Setup utility has a Main Menu window and five
top-level menus with submenus.

The Main Menu window contains the following areas:

■ A title line — the top line of the Main Menu. This line
   displays the Setup utility name and copyright message.

■ The menu bar — the line under the Setup title line. The
   menu bar contains five top-level menus that you can
   choose to set system parameters.

- A Main Menu summary window — the center area on the left side of the screen. This area provides a summary of Main Menu Setup parameters. You can set some Main Menu parameters directly from this window or you can set them from the Main menu option in the legend bar.

- The Field Help window or Item Specific Help — the area on the right side of the screen. This help area provides help information for the Setup option currently selected.

- The legend bar — the area at the bottom of the screen. The legend bar provides a summary of command keys for using Setup.

- The General Help window — a window that appears any time during Setup when you press **F1** or **Alt H**. This help window provides two pages of general information about using Setup.

The following sections describe how to use the Main Menu window to set system parameters.

The Menu Bar

The menu bar at the top of the Main Menu window lists these menus:

- Main — Use this menu for basic system configuration. For example, select "Main" to set the system time, system date, diskette drives, and video parameters. Use this menu to check memory parameters.

- Advanced — Use this menu to set serial port and printer port addresses and interrupts, and to enable/disable the system's diskette drive controller and dual-IDE controllers.

The Advanced menu also provides menu items for setting parity and for setting parameters for large disks (for example, to use large disks with Windows NT™).

Some of the Advanced features are accessible only with a Supervisor password when the Supervisor password is set.

■ Security — Use this menu to set User and Supervisor Passwords and the Backup and Virus-check reminders.

■ Power — Use this menu to configure Power Management features.

■ Exit — Use this menu to exit the current menu.

To select an option from the menu bar, use the left ← and right → arrow keys.

See "Exiting Setup" in this chapter for a description of exiting the Main Menu.

The Legend Bar

Use the keys listed in the legend bar on the bottom of the Setup menu to make your selections or exit the current menu. The following table describes the legend keys and their alternates.

Setup Key Functions

KEY	FUNCTION
F1 or Alt-H	Displays the General Help window (described later in this chapter).
Esc	Exits the menu.
← or → arrow keys	Selects a different menu.
↑ or ↓ arrow keys	Moves the cursor up and down for item selection.
Tab or Shift-Tab	Cycles the cursor up and down for item selection.
Home or End	Moves the cursor to the top or bottom of the window.
Page Up or Page Down	Moves the cursor to the next or previous page.
F5 or -	Selects the Previous Value for the field.
F6 or + or Space	Selects the Next Value for the field.
F9	Loads the Default Configuration values for this menu.
F10	Loads the Previous Configuration values for this menu.
Enter	Executes a command or selects a submenu.
Alt-R	Refreshes the screen.

Selecting a Menu Item

To select a menu item, use the arrow keys to move the cursor to the field you want. Then use the value keys (F5, -, F6, +, or space bar) to cycle through the value for that field. The Save Values command in the Exit Menu saves the
values currently displayed in all the menus.

Displaying a Submenu

To display a submenu, use the arrow keys to move the cursor to the submenu you want. Then press **Enter**. A pointer (a right-pointing triangle) marks all selectable submenus.

The Field Help Window

The Field Help window or Item Specific Help window on the right side of each menu displays the help text for the currently selected Setup option. It updates as you move the cursor to each new field.

The General Help Window

Pressing **F1** or **Alt H** on any menu brings up the General Help window that describes the legend keys and their alternates.

The scroll bar on the right of any window indicates that there is more than one page of information in the window. Use **Page Up** and **Page Down** to display all the pages. Pressing **Home** and **End** displays the first and last page.

Press **Esc** to exit the current window.

Main Menu Options

The following table lists and describes the available parameters when you select the Main menu in the legend bar. Other Main Menu parameters are available by selecting submenus.

Parameters available directly from the Main Menu summary window have a right-pointing triangle next to the parameter. Use the arrow keys to move the cursor to the parameter and press **Enter** to select a submenu.

See the sections following the table for a description of Main Menu parameters from the summary window.

Main Menu Parameters

PARAMETER	OPTIONS	DESCRIPTION
System Time	HH:MM:SS	Sets the system time.
System Date	MM/DD/YYYY	Sets the system date.
Diskette A: Diskette B:	360KB, 5 1/4" 1.2MB, 5 1/4" 720KB, 3 1/2" 1.44MB, 3 1/2" (default A) 2.88MB, 3 1/2" Not Installed (default B)	Selects the type of diskette drive in your system.
IDE Adapter	User (default)	Described in the following sections.
Video System	Monochrome EGA/VGA (default) CGA 80x25	Selects the default video device.
Memory Shadow	Enabled (default)	Described in the following sections.
Boot Sequence	A: then C: (default)	Described in the following sections.
NumLock	Auto (default)	Described in the following sections.
System Memory	Automatically detected	Displays the amount of conventional memory

Main Menu Parameters

PARAMETER	OPTIONS	DESCRIPTION
	by the system	detected at power-on.
Extended Memory	Automatically detected by the system	Displays the amount of extended memory detected at power-on.

IDE Adapters

IDE adapters control the IDE devices, such as IDE hard disk drives and IDE CD-ROM readers, in your system. Your system uses two IDE controllers integrated on the system board.

Setup supports up to four IDE devices, with the following possible configurations:

1 Master
1 Master, 1 Slave
2 Masters
2 Masters, 1 Slave
2 Masters, 2 Slaves

The master/slave combination for configurations with an IDE hard disk is "1 Master." If you add a hard disk to the primary IDE port, the combination becomes "1 Master, 1 Slave." Jumper settings on the IDE device set the device to master or slave (see the documentation that comes with the device).

In the PowerMate VP multimedia system the IDE hard disk and CD-ROM reader are both "Masters." The hard disk drive is the "Master" on the primary connector and the CR-ROM reader is the "Master" on the secondary connector. If you add an IDE hard disk to the system, the combination becomes "2 Masters, 1 Slave."

NOTE If you change the CD-ROM reader setting in the multimedia configuration, the CONFIG.SYS and AUTOEXEC.BAT require changes as well.

Select the IDE Adapter option configuration directly from the Main Menu summary window. Available options include:

- IDE Adapter 0 Master
- IDE Adapter 0 Slave
- IDE Adapter 1 Master
- IDE Adapter 1 Slave.

IDE Adapter 0 configures the primary IDE port, and IDE Adapter 1 configures the secondary IDE port.

Each IDE Adapter parameter has a right-pointing arrow to the left of it. Selecting the option displays IDE hard disk parameters. Select an IDE Adapter option and set parameters for each hard disk separately.

Use the following table to configure the hard disk. If your IDE hard disk features auto IDE type detection, you need only to select the Autotype Fixed Disk parameter. The system then automatically detects the hard disk type and sets the remaining parameters.

CAUTION: Use the following IDE Hard Disk Parameter table only when the system cannot auto detect any installed optional drive.

An incorrect setting can cause your system to malfunction and not be able to read your drive.

IDE Hard Disk Parameters

PARAMETER	OPTIONS	DESCRIPTION
Type	1 to 39 User Auto	Selecting 1 to 39 fills in all remaining fields with values for predefined disk type. "User" prompts the user to fill in remaining fields. When "Auto" is selected the BIOS automatically sets the drive type.
Cylinders	1 to 65534	Specifies the number of cylinders.
Heads	1 to 16	Specifies the number of read/write heads.
Sectors/Track	1 to 63	Specifies the number of sectors per track.
Write Precomp	0 to 65534 None	Specifies the number of the cylinder at which to change the write timing.
Multi-Sector Transfers	2, 4, 8, 16, Sectors Disabled	Specifies the number of sectors in multi-sector transfers.
LBA Mode Control	Enabled (default) Disabled	Sets LBA Mode Control on or off.
32 Bit I/O	Enabled (default) Disabled	Sets 32 bit I/O to on or off.
Transfer Mode	Standard, Fast PIO1, PIO2, PIO3	Specifies the transfer mode.

Memory Shadow

For memory shadowing parameters, select "Memory Shadow" directly from the Main Menu summary window. See the following table for a description of Memory Shadow parameters.

 CAUTION: Incorrect settings can cause the system to malfunction.

Memory Shadow Parameters

PARAMETER	OPTIONS	DESCRIPTION
System Shadow	Enabled Not user-selectable	Always enabled. Shadows the system BIOS and improves performance.
Video Shadow	Enabled Not user-selectable	Always enabled. Shadows the video BIOS and improves performance.
Shadow Memory Regions	Enabled Disabled	Default is disabled. Shadows optional ROM located in specified segments of memory and can improve performance. **CAUTION:** Some add-in cards, particularly with on-board firmware, do not work properly when shadowed.

Boot Sequence

Your system might require a Supervisor password to set Boot Sequence parameters. Select "Boot Sequence" directly from the Main Menu summary window to display the "Boot Options" menu.

Use the legend keys to make your selections and exit to the Main Menu. Use the following table to select your boot options.

Boot Parameters

PARAMETERS	OPTIONS	DESCRIPTION
Boot Sequence	A: then C: (default) C: then A: C: only	The BIOS attempts to load the operating system from the disk drives in the sequence selected here. "C: only" (under Supervisor password control) provides virus protection.
Setup Prompt	Enabled (default) Disabled	Displays "Press<F2> for Setup" during bootup.
POST Errors	Enabled (default) Disabled	At boot error, pauses and displays "Press <F1> to resume, <F2> for Setup."
Floppy Check	Enabled (default) Disabled	Seeks diskette drives during bootup. Disabling speeds boot time.
Summary Screen	Enabled (default) Disabled	Describes system configuration at the end of bootup.
Last Boot Fail	3 (default) User-selectable settings Disabled	Sets the number of times you can attempt to boot the system. If the system fails to boot on the set number of tries, the "Previous Boot Incomplete" message appears and the system boots with default settings. The default setting, 3, gives you three tries to boot the system. On the fourth try the "Previous Boot Incomplete" message appears.

NumLock

Select "NumLock" directly from the Main Menu summary window to display the Keyboard Features menu.

Use the legend keys to make your selections and exit to the Main Menu. Use the following table to configure the keyboard parameters. Select "NumLock" directly from the Main Menu summary window to display the Keyboard Features menu.

Keyboard Parameters

PARAMETERS	OPTIONS	DESCRIPTION
Numlock	Auto (default) On Off	On or Off turns Num Lock on or off at bootup. Auto turns Num Lock on if it finds a numeric key pad.
Keyboard Auto-Repeat Rate	Fast (default) Medium Slow	Sets the delay time after the key is held down and before it begins to repeat the keystroke.
Keyboard Auto-Repeat Delay	1/4 sec 1/2 sec (default) 3/4 sec 1 sec	
Key Click	Enabled Disabled (default)	Turns audible key click on or off.

THE ADVANCED MENU

Accessing the Advanced menu might require a Supervisor password. Selecting "Advanced" from the menu bar on the Main Menu displays a menu with the following options:

■ Integrated Peripherals

■ Parity

■ Large Disk Access Mode.

The following sections describe Advanced menu options.

CAUTION: Setting menu items in the Advanced menu to incorrect values can cause your system to malfunction.

Integrated Peripherals Menu

Select the "Integrated Peripherals" menu on the Advanced Menu to configure the connections between the system processor and the I/O ports (serial port 1, serial port 2, and the printer port), the diskette drives, and hard disk controllers.

NOTE A Supervisor password might be required to select parameters from the Integrated Peripherals menu.

Use the legend keys to make your selections and exit to the Main Menu. Use the table that follows to configure your peripherals.

Integrated Peripherals Parameters

FEATURE	OPTIONS	DESCRIPTION
COM1 Port COM2 Port	Disabled User-selectable settings Auto COM1 default: 3F8, IRQ4 COM2 default: 2F8, IRQ3	Selects a unique address and interrupt request for the listed COM ports. Auto selects the next available combination.
LPT Port	Disabled 378, IRQ 5 (default) User-selectable settings Auto	Selects a unique address and interrupt request for the LPT port. Auto selects the next available combination.
Diskette Controller	Enabled (default) Disabled	Enables the on-board diskette drive controller.
Local Bus IDE Adapter	Both (default) Disabled Primary	Enables the on-board IDE controllers. "Both" enables the primary (fast) channel and secondary (standard) channel.

Parity

The Parity option in the Advanced menu controls system memory parity checking. The system ships with non-parity SIMMs. The default setting for the Parity option is "Disabled."

> **NOTE** The system supports parity and non-parity memory. Parity should only be "Enabled" if the non-parity SIMMs that come with your system are removed and replaced with parity SIMMs.

The Parity parameter might require a Supervisor password.

Large Disk Access Mode

Select the Large Disk Access Mode parameter to configure a large disk (see the following table).

Use the legend keys to make your selections and exit to the Main Menu.

Large Disk Parameters

PARAMETER	OPTIONS	DESCRIPTION
Large Disk Mode	DOS Other	Select DOS if you have DOS. Select Other if you have another operating system such as UNIX. A large disk is one that has more than 1024 cylinders, more than 16 heads, or more than 63 tracks per sector.

THE SECURITY MENU

Selecting "Security" from the Main Menu displays a menu with system security options.

> **NOTE** You can enter the Setup program with either a User or Supervisor password. However, more Setup choices are available with a Supervisor password.
>
> **CAUTION:** The features that you set in the Security menu affect the features that appear on the Security menu as well as on other Setup menus.

Enabling "Supervisor Password" requires a password for entering Setup. Passwords are not case sensitive.

Pressing **Enter** at either Set Supervisor Password or Set User Password on the menu displays a Set Password dialog box with the following prompts:

Enter new password: [   ]
Re-enter new password: [   ]

To set a password, type the password and press **Enter**. Re-enter your password and press **Enter**.

See the following table for a description of the security features you can select. Use the legend keys to make your selections and exit to the Main Menu.

System Security Options

FEATURE	OPTIONS	DESCRIPTION
Supervisor Password	Disabled (default) Enabled	Must set to Enabled to set a Supervisor password.
Set Supervisor Password	Up to seven alphanumeric characters	Pressing **Enter** displays a dialog box for entering the supervisor password. This password gives FULL access to Setup menus.
User Password	Disabled (default) Enabled	Must set to Enabled to set a User password.
Set User Password	Up to seven alphanumeric characters	Pressing **Enter** displays the dialog box for entering the user password. This password gives RESTRICTED access to Setup menus. Requires the prior setting of a Supervisor password.

System Security Options

FEATURE	OPTIONS	DESCRIPTION
Password on Boot	Disabled (default) Enabled	Enabled requires a password on boot (cold boot only — no password required for warm boot). Requires the prior setting of a Supervisor and/or User password. If disabled, password(s) are required for entering Setup but are not required for booting. If a Supervisor password is set and this option is disabled, the BIOS boots without asking for a password.
Diskette Access	User (default) Supervisor	Supervisor setting restricts the use of diskette drives to a supervisor. Requires setting the Supervisor password.
Fixed Disk Boot Sector	Normal (default) Write Protected	Write protected helps prevent viruses. When write protected, operating systems (and viruses and application programs) which attempt to modify the boot sector will not be able to do so.
System Backup Reminder Virus Check Reminder	Disabled (default) Daily Weekly Monthly	When a schedule is specified, displays a message during bootup asking (Y/N) if you have backed up the system or scanned it for viruses. Message returns on each boot until you respond with "Y". Daily displays the message on the first boot of the day, weekly on the first boot after Sunday, and monthly on the first boot of the month.

THE POWER MENU

Selecting "Power" from the menu bar displays a screen with the power management parameters described in the following table.

A power management system reduces the amount of energy used after specified periods of inactivity. The Power menu supports a Full-On state, a Standby state with partial power reduction, and a Suspend state with full power reduction. See "Power Management" in Chapter 1 for additional
information about managing power.

Use the Power menu to specify your settings for Power Management. Use the following table to make your selections.

> **NOTE** To disable all power management features, set advanced power management (APM) to Disabled. See the following table to set power management parameters.

Power Management Parameters

FEATURE	OPTIONS	DESCRIPTION
APM	Enabled (default) Disabled	Advanced power management (APM) allows APM-aware software to better manage power savings.
Power Management Mode	Customize (default) Disabled Maximum Medium Minimum	Maximum, Medium, and Minimum set power-management options with predefined values. Select Customize to select your own level of power management.
Standby Timeout	15 min (default) Disabled User selectable	Specifies inactivity period required before partial power shutdown.
Standby CPU	Max (default)	Sets the processor speed during

Power Management Parameters

FEATURE	OPTIONS	DESCRIPTION
Speed	High Medium Low	Standby.
Suspend Button	Suspend (default) Standby Disabled	Suspend allows the system to enter Suspend mode when the suspend button is pressed. Standby enables the system to enter Standby mode when the suspend button is pressed.
Parallel Port Activity	Enabled (default) Disabled	Enables parallel port activity by resetting the timer and bringing the system to full power when it is in a low power management mode.
Serial Port Activity	Enabled (default) Disabled	Enables serial port activity by resetting the timer and bringing the system to full power when it is in a low power management mode.
IRQ1...IRQ15	Disabled Enabled (default)	During Suspend, enabled IRQ turns on processor clock. IRQ1 and IRQ12 cannot be disabled.

THE EXIT MENU

Selecting "Exit" from the menu bar displays the following exit options:

- Save Changes & Exit
- Discard Changes & Exit
- Get Default Values
- Load Previous Values
- Save Changes.

The following sections describe each of the options on the Exit Menu. Note that **Esc** does not exit this menu. You must select one of the items from the menu or menu bar to exit.

Save Changes & Exit

After making your selections on the Setup menus, always select Save Changes to make them operative.

After you save your selections, the program displays this message:

Changes have been saved
Continue

If you attempt to exit without saving, the program asks if you want to save before exiting.

During bootup, Setup attempts to load the values you saved in NVRAM. If the values saved in NVRAM cause the system boot to fail, reboot and press **F2** to enter Setup. In Setup, you can load the ROM default values (as described in "Get Default Values") or try to change the values that caused the boot to fail.

Discard Changes & Exit

Use this option to exit Setup without recording any changes you may have made.

Get Default Values

To load all the default Setup values in the Setup menus, select Load ROM Default Values from the Main Menu. The program displays this message:

Default values have been loaded!
Continue

If, during bootup, the BIOS program detects a problem in the integrity of values stored in NVRAM, it displays these messages:

System CMOS checksum bad - run SETUP
Press <F1> to resume, <F2> to Setup

The CMOS values have been corrupted or modified incor-
rectly, perhaps by an application program that changes
data stored in CMOS.

Press **F1** to resume the boot or **F2** to run Setup with the
ROM default values already loaded into the menus. You
can make other changes before saving the values to
NVRAM.

Load Previous Values

If, during a Setup session, you change your mind about
your selections and have not yet saved the values to
NVRAM, you can restore the values you previously saved
to NVRAM.

Selecting Load Previous Values on the Exit menu updates
all the selections and displays this message:

Previous values have been loaded!
Continue

Save Changes

Save Changes saves all the selections without exiting
Setup. You can return to the other menus if you want to
review and change your selections.

3 Using NEC Utilities and Drivers

This chapter provides information for the following NEC drivers and utilities that you can use with your system:

- mouse driver

- video drivers

- BIOS Update utility.

MOUSE DRIVER

Mouse driver software contains the basic operating instructions between the computer and your mouse. It tracks mouse position, gets data from the mouse buttons, and displays a text cursor or graphics pointer on the screen, based on information from your mouse and application. See the following sections to run mouse drivers for your operating system.

> **NOTE** Use the following information to run mouse drivers for MS-DOS. The information is not appropriate for using your mouse in Windows.

The MS-DOS mouse driver is LMOUSE.COM and works with all applications that use the Microsoft mouse driver.

To run LMOUSE.COM, you must be in the Windows directory where it is located, or you must include the mouse software directory in your PATH statement. Then, at the MS-DOS prompt, type **LMOUSE** and press **Enter.**

NOTE You can include the LMOUSE command in an AUTOEXEC.BAT file.

Changing Mouse Parameters

Use the mouse parameters to change the function of the mouse and the way that your screen cursor responds to mouse movement. You can combine any number of parameters when loading the mouse drivers.

The parameters described in the following section are common to all types of Logitech® mice. If you have another type of mouse, parameters may vary.

Command Line Options

The syntax for setting mouse parameters using a DOS command line is as follows:

LMOUSE *parameter*...

The following list describes the parameters that you can use.

■ Ballistic Effect (BHIGH, BLOW, BON, BOFF) — The ballistic effect gives you speed and precision as you require them. Moving your mouse quickly lets you sweep the cursor across your screen quickly. Moving it slowly lets you zero in on an exact position.

The ballistic effect lets you select a single pixel easily at any sensitivity level. This feature is ideal for graphics programs. When you use a paint or draw program, the ballistic effect slows your mouse cursor when you create fine details in your drawing and then speeds up when you need to go between your drawing and the toolbox or a menu.

Ballistic arguments include the following:

BHIGH — sets the ballistic effect to its highest setting.

BLOW — sets the ballistic effect to its lowest setting.

BON — enables the ballistic effect.

BOFF — disables the ballistic effect.

■ Driver orientation (NORTH, SOUTH, EAST, WEST) — You can use this parameter to change the direction in which the screen cursor moves when you move the mouse. For most situations, keep the default parameter (NORTH).

With the driver orientation set to the default, NORTH, the mouse buttons point away from your wrist so that your fingers rest on top of the buttons. The mouse's compass direction south points towards your wrist; east points towards your right; west towards the left. The screen cursor moves in the same direction that your mouse moves.

With the driver orientation set to the default, NORTH, the cursor moves in the following directions in response to the mouse movement:

NORTH — moves the cursor to the top of the screen.

SOUTH — moves the cursor to the bottom of the screen.

EAST — moves the cursor to the right.

WEST — moves the cursor to the left.

- Sensitivity level (*Sn*) — defines how fast and responsive the mouse movement is for the application. This parameter sets the relationship between how fast you move the mouse to how fast the cursor moves. The syntax for the sensitivity level is as follows:

    Sn

    where *n* is a two-digit number from 00-10. The default is **S***04*.

- Button orientation (SWAP) — This parameter lets you swap the functions of the left and right mouse buttons. The swap argument toggles the functions between the two.

- Number of mouse buttons (*n*K) — You can specify whether you have a two- or three-button mouse using the K command.

- ? — This parameter displays the current mouse settings. Type the following command and press **Enter** to view a listing of mouse settings:

    lmouse ?

The following example sets the ballistic effect to high, the mouse orientation to NORTH sets the sensitivity level to 5, and specifies a three-button mouse.

    lmouse bhigh north s05 3k

VIDEO DRIVERS

Video drivers let you take advantage of your computer's integrated video hardware and extended graphics modes.

> **NOTE** A multi-frequency monitor, such as the NEC MultiSync XE/XP monitors, is required to access the extended graphics mode.

Your system ships with the following Windows video drivers preinstalled on the hard disk. Resolutions supported with the standard 1 MB of video DRAM are as follows.

1-MB Video Resolutions

RESOLUTIONS	COLORS	REFRESH RATES
640 by 480	16	60, 72, 75 Hz
640 by 480	256	60, 72, 75 Hz
640 by 480	64,000	60, 72, 75 Hz
640 by 480	16.8 million	60 Hz
800 by 600	16	60, 72, 75 Hz
800 by 600	256	60, 72, 75 Hz
800 by 600	64,000	56, 60 Hz
1024 by 768	16	87 Hz (interlaced)
1024 by 768	256	60, 70, 75, 87 Hz (interlaced)
1280 by 1024	16	87 Hz

Resolutions supported with the optional 2 MB of video DRAM are as follows.

2-MB Video Resolutions

RESOLUTIONS	COLORS	REFRESH RATES
640 by 480	16	60, 72, 75 Hz
640 by 480	256	60, 72, 75 Hz
640 by 480	64,000	60, 72, 75 Hz
640 by 480	16.8 million	60, 72, 75 Hz
800 by 600	16	60, 72, 75 Hz

2-MB Video Resolutions

800 by 600	256	60, 72, 75 Hz
800 by 600	64,000	60, 72, 75 Hz
800 by 600	16.8 million	56, 60 Hz
1024 by 768	16	87 Hz (interlaced)
1024 by 768	256	60, 70, 75, 87 Hz (interlaced)
1024 by 768	64,000	60, 70, 75, 87 Hz (interlaced)
1280 by 1024	16	87 Hz (interlaced)
1280 by 1024	256	60, 87 Hz (interlaced)

The default Windows video resolution is 800 by 600 with 256 colors. For an optimum screen display, you can set video modes and refresh rates through the CLMODE utility, also preinstalled on your system.

To change the video drivers in Windows, use the WinMode utility. Select the driver and resolution you want and the driver will load from the hard disk drive.

Additional VGA drivers are available for non-Windows based applications through the NEC Bulletin Board Service (see "NEC Bulletin Board Service" later in this chapter).

BIOS UPDATE UTILITY

The system BIOS resides on a flash ROM in your system. You can update the ROM BIOS, *should it ever become necessary*. This feature allows the ROM BIOS chip to be "flashed" with a new BIOS code through software, rather than requiring you to replace the chip.

To perform a BIOS update, you need a BIOS flash diskette. The diskette, which contains the latest version of the BIOS code, can be obtained through NEC Technologies, Inc.

Check the NEC Bulletin Board Service (BBS) for available updates to your system BIOS. See "NEC Bulletin Board Service" at the end of this chapter for information about using the bulletin board (available in the U.S. and Canada).

Using the Flash Utility

Use the following steps to update the BIOS from the BIOS flash diskette. In the unlikely event that the upgrade is interrupted, refer to the next section for system recovery procedures.

1. Write down the Setup parameters currently set on your system. (See Chapter 2, Setting System Parameters.)

2. Insert the flash diskette in drive A.

3. Reboot the system.

4. At the flash upgrade Main Menu, use the arrow keys to select "Install new BIOS" and press **Enter**.

5. A prompt will ask you to confirm that you want to upgrade the BIOS. Press **Enter** to continue with the flash upgrade and **Cancel** to quit.

6. On upgrade completion, remove the flash diskette.

7. Reboot the system and run Setup. Check and reset your parameters, using the copy of the Setup parameters that you made earlier.

NEC Bulletin Board Service

The NEC Bulletin Board Service (BBS) provides users with information about system software and hardware. It allows you to download files for system enhancements and upgrades. For example, use the NEC BBS to obtain the latest version of the your BIOS.

Use the following steps to log onto the NEC BSS.

> **NOTE** BBS screens contain information that you might want to read. The following procedure steps you through using the BBS as simply as possible.
>
> The first time you use the BBS, it requests information for a new user questionnaire.

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

2. From the Settings menu, select Communications and check that the settings match the following BBS parameters:

   - Baud rate: 2400 bps

   - Parity: none

   - Data bits: 8

   - Stop bits: 1

3. Log onto the BBS:

   - Click on the Phone menu item.

   - Enter the BBS phone number 508 635-4706. Your business phone system and/or location might require a 91 or 1 prefix.

   - Click on "OK."

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 NECTECH Main Menu, press **F** and **Enter** for the file menu.

To hang up and log off, follow these steps at the NEC Technologies Bulletin Board:

1. Press **Enter** (to continue).

2. Press **G** (command for Goodbye/Hangup).

3. Press **Enter**.

4 Maintaining Your Computer

Your system is a durable, dependable computer built for lots of use. With protective measures and proper care, you can prevent problems and promote the successful operation and long life span of your computer.

This chapter provides information for taking care of your computer and preparing it for moving or shipping.

SYSTEM CARE

Use the guidelines in the following sections to protect your system from possible damage and to maintain its condition and performance.

Protective Measures

There are several ways that you can protect your system from possible damage. NEC strongly recommends the following protective measures:

■ Connect a surge suppressor between your computer and a grounded wall outlet. A surge suppressor protects your system from sudden, transient increases and decreases in electrical power.

Be sure to connect all peripherals, such as your monitor and printer, to the surge protector. The surge protector should be the only device that you plug into the wall outlet.

■ Avoid repeated power-on cycles because this subjects the system components to temperature variations and stress.

■ Disconnect your system from power lines when an electrical storm threatens. Lightning can travel in on power lines and damage your monitor and the system unit.

■ Be sure that system power is off before you connect or disconnect a cable. Never make cable changes when the system power is on. To do so could damage your system and its peripherals.

■ Use appropriate virus detection software regularly to protect your system from computer viruses.

If you plan to use software programs other than NEC supplied software, NEC strongly recommends that you take the necessary steps, such as virus checks, to protect your system.

■ Place your computer away from direct sunlight and extreme hot and cold temperatures.

The recommended operating environment is from 50°F to 95°F (10°C to 35°C).

The recommended non-operating environment (shipping or storage) is from 14°F to 158°F (–10°C to 70°C).

■ Back up all hard disk information on a regular basis.

■ After turning off power, wait about five seconds for the hard disk to spin down before you power on again.

■ Be sure that nothing is placed on top of your system power cables.

■ Never use a hard disk parking program with your computer. The system hard disk parks its heads automatically whenever you turn off system power.

■ Prevent dust from entering your system by covering it when it is not in use.

Routine Care

Maintain the condition of your system by periodically following the general procedures listed below.

> **NOTE** For safety, power off and unplug your system, monitor, and any external options before cleaning them.

■ Clean the outside of the computer with a soft clean cloth.

 You can remove stubborn stains with a cloth slightly dampened with a mild detergent. Never use a strong cleaner or solvent on any part of the system.

■ Check the system regularly for any loose material (such as paper, books, magazines) that blocks air circulation around your unit.

■ Keep food and liquids away from your computer.

■ Periodically clean the keyboard with a vacuum cleaner brush attachment. Do not use any liquid cleaners on the keyboard because they can damage the keyboard.

 If an object, such as a paper clip, falls into the keyboard, turn the keyboard over and gently shake it.

■ Clean the monitor screen with a glass cleaner and wipe it with a clean, lint-free cloth. Or use wet/dry cleaning pads manufactured for monitor screens.

Backup

Backup procedures are important for the efficient and effective use of your computer. Protect your program and data files with regular backup procedures. The Setup utility provides a backup reminder option (see Chapter 4).

See your MS-DOS and Windows for Workgroups documentation for information about backup procedures. Make backup copies of your program and data files that are on diskette and on the hard disk.

The standard practice for diskette backup is to copy each diskette, store the original in a safe place, and use the copy as your working diskette. You can use the MS-DOS DISKCOPY command for making copies of your diskettes. See your MS-DOS documentation for information about using the command.

MOUSE CARE

For best results with your mouse, use it on a mouse pad.

Under normal conditions, your mouse has a self-cleaning mechanism that prevents a buildup of dust or lint around the mouse ball and tracking mechanism. Periodically, however, you might need to wipe the mouse ball clean. Use the following procedure to clean the mouse.

1. Turn off your computer and any peripherals attached to it.

2. Turn your mouse upside down. Locate the mouse ball cover (see the following figure).

3. Turn the ball cover counterclockwise and remove the cover.

4. Gently turn the mouse over and let the ball fall into your palm.

5. Clean the mouse as follows.

   ■ Use tap water, or tap water and a mild detergent to clean the mouse ball.

   ■ Use a clean, lint-free cloth to dry the ball.

   ■ Blow into the mouse socket to remove remaining dust or lint.

Locating the mouse ball cover

6. Gently put the ball back into its socket.

7. Fit the ball cover over the ball and turn the cover clockwise until it locks in place.

CD CARE

When handling CDs, keep the following guidelines in mind.

■ Always pick up the disc by its edges.

Handle a disc by its edges

■ Avoid touching the side of the disc that has no printing or writing on it. This is the data side of the disc.

■ Do not write on or apply labels to either side of the disc.

■ Keep the disc away from direct sunlight or high temperatures.

■ Clean fingerprints or dust from the disc by wiping it with a soft cloth. Gently brush the cloth from the center of the disc toward the edge.

> ⚠️ **CAUTION:** Do not use benzene, paint thinner, record cleaner, static repellent, or any other chemical on the disc. Chemicals and cleaners can damage the disc.

Wipe a disc from the center and toward the edge

MOVING GUIDELINES

Use the following steps to prepare your system for moving or shipping.

1. Back up your hard disk files onto diskettes or tape cartridges.

Be sure to take precautions for storing and transporting diskettes or cartridges so that they are not exposed to magnetic fields or electrical impulses.

2. Remove any diskette from the diskette drive.

3. Turn off the system unit and any external options connected to it.

4. Unplug the system unit power cable from the wall outlet or surge suppressor, then from the unit.

5. Unplug any external options from the wall outlets or surge suppressor, then disconnect them from the system unit.

6. Pack the system components in the original shipping materials and cartons. If these are not available, be sure to use adequate packing materials to protect the components.

To set up your system, follow the instructions on the *NEC PowerMate VP Systems Quick Setup* sheet.

5 Removing the System Unit Cover

This chapter provides cover removal and replacement procedures for the system unit. You need to remove the system unit cover to

- install any expansion options, such as expansion boards, memory modules and drives.

- check or change system configuration switches.

DESKTOP SYSTEM UNIT COVER

Use the following procedures to remove and replace the desktop system unit top cover.

Removing the Desktop Cover

Remove the cover as follows.

> ⚠ **CAUTION:** Electrostatic discharge can damage computer components. Discharge static electricity before you remove the system unit cover.

1. Turn off and unplug the system unit and monitor.

2. Disconnect the keyboard and mouse from the rear of the system.

3. Unplug any external options (such as a printer) connected to the rear of the system unit.

4. Remove two cover screws from the rear of the system unit.

Removing desktop cover screws

5. Release the cover from the unit as follows.

- From the rear of the system, grasp the sides of the cover.

- Press your thumbs against the rear panel and slide the cover away from the front of the unit until it stops (about an inch).

6. Lift the cover up and away from the unit.

Removing the desktop cover

Replacing the Desktop Cover

Use the following steps to replace the cover.

> ⚠ **CAUTION:** To prevent damage to sys-
> tem cables, carefully tuck the cables out of the path
> of the cover.

1. Position the cover on the system unit with the cover
tabs aligned above the cutouts in the system unit frame.

Aligning the desktop cover

2. Slide the cover forward to meet the front panel.

> **NOTE** The cover fits tightly. If the cover does not slide all the way to the front panel, place one hand on the front of the unit while you press each side of the cover forward from the rear.

Sliding the desktop cover

3. Secure the cover with two previously removed screws.

4. Connect the monitor, keyboard, mouse, and any other external options to the rear of the system unit.

5. Plug in your power cables.

MINITOWER SYSTEM UNIT COVER

Use the following procedures to remove and replace the desktop system unit top cover.

Removing the Minitower Cover

Remove the system unit cover as follows.

> ⚠ **CAUTION:** Electrostatic discharge can damage computer components. Discharge static electricity before you remove the system unit cover.

1. Turn off and unplug the system unit and monitor.

2. Disconnect the keyboard and mouse from the rear of the system.

3. Unplug any external options (such as a printer) connected to the rear of the system unit.

4. Remove the four screws that secure the cover to the system unit.

Removing the minitower cover screws

5. Pull the cover back about one inch from the front of the unit.

Releasing the minitower cover

6. Lift the cover off of the system unit.

Removing the Minitower Bottom Access Cover

Remove the bottom access cover as follows.

1. Turn off and unplug the system unit and monitor.

2. Disconnect the keyboard and mouse from the rear of the system.

3. Unplug any external options (such as a printer) connected to the rear of the system unit.

4. Turn the system over on its side, with the bottom facing you (see the following figure).

Removing the minitower bottom access cover

5. Remove the screw holding the access cover in place.

6. Slide the access cover to the left, towards the rear of the system, to release it from the chassis. Remove the access cover from the chassis.

Replacing the Minitower Cover

Use the following steps to replace the cover.

> ⚠️ **CAUTION:** To prevent damage to system cables, carefully tuck the cables out of the path of the cover.

1. Align the cover over the unit, about one inch in back of the front panel, then set the cover down on the unit.

2. Align the bottom edges of the cover, then slide it in to meet the front panel.

Sliding the minitower cover on

3. Secure the cover with the four screws.

Securing the minitower cover

4. Connect the monitor, keyboard, mouse, and any other external options to the rear of the system unit.

5. Plug in your power cables.

6. If desired, lock the cover to the chassis.

Replacing the Bottom Access Cover

Use the following steps to replace the bottom access cover.

1. Align the access cover with the bottom of the chassis.

2. Position the tabs on the access cover over the cutouts in the chassis (see the following figure).

Replacing the minitower bottom access cover

3. Press the access cover against the bottom of the chassis until the tabs are down in the cutouts.

4. Slide the access cover to the right until the cover locks in place.

5. Secure the access cover with the screw.

6. Turn the system upright.

7. Connect the monitor, keyboard, mouse, and any other external options to the rear of the system.

8. Plug in the power cables.

6 Adding Options

Your system supports a variety of NEC and industry-standard expansion options. This chapter provides:

■ general information about the options you can use with the system.

■ detailed instructions specific to the system for adding:

— expansion boards

— SIMM upgrade kits

— video DRAM chips

— Intel OverDrive processor upgrade

— storage devices, such as hard disks, CD-ROM readers, and diskette drives

— external peripherals, such as the external multimedia speakers, monitor, printer or serial device.

OPTIONAL HARDWARE

Many optional components are available for customizing your computer to fit your needs. See your authorized NEC dealer for assistance in determining which options are best for you.

The following information describes the hardware that your system can accommodate.

■ Monitors and video expansion
Your system supports the connection of a VGA-compatible monitor (such as NEC MultiSync® XE and XP series monitors).

The system board comes standard with 1 MB of video DRAM. If you install the optional 1 MB of video DRAM, your system will support resolutions up to 1280 by 1024 with 256 colors, 1024 by 768 with 64,000 colors, or 800 by 600 with 16.8 million colors.

■ Memory expansion
Single in-line memory module (SIMM) sockets on the system board support 128 MB of memory (see "SIMM Upgrade Kits" in this chapter).

■ Processor upgrades
A zero insertion force (ZIF) socket on the system board supports the Pentium processor. The socket also supports the next generation of Intel's OverDrive processor.

> ⚠ **CAUTION:** Incorrect installation of the processor can damage the system board, the processor, or both. See "Processor Upgrades" in this chapter for detailed information.

■ Drives
The desktop system accommodates a total of four data storage devices. The minitower systems accommodate six data storage devices.

■ External options
External peripherals, such as state-of-the-art printers, are compatible with your system.

SAFETY PRECAUTIONS

Take care when you work inside the system and when you handle computer components. Avoid electric shock or personal injury by observing the following warning.

> ⚠️ Before you remove the *turn off* *disconnect* peripherals from their power sources.
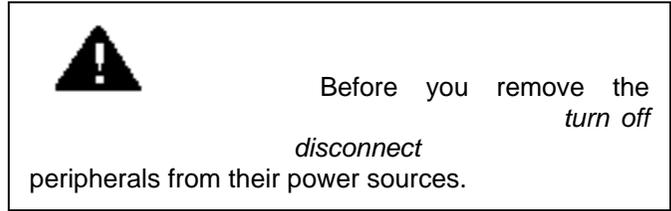
Static electricity and improper installation procedures can

components by following these safety instructions.

- Leave an option, such as a board or chip, in its anti-

- Dissipate static electricity before handling any system

  grounded metal object, such as the system's unpainted

  and floor mats.

  touching the components on the chip or board.

  damaged cable can cause a short in the electrical ci -

  comp nents at power-on.

When you install a cable, be sure to route the cable so it

path of the system unit cover. Prevent damage to the

n

nect the cable.

When you disconnect a cable, always pull on the cable

EXPANSION BOARDS

You can add PCI and ISA expansion boards to your sy -

n

tervention on your part. Your system has PCI Auto

your system to accept add-on PCI expansion boards.

The PCI auto-configuration utility operates in conjunction

boards. Once the system is turned on after installing a PCI

channels, I/O space, and other parameters. You do not

interrupts and addresses used by the ISA board. See the

and Play cards automatically select available addresses and

> **NOTE** Generally, a resource can be used by only one card or device. However, some cards can share the same DMA or IRQ resources. The card manufacturer's documentation tells you whether a card supports shared resources.

If you install an ISA and a Plug and Play card that do not support shared resources, an ISA Configuration Utility (ICU) may be needed. The ICU is used to eliminate the guess work from the configuration procedure. Although most Plug and Play cards come with an ICU, an ICU can be obtained from the NEC Bulletin Board Service (see Chapter 3).

Use the following procedures for installing an expansion board in the system.

Desktop Slot Expansion Locations

The desktop system has four expansion slots on the rear of the system with five connectors on the riser board:

■ three ISA slots

— one full-length expansion board (used by the network or sound board in the network and multimedia configurations.)

— one three-quarter length expansion board

— one half-length expansion board

■ one shared PCI or ISA slot.

Expansion board slot locations for the desktop system are shown in the following figure.

Locating desktop expansion slots

ISA expansion slots support industry-standard 8-bit or 16-bit expansion boards.

The PCI connector in the shared PCI/ISA slot supports 32-bit PCI expansion cards, such as LAN cards, graphics adapters, and disk controllers.

The PCI/ISA shared slot on the system accommodates a full-length PCI board or a full-length ISA board. If you are installing a PCI board in the shared slot, the board is installed component side down and connects to the top-most (PCI) connector on the riser board. If you are installing an ISA board, the board is installed component side up and connects to the ISA connector under the PCI connector.

Desktop Board Installation

Use the following steps to install an industry-standard 8-bit or 16-bit ISA or 32-bit PCI expansion board in your system unit.

1. Follow any preinstallation instructions in your option documentation (such as setting switches or jumpers on the board).

    Any switch or jumper information in NEC option documentation is common to all NEC systems. Use this information for the board you are installing in your system.

    WARNING: Be sure that the system unit power is turned off and the system is unplugged before you begin the installation procedure.

2. Remove the system unit cover (see Chapter 5).

    If you are installing a board in an inside expansion slot (next to the power supply) in the desktop, see "Inside Expansion Slots in the Desktop" in this chapter. Otherwise, continue to the next step.

3. Remove the screw securing an expansion slot cover and remove the cover.

Save the screw for installing the board. Keep the slot cover in a convenient place for possible future use.

> ⚠ **CAUTION:** A slot cover can damage the system board or option board if it falls into the system unit. Take special care to keep the slot cover from falling when you remove the screw.

Removing a desktop slot cover

4. Hold the board by its edges and insert it into the expansion slot.

Press the board firmly into the expansion slot connector on the riser board. You might have to gently rock the board from side-to-side to seat it into the connector.

5. Insert the screw to attach the board to the support bracket.

Securing the board in the desktop

6. Replace the system cover (see Chapter 5).

7. Run the Setup program if you installed an ISA board.

Desktop Board Removal

The installation of some options might require the removal of a board that is already installed. Use the following steps to remove a board from the system.

> ⚠ **CAUTION:** Be sure that the system unit power is turned off and the system is unplugged before you begin the removal procedure.

1. If you have any cables connected to the board that you need to remove, label the connectors. Then disconnect the cables.

2. Remove the screw that secures the board to the support bracket.

Removing the desktop expansion board screw

3. Pull the board out of the riser board connector. You might have to gently rock the board from side-to-side to release it from its connector.

Removing the expansion board from the desktop

Desktop Inside Expansion Slot

Use the following procedures to install or remove an expansion board from an inside expansion slot in the desktop system.

Installing an Inside Slot Board

Use the following instructions to install an expansion board in an inside expansion slot in the system.

1. Remove the screw that secures the expansion slot cover to the rear of the system. Remove the slot cover.

> ⚠️ **CAUTION:** Take special care to keep the slot cover from falling when you remove the screw. The slot cover can damage the system or option board if it falls into the system.

Removing the inside slot cover screw

2. Remove the screw securing the L-bracket to the slot cover and remove the L-bracket.

Keep the slot cover in a convenient place for possible future use.

Removing the L-bracket

3. Attach the L-bracket to the expansion board bracket with the screw you removed in the previous step.

4. Hold the board by its edges, component side down and the bracket end facing the rear of the unit, and insert it into the expansion slot.

Press the board firmly into the expansion slot connector. You might have to gently rock the board from side-to-side to seat it into the connector.

5. Insert the screw at the rear of the system to secure the board in place.

6. Replace the system unit cover (see Chapter 5).

7. Run the Setup program if you installed an ISA board.

Removing an Inside Slot Board

To remove a board from an inside expansion slot in the desktop, follow these steps.

> ⚠ **CAUTION:** Be sure that the system unit power is turned off and the system is unplugged before you begin the removal procedure.

1. If you have any cables connected to the board, label the connectors. Then disconnect the cables.

2. Remove the screw that secures the expansion board to the rear of the system.

Removing the inside expansion board screw

3. Pull the board out of the connector. You might have to gently rock the board from side-to-side to release it from the connector.

Minitower Slot Locations

The minitower system has five expansion slots on the rear of the system with six connectors on the riser board:

- three ISA slots (one of the ISA slots can only accommodate a three-quarter length expansion card)
- one shared PCI or ISA slot
- one PCI slot.

Expansion board slot locations for the minitower system are shown in the following figure.

Locating minitower expansion slots

The PCI/ISA shared slot accommodates either a full-length PCI board or a full-length ISA board. If you are installing a PCI board in the shared slot, it must be connected to the second PCI connector on the riser board. If you are installing an ISA board in the shared slot, it must be connected to the ISA connector directly under the second PCI connector.

Minitower Board Installation

Use the following steps as a general guide for installing an industry-standard 8-bit or 16-bit ISA or 32-bit PCI expansion board in your system unit.

1. Follow any preinstallation instructions in your option documentation (such as setting switches or jumpers on the board).

Any switch or jumper information in NEC option documentation is common to all NEC systems. Use this information for the board you are installing in your system.

> ⚠ **WARNING:** Be sure that the system unit power is turned off and the system is unplugged before you begin the installation procedure.

2. Remove the system unit bottom access cover (see Chapter 5).

3. Remove the screw securing an expansion slot cover and remove the cover. Take care to keep the slot cover from falling into the unit when you remove the screw. If it does fall into the unit, be sure to remove it.

Save the screw for installing the board. Keep the slot cover in a convenient place for possible future use.

Removing a minitower slot cover

4. Hold the board by its edges and insert it into the expansion slot.

   Press the board firmly into the expansion slot connector on the riser board. You might have to gently rock the board from side-to-side to seat it into the connector.

5. Insert the screw to attach the board to the support bracket.

Securing the minitower expansion board

6. Replace the bottom access cover (see Chapter 5).

7. Run the Setup program if you installed an ISA board.

Minitower Board Removal

The installation of some options might require the removal of a board that is already installed. Use the following steps to remove a board from the system.

> **WARNING:** Be sure that the system unit power is turned off and the system is unplugged before you begin the removal procedure.

1. If you have any cables connected to the board that you need to remove, label the connectors. Then disconnect the cables.

2. Remove the screw that secures the board to the support bracket.

Removing the minitower expansion board screw

3. Pull the board out of the riser board connector. You might have to gently rock the board from side-to-side to release it from its connector.

SIMM UPGRADE KITS

Systems support the following 32-bit or 36-bit (parity) SIMM configurations:

- 1-MB by 32- or 36-bit (4-MB stick)
- 2-MB by 32- or 36-bit (8-MB stick)
- 4-MB by 32- or 36-bit (16-MB stick)
- 8-MB by 32- or 36-bit (32-MB stick)
- 16-MB by 32- or 36-bit (64-MB stick).

> ⚠ **CAUTION:** To avoid corrosion between different metals, only use tin-plated SIMM sticks.
>
> The SIMM sticks must have a speed of 70 nanoseconds (ns). Slower SIMMs are not supported.

SIMM sticks installed in the SIMM sockets on the system board increase the total system high-speed memory. The system supports up to 128 MB. The SIMMs come in two different types; single and double sided. Jumper JP1 on the system board must be set the match the type of SIMMs being installed.

In the 8 MB configurations, two 4-MB single-sided SIMMs are installed in bank 0. The default setting for JP1 in the
8-MB configuration has pins 2 and 3 shorted. Pins 2 and 3 must be shorted when the following SIMMs are installed in bank 0.

- 1 MB SIMMs
- 4 MB SIMMs
- 16 MB SIMMs
- 64 MB SIMMs

In the 16-MB configurations, two 8-MB double-sided SIMMs are installed in bank 0. The default setting in the 16 MB configuration has pins 1 and 2 shorted. Pins 1 and 2 must be shorted when the following SIMMs are installed in bank 0.

■ 2 MB SIMMs

■ 8 MB SIMMs

■ 32 MB SIMMs

Use the following procedures to install a SIMM stick.

> ⚠ **CAUTION:** Static discharge can damage SIMM components. Heed the cautions in the following section.

Precautions

Always remove a SIMM from its shipping material carefully. Static discharge can damage SIMM components. Take the following precautions when handling SIMMs:

■ Avoid carpets in cool, dry areas.

■ Do not remove the SIMM from its anti-static packaging until you are ready to install it.

■ Before handling a SIMM, discharge any static electricity by touching a grounded metal object, such as the metal frame inside the system unit.

■ Always hold a SIMM by its edges. Avoid touching the components on the SIMM.

Checking the Memory in Your System

Use the following steps to check the memory configuration in your system.

1. Remove the system cover (see Chapter 5).

> ⚠️ **WARNING:** Be sure that the system unit power is turned off and the system is unplugged before you begin the installation procedure.

2. Locate the SIMM sockets and jumper JP1 on the system board. The SIMM sockets are assigned as bank 0 and bank 1.

Locating SIMM sockets and banks

If you have cables obstructing your view of the sockets, move them aside or unplug them. Tag any cables you unplug.

 CAUTION: IDE and diskette drive cables are not keyed to fit only in the correct position. If removing a cable to install the SIMMs, reinstall the cable by aligning the red edge of the cable with pin 1 of the connector on the system board.

3. Check the memory in your system. non-multimedia systems ship with 8 MB (two 4-MB, 32-bit SIMMs) in bank 0, on the system board. Multimedia configurations come with two 8-MB (32-bit) SIMMs installed in bank 0 for a total of 16 MB.

Fill both sockets in a bank when upgrading. Begin SIMM installation using bank 0. Both sockets in a bank must be filled with the same type of SIMM sticks (two SIMM sticks with the same size and speed). Supported SIMMs include:

- 4-MB SIMM stick (1 MB by 32 or 36 bit)
- 8-MB SIMM stick (2 MB by 32 or 36 bit)
- 16-MB SIMM stick (4 MB by 32 or 36 bit)
- 32-MB SIMM stick (8 MB by 32 or 36 bit)
- 64-MB SIMM stick (16 MB by 32 or 36 bit)

When using single-sided SIMMs, fill SIMM sockets according to the following table.

 Jumper JP1 on the system board must be set on pin 2–3 when using single-sided SIMMs in bank 0 (see Chapter 7, Setting System Board Jumpers).

Single-Sided SIMM Upgrade Path

TOTAL MEMORY	BANK 0	BANK 1
8 MB *	8 MB (two 4-MB SIMMs)	Empty
16 MB	8 MB (two 4-MB SIMMs)	8 MB (two 4-MB SIMMs)
24 MB	8 MB (two 4-MB SIMMs)	16 MB (two 8-MB SIMMs)
32 MB	32 MB (two 16-MB SIMMs)	Empty
40 MB	8 MB (two 4-MB SIMMs)	32 MB (two 16-MB SIMMs)
48 MB	32 MB (two 16-MB SIMMs)	16 MB (two 8-MB SIMMs)
64 MB	32 MB (two 16-MB SIMMs)	32 MB (two 16-MB SIMMs)
80 MB	64 MB(two 32-MB SIMMs)	16 MB (two 8-MB SIMMs)
128 MB	128 MB (two 64-MB SIMMs)	Empty

* Standard on 8-MB configurations.

When using double-sided SIMMs, fill SIMM sockets according to the following table.

> **NOTE** Jumper JP1 on the system board must be set on pin 1–2 when using double-sided SIMMs in bank 0 (see Chapter 7, Setting System Board Jumpers).

Double-Sided SIMM Upgrade Path

TOTAL MEMORY	BANK 0	BANK 1
16 MB *	16 MB (two 8-MB SIMMs)	Empty
24 MB	16 MB (two 8-MB SIMMs)	8 MB (two 4-MB SIMMs)

Double-Sided SIMM Upgrade Path

TOTAL MEMORY	BANK 0	BANK 1
32 MB	16 MB (two 8-MB SIMMs)	16 MB (two 8-MB SIMMs)
64 MB	64 MB (two 32-MB SIMMs)	Empty
72 MB	64 MB (two 32-MB SIMMs)	8 MB (two 4-MB SIMMs)
80 MB	64 MB(two 32-MB SIMMs)	16 MB (two 8-MB SIMMs)
96 MB	64 MB (two 32-MB SIMMs)	32 MB (two 16-MB SIMMs)
128 MB	64 MB (two 32-MB SIMMs)	64 MB (two 32-MB SIMMs)

* Standard on 16-MB configurations.

SIMM Installation

Use the following procedures to install SIMMs in your system.

1. If you need to replace a SIMM that is presently in-stalled with a different SIMM configuration, remove the SIMM as follows.

- Press the metal clips at the outer edges of the socket away from the SIMM (see the following figure).

- Push the SIMM away from the locking tabs and remove it from the socket.

Removing a SIMM

2. Install a SIMM as follows.

> ⚠ **CAUTION:** Before you install a SIMM, reduce static discharge by touching the system's metal chassis.

■ Locate the notched end of the SIMM.

Locating the notched end of the SIMM

■ Locate the appropriate SIMM socket (see the previous figures and the table "Recommended Memory Upgrade Path").

■ Align the notched end of the SIMM with the correct end of the SIMM socket (see the following figure).

■ Insert the SIMM at an angle into the socket.

> ⚠ **CAUTION:** SIMMs are fragile; install the SIMMs into the sockets carefully.

■ Using equal pressure at the ends of the SIMM, push it until it locks under the metal clips at the ends of the socket.

Securing the SIMM

3. Replace any expansion boards that you may have removed (see "Expansion Boards" earlier in this chapter).

⚠ **CAUTION:** IDE and diskette drive cables are *not* keyed to fit only in the correct position. If you removed a cable to install the SIMMs, reinstall the cable by aligning the red edge of the cable with pin 1 of the connector on the system board.

4. Replace the system cover (see Chapter 5).

5. Connect external peripherals and power cables.

> **NOTE** If you find a discrepancy in the amount of memory that the Power-On Self-Test finds with the amount of memory that you installed, check that you installed the SIMM sticks correctly.

VIDEO UPGRADE

Your system comes standard with 1 MB of video dynamic RAM (DRAM). You can upgrade video memory to 2 MB by adding two 256-KB by 16-bit video DRAM chips.

The upgrade significantly increases video performance and allows your system to display more colors at higher resolutions.

Use the following steps to upgrade video memory in your system.

1. Remove the system unit cover and bottom access cover (see Chapter 5).

> **WARNING:** Be sure that the system unit power is turned off and the system is unplugged before you begin the installation procedure.

2. Locate the two video DRAM sockets on the system board (see the following figure).

If you have expansion boards obstructing your view of the sockets, remove the boards (see "Expansion Boards" earlier in this chapter).

Locating video DRAM sockets

3. Align the alignment dot end of the video DRAM module with the notched end of the socket (see the following
figure).

```
⚠   CAUTION: Reduce static electricity by
touching the metal inside the system unit cover.
```

Aligning the video DRAM module with the socket

4. Set the module on the socket. Check that the module is aligned correctly.

5. Using equal pressure, gently press down on the module until it is fully seated in the socket.

6. Follow the same procedure to install the remaining video DRAM module.

7. Replace any expansion boards that you removed (see "Board Installation" earlier in this chapter).

8. Replace the system unit cover and the bottom access cover (see Chapter 5).

9. Connect external peripherals and power cables.

You can verify that the system recognizes the additional video DRAM by performing the following.

1. Power up the system.

2. Exit Windows and return to the C:\ prompt.

3. At the C:\ prompt, type **cd\windows\vgautil** and press **Enter**. Type **clmode** and press **Enter**. The CLMODE main screen displays.

4. In the system information the amount of display memory is shown. A value of 1024k means 1 MB is installed. A value of 2048k means 2 MB is installed.

5. Press **ESC** to exit the CLMODE utility.

6. Press **Enter** to select "No" to the update AUTOEXEC.BAT question and return to the C:\ prompt. Type **win** and press **Enter** to return to Windows.

PROCESSOR UPGRADE

The zero-insertion force (ZIF) socket makes it easy for you to upgrade to the Intel OverDrive processor. Use the following procedures and the instructions included with the processor kit to install the processor in your system. (Processor kits are not available through NEC.)

> ⚠️ **WARNING:** Be sure that the system unit power is turned off and the system is unplugged before you begin the installation procedure.

1. Remove the system unit cover (see Chapter 5).

2. Locate the processor socket on the system board (see the following figure).

   If you have expansion boards obstructing your view of the socket, remove the boards (see the minitower and desktop expansion board removal sections earlier in this chapter).

Locating the processor socket

3. Open the lever on the socket as follows.

- Release the lever by slightly pulling it away from the socket and swing the lever up.

- Release the heatsink clip from the tabs on the socket.

Opening the socket lever

4. Carefully lift the processor out of the socket.

> ⚠️ **CAUTION:** Before picking up the processor, reduce static discharge by touching the metal frame of the system unit.

5. Align the notch on upgrade processor with the missing pin on the socket as shown in the figure and in accordance with the instructions included in the upgrade kit.

> ⚠ **CAUTION:** Incorrect alignment of the processor in the socket can damage the system board processor.
>
> After installing the processor, make sure the processor jumper on the system board is set properly for the new processor (see Chapter 7, "Setting System Board Jumpers").

Aligning the processor

6. Carefully insert the processor into the socket.

7. Lock the processor in place by swinging the socket lever down towards the socket until it locks in place.

8. Set the processor speed and voltage jumpers (see Chapter 7, "Setting System Board Jumpers").

9. Replace any expansion boards that you removed (see "Board Installation" earlier in this chapter) and reconnect any cables.

10. Turn the system upright and replace the system unit cover (see Chapter 5).

DATA STORAGE DEVICES

The following sections describe:

- the storage devices supported by your system

- the device slots in your computer

- device preparation, such as switch and jumper settings

- device cables and cable connector locations

- procedures for installing storage devices.

Storage Device Support

The system board in your computer supports the following peripheral storage devices:

- up to two diskette drives, including the standard 1.44-MB diskette drive

- up to four devices such as hard disks and a CD-ROM reader.

Other storage devices might require the installation of a compatible controller board. See your hardware dealer for the storage devices available for your system.

Desktop Device Slots

The system has four storage device slots:

- a 3 1/2-inch accessible device slot which contains the standard 1.44-MB diskette drive

- one internal 3 1/2-inch device slot for the standard IDE hard disk (in hard disk configurations)

- two 5 1/4-inch accessible device slots for 1.6-inch high (half-height) devices. Multimedia systems come with a CD-ROM reader in the top 5 1/4-inch slot.

  You can install accessible devices such as a diskette drive, tape drive, CD-ROM reader or hard disk with a 5 1/4-inch form factor (frame) in the 5 1/4-inch slots.

The following figures show the device slot locations.

Locating desktop device slots

Minitower Device Slots

The minitower system has six device slots:

- One 3 1/2-inch accessible device slot which contains the standard 1.44-MB diskette drive.

- Three 5 1/4-inch accessible device slots for 1.6-inch high (half-height) devices (one slot contains the CD-ROM reader in multimedia configurations).

- Two internal 3 1/2-inch device slots (one slot contains the standard IDE hard disk in hard disk configurations).

    You can install accessible devices such as a diskette drive or tape drive with a 5 1/4-inch form factor (frame) in the 5 1/4-inch slots. To install a hard disk in the 5 1/4-inch slots a 5 1/4-inch form factor is required.

The following figure shows the device slot locations.

Locating minitower device slots

Device Preparation

Before you install a storage device in the system, follow any preinstallation instructions that come with the device.

For example, check the following items for these devices:

- Diskette drive — remove any termination on the optional diskette drive. See the documentation that comes with the drive.

- PCI/IDE device — check the jumper settings on the device before you install it. See the documentation that comes with the device for jumper setting information.

  A device, such as an IDE hard disk or IDE CD-ROM reader, must be set correctly as the first (master) or second (slave) device on a PCI/IDE channel.

  The standard IDE hard disk is set as the master device on the primary PCI/IDE channel. The CD-ROM reader in the multimedia configurations is the master device on the secondary PCI/IDE channel.

Cables

Systems ship with the following cables:

- a diskette drive signal cable (supports one device)

- a PCI/IDE signal cable on the primary IDE connector (supports one device)

- a PCI/IDE signal cable on the secondary IDE connector (supports one device)

- storage device power cables.

Your system ships with one diskette drive and two PCI/IDE interface signal cables connecting the system board to the storage devices. Connectors for optional storage devices are not available on the standard diskette and PCI/IDE cables. Power cables coming from the power supply are available for attaching optional attached to the storage devices.

The following figure shows the diskette drive and PCI/IDE cable connector locations on the system board. Cable and connection information follow the figures.

System board cable connectors

System Power Cables

System power cables vary in length and provide connector sizes to accommodate a variety of supported storage configurations. Power cable connectors are keyed to fit only in the correct position.

Power cable connectors

Diskette Drive Signal Cable

The diskette drive signal cable that comes attached to the system board only connects the standard 1.44-MB diskette drive. An optional diskette drive cable (shown in the following figure) is required if attaching a second diskette drive.

The NEC spare part number for the optional diskette drive cable that supports two devices is 158-050561-000.

Optional diskette drive cable

PCI/IDE Cable

Systems ship with an IDE interface cable connecting the
hard disk drive to the primary PCI/IDE connector on the
system board. An optional hard disk drive cable (shown in
the following figure) is required if attaching a second hard
disk drive.

The NEC spare part number for the optional PCI/IDE ca-
ble that supports two devices is 158-050562-000. This op-
tional PCI/IDE cable can be used on either the primary or
secondary system board connector.

In multimedia configurations the CD-ROM is connected to the secondary PCI/IDE connector on the system board. If installing two devices to the secondary PCI/IDE connector, the IDE interface cable shown in the following figure is required.

> ⚠ **CAUTION:** The IDE device cables are *not* keyed to fit only in the correct position. Align the red edge of the cable with pin 1 of the connectors on the drive and system board.

Optional PCI/IDE cable

Desktop Storage Device Installation

The following section is used to install a 5 1/4-inch device or 3 1/2-inch hard disk drive in your desktop system. If installing a device into the minitower system see "Minitower Storage Device Installation" later in this chapter.

Installing a Desktop Storage Device

Install a storage device in the system as follows.

1. Follow the preinstallation instructions that come with your device, such as setting jumpers and switches.

See "Device Preparation" earlier in this chapter for device preparation information.

> **NOTE** If your 5 1/4-inch device comes with drive rails, do not attach them. Remove any rails already attached. See the documentation that comes with the device.

2. Remove the system unit cover (see Chapter 5).

> **WARNING:** Be sure that system power is *off* and the system and its peripherals are *unplugged* before you begin the installation procedure.

3. Remove the 3 1/2-inch drive bracket containing the standard 1.44-MB diskette drive and hard disk as follows.

> **NOTE** All device installations (3 1/2-inch and 5 1/4-inch devices) require the removal of the 3 1/2-inch drive bracket.

- Remove the four screws securing the drive bracket to the chassis.

- Carefully lift the drive bracket up and place it on top of the power supply. Avoid pulling on the installed drive cables.

Removing the desktop 3 1/2-inch drive bracket

4. If you are installing a device in the lower 5 1/4-inch device slot, prepare the slot as follows:

■ Release the front panel by removing five screws from the back of the panel (see the following figure).

Removing the desktop front panel

■ If you are installing an accessible device, such as a diskette drive, locate the blank panel in the front panel for the lower device slot.

Remove the blank panel by pressing the panel tabs from the inside of the front panel and pushing the blank panel out.

Locating the desktop blank panel tabs

■ If there is a perforated metal plate in front of the device slot, remove the plate by pulling it back and forth until it releases from the chassis.

5. Replace the front panel. Secure the panel in place with the five screws you removed earlier.

6. Insert the device, connector end first, into the device slot.

> **NOTE** To easily access device connectors for cabling, do not insert a 5 1/4-inch device all the way into the slot.

7. Continue to "Cabling a Desktop Storage Device."

Cabling a Desktop Storage Device

Use the following procedure to cable a storage device in the system and reinstall the parts you removed earlier.

1. Connect the device cables as follows:

■ Connect the PCI/IDE cable and power cable (see "PCI/IDE Cables" in this chapter).

Take care to prevent bending drive connector pins. Be sure to align the PCI/IDE cable connector as shown in the figure.

Connecting PCI/IDE device cables

■ If you are installing a 1.2-MB diskette drive, con-
nect the diskette drive signal cable and power cable.

Be sure to align the signal cable connector as shown
in the figure.

Connecting 1.2-MB diskette drive cables

2. Secure the device in the slot as follows.

- Align the holes in the device with the holes in the device bracket.

- Secure the device to the bracket with the screws that come with the drive (see the following figure).

Securing a 5 1/4-inch device in the desktop

3. Replace the 3 1/2-inch device bracket in the 3 1/2-inch device slot. Take care to prevent pulling and loosening cable connections.

Secure the device bracket in place with the four screws you removed earlier.
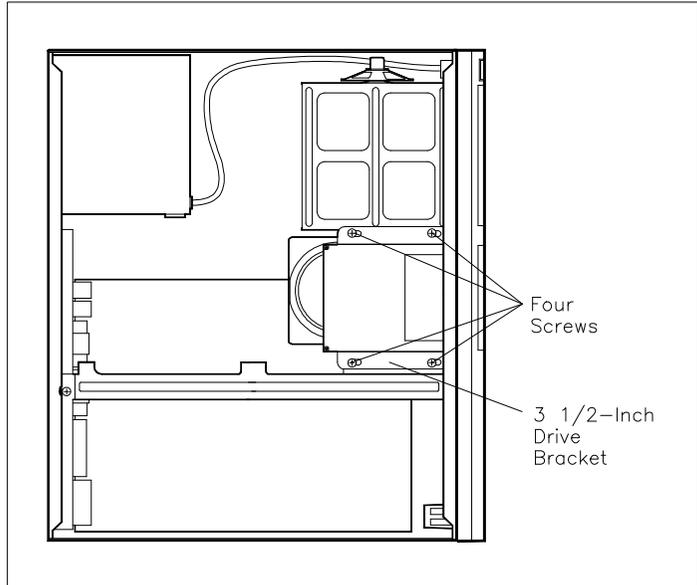
Securing the desktop 3 1/2-inch drive bracket

4. If you installed a 1.2-MB diskette drive, remove the protective cardboard insert from the drive.

5. Replace the system unit cover (see Chapter 5).

Be sure that you do not pinch any cables or wires when you replace the cover.

6. Connect external peripherals and power cables.

7. Run the Setup program to set your new configuration (see Chapter 2, Setting System Parameters).

Minitower Storage Device Installation

Use the appropriate procedures to install storage devices in your system:

- To install an accessible storage device, see "Installing an Accessible Minitower Storage Device."

- To install an internal storage device, see "Installing an Internal Minitower Storage Device."

Installing an Accessible Minitower Storage Device

Use the following procedure to install an accessible storage device in the system.

1. Follow the preinstallation instructions that come with your device, such as setting jumpers and switches.

See "Device Preparation" earlier in this chapter for device preparation information.

NOTE If your 5 1/4-inch device comes with drive rails, do not attach them. Remove any rails already attached. See the documentation that comes with the device.

---

2. Remove the system unit cover (see Chapter 5).

WARNING: Be sure that system power is *off* and the system and its peripherals are *unplugged* before you begin the installation procedure.

---

3. Remove the device bracket from the system as follows:

■ Remove the four screws (two to a side) holding the front panel to the system (see the following figure).

Removing the minitower front panel screws

> **NOTE** If you are installing a hard disk in the 5 1/4-inch slot, do not remove the blank panel or cover plate. Otherwise store the blank panel and cover plate for reuse if you remove the device.

- Remove the blank panel from the metal cover plate by pressing in on the panel tabs (see the following figure).

- Remove the two screws holding each metal cover plate to the device bracket. Remove the plates.

Removing the minitower blank panel and cover plate

- Remove the five screws holding the 5 1/4-inch device bracket to the chassis (see the following figure).

Removing the minitower device bracket screws

- Carefully pull the device bracket out of the chassis.

4. Insert the connector end of the device into the device bracket.

5. Align the device mounting holes with the bracket mounting holes. Secure the device to the bracket with the four screws (two to a side) provided with the device.

Securing a device in the minitower device cage

6. Insert the device bracket into the chassis.

7. Continue to "Cabling a Minitower Storage Device."

Cabling a Minitower Storage Device

Use the following procedure to cable a storage device in the system.

1. Connect the device cables as follows:

   ■ If you have installed a 1.2-MB diskette drive, connect the diskette drive signal cable and power cable.

   Align the signal cable connector as shown in the following figure.

Connecting 1.2-MB diskette drive cables

■ Connect an unused connector on the PCI/IDE cable and on the power cable into the device.

Take care to prevent bending drive connector pins. Be sure to align the PCI/IDE cable connector as shown in the figure.

Connecting the PCI/IDE device cables

2. Push the device bracket up against the chassis and secure in place with the five previously removed screws.

3. Install the front panel to the chassis with the four previously removed screws (two to a side).

4. If you installed a 1.2-MB diskette drive, remove the protective cardboard insert from the drive.

5. Replace the system unit cover (see Chapter 5).

Be sure that you do not pinch any cables or wires when you install the cover.

6. Connect external peripherals and power cables.

7. Run the Setup program to set your new configuration (see Chapter 2, Setting System Parameters).

Installing an Internal Minitower Storage Device

Use the following procedure to install a device in the 3 1/2-inch internal device bracket.

1. Follow the preinstallation instructions that come with your device, such as setting jumpers and switches.

See "Device Preparation" earlier in this chapter for device preparation information.

2. Remove the system unit cover (see Chapter 5).

WARNING: Be sure that system power is *off* and the system and its peripherals are *unplugged* before you begin the installation procedure.

3. Install the device in the chassis as follows:

■ Hold the device in the open bay in the top of the chassis.

■ Align the device mounting holes with the mounting holes in the chassis (see the following figure).

■ Secure the device to the chassis with the four screws provided with the device.

Securing the device in the minitower chassis

4. Connect a power cable and signal cable to the connectors on the device (see "Cabling a Minitower Storage Device" earlier in this chapter).

5. Replace the system unit cover (see Chapter 5).

6. Be sure that you do not pinch any cables or wires when you install the cover.

7. Connect external peripherals and power cables.

8. Run the Setup program to set your new configuration (see Chapter 2, Setting System Parameters).

EXTERNAL PERIPHERALS

This sections contains instructions for connecting the following external peripherals to the system unit ports.

■ VGA monitor to the VGA monitor port

■ Parallel printer to the parallel printer port

■ Two RS-232C devices, such as a pointing device and serial printer, to the serial 1 and serial 2 ports.

■ Multimedia components to the sound board

— speakers

— microphone

VGA MONITOR

Use the following procedure to connect a VGA monitor to your computer.

> **NOTE** Before connecting a monitor to your system, set up the monitor according to the instructions that come with the monitor.

1. Turn off and unplug the system unit and any external option connected to the system unit.

2. Make sure that any power to your monitor device is off and the power cable is unplugged.

3. Connect your video cable to the system's VGA monitor port and to the monitor. Secure the cable with the screws provided.

Connecting a VGA monitor to the desktop

Connecting a VGA monitor to the minitower

PARALLEL PRINTER

Use the following steps to connect a parallel printer to your system unit. If you have a serial printer, see the next section, "RS-232C Device."

> **NOTE** Before connecting a printer to your system, set up the printer according to the instructions that come with the printer.

1. Turn off and unplug the system unit and any external option connected to the system unit.

2. Make sure that your printer power is off and the power cable is unplugged.

3. Connect the printer cable to the printer port on the rear of the system unit. Secure the cable as follows.

   ■ Secure the system unit connection with the screws provided.

   ■ Lock the connector to the printer with the connector clips.

Connecting a printer cable to the desktop

Connecting a printer cable to the minitower

RS-232C DEVICE

Use the following procedure to connect an RS-232C device, such as a pointing device or serial printer, to your computer.

> **NOTE** Before connecting an RS-232C device to your system, set up the device according to instructions that come with the option.

1. Turn off and unplug the system unit and any external option connected to the system unit.

2. Make sure that any power to your RS-232C device is off and the power cable is unplugged.

3. Connect your RS-232C cable to one of the system's serial ports and to the device. Secure the cable with the screws provided.

Connecting an RS-232C cable to the desktop

Connecting an RS-232C cable to the minitower

MULTIMEDIA COMPONENTS

The sound board in the system has four jacks that allow you to attach speakers, headphones, a microphone, or a stereo amplifier to the back of the system. See your *Ensemble Software User's Guide* for information on playing audio CDs. Use the following jacks to attach your multimedia peripherals:

■ Line In Jack

The Line In Jack allows you to connect devices such as a cassette, DAT, or Minidisc player to your sound board for playback or recording.

■ Microphone In Jack

The Microphone In (MIC) Jack allows you to connect a microphone for voice input.

■ Line Out Jack

The Line Out Jack allows you to bypass your sound board's internal amplifier to connect powered speakers or an external amplifier for audio output. (This is the jack to use for the speakers shipped with the system.)

■ Speaker Jack

The Speaker Jack allows you to connect speakers for audio output from the sound board's built-in power amplifier. The built-in amplifier has a maximum output power of four watts per channel from four-ohm speakers and two watts per channel from eight-ohm speakers. Do not play at maximum volume if your speakers cannot handle this power. (Use this jack if you connect unamplified speakers.)

■ MIDI/Joystick Connector

The MIDI/Joystick Connector allows you to connect a joystick or MIDI kit to your sound board.

Use the instructions in the following sections to connect the speakers and microphone to your system.

Connecting the Speakers

Connect the speakers to your system unit as follows.

1. Locate the speaker with the control knobs. This is the left speaker.

2. Insert right speaker cable into the jack marked "SPEAKER" on the back of the left speaker.

3. Attach the audio output cable to the computer as follows.

   ■ Insert one end of the cable into the "INPUT" jack on the back of the left speaker.

   ■ Insert the other end of the cable into the "Line Out" jack on the back of the system unit.

4. Locate the AC adapter.

5. Plug the AC adapter into the jack marked "DC IN" on the back of the left speaker.

6. Plug the other end of the cable into a properly grounded wall outlet.

Connecting speaker components

To operate your speakers, turn on your audio source.

1. Push the power button on the back of the speakers to ON.

2. Turn the volume control on the front of the speakers to the desired level.

3. Set the Bass Boost switch (DXBB) on the front of the speakers to the desired level.

Connecting the Microphone

Connect the microphone to your system as follows:

1. Plug the microphone cable connector into the microphone in jack on the rear of the system.

2. Mount the microphone (see the following figure).

   ■ Remove the center and the backing from one side of the adhesive pad that comes with the microphone. Attach the pad to the microphone holder.

   ■ Remove the backing from the other side of the adhesive pad and attach it to where you wish to keep the microphone (on your computer, for example).

   ■ Slide the microphone into the holder.

Setting up the microphone

7 Setting System Board Jumpers

This chapter provides jumper setting information for configuring your system for a particular system requirement. Situations that require changing the jumper settings include the following:

■ You are changing bank 0 SIMMs from single- to double-sided SIMMs or vice versa.

■ You are upgrading the processor and clock speed.

⚠ **CAUTION:** The jumpers are set correctly at the factory for your configuration.

If your system requires a jumper change, change only the jumper setting for that condition. Otherwise, keep the jumpers at their factory settings.

JUMPER LOCATIONS

The following figure shows the location of the system board's jumpers.

Locating system configuration jumpers

The factory settings of the jumpers are in the following figures. Functions of each position are also provided. If you need to change the jumpers, use the procedure that follows the figures.

JUMPER SETTINGS

In the 8-MB configurations, two 4-MB single-sided SIMMs are installed in bank 0. (Memory bank locations and valid SIMM configurations are provided in Chapter 6 under "Checking the Memory in Your System.") The default setting for JP1 in the 8-MB configuration has pins 2 and 3 shorted. Pins 2 and 3 must be shorted when the following SIMMs are installed in bank 0.

- 1-MB SIMMs

- 4-MB SIMMs

- 16-MB SIMMs

- 64-MB SIMMs

In the 16-MB configuration, two 8-MB double-sided SIMMs are installed in bank 0. The default setting in the 16-MB configuration has pins 1 and 2 shorted. Pins 1 and 2 must be shorted when the following SIMMs are installed in bank 0.

- 2-MB SIMMs

- 8-MB SIMMs

- 32-MB SIMMs

SIMM type jumper JP1

The following jumpers are used to set the processor frequency.

Processor speed jumpers JP5, JP6, and JP7

Jumper J10 is used to set the bus frequency. This jumper is not installed in all configurations.

Bus speed jumper JP10

Jumper JP12 sets the voltage used by the processor. This is set at the factory and should not be changed.

CAUTION: Changing the processor voltage jumper (JP12) could damage the system board processor.

Processor voltage jumper JP12

Changing Jumper Settings

To change system board jumper settings, use the following procedure. A label showing the jumper information is inside the system unit cover. The label provides a quick reference for the settings.

1. Turn off and unplug the system and any external options.

> ⚠ **WARNING:** The system power must be off before changing a jumper setting.

2. Remove the system unit cover (see Chapter 5).

3. Locate the jumper(s) on the system board (see the figure under "Jumper Locations" earlier in this chapter).

You might have to remove installed expansion boards to access the jumper (see expansion board removal procedures in Chapter 6).

4. If you removed any expansion boards, replace them.

5. Replace the system unit cover (see Chapter 5).

6. Plug in system and peripheral cables and turn on the system.

7. Run Setup (see Chapter 2).

CMOS Jumper

When clearing CMOS (JP8), use the following procedure.

1. Turn off and unplug the system and any external options.

⚠️ **WARNING:** The system power must be off before changing a jumper setting.

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2. Remove the system unit cover (see Chapter 5).

3. Locate the jumper(s) on the system board (see the figure under "Jumper Locations" earlier in this chapter).

You might have to remove installed expansion boards to access the jumper (see expansion board removal procedures in Chapter 4).

4. Install a jumper on jumper JP8.

5. Power on the system for 5 seconds. The monitor will be blank.

6. Power off the system.

7. Remove the jumper from jumper JP8.

8. Replace the system unit cover (see Chapter 5).

9. Run Setup (see Chapter 2).

8 **Solving Problems**

Your system has a built-in checking program that automatically tests its components when you turn the system unit power on. If there is a problem, the system displays an error message. If this happens, follow any instructions on the screen.

If screen messages do not help or an error message does not appear, use the information in this chapter to determine and solve the problem. The problem is often one that you can solve yourself.

PROBLEM CHECKLIST

First check the items in the following list. If these do not help, see the table that follows the list. If you still cannot determine the problem, see "If You Need Assistance" in this chapter.

Check that the following conditions are true for your computer:

■ The power switch for each component is on.

■ All cables and power cords are tightly connected.

■ The electrical outlet to which your components are connected is working. Test the outlet by plugging in a lamp or other electrical device.

■ The monitor's brightness and contrast controls are adjusted properly.

■ All option boards in the expansion slots are seated securely in their connectors.

- Additional memory is installed correctly (see "SIMM Upgrade Kits" in Chapter 6, Options).

- Any option you have installed is designed for your system and is set up correctly.

Troubleshooting

PROBLEM	CORRECTIVE ACTION
System Errors	
No power. Power lamp is not lit.	Check that the power cable is plugged into the system power socket. Check that the other end of the cable is plugged into a live, properly grounded AC power outlet.
System does not boot and an error message is displayed on the screen.	Run Setup (see Chapter 4). Check that the parameters are set correctly, particularly if you just installed an option.
The system makes a continuous sound pattern.	Turn system power off, wait 5 seconds, and turn the power on again. If the sound continues, call the NEC Technical Support Center. See "If You Need Assistance" later in this chapter for the telephone number.
The system no longer maintains the date, time, or your system configuration.	The backup battery in the real time clock chip has failed. Call the NEC Technical Support Center for a replacement system board.
The system does not boot from the hard disk.	The system always tries to start from the diskette drive before it starts from the hard disk. Remove any diskette in the drives.

Run Setup and check Boot parameter settings. |

Troubleshooting

PROBLEM	CORRECTIVE ACTION
Diskette Drive Errors	
A diskette won't load.	Check that the diskette is inserted correctly.
	Verify that the system unit and monitor power lamps are on and that the power-on screen appears on the screen.
	If the diskette is not formatted, format it. See your MS-DOS documentation.
	If the diskette drive busy lamp does not light when you load the diskette, try a different diskette. If this loads, the problem is in the software. Call your software dealer.
A Non-System Disk or Disk Error message is displayed.	If you are starting from the diskette drive, insert a diskette with system files into drive A. If a bootable diskette does not boot, use Setup to verify that the initial boot parameter is set to diskette drive A and not a hard disk.
CD-ROM Problems	
CD-ROM disc cartridge does not eject due to a power failure or software error.	Power off the system. See the emergency eject screw in Chapter 1.
Monitor Problems	
The monitor screen remains dark.	Check that the monitor power cable is connected to the monitor and a power outlet.
	Be sure that the monitor signal cable is connected to the system unit.
	Press a key on the keyboard or move the mouse to make sure the system is not in suspend mode.
	Check that the system unit and monitor power lamps are on, all monitor connections are tight, and the brightness and contrast controls are adjusted.

Troubleshooting

PROBLEM	CORRECTIVE ACTION
A distorted image appears on your monitor screen.	Adjust the video controls on your monitor. If this doesn't help, turn the monitor off for a few seconds, then turn it back on.
There is constant movement on the screen or the screen display is fuzzy.	A magnetic field is affecting your monitor. If you have another monitor nearby, or other device with a motor that generates a magnetic field (for example, a fan), move the monitor or device away from the affected monitor.
Distortion or discoloration in the graphics characters appear on the screen.	Check that your monitor is set up correctly. Check the monitor connections. Make sure that the monitor signal connector pins are not damaged. Be sure that the correct video driver is installed.
Keyboard Problems	
An image appears on the screen but nothing happens when you use the keyboard.	Check and tighten the keyboard cable connection. Move the mouse to make sure the system is not waiting for a mouse response. Check the disk light to make sure a program is not loading.
	If this doesn't help, power off the system. Wait 5 seconds and power on the system.
System Performance Problems	
System performance appears sluggish.	Check that you have your system set for optimal operation. If you have had your system for a while, try defragmenting the hard disk drive. See your Microsoft Windows and MS-DOS documentation.
	Check the memory requirements of your software applications. If required, install additional memory (see "SIMM Upgrade Kits" in Chapter 6, Options).

PRODUCT INFORMATION

NEC FastFacts™ is a self-help, automated electronic information service that you can use to obtain up-to-date product application notes, installation procedures, troubleshooting tips, data sheets, technical information bulletins, illustrated parts breakdowns, and other information about your system.

Using a fax machine, you can obtain information from the FastFacts service 24 hours a day, 7 days a week. You simply call the FastFacts number on your touch-tone telephone, order the information you want through the voice prompts, and FastFacts will automatically fax you the information.

If you are new to FastFacts, you should first order a catalog that lists the available documents and the document numbers. Current catalogs include:

- Catalog 1, Monitors, Graphics Boards, and Data Projector Products

- Catalog 2, CD-ROM Hardware and Software, Printers, and Disk Drive Products

- Catalog 3, Laptop, Desktop, and Server Computer Products

- Catalog 4, NEC Products for the Macintosh

- Catalog 9, Product and Configuration Index.

To order up-to-date technical information on your system, request document number 273301. This document includes BIOS versions, technical tips, available bulletin board files, and current drivers (MS-DOS and Windows video drivers as well as other system related drivers).

A catalog of all current technical information bulletins can be ordered by requesting document number 72842228.

A catalog of current illustrated parts breakdowns can be ordered by requesting document number 42228.

A set of instructions for using FastFacts can be ordered by requesting document 63233469.

Due to the dynamic nature of FastFacts, documents are added and removed constantly, therefore all catalog subjects and numbers, and all document subjects and numbers may change at any time.

Order information from FastFacts as follows.

1. Be sure your system is ready to receive a fax or your fax machine is on. Have the document number handy for the document you want.

2. From your touch-tone telephone, call 1-800-366-0476 (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 (01-708-238-7800).

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 to order your document or catalog.

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

4. When asked by the voice prompts, enter your fax number and telephone number.

   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 requested is automatically sent to your fax machine. Please wait for ordered document to arrive before calling to order more documents. If you don't, the second order attempts to reach your fax number before the first order is complete. If that occurs, FastFacts, after three more tries, assumes that your line is busy and terminates any future processing of the order.

IF YOU NEED ASSISTANCE

If you have a problem with your computer, first review the checklist and troubleshooting table in the previous section. If you still have a problem, continue with the suggestions that follow.

Getting Help from Your Company

If your company is large, the best source of help may be within your own company. Your company may have designated central support personnel to whom you can go when you have problems.

Your central support personnel can then contact the appropriate dealer or NEC support staff, if needed.

Getting Help from Your Dealer

The dealer from whom you purchased your system is backed by complete support resources and programs within NEC. Your dealer can provide you with details on all available support options.

Getting Help from NEC

If you have a problem that you cannot resolve yourself, within your company, or through your NEC dealer, help is available from the NEC Technical Support Center (TSC). Call the NEC Technical Support Center, toll free, at 1-800-632-4525. Direct technical assistance is available Monday through Friday, between 8:30 a.m. and 8:00 p.m. Eastern Standard Time.

Technical questions regarding the PowerMate VP system can be sent over the Internet system to TSC. The Internet address is as follows:

tech-support@nectech.com

If it is more convenient, questions may also be faxed to TSC. TSC's fax number is:

(508) 635-4666

Along with the system model number (found on the back of the computer) and question(s), be sure to include your name and fax number or Internet address, so that an expert can respond to the question.

It would also help to include your telephone number in case TSC cannot get their answer to you. TSC will reply to all questions received by Internet of fax within one business day.

A Setting Up a Healthy Work Environment

> ⚠️ **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.

See a physician if you experience pain, tenderness, swelling, burning, cramping, 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. Information in this appendix 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, DeQuervain's Disease, 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" at the end of this 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, see a physician as soon as possible. Signs of discomfort might include pain, tenderness, swelling, burning, cramping, 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 set-up 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 keyboard
and mouse

Adjust
your monitor

Adjust
your chair

ADJUST YOUR CHAIR

Your chair should be adjustable. Keep your body in an upright position with the backrest adjusted to support your lower back. Maintain a comfortable, stable position.
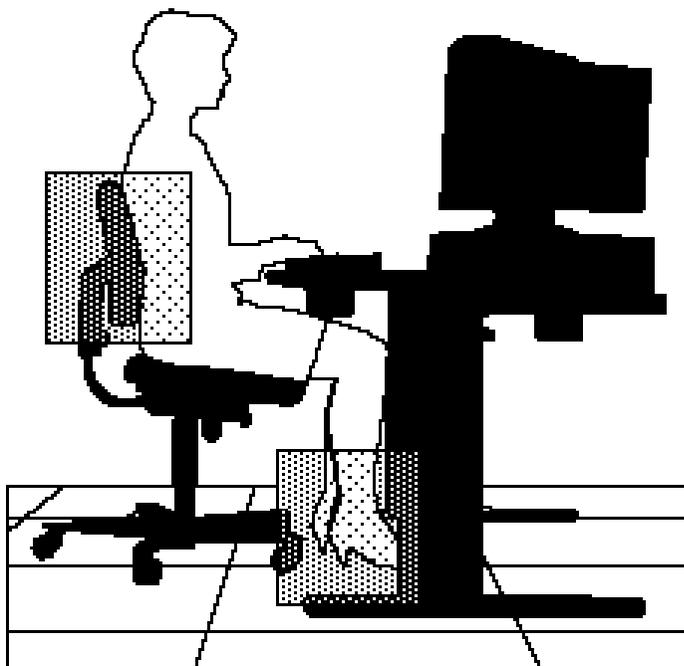
Check the following:

■ The backrest of your chair should support the inward curve of your lower back. Tilt the backrest slightly back (100 to 110 degrees) so that some of the weight of your upper body is transferred to the backrest and off your spine.

- 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 thigh and lower leg is slightly more than 90 degrees.

- 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.

ADJUST YOUR KEYBOARD AND MOUSE
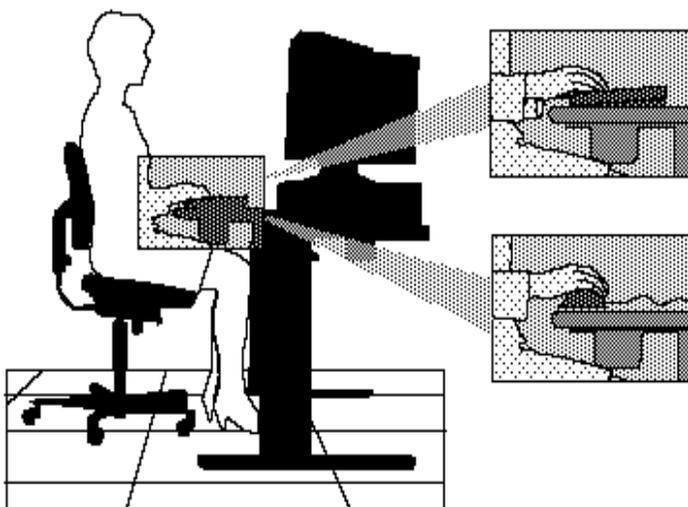
Follow these points in positioning your keyboard and mouse.

■ 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.

■ Adjust the keyboard height so that your elbows are near your body, and your forearms are parallel to the floor. Your upper arms should hang comfortably at your sides.

■ Adjust your keyboard slope so that your wrists are straight while you are typing.
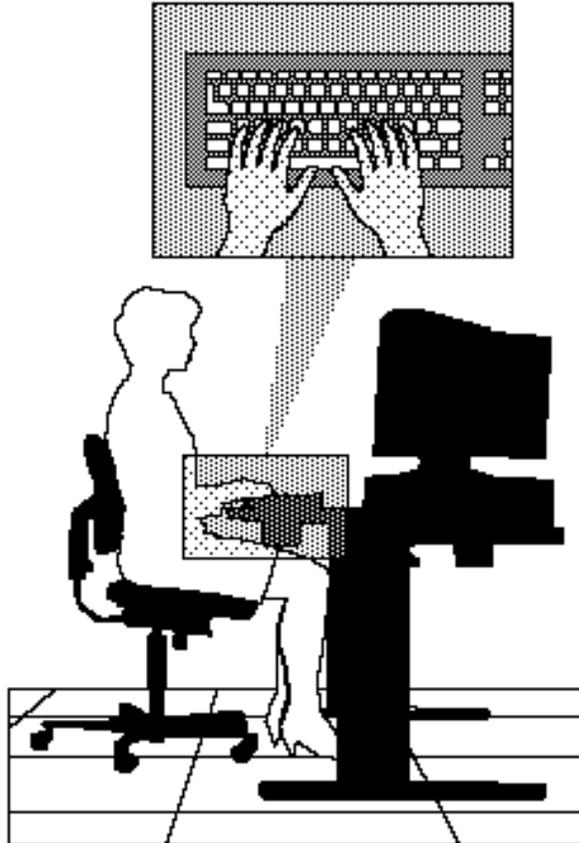
- Type with your hands and wrists floating above the keyboard. Use a wrist pad only to rest your wrists between typing. Avoid resting your wrists on sharp edges.

- 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.
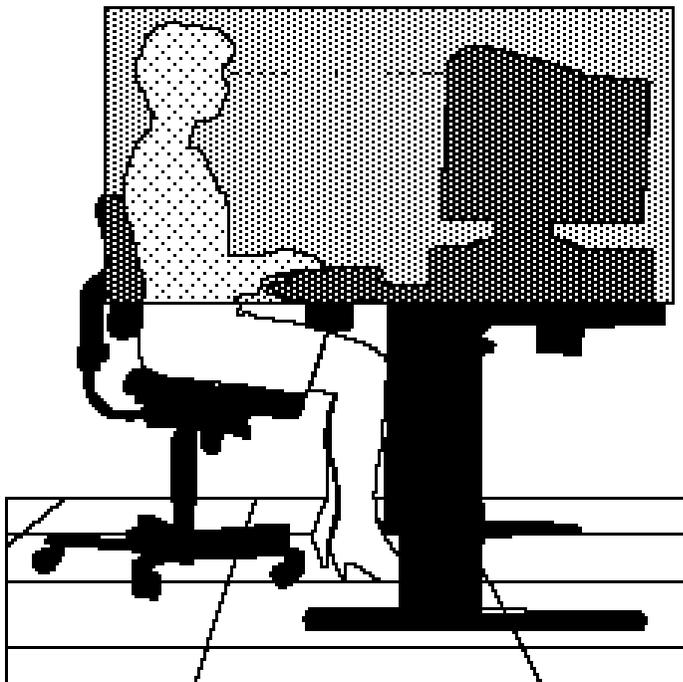
- Adjust the monitor height so that the top of the screen is at or slightly below eye level. Your eyes should look slightly downward when viewing the middle of the screen.

- Position your monitor 18 to 28 inches from your eyes.

- Rest your eyes periodically by focusing on an object at least 20 feet away. Blink often.

- Position the monitor at a 90 degree 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 screen 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 locked in one position for an extended period of time. Relax muscles and joints that were active.
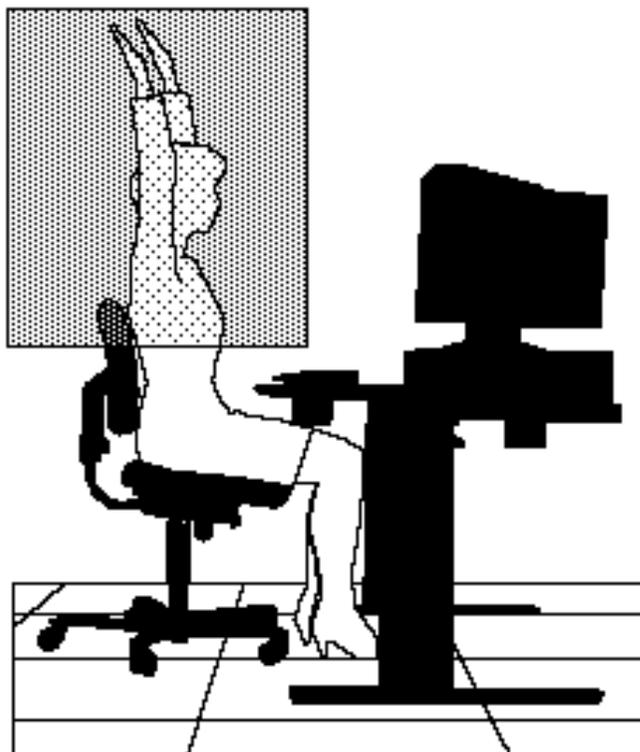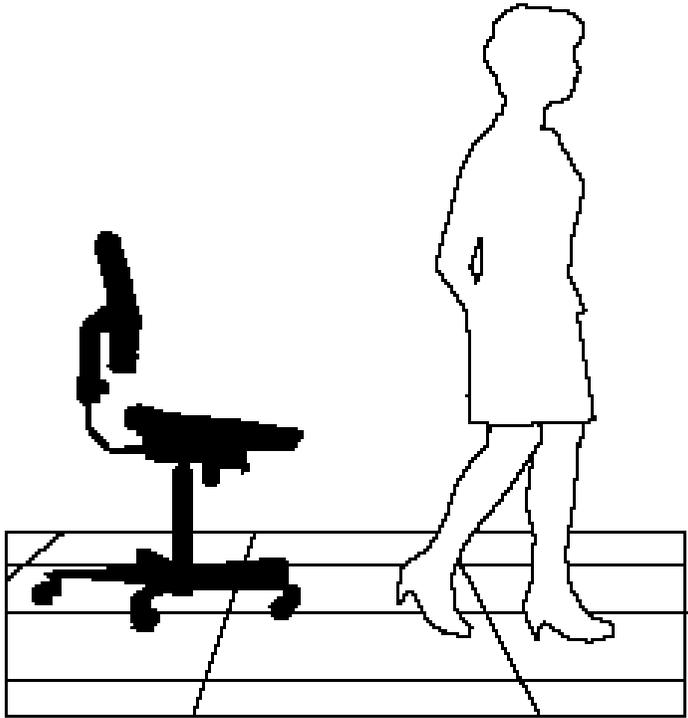
- Use a timer or reminder software to remind you to take breaks.

- To enhance blood circulation, alter your sitting posture periodically and keep your hands and wrists warm.

For more information, see the Visual Display Terminal standards ANSI/HFS 100-1988 developed by the Human Factors Society and issued by the American National Standard Institute (ANSI). Also see literature by experts in the field of ergonomics and human factors.

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, metabolic disorders, endocrine disorders (e.g., diabetes), connective tissue disorders (e.g., arthritis), prior trauma (to the hands, wrists, arms, shoulders, neck, or back), 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.

See a physician if you experience pain, tenderness, swelling, burning, cramping, 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 our 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 18-28 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 visit your doctor if you feel any sustained discomfort?

B Specifications

The following PowerMate VP systems specifications are standard except as noted.

System Processor

64-bit Intel Pentium P54C processor — 75 MHz internally and 50 MHz externally.

PGA ZIF Socket

320-pin integrated socket — supports optional processor upgrades

Cache

16-KB dual write-back internal cache: 8 KB for data, 8 KB for instructions

256-KB write-back/through secondary cache using 15-ns SRAMs

Random Access Memory (RAM)

8-MB standard, expandable to 128 MB (70-ns SIMMs on system board)

16-MB standard, on multimedia models, expandable to 128 MB

Support for industry-standard 32- or 36-bit single- or double-sided SIMMs (4 MB, 8 MB, 16 MB, 32 MB, and 64 MB) with tin connector plating

Read-Only Memory (ROM)

NEC ROM flash BIOS

- System BIOS — 128 KB
- Video BIOS — 32 KB

Video Dynamic RAM (DRAM)

1 MB standard video memory, expandable to 2 MB

Calendar Clock

Year/Month/Day/Hour/Minute/Second; maintained by RTC chip on the system board

Input/Output (I/O) Facilities

Integrated Industry-Standard Interfaces

- Bidirectional Parallel — 25-pin connector
- Serial — two RS-232C ports; support asynchronous communication, up to 9600 bps, 9-pin connectors
- VGA Video Monitor — supports NEC MultiSync XE series monitors and standard, super, and high-resolution VGA modes, 15-pin connector (D-shell)
- VESA Feature — VESA compliant 8514/A standard connector
- Keyboard — PS/2-compatible-style, 6-pin connector (mini DIN)
- Mouse — PS/2 compatible, 6-pin connector (mini DIN)
- PCI/IDE Devices — supports four PCI/IDE devices, two PCI/IDE connectors supporting two devices each
- Diskette Drive — supports two diskette drives, 34-pin connector
- Multimedia — sound board jacks support speakers, headphones, microphone, and a RJ-11 telephone jack for fax/modem hook-up

Expansion Slots

- Desktop — Three 16-bit ISA slots and one shared 32-bit PCI or 16-bit ISA slot

- Minitower — Three 16-bit ISA slots and one shared 32-bit PCI or 16-bit ISA slot, and 1 dedicated PCI slot

Keyboard

Industry-Standard — 101 keys (U.S., Canada, Australia, and Asia), 102 keys (UK and Germany); PS/2-compatible

- Function Keys — 12 keys, capable of up to 48 functions
- Status Lamps — numeric lock, capital lock, and scroll lock keys
- Numeric Keypad — standard
- Separate Cursor Control Keys — standard

Mouse

PS/2 compatible — 6-pin connector

Storage Devices

3 1/2-inch, 1.44-MB diskette drive (standard in all systems)

3 1/2-inch IDE hard disk (standard in hard disk model)

5 1/4-inch IDE CD-ROM reader (standard in multimedia systems)

Device Slots

- Desktop — Three externally accessible bays. One slot contains the 3 1/2-inch diskette drive and one slot contains the 5 1/4-inch CD-ROM reader
- Minitower — Four externally accessible slots. One slot contains the 3 1/2-inch diskette drive and one slot contains the 5 1/4-inch CD-ROM reader

Graphics

Integrated 32-bit super VGA with graphics accelerator on the 32-bit PCI local bus which supports Display Data Channel (DDC) monitors.

Video Memory — 1 MB of video DRAM integrated on system board along with two video DRAM sockets for 2 MB expandability.

Resolutions supported with the standard 1 MB of video DRAM are as follows.

- 640 by 480 with 16 colors
- 640 by 480 with 256 colors
- 640 by 480 with 64,000 colors
- 640 by 480 with 16.8 million colors
- 800 by 600 with 16 colors
- 800 by 600 with 256 colors
- 800 by 600 with 64,000 colors
- 1024 by 768 with 16 colors
- 1024 by 768 with 256 colors
- 1280 by 1024 with 16 colors

Resolutions supported with the optional 2 MB of video DRAM are as follows.

- 640 by 480 with 16 colors
- 640 by 480 with 256 colors
- 640 by 480 with 64,000 colors
- 640 by 480 with 16.8 million colors
- 800 by 600 with 16 colors
- 800 by 600 with 256 colors
- 800 by 600 with 64,000 colors
- 800 by 600 with 16.8 million colors
- 1024 by 768 with 16 colors
- 1024 by 768 with 256 colors
- 1024 by 768 with 64,000 colors
- 1280 by 1024 with 16 colors

■ 1280 by 1024 with 256 colors

CD-ROM Reader

Logical Format — ISO 9660 file format

■ Laser Pick-Up — 3 beam tracking system
■ Disc Loading — Motorized front loading (no caddy)
■ Channels — 2 channels
■ Sampling Frequency — 44.1 Khz
■ Quantization — 1 bit (16 bits linear equivalent)
■ Data and Buffer Capacity
    12 cm disc — Mode 1; 540 MB/disc
    12 cm disc — Mode 2; 630 MB/disc
    8 cm disc — Mode 1; 180 MB/disc
    8 cm disc — Mode 1; 210 MB/disc
■ Data transfer rate (quadruple speed)
    Mode 1; 600 KB/disc
    Mode 2; 700 KB/disc
■ Burst transfer rate — 3.34 MB/sec (16 bit PIO mode)
■ Memory buffer — 128 KB
■ Interface — IDE

Sound Board (multimedia models)

Creative Labs 16-bit audio card with a Panasonic/Creative
CD-ROM interface; fully Adlib and Sound Blaster
compatible

Music Synthesizer

■ Enhanced FM OPL3 music chip using four operators
■ Compatible with previous Sound Blaster and Adlib FM
  chip
■ 11 voices with 4 operators or 20 voices with 2
  operators FM synthesis

Stereo Digitized Voice Channel

- 16-bit and 8-bit digitizing in stereo and mono modes
- Programmable sampling rate, 5 kHz to 45 kHz in 228 steps
- 16-bit and 8-bit DMA channels using a single interrupt
- Dynamic filtering for digital audio recording and playback

Built-in Mixer

- Mixes sources from digitized voice, CD audio and inputs from MIDI device, line-in, microphone and PC speaker
- Selectable input source or mixing source of various audio sources for recording
- Automatic gain control amplifier/fixed gain amplifier for microphone level

Volume Control

- Software volume control of master volume, digitized voice, CD-audio and inputs from MIDI device, line-in, microphone, and PC speaker
- PC speaker at 4 levels in 6 dB steps
- All other sources at 8 levels
- Full software control of fade-in, fade-out, and panning

Built-in Stereo Amplifier

- Four watts per channel with four ohms stereo output
- Internal or external audio output amplifier

MIDI Interface

- Built-in MIDI interface for connection to external MIDI devices
- Sound Blaster and MPU-401UART mode compatible

Dimensions

Desktop System Unit

- Height — 4.4 in. (11.2 cm)
- Width — 16.9 in. (42.9 cm)
- Depth — 16.2 in. (41.2 cm)

Minitower System Unit

- Height — 15.25 in. (38 cm)
- Width — 8.5 in. (22 cm)
- Depth — 17.5 in. (445 cm)

Keyboard

- Height — 1.6 in. (4.1 cm)
- Width — 19.0 in. (48.3 cm)
- Depth — 8.4 in. (21.3 cm)

Weight

The following weights are averages. Weights depend upon the system configuration.

- Desktop System Unit — 21.5 lb (9.7 kg)

- Minitower System Unit — 30 lb (13.6 kg)

- Keyboard — 3.5 to 4 lb (1.6 to 1.8 kg)

Power

145-Watt desktop power supply — 115/230 V, switch selectable

200-Watt minitower power supply — 115/230 V, switch selectable

Recommended Operating Environment

Temperature — 50°F to 95°F (10°C to 35°C)

Relative Humidity — 20% to 80%

C CD-ROM Reader Configuration

This appendix provides connector and jumper setting information for the quadruple-speed CD-ROM reader. Use this information if you need to remove, reconfigure, or reinstall the CD-ROM reader.

The rear panel of the quadruple-speed CD-ROM reader provides the connectors and jumpers for cabling and configuring the reader. The front panel controls are provided in Chapter 1. The rear panel features are shown in the following figure and then described.

Rear view of the quadruple-speed reader

■ Audio output connector
Provides the digital audio output from the CD-ROM
reader to the sound board.

■ Configuration jumpers
Sets the configuration for the CD-ROM reader to a
Master or Slave configuration (see the following figure
and jumper descriptions).

■ IDE cable connector
Connects the IDE interface to the CD-ROM reader.
This connection controls the CD-ROM reader and data.
Connect the IDE interface cable from the secondary
IDE port on the system board to this connector. The
IDE interface cable is keyed to fit in only the correct
position.

■ Power connector
Provides operating power from your computer. The
IDE power cable is keyed to fit in only the correct
position.

Use the following jumper setting information to set your quadruple-speed CD-ROM reader to a Master or Slave configuration.

> **NOTE** The quadruple-speed CD-ROM reader jumpers are set correctly at the factory for your configuration.
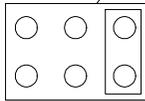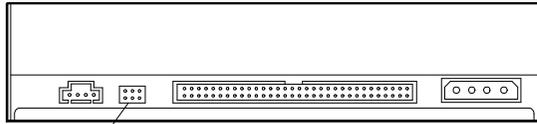
MASTER (FACTORY SETTING)

Sets the reader as the master when one or two devices are connected to the same IDE port.
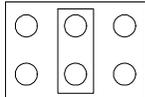
SLAVE

Sets the reader as the slave when two devices are connected to the same IDE port.
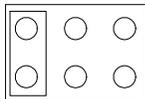
CABLE SELECT

Quadruple-speed reader jumper settings

D Sound Board Jumper Settings

This chapter provides jumper setting information for configuring the sound board. The jumpers on the sound board allow you to define the following hardware functions:

- I/O addresses
- interrupt request (IRQ) lines
- direct memory access (DMA) channels
- joystick connector
- MIDI interface.

Situations that might require changing jumper settings include:

- You add a peripheral device that uses the same I/O addresses, DMA channel, or interrupt setting as your sound board (known as a hardware conflict).

- You install a board with another joystick/game connector in your system.

⚠ **CAUTION:** Sound board jumpers are set correctly at the factory for your multimedia configuration.

The board is set to work with many applications. Only change (or check) the appropriate jumper setting if a hardware conflict arises.

FACTORY SETTINGS

Factory settings for the sound board are as follows.

Sound Board Jumper Settings — Factory Settings

FUNCTION	JUMPER LOCATION	FACTORY SETTING	
MIDI interface base I/O address	MSEL	jumpered	330H
Joystick connector	JYEN	jumpered	enabled
Audio low DMA channel	DAS0	not jumpered	1
	DAS1	jumpered	
Audio high DMA channel	DBS0	jumpered	5
	DBS1	jumpered	
Audio base I/O address	IOS0	jumpered	220H
	IOS1	jumpered	
Audio interface interrupt	IS0	not jumpered	IRQ5*
	IS1	jumpered	
MIDI interface	MPUEN	jumpered	enabled

*Sound board driver software sets the audio interface interrupt to IRQ7. The driver software IRQ7
 setting overrides the sound board IS0 and IS1 jumper settings.

The following figure shows jumper locations. Descriptions of the jumper settings follow the figure.

Check the settings for your particular requirements. If you need to change the settings, use the procedure that follows the figures.

Sound board jumper locations and functions

JUMPER FUNCTIONS

The following sections describe the sound board jumper functions and settings.

MIDI Base I/O Address

Jumper MSEL sets the base I/O address for the MPU-401 UART MIDI interface. Two base I/O addresses are available:

- 300H
- 330H (factory setting).

Base I/O address settings of the MIDI interface

Joystick Connector

Jumper JYEN enables (factory setting) or disables the
joystick connector on the sound board. If you are using a
joystick connector on another board, disable the one on the
sound board.

Joystick connector settings

Audio Interface DMA Channels

The sound board audio interface supports both low and high DMA channels for direct data transfers to system memory.

Jumpers DAS0 and DAS1 set low DMA channels 0, 1 (factory default setting), and 3 for 8-bit data transfers.

Jumpers DBS0 and DBS1 set high DMA channels 5 (factory default setting), 6, and 7 for 16-bit data transfers.

Low DMA channel settings

High DMA channel settings

Audio Interface Base I/O Address

Jumpers IOS0 an IOS1 set the audio interface base I/O address. Four address are available: 220H (factory setting), 240H, 260H, and 280H.

Base I/O address settings for the audio interface

Audio Interface IRQ Line

Jumpers IS0 and IS1 set the audio interface interrupts. Four interrupts lines are available: IRQ 2, 5 (factory default setting), 7, and 10.

> **NOTE** Sound board driver software sets the audio interface to IRQ7. The driver software IRQ7 setting overrides the sound board IS0 and IS1 jumper settings.

IRQ settings for the audio interface

MIDI Interface

Jumper MPUEN enables/disables the MPU-401 UART MIDI interface on the sound board. The default setting is enabled.

MPU-401 UART MIDI settings

CHANGING JUMPER SETTINGS

To change sound board jumper settings, use the following procedure. NEC recommends using needle-nose pliers to move a jumper.

1. Power off and unplug the system and any external options.

> ⚠ **WARNING:** The system power must be off before changing a jumper setting.

2. Remove the system unit cover (see Chapter 5).

3. Locate the jumper(s) on the sound board (see the figure earlier in this chapter).

You might have to remove the sound board or another expansion board from the system to access the jumper (see "Expansion Boards" in Chapter 6).

4. Change the jumper setting.

5. If you removed the sound board or any other board from the system, replace it (see "Expansion Boards" in Chapter 6).

6. Replace the system unit cover (see Chapter 5).

Index

Glossary

A   **applications programs**

Software designed to perform specific functions, like solving business or mathematical problems.

asynchronous communications

Method of data transmission where characters are preceded by a start bit and followed by a stop bit, permitting the time between characters to vary.

AUTOEXEC.BAT

A batch program file that the operating system runs to define hardware device characteristics.

B   **base RAM**

Area of system memory between 0 and 640 kilobytes available to the user for operating system and application programs.

BIOS

Basic Input Output System. A collection of primitive computer routines, usually burnt into ROM, that controls the real-time clock, keyboard, disk drives, video display, and other peripheral devices.

bit

Binary digit. The smallest unit of computer data.

bits per second

(bps) A unit of transmission. Also called baud rate.

board

Printed circuit board. Board onto which computer components are soldered and thin wires are printed to connect the components.

boot

To start up a computer. See cold boot and warm boot.

bus

An electronic circuit within a computer used for transmitting data or electrical power from one device to another.

busy lamp

Indicator on the front of the diskette drive that lights when the drive is writing to or reading from a diskette.

byte

Group of eight contiguous bits.

C **chip**

A small piece of semiconductor material, usually silicon, that contains miniaturized electronic circuits.

CD-ROM reader

(compact disc, read-only memory) A device that uses laser technology to read data or play audio stored on a CD.

clock

Electronic timer used to synchronize computer operations.

CMOS

Complementary Metal Oxide Semiconductor. A chip that contains nonvolatile memory. CMOS is backed up by an internal lithium battery that preserves clock/calendar data and system configuration parameters stored in CMOS.

cold boot

Process of starting up the computer by turning on the power. If power is already on, the process means to turn off the computer and turn it on again. A cold boot reinitializes all devices.

compact disk

(CD) A non-erasable storage disc that is read optically by means of a laser. Holds more than 500 megabytes of data.

CONFIG.SYS

A text file that tells the computer where in memory to load the operating system, what device drivers to install, and what memory management features to activate.

conventional RAM

The first megabyte of RAM in the system which contains 640 KB of base memory and 384 KB of reserved memory.

cursor

A movable image on the display screen that indicates where the next entered data appears.

D **diskette**

A thin flexible platter coated with a magnetic material for storing information.

diskette drive

A magnetic drive that writes on and retrieves data from a diskette.

E **expansion option**

Add-on hardware that expands system performance and versatility.

expansion slot

Location inside the system unit for connecting an optional printed circuit board.

extended RAM

The area of RAM above the first megabyte of memory in the system available for enhancing system performance.

F formatting

The process of preparing a disk or diskette to accept data.

function key

The set of keys on the keyboard (usually F1 through F12) that let you get help and error message information or quickly select frequently used commands.

H hard disk

A rigid magnetic storage device that provides fast access to stored data.

hardware

The electrical and mechanical parts from which a computer is made.

hertz

(Hz) A unit of frequency equal to one cycle per second.

I input/output

(I/O) The process of transferring data between the computer and external devices.

IDE

Intelligent Drive Electronics. A hard disk drive type that has controller electronics built into the drive and delivers high throughput.

interface

A connection that enables two devices to communicate.

interrupt

A special control signal from an I/O device that diverts the attention of the microprocessor from the program to a special address.

K **kilobyte**

(KB) 1024 bytes.

L **load**

The process of copying a program into the computer's memory from a storage device.

M **megabyte**

(MB) 1,048,576 bytes.

memory

Electronic storage area in a computer that retains information and programs. A computer has two types of memory — read-only memory (ROM) and random access memory (RAM).

menu

A video display of programs or options.

microprocessor

A semiconductor central processing unit that is the principal component of a microcomputer. Usually contained on a single chip that includes an arithmetic logic unit, control logic, and control-memory unit.

millisecond

(ms) One-thousandth of one second; 0.001 second.

mode

A method of operation; for example, the system operates in either normal or power-saving modes.

modem

MOdulator-DEModulator. A device that links computers over a telephone line.

O **operating system**

Set of programs that manage the overall operation of the computer.

overwrite

Storing information at a location where information is already stored, thus destroying the original information.

P **parallel interface**

Interface that communicates eight bits at a time.

parallel printer

A printer with a parallel interface.

parameter

A characteristic of a device or system.

password

A string of characters that the user must enter before the system allows access or system privileges.

peripheral

Input or output device not under direct computer control. A printer is a peripheral device.

pixels

Picture elements. Tiny dots that make up a screen image.

port

Provides the means for an interface between the microprocessor and external devices. A cable connector is usually plugged into the port to attach the device to the computer.

processor

In a computer, a functional unit that interprets and executes instructions.

prompt

A special symbol indicating the beginning of an input line. Also a message that appears on the screen indicating that the user must take a certain action.

R **RAM**

Random Access Memory. A storage device into which data is entered and from which data is retrieved in a non-sequential manner.

read

To extract data from a storage device such as a diskette.

ROM

Read-Only Memory. Memory in which stored data cannot be modified by the user except under special conditions.

reset

The process of returning a device to zero or to an initial or arbitrarily selected condition.

resolution

The degree of screen image clarity. Video display resolution is determined by the number of pixels on the screen. Resolution is usually specified in pixels by scan lines, for example, 640 by 480. See pixels.

RS-232C

Standard interface for serial devices.

S serial interface

An interface that communicates information one bit at a time.

serial printer

A printer with a serial interface.

shadowing

To copy the system and video BIOS from chip to RAM for enhanced system performance.

software

Programs that run on a computer, such as operating systems, word processors, and spreadsheets.

synchronous communication

Method of data transmission where transmission is regulated by a clock.

system board

The main printed circuit board inside the system unit into which other boards and major chip components, such as the system microprocessor, are connected.

system unit

The system component that contains the computer parts, drives, power supply, and option boards.

V VGA

Video Graphics Array. Graphics technology that supports many colors and resolutions (for example, 256 colors and a graphics resolution of 800 by 600 pixels).

volatile memory

Storage media that loses its data when system power is turned off. Standard memory and memory that you add to your computer are volatile memory. See nonvolatile memory.

W wait state

The additional cycle beyond the minimum cycles required by the microprocessor to complete a memory transaction. When additional cycles are required, the microprocessor must wait for the additional cycle before the transaction is completed. A "zero wait state" means that the operation required no additional cycles to complete the memory transaction.

warm boot

Process of resetting the computer without turning off the power through keyboard input (pressing **Ctrl**, **Alt**, and **Del** keys simultaneously) or the reset button. The system returns to an initial or arbitrarily selected condition.

write

To record or store information to a storage device.

write protection

Allows reading from a diskette but prevents writing to a diskette.

(For United States Use Only)

FEDERAL COMMUNICATIONS COMMISSION
RADIO FREQUENCY INTERFERENCE STATEMENT

WARNING: Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: 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 receiver.

- Connect the equipment to an outlet on a circuit different from the one to which the receiver is connected.

Use shielded and properly grounded I/O cables and power cable to ensure compliance of this unit to the specified limits of the rules.

(For Canadian Use Only)

This equipment is a Class B digital apparatus which complies with the Radio Interference Regulations, C.R.C., c.1374.

Cet appareil numérique de la classe B est conforme àu Règlement sur le brouillage radioélectrique, C.R.C., ch.1374.