Dell® OptiPlex® GX*i* Low-Profile Systems

REFERENCE AND INSTALLATION GUIDE

DELL®

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Safety Instructions

When Using Your Computer System

As you use your computer system, observe the following safety guidelines:

- To help avoid damaging your computer, be sure the voltage selection switch on the power supply is set to match the alternating current (AC) power available at your location:

  — 115 volts (V)/60 hertz (Hz) in most of North and South America and some Far Eastern countries such as Japan, South Korea, and Taiwan

  — 230 V/50 Hz in most of Europe, the Middle East, and the Far East

  Also be sure your monitor and attached peripherals are electrically rated to operate with the AC power available in your location.

- To help prevent electric shock, plug the computer and peripheral power cables into properly grounded power sources. These cables are equipped with 3-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.

- To help protect your computer system from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or un-interruptible power supply.

- Be sure nothing rests on your computer system's cables and that the cables are not located where they can be stepped on or tripped over.

- Do not spill food or liquids on your computer. If the computer gets wet, consult your *Diagnostics and Troubleshooting Guide.*

- Do not push any objects into the openings of your computer. Doing so can cause fire or electric shock by shorting out interior components.

- Keep your computer away from radiators and heat sources. Also, do not block cooling vents. Avoid placing loose papers underneath your computer; do not place your computer in a closed-in wall unit or on a bed, sofa, or rug.

Ergonomic Computing Habits

> **WARNING: Improper or prolonged keyboard use may result in injury.**

For maximum comfort and efficiency, observe the following ergonomic guidelines when setting up and using your computer system:

- Position your system so that the monitor and keyboard are directly in front of you as you work. Special shelves are available (from Dell and other sources) to help you correctly position your keyboard.

- Set the monitor at a comfortable viewing distance (usually 510 to 610 millimeters [20 to 24 inches] from your eyes).

- Make sure the monitor screen is at eye level or slightly lower when you are sitting in front of the monitor.

- Adjust the tilt of the monitor, its contrast and brightness settings, and the lighting around you (such as overhead lights, desk lamps, and the curtains or blinds on nearby windows) to minimize reflections and glare on the monitor screen.

- Use a chair that provides good lower back support.

- Keep your forearms horizontal with your wrists in a neutral, comfortable position while using the keyboard or mouse.

- Always leave space to rest your hands while using the keyboard or mouse.

- Let your upper arms hang naturally at your sides.

- Sit erect, with your feet resting on the floor and your thighs level.

- When sitting, make sure the weight of your legs is on your feet and not on the front of your chair seat. Adjust your chair's height or use a footrest, if necessary, to maintain proper posture.

- Vary your work activities. Try to organize your work so that you do not have to type for extended periods of time without stopping. When you stop typing, try to do things that use both hands.

monitor screen at or below eye level

wrists relaxed and flat

monitor and keyboard positioned directly in front of user

arms at desk level

feet flat on the floor
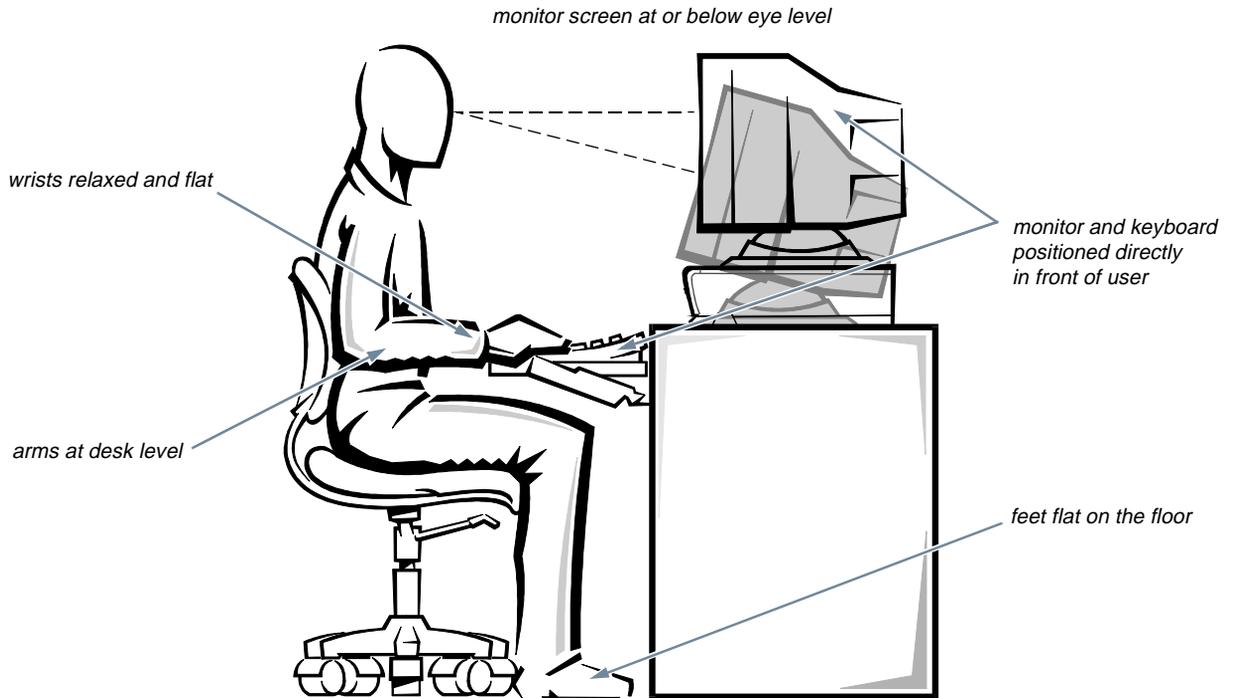
When Working Inside Your Computer

Before you remove the computer cover, perform the following steps in the sequence indicated:

1. **Turn off your computer and any peripherals.**

2. **Disconnect your computer and peripherals from their power sources. Also, disconnect any telephone or telecommunication lines from the computer.**

    Doing so reduces the potential for personal injury or shock.

3. **Touch an unpainted metal surface on the chassis, such as the power supply at the back of the computer, before touching anything inside your computer.**

    While you work, periodically touch an unpainted metal surface on the computer chassis to dissipate any static electricity that might harm internal components.

In addition, take note of these safety guidelines when appropriate:

- Do not attempt to service the computer system yourself, except as explained in this guide and elsewhere in Dell documentation. Always follow installation and servicing instructions closely.

- When removing a component from the system board or disconnecting a peripheral device from the computer, wait 5 seconds after turning off the system before removing the component or disconnecting the device to avoid possible damage to the system board.

- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, make sure both connectors are correctly oriented and aligned.

- Handle components and cards with care. Don't touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a microprocessor chip by its edges, not by its pins.

Protecting Against Electrostatic Discharge

Static electricity can harm delicate components inside your computer. To prevent static damage, discharge static electricity from your body before you touch any of your computer's electronic components, such as the microprocessor. You can do so by touching an unpainted metal surface on the computer chassis.

As you continue to work inside the computer, periodically touch an unpainted metal surface to remove any static charge your body may have accumulated.

In addition to the preceding precautions, you can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in your computer. Just before unwrapping the antistatic packaging, be sure to discharge static electricity from your body.

- When transporting a sensitive component, first place it in an antistatic container or packaging.

- Handle all sensitive components in a static-safe area. If possible, use antistatic floor pads and workbench pads.

The following caution appears throughout this document to remind you of these precautions:

> **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

Preface

About This Guide

This guide is intended for anyone who uses a Dell Opti-Plex GX*i* low-profile computer system. It can be used by both first-time and experienced computer users who want to learn about the features and operation of the systems or who want to upgrade their computers. The chapters and appendixes are summarized as follows:

- Everyone should read Chapter 1, "Introduction," for an overview of the system features, instructions on how to access the online *System User's Guide*, and information on where to get help if you need it.

- Everyone should read the first several sections of Chapter 2, "Using the System Setup Program," to familiarize themselves with this important program. Only users who want to make configuration changes to their system or who want to use the password features need to read the rest of Chapter 2.

- Users who add or remove an Industry-Standard Architecture (ISA) expansion card should read Chapter 3, "Using the ISA Configuration Utility."

- Users who want to change the default configuration of the system's integrated video and audio controllers or who want to connect their system to a network should read Chapter 4, "Using Integrated Devices." This chapter describes the configuration software provided for the integrated video and audio controllers and provides information on connecting the system to a network, configuring the network interface controller (NIC), and installing drivers for the NIC.

- Chapter 5, "Working Inside Your Computer," Chapter 6, "Installing System Board Options," and Chapter 7, "Installing Drives," are intended for users who want to install or remove options inside the computer, such as dual in-line memory modules (DIMMs), expansion cards, or drives.

- Appendix A, "Technical Specifications," is intended primarily as reference material for users interested in learning more about the details of the system.

- Appendix B, "ISA Configuration Utility Messages," describes error messages generated by the ISA Configuration Utility (ICU), possible causes, and corrective actions.

- Appendix C, "Regulatory Notices," is for users who are interested in which regulatory agencies have tested and approved the Dell OptiPlex GX*i* low-profile systems.

- Appendix D, "Warranties and Return Policy," describes the warranty for your Dell system and the "Total Satisfaction" return policy.

Warranty and Return Policy Information

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. For information about the Dell warranty for your system, see Appendix D, "Warranties and Return Policy."

Other Documents You May Need

Besides this *Reference and Installation Guide*, the following documentation is included with your system:

• The *Getting Started* sheet provides step-by-step instructions for setting up your computer system.

• The Windows-based online *System User's Guide* contains important information about your computer system. This document includes descriptions of system features, instructions on installing and configuring drivers and utilities, information on the System Setup program and ISA Configuration Utility, and instructions for attaching devices to the connectors on your computer's back panel.

• The *Frequently Asked Questions* cards provide detailed answers to questions that are often asked by Dell computer users. Be sure to read these cards before calling Dell for technical assistance.

• The *Diagnostics and Troubleshooting Guide* includes troubleshooting procedures and instructions for using the diskette-based diagnostics to test your computer system.

You may also have one or more of the following documents.

*NOTE: Documentation updates are sometimes included with your system to describe changes to your system or software. Always read these updates **before** consulting any other documentation because the updates often contain the latest information.*

• Operating system documentation is included if you ordered your operating system software from Dell. This documentation describes how to install (if necessary), configure, and use your operating system software.

• Documentation is included with any options you purchase separately from your system. This documentation includes information that you need to configure and install these options in your Dell computer. Installation instructions for the options are included in this *Reference and Installation Guide*.

• Technical information files—sometimes called "readme" files—may be installed on your hard-disk drive to provide last-minute updates about technical changes to your system or advanced technical reference material intended for experienced users or technicians.

Notational Conventions

The following subsections list notational conventions used in this document.

Warnings, Cautions, and Notes

Throughout this guide, there may be blocks of text printed in bold type within boxes or in italic type. These blocks are warnings, cautions, and notes, and they are used as follows:

> **WARNING: A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.**

> **CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

NOTE: A NOTE indicates important information that helps you make better use of your computer system.

Typographical Conventions

The following list defines (where appropriate) and illustrates typographical conventions used as visual cues for specific elements of text throughout this document:

• *Keycaps*, the labeling that appears on the keys on a keyboard, are presented in uppercase and enclosed in angle brackets.

  Example: <ENTER>

- *Key combinations* are series of keys to be pressed simultaneously (unless otherwise indicated) to perform a single function.

  Example: <CTRL><ALT><ENTER>

- All *items on a menu screen* are presented in the **HELVETICA** font and in uppercase bold.

  Example: **SETUP PASSWORD** category

- *Commands* presented in lowercase bold are for reference purposes only and are not intended to be typed at that particular point in the discussion.

  Example: "Use the **format** command to. . . ."

  In contrast, commands presented in the Courier font are intended to be typed as part of an instruction.

  Example: "Type `format a:` to format the diskette in drive A."

- *Filenames* and *directory names* are presented in lowercase bold.

  Examples: **autoexec.bat** and **c:\windows**

- *Syntax lines* consist of a command and all its possible parameters. Commands are displayed in lowercase bold; variable parameters (those for which you substitute a value) are displayed in lowercase italics; constant parameters are displayed in lowercase bold. The brackets indicate items that are optional.

  Example: **del** [*drive***:**] [*path*]*filename* [**/p**]

- *Command lines* consist of a command and may include one or more of the command's possible parameters. Command lines are presented in the Courier font.

  Example: `del c:\myfile.doc`

- *Screen text* is text that appears on the screen of your monitor or display. It can be a system message, for example, or it can be text that you are instructed to type as part of a command (referred to as a *command line*). Screen text is presented in the Courier font.

  Example: "Type `md c:\dos`, and then press <ENTER>."

  Example: The following message appears on your screen:

  `No boot device available`

- *Variables* are placeholders for which you substitute a value. They are presented in italics.

  Example: DIMM_*x* (where x represents the DIMM socket designation)

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Chapter 1
Introduction

*D*ell ® OptiPlex ® GX*i* low-profile systems are high-speed, expandable personal computers designed around Intel ® Pentium ® microprocessors. Each system uses a high-performance Peripheral Component Interconnect (PCI) design that allows you to configure the computer system to your initial requirements and then add Dell-supported upgrades as necessary. These systems also support the Industry-Standard Architecture (ISA) bus for older expansion devices.

This chapter describes the major hardware and software features of your system, provides information about accessing the online documentation, and tells you where to find help if you need it.

*S*ystem Features

Your system offers the following features:

- An Intel Pentium microprocessor. The following microprocessor options are available:

   — An Intel Pentium microprocessor with an internal speed of 133 megahertz (MHz) and an external speed of 66 MHz

   — An Intel Pentium microprocessor with an internal speed of 166 MHz and an external speed of 66 MHz

   — An Intel Pentium microprocessor with an internal speed of 200 MHz and an external speed of 66 MHz

   The Pentium microprocessor has an 8-kilobyte (KB) internal data cache and an 8-KB internal instruction cache, an internal math coprocessor, and other advanced internal logic.

- A keyboard command (<CTRL><ALT><\>) that lets you switch between the microprocessor's rated speed and a slower compatibility speed.

   NOTE: This keyboard command is not available under the Microsoft® Windows NT ® and IBM® OS/2®operating systems.

- A cache with 256 or 512 KB of pipeline-burst static random-access memory (SRAM). Cache memory enhances the speed of many microprocessor operations by storing the most recently accessed contents of system memory.

- System memory that can be increased up to 512 megabytes (MB) by installing 8-, 16-, 32-, 64-, or 128-MB extended-data out (EDO) dual in-line memory modules (DIMMs) in the four DIMM sockets on the system board. The system also supports both error correction code (ECC) and non-ECC DIMMs. See "Adding Memory" in Chapter 6 for details.

- Self-Monitoring Analysis Reporting Technology (SMART) support, which warns you at system start-up if your hard-disk drive has become unreliable. To take advantage of this technology, you must have a SMART-compliant hard-disk drive in your computer. All hard-disk drives shipped with OptiPlex GX*i* systems are SMART-compliant.

- A basic input/output system (BIOS), which resides in flash memory and can be upgraded by diskette if required.

- Full compliance with PCI specification 2.1.

- Full Plug and Play version 1.0a capability, which greatly simplifies the installation of expansion cards. Plug and Play support included in the system BIOS allows you to install Plug and Play expansion cards without setting jumpers or switches or performing

other configuration tasks. The ISA Configuration Utility (ICU) allows you to configure existing non-Plug and Play ISA expansion cards for conflict-free operation. Also, because the system BIOS is stored in flash memory, it can be updated to support future enhancements to the Plug and Play standard.

- Universal Serial Bus (USB) capability, which can simplify connecting peripheral devices such as mice, printers, and computer speakers. The USB connectors on your computer's back panel provide a single connection point for multiple USB-compliant devices. USB-compliant devices can also be connected and disconnected while the system is running.

- A modular computer chassis with a minimum number of screws for easy disassembly and improved serviceability.

- A chassis designed for both horizontal (desktop) and vertical (mini tower) use. Although the chassis is optimized for horizontal positioning, an optional floor stand can be purchased that, when attached, makes the system into a mini tower (for instructions on attaching the floor stand, see "Using the Optional Floor Stand" found later in this chapter).

The system board includes the following built-in features:

- One 16-bit ISA expansion slot, one shared PCI/ISA expansion slot, and one PCI expansion slot on the riser board.

- A 64-bit PCI local bus video subsystem, which includes the S3 Trio64V+ 86C765 super video graphics array (SVGA) video controller and 2 MB of video memory. Maximum resolutions are 1280 x 1024 pixels with 256 colors noninterlaced and 1024 x 768 pixels with 65,536 colors non-interlaced. In 800 x 600- and 640 x 480-pixel resolutions, 16.7 million colors are available for true-color graphics.

- A diskette/tape drive interface, which supports a 3.5-inch diskette drive and, optionally, a second diskette drive or tape drive.

- Enhanced integrated drive electronics (EIDE) support. The primary and secondary interface are both located on the PCI bus to provide faster data throughput. Each interface supports high-capacity EIDE drives, as well as devices such as EIDE CD-ROM drives and EIDE tape drives.

- One high-performance serial port and one bi-directional parallel port for connecting external devices. The parallel port is fully Enhanced Capabilities Port (ECP) compliant.

- A Personal System/2 (PS/2)-style keyboard port and a PS/2-compatible mouse port.

- An integrated 10/100 megabit-per-second (Mbps) 3Com® PCI 3C905TX Ethernet network interface controller (NIC), which uses the 3C916 chip. The NIC is configured using software described in Chapter 4, "Using Integrated Devices."

- A 16-bit integrated Crystal CS4236 audio controller that provides all the sound functions of the Sound Blaster Pro expansion card. For information, see your online *System User's Guide*.

The following software is included with your Dell computer system:

- Utilities that safeguard your system and enhance the operation of its hardware features, such as maximizing your monitor's resolution capabilities. For information on these utilities, see your online *System User's Guide*.

- Video drivers for displaying many popular application programs in high-resolution modes. For more information on these utilities, see your online *System User's Guide*.

- The System Setup program for quickly viewing and changing the system configuration information for your system. For more information on this program, see Chapter 2, "Using the System Setup Program."

- An Auto Power On utility that enables your system to perform routine tasks automatically in your absence. For more information on this utility, see your online *System User's Guide*.

- Enhanced security features available through the System Setup program (a setup password, a system password, a system password lock option, a write-protect option for diskette drives, and automatic display of the system's service tag number). In addition, a customer-definable asset tag number can be assigned via a software support utility and viewed on the System Setup screens. For more information, see

your online *System User's Guide* and Chapter 2, "Using the System Setup Program."

- Advanced power management options that can reduce the energy consumption of your system. For more information, see Chapter 2, "Using the System Setup Program."

- The ICU, which tells you how to configure ISA expansion cards manually. After resources have been assigned to these cards, the system BIOS can assign resources to PCI and Plug and Play expansion cards for a conflict-free configuration. For more information, see Chapter 3, "Using the ISA Configuration Utility."

- Dell diagnostics for evaluating the computer's components and devices. For information on using the diagnostics, see the chapter titled "Running the Diskette-Based Diagnostics" in the *Diagnostics and Troubleshooting Guide*.

- Network device drivers for several network operating systems. These drivers are described in Chapter 4, "Using Integrated Devices."

- Desktop Management Interface (DMI) support, which enables the management of your computer system's software and hardware. DMI defines the software, interfaces, and data files that enable your system to determine and report information about its components.

  If your system has a Dell-installed Microsoft Windows®, Windows for Workgroups™, or Windows NT operating system, DMI is already installed on your system's hard-disk drive. You can enable DMI support by double-clicking the DMI icon in the Windows Control Panel (located in the Main program group or folder). For instructions on enabling DMI support or for information about DMI, refer to the DMI online help. You can access the online help by double-clicking the DMI icon in the Control Panel. The DMI online help is also provided in the Dell Accessories program group or folder.

- The Dell Inspector utility, which uses DMI support to display detailed information about the hardware and software configuration for your system. The Dell Inspector utility provides you with the information you may need if you call Dell for technical assistance. It also provides you with the information you may need when you install hardware or software in your system. The Dell Inspector utility is located in the Dell Accessories program group or folder.

If you ordered Dell-installed software with your system, such as MS-DOS®, Microsoft Windows, or other programs, Dell provides a menu that allows you to make program diskette sets of your Dell-installed software. A *program diskette set* is an uninstalled version of a software package that you can use to reinstall or reconfigure the software. You can use this same menu to remove *diskette image files* (individual files that correspond to each diskette in a program diskette set) to reclaim space on the computer's hard-disk drive. For more information on making program diskette sets, see the online help provided in the Dell DiskMaker program, which is available in the Dell Accessories program group or folder.

*U*sing the Optional Floor Stand

An optional floor stand is available for your system that you can attach to the computer to give it a mini tower (vertical) orientation. Although you can attach (and remove) the floor stand at any time with a minimum of system disruption, it is easiest to attach before you set up your computer and connect the back panel cables.

Attach the floor stand as follows:

1. **Turn the computer onto its right side, so that the drive bays are at the bottom.**

2. **Fit the floor stand onto what *was* the left side of the computer.**

   Position the floor stand as shown in Figure 1-1. Align the large round hole in the floor stand with the securing button on the side of the cover, and align the captive thumbscrew in the stand with the screw hole in the cover.

captive screw

locator hole

locator pin (on under-side of floor stand)

securing button
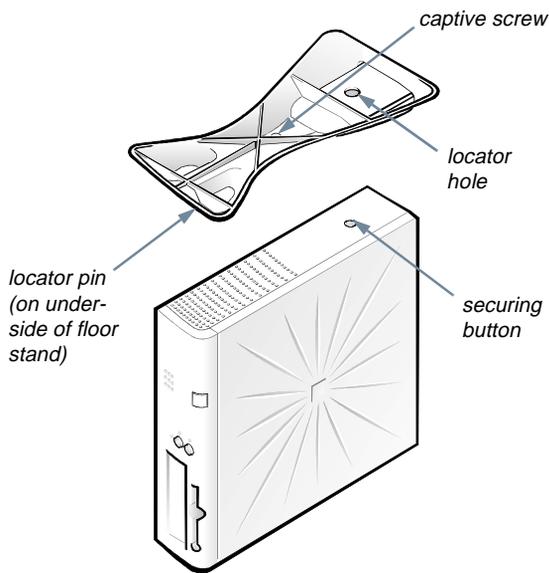
Figure 1-1. Attaching the Optional Floor Stand

As you lower the stand into place, make sure the locator pin (see Figure 1-1) heads into the corner hole of the hole pattern as shown. When the stand is in place, tighten the thumbscrew.

3. **Rotate the computer so that the floor stand is at the bottom and the drives are at the top.**

To remove the floor stand, turn the computer over so the floor stand is at the top, loosen the screw and lift the floor stand away, and place the computer in a horizontal position.

*S*ecurity Cable Slot and Padlock Ring

To the right of the fan vent on the back of the computer are a security cable slot and padlock ring (see Figure 1-2) for attaching a commercially available antitheft device. Antitheft cable devices for personal computers usually include a segment of galvanized cable with an attached locking device and key. To prevent unauthorized removal of your computer, loop the cable around an immovable object, insert the locking device into the security cable

slot on the back of your computer, and lock the device with the key provided. Complete instructions for installing this kind of antitheft device are usually included with the device.

NOTE: Antitheft devices are of differing designs. Before purchasing such a device, make sure it will work with the cable slot on your computer.

The padlock ring allows you to secure the computer cover to the chassis to prevent unauthorized access to the inside of the computer. To use the padlock ring, insert a commercially available padlock through the ring and then lock the padlock.

padlock ring

security cable slot

fan vent
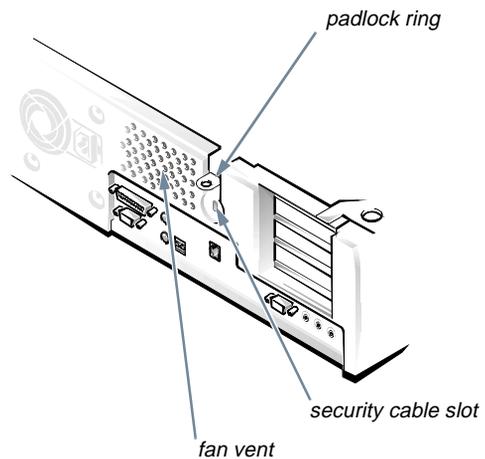
Figure 1-2. Security Cable Slot and Padlock Ring

*E*nergy Star Compliance

Certain configurations of Dell computer systems comply with the requirements set forth by the Environmental Protection Agency (EPA) for energy-efficient computers. If the front panel of your computer bears the Energy Star Emblem (see Figure 1-3), your original configuration complied with these requirements and all Energy Star power management features of the computer are enabled. To disable or change the operation of these features, you must change the setting for the **POWER MANAGEMENT** category in the System Setup program. For instructions, see Chapter 2, "Using the System Setup Program."

NOTES: As an Energy Star Partner, Dell Computer Corporation has determined that this product meets the Energy Star guidelines for energy efficiency.

*Any Dell computer bearing the Energy Star Emblem is certified to comply with EPA Energy Star requirements **as configured when shipped by Dell**. Any changes you make to this configuration (such as installing additional expansion cards or drives) may increase the system's power consumption beyond the limits set by the EPA's Energy Star Computers program.*

Figure 1-3. Energy Star Emblem

The EPA's Energy Star Computers program is a joint effort between the EPA and computer manufacturers to reduce air pollution by promoting energy-efficient computer products. The EPA estimates that use of Energy Star computer products can save computer users up to two billion dollars annually in electricity costs. In turn, this reduction in electricity usage can reduce emissions of carbon dioxide, the gas primarily responsible for the greenhouse effect, and sulfur dioxide and nitrogen oxides, which are the two primary causes of acid rain.

Computer users can also help to reduce electricity usage and its side effects by turning off their computer systems when they are not in use for extended periods of time—particularly at night and on weekends.

Important Note to Windows 95 Users

For the Microsoft Windows 95 operating system to work correctly on your computer system, you *must* use the version of Windows 95 that Dell installed on your computer.

Should you need to reinstall Windows 95 on an OptiPlex GXi system for any reason, you must be sure to reinstall the correct version. Dell recommends performing a periodic tape backup of the system's entire hard-disk drive so that, if necessary, the operating system, drivers, and other software can be reinstalled as originally configured with a minimum of downtime.

If you are unable to reinstall your software from a tape backup of the hard-disk drive, you can reinstall Windows 95 from the system's Windows 95 backup media (CD or diskettes) that you received from Dell or created from the Dell-installed software on your system. *However, if you reinstall Windows 95 in this manner, the bus-mastering functionality of the Windows 95 EIDE driver, which was operative in your original configuration, will be disabled.* (Your system will operate without the bus-mastering functionality with only a small degradation in performance. For information on the advantages of using bus-mastering drivers, see "Bus-Mastering IDE Drivers" in the online *System User's Guide*.) *You may also need to reinstall your system's video, audio, and NIC drivers from the diskettes created from the Dell-installed software on your system.*

NOTE to system administrators of corporate networks: If you must download Windows 95 from a server to client systems, make sure that you have the Windows 95 backup media for the OptiPlex GXi system on your server before downloading.

Accessing Online Documentation

The online *System User's* Guide installed on your hard-disk drive contains information on the following topics:

- How to use the online *System User's Guide*
- System features
- Video drivers and utilities
- Using the integrated audio controller
- System Setup program
- Configuring expansion cards
- Securing your computer
- Connecting external devices

- Maintaining the system
- Contacting Dell

The guide also contains a glossary of commonly used terms and abbreviations.

The *System User's Guide* is located in the Dell Accessories program group or folder.

To print any of the topics from this guide, display the topic you want on your screen, and select **PRINT TOPIC** from the File menu.

NOTE: Text in pop-up windows cannot be printed.

Getting Help

Dell provides a number of tools to help you if you don't understand a procedure described in this guide or if your system does not perform as expected. For information on these help tools, see the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* or the "Contacting Dell" section in the online *System User's Guide*.

Chapter 2
Using the System Setup Program

*E*ach time you turn on your computer system or press the reset button, the system compares the hardware installed in the system to the hardware listed in the system configuration information stored in nonvolatile random-access memory (NVRAM) on the system board. If the system detects a discrepancy, it generates error messages that identify the incorrect configuration settings. The system then prompts you to enter the System Setup program to correct the setting.

You can use the System Setup program as follows:

- To change the system configuration information after you add, change, or remove any hardware in your system
- To set or change user-selectable options—for example, the time or date on your system

You can *view* the current settings at any time. When you *change* a setting, in many cases you must reboot the system before the change takes effect.

After you set up your system, run the System Setup program to familiarize yourself with your system configuration information and optional settings. Dell recommends that you print out the System Setup screens (by pressing the <PRINT SCRN> key) or write down the information for future reference.

Before you use the System Setup program, you need to know the kind of diskette drive(s) and hard-disk drive(s) installed in your computer. If you are unsure of any of this information, see the Manufacturing Test Report that was shipped with your system. You can access the Manufacturing Test Report from the Dell Accessories folder or program group.

*E*ntering the System Setup Program

Enter the System Setup program as follows:

1. **Turn on (or reboot) your system.**

2. **Press <CTRL><ALT><ENTER> immediately after your computer's speaker emits a beep.**

If you wait too long and your operating system begins to load into memory, *let the system complete the load operation*; then shut down the system and try again.

NOTES: To ensure an orderly system shutdown, consult the documentation that accompanied your operating system.

If your system is running Microsoft Windows 3.1x or later, Microsoft Windows 95, or any other protected-mode operating system, you are advised not to enter the System Setup program from an MS-DOS window. Instead, enter the System Setup program as described in the previous procedure. Alternatively, to get an MS-DOS prompt in Windows 95, you can press <F8> when the Starting Windows 95 message appears; then press <CTRL><ALT><ENTER>.

Another way of entering the System Setup program is to shut down the system, boot from an MS-DOS diskette, and then press <CTRL><ALT><ENTER>.

If your system is running MS-DOS, you can enter the System Setup program from the operating system prompt by holding down the <CTRL> and <ALT> keys and pressing the <ENTER> key.

You can also enter the System Setup program by responding to certain error messages. See "Responding to Error Messages" at the end of this chapter.

*S*ystem Setup Screens

The two System Setup screens, Page 1 and Page 2, display the current setup and configuration information and optional settings for your system. (Typical examples are illustrated in Figure 2-1.) Information on the two System Setup screens is organized in five boxed areas:

- **Title box**

  The box at the top of both screens lists the system name, page number (Page 1 or Page 2), and the revision number of the basic input/output system (BIOS).

- **Configuration options**

  The box on the left half of both screens lists the categories that define the installed hardware in your computer.

  Fields beside the categories contain options or values. You can change those that appear bright on the screen. Options or values that you cannot change because they are determined by the system appear less bright.

  Some categories have multiple fields, which may show options or values as bright or less bright, depending upon what options or values you entered in other fields.

- **Help**

  The box on the upper-right half of both screens displays help information for the category with a currently highlighted field.

- **System data**

  The box in the lower-right corner of both screens displays information about your system.

- **Key functions**

  The line of boxes across the bottom of both screens lists keys and their functions within the System Setup program.

*U*sing the System Setup Program

Table 2-1 lists the keys you use to view or change information on the System Setup screens and to exit the program.

Table 2-1. System-Setup Navigation Keys

Keys	Action
Tab or ↓	Moves to the next field.
Shift Tab or ↑	Moves to the previous field.
← or →	Cycles through the options in a field. In many fields, you can also type in the appropriate value.
Page Down or Page Up	Scrolls through help information.
Alt P	Switches between Pages 1 and 2.
Esc	Exits the System Setup program without rebooting the system and returns the system to its previous state—the boot routine or operating system prompt. For most of the categories, any changes you made are recorded but do not take effect until the next time you boot the system. For a few categories (as noted in the help area) the changes take effect immediately.
Alt B	Exits the System Setup program and reboots the system, implementing any changes you made.
	CAUTION: Any unsaved data in open application programs will be lost when you use this key combination.

configuration options   title box   help

```
                        Dell Computer Corporation
   Page 1 of 2          System OptiPlex GXi 5200L Setup        BIOS Version: XXX

   Time: [13]:17:02  Date:  Mon Jan 6, 1997
                                               This category sets the time in
   Diskette Drive A:    3.5 inch, 1.44 MB      24-hour format (hours:minutes:
   Diskette Drive B:      Not Installed        seconds) for the internal clock/
   Drive A Location:          Top              calendar.
    Drives:
     Primary   Type Cyls Hds  Pre  LZ  Sec  Size   To change the value in a field,
      Drive 0: Auto  524  32   -1  524  63  540    enter a number or use the left-
      Drive 1: None                                or right-arrow key.
    Secondary
     Drive 0: Auto  Packet Interface Device
     Drive 1: None

       Base Memory:           640 KB            Microprocessor: Pentium-200
   Extended Memory:           15 MB             External Cache: 256 KB
   Reserved Memory:           None                Video Memory: 2 MB
          CPU Speed:          200 MHz          System Memory: 16 MB (EDO)
          Num Lock:           On                 Service Tag: XXXXX
                                                   Asset Tag: XXXXX

  Tab,Shift-Tab change fields  | ← → change values | Alt-P next | Esc exit | Alt-B reboot
```

                        key functions   system data

```
                        Dell Computer Corporation
   Page 2 of 2          System OptiPlex GXi 5200L Setup        BIOS Version: XXX

      Keyboard Errors:    [Report]
      System Password:     Not Enabled         This category determines whether
      Password Status:     Unlocked            keyboard-related error messages are
       Boot Sequence:      Diskette First      reported at system startup.
      Setup Password:      Not Enabled

      Auto Power On:      Disabled 00:00
   Power Management:      Disabled
              Integrated Devices
              Sound:         On
           NIC (TX):         On
              Mouse:         On
        Serial Port:         Auto
      Parallel Port:         378h                 Microprocessor: Pentium-200
      Parallel Mode:         AT                   External Cache: 256 KB
          Hard Disk:         Auto                   Video Memory: 2 MB
           Diskette:         Auto                 System Memory: 16 MB (EDO)
                USB:         Off                    Service Tag: XXXXX
            Speaker:         On                      Asset Tag: XXXXX
                ECC:         On
  Tab,Shift-Tab change fields  | ← → change values | Alt-P next | Esc exit | Alt-B reboot
```

Figure 2-1. System Setup Screens

System Setup Categories

The following subsections explain in detail each of the categories on the System Setup screens.

Time

TIME resets the time on the computer's internal clock.

Time is kept in a 24-hour format (*hours*:*minutes*:*seconds*). To change the time, press the right-arrow key to increase the number in the highlighted field or press the left-arrow key to decrease the number. If you prefer, you can type numbers in each of the appropriate fields.

Date

DATE resets the date on the computer's internal calendar.

Your system automatically displays the day of the week corresponding to the settings in the three fields that follow (*month*, *day-of-month*, and *year*).

To change the date, press the right-arrow key to increase the number in the highlighted field or press the left-arrow key to decrease the number. If you prefer, you can type numbers in the *month* and *day-of-month* fields.

Diskette Drive A and Diskette Drive B

DISKETTE DRIVE A and **DISKETTE DRIVE B** identify the type of diskette drives installed in your computer. With the standard cabling configuration, **DISKETTE DRIVE A** (the boot diskette drive) is the 3.5-inch diskette drive installed in the top externally accessible drive bay; **DISKETTE DRIVE B** is any drive installed in the bottom externally accessible drive bay that is connected to the system's diskette/tape drive interface.

The category options always match the physical locations of the drives in your computer—the first drive listed on Page 1 of the System Setup screens is the top drive in your computer.

The options are:

- **5.25 INCH, 360 KB**
- **5.25 INCH, 1.2 MB**
- **3.5 INCH, 720 KB**

- **3.5 INCH, 1.44 MB**
- **NOT INSTALLED**

NOTE: Tape drives are not reflected in the **DISKETTE DRIVE A** *and* **DISKETTE DRIVE B** *categories. For example, if you have a single diskette drive and a tape drive attached to the diskette/tape drive interface cable, set the* **DISKETTE DRIVE A** *category to match the characteristics of the diskette drive and set the* **DISKETTE DRIVE B** *category to* **NOT INSTALLED**.

Drive A Location

DRIVE A LOCATION identifies which diskette drive—**TOP** (the default option) or **BOTTOM** (if existing)—is used as drive A, the boot drive.

The letters *A* and *B* in the categories **DISKETTE DRIVE A** and **DISKETTE DRIVE B** are switched automatically when **DRIVE A LOCATION** is changed to reflect the new configuration.

If an external diskette drive controller is being used, **DRIVE A LOCATION** becomes a nonselectable category.

Drives: Primary and Secondary

PRIMARY identifies drives attached to the primary enhanced integrated drive electronics (EIDE) interface connector (labeled "IDE1") on the system board; **SECONDARY** identifies drives connected to the secondary EIDE interface connector (labeled "IDE2"). It is recommended that you use the secondary EIDE interface connector for EIDE CD-ROM and EIDE tape drives.

NOTES: For all devices from Dell that use the built-in EIDE controller, set the appropriate **DRIVE** *category to* **AUTO**.

You must have an EIDE device connected to the primary EIDE interface if you have an EIDE device connected to the secondary EIDE interface.

For both the **PRIMARY** and **SECONDARY** drive sections, the **DRIVE 0** and **DRIVE 1** categories identify the type of EIDE devices installed in the computer. For each drive, seven parameters can be chosen as a group by drive-type number, entered individually from the keyboard or set automatically. A *drive-type number* specifies the parameters of a hard-disk drive based on a table recorded in the system's BIOS.

To choose a setting for these categories, type characters from the keyboard or use the left- or right-arrow key to cycle through the choices. The options are:

- **AUTO** (use this setting for all EIDE devices from Dell)
- **NONE**
- **USER1** or **USER2**
- A specific drive-type number

NOTE: Operating systems that bypass the system BIOS may not obtain optimum hard-disk drive performance.

EIDE Devices

For EIDE hard-disk drives, the system provides an automatic drive-type detect feature. To use this feature for **DRIVE 0**, highlight the **DRIVE 0** category in the **PRIMARY** drive section and type a (for *automatic*). To use it for **DRIVE 1**, highlight the **DRIVE 1** category and type a. In each case, the category setting changes to **AUTO**. After you reboot the system, the System Setup program automatically sets the correct drive-type number and parameters for each drive.

Before installing a new EIDE hard-disk drive, also check the documentation that came with the drive to verify that all jumper settings on the drive are appropriate for your configuration.

If You Have a Problem

If the system generates a drive error message the first time you boot your system after installing an EIDE drive, it may mean that your particular drive does not work with the automatic drive-type detect feature. If you suspect that your problem is related to drive type, try entering your drive-type information in one of the following ways.

If You Know the Drive-Type Number

Use the drive-type number you found in the documentation that came with the drive or, if the drive was installed by Dell when you purchased your system, access the Manufacturing Test Report from the Dell Accessories folder or program group.

To set the drive-type number in the System Setup program, highlight the appropriate drive category (**DRIVE 0** or **DRIVE 1** in the **PRIMARY** drive section) and type the correct drive-type number. If you prefer, you can press the right- or left-arrow key to increase or decrease, respectively, the drive-type number until the correct one is displayed.

If You Do Not Know the Drive-Type Number

The **DRIVE 0** and **DRIVE 1** categories display the following seven parameters for each drive:

- **TYPE** is the drive-type number for the selected hard-disk drive.
- **CYLS** is the number of logical cylinders.
- **HDS** indicates the number of logical heads in the drive.
- **PRE** (*precompensation cylinder*) is the cylinder number at which the electrical current for the drive head changes to compensate for differences in data density across the disk surface (this parameter has no effect for EIDE drives).
- **LZ** is the cylinder number that is used as the drive's landing zone for the heads when the drive is not in use.
- **SEC** is the number of logical sectors per track.
- **SIZE** (automatically calculated by the system) indicates the number of millions of bytes of storage provided by the drive.

If none of the supported drive types match the parameters of your new drive, you can enter your own parameters. To do so, highlight the **DRIVE 0** category and type u to display **USER1**. You can then use the right- or left-arrow key to switch between the **USER1** and **USER2** settings (only two user-defined drive types are allowed). Then press the <TAB> key to highlight each of the parameter fields in succession, and enter the appropriate number for each field.

*NOTE: The **USER1** and **USER2** drive types can be used for both the **DRIVE 0** and **DRIVE 1** categories in the **PRIMARY** and **SECONDARY** drive sections. However, if you select the **USER1** or **USER2** drive type, you may not obtain optimum hard-disk drive performance. Also, the **USER1** and **USER2** drive types cannot be used for hard-disk drives greater than 528 megabytes (MB) in capacity.*

Base Memory

BASE MEMORY displays the amount of memory available to MS-DOS programs that do not use extended or expanded memory. This category has no user-selectable options.

The default value for the **BASE MEMORY** category is **640 KB**, which includes 1 kilobyte (KB) reserved for system use.

Extended Memory

EXTENDED MEMORY, which has no user-selectable options, indicates the amount of memory available as extended memory. The value given is in megabytes rather than kilobytes. To convert megabytes to kilobytes, multiply the megabyte total by 1024.

Reserved Memory

RESERVED MEMORY allows you to designate a region of system board memory that can be supplied by an expansion card. You should not enable the reserved memory feature unless you are using an expansion card that requires special addressing.

For example, you may have a memory expansion card that needs to be addressed starting at 15 MB. Selecting the **15M - 16M** option in the **RESERVED MEMORY** category specifies that only part of the base memory comes from the dual in-line memory modules (DIMMs) on the system board, whereas the base memory from 15 to 16 MB comes from the memory expansion card.

The **RESERVED MEMORY** category has the following options:

• **NONE** (the default option)

• **15M - 16M**

CPU Speed

CPU SPEED indicates the processor speed at which your system boots.

Press the left- or right-arrow key to toggle the **CPU SPEED** category between the resident microprocessor's rated speed (the default) and a lower compatibility speed, which lets you accommodate speed-sensitive application programs. A change to this category takes effect immediately (rebooting the system is not required).

You can also toggle between the rated processor speed and the compatibility speed while the system is running in real mode by pressing <CTRL><ALT><\>. (For keyboards that do not use American English, press <CTRL><ALT><#>.)

Num Lock

NUM LOCK determines whether your system boots with the Num Lock mode activated on 101- or 102-key keyboards (it does not apply to 84-key keyboards).

When Num Lock mode is activated, the rightmost bank of keys on your keyboard provides the mathematical and numeric functions shown at the tops of the keys. When Num Lock mode is turned off, these keys provide cursor-control functions according to the labels on the bottom of each key.

Keyboard Errors

KEYBOARD ERRORS enables or disables reporting of keyboard errors during the power-on self-test (POST), which is a series of tests that the system performs on the hardware each time you turn on the system or press the reset button.

This category is useful when applied to self-starting servers or host systems that have no permanently attached keyboard. In these situations, selecting **DO NOT REPORT** suppresses all error messages relating to the keyboard or to the keyboard controller during POST. This option does not affect the operation of the keyboard itself, if one is attached to the computer.

System Password

SYSTEM PASSWORD displays the current status of your system's password security feature and allows you to assign and verify a new password. No one can assign a new password unless the current status is **NOT ENABLED**, which is displayed in bright characters.

The options for the **SYSTEM PASSWORD** category are:

• **NOT ENABLED** (the default option)

• **ENABLED**

• **DISABLED BY JUMPER**

NOTE: Read "Using the System Password Feature" found later in this chapter for instructions on assigning a

system password and using or changing an existing system password. See "Disabling a Forgotten Password" found later in this chapter for instructions on disabling a forgotten system password.

Password Status

When **SETUP PASSWORD** is set to **ENABLED**, **PASSWORD STATUS** allows you to prevent the system password from being changed or disabled at system start-up.

To lock the system password, you must first assign a setup password and then change the **PASSWORD STATUS** category to **LOCKED**. In this state, the system password cannot be changed through the **SYSTEM PASSWORD** category and cannot be disabled at system start-up by pressing <CTRL><ENTER>.

To unlock the system password, you must enter the setup password and then change the **PASSWORD STATUS** category to **UNLOCKED**. In this state, the system password can be disabled at system start-up by pressing <CTRL><ENTER> and then changed through the **SYSTEM PASSWORD** category.

Boot Sequence

BOOT SEQUENCE can be set to **DISKETTE FIRST** (the default option) or **HARD DISK ONLY**.

The term *boot* refers to the system's start-up procedure. When turned on, the system "bootstraps" itself into an operational state by loading into memory a small program, which in turn loads the necessary operating system. **BOOT SEQUENCE** tells the system where to look for the files that it needs to load.

Selecting **DISKETTE FIRST** causes the system to try booting from drive A first. If it finds a diskette that is not bootable in the drive or finds a problem with the drive itself, the system displays an error message. If it does not find a diskette in the drive, the system then tries to boot from the hard-disk drive (drive 0).

Selecting **HARD DISK ONLY** causes the system to boot *only* from the hard-disk drive, even if there is a bootable diskette in drive A.

Setup Password

SETUP PASSWORD lets you restrict access to your computer's System Setup program in the same way that you restrict access to your system with the system password feature. The options are:

- **NOT ENABLED** (the default option)
- **ENABLED**
- **DISABLED BY JUMPER**

NOTE: Read "Using the Setup Password Feature" found later in this chapter for instructions on assigning a setup password and using or changing an existing setup password. See "Disabling a Forgotten Password" found later in this chapter for instructions on disabling a forgotten setup password.

Auto Power On

AUTO POWER ON allows you to set the time and days of the week to turn on the computer system automatically. You can set **AUTO POWER ON** to turn on the system either every day or every Monday through Friday.

NOTE: This feature will not work if you shut off your system using a power strip or surge protector.

Time is kept in a 24-hour format (hours:minutes). To change the start-up time, press the right-arrow key to increase the number in the highlighted field or press the left-arrow key to decrease the number. If you prefer, you can type numbers in both of the appropriate fields.

The default for **AUTO POWER ON** is **DISABLED**.

Power Management

For certain types of monitors and most EIDE hard-disk drives, you can reduce system power consumption by enabling the power management feature. With **POWER MANAGEMENT** enabled, these monitors and drives automatically switch into low-power mode during periods of system inactivity.

POWER MANAGEMENT can be implemented at three levels—**MAXIMUM**, **REGULAR**, and **MINIMUM.** (The different levels apply to the monitor only; hard-disk drive operation is the same for all three.) The default setting for this category is **DISABLED**.

Saving Monitor Power

If you have a Video Electronics Standards Association (VESA®) Display Power Management Signaling (DPMS)-compliant monitor, enabling the **POWER MANAGEMENT** category reduces monitor power consumption during periods of keyboard and mouse inactivity.

> **CAUTION: Check your monitor documentation to make sure you have a DPMS-compliant monitor before you enable this feature. Otherwise, you risk damaging the monitor.**

NOTE: The power management feature monitors activity of a mouse connected to the Personal System/2 (PS/2)-compatible mouse port.

By setting **POWER MANAGEMENT** to **MAXIMUM**, **REGULAR**, or **MINIMUM**, you can set predefined time-out periods (see Table 2-2) for the two successive monitor shutdown stages, *standby* and *off*.

NOTE: Each monitor manufacturer defines the details of the shutdown stages for its own monitors. But in all cases, power consumption decreases with each stage from "on" (full power) to "standby" (reduced power; the display image usually disappears) to "off" (where power consumption is minimal). To define these stages for your monitor, see the documentation that came with the monitor.

From either shutdown stage, you can return full power to the monitor in one of the following ways:

- For most DPMS-compliant monitors, any subsequent activity—including moving the mouse—should return full power to the monitor.

- A few DPMS-compliant monitors require that you turn monitor power off and then on again to return to full power.

Check your monitor documentation for information on how your monitor is designed to operate.

Saving EIDE Hard-Disk Drive Power

For most systems, enabling **POWER MANAGEMENT** at any level causes EIDE hard-disk drives to switch to low-power mode after about 20 minutes of system inactivity (see Table 2-2).

NOTES: All EIDE drives shipped with your system support this feature. (For more information on Energy Star systems, see "Energy Star Compliance" in Chapter 1.)

*However, not all EIDE hard-disk drives support this feature. Enabling this feature for drives that do not support it may cause the EIDE drive to become inoperable until the computer is restarted and the **POWER MANAGEMENT** category is disabled.*

In low-power mode, the disks inside the drive stop spinning. They remain idle until the next drive access, which causes them to start spinning again. (Because the disks take a few seconds to regain full speed, you may notice a slight delay when you next access the hard-disk drive.)

When **POWER MANAGEMENT** is set to **DISABLED** (the default), the disks spin constantly as long as the system is turned on.

Table 2-2. Power Time-Out Periods

Power Management Setting	EIDE Drive Spindown Time-Outs	Monitor Standby Time-Outs	Monitor Off Time-Outs
Disabled	Never	Never	Never
Maximum	20 minutes	10 minutes	1 hour
Regular	20 minutes	20 minutes	1 hour
Minimum	20 minutes	1 hour	Never

Sound

SOUND determines whether the integrated audio controller is **ON** or **OFF**. You must reboot your system before a change takes effect.

NIC

NIC determines whether the network interface controller (NIC) is **ON** or **OFF**. You must reboot your system before a change takes effect.

Mouse

MOUSE enables or disables the system's built-in PS/2-compatible mouse port. Disabling the mouse allows an expansion card to use interrupt request (IRQ) 12.

Serial Port

SERIAL PORT configures the system's built-in serial port. This category can be set to **AUTO** (the default option) to automatically configure the port to a particular designation (**COM1** through **COM4**) or to **OFF** to disable the port.

If you set the serial port to **AUTO** and add an expansion card containing a port configured to the same designation, the system automatically remaps the built-in port to the next available port designation that shares the same IRQ setting:

- COM1 (input/output [I/O] address 3F8h), which shares IRQ4 with COM3, is remapped to COM3 (I/O address 3E8h).

- Likewise, COM2 (I/O address 2F8h), which shares IRQ3 with COM4, is remapped to COM4 (I/O address 2E8h).

*NOTE: When two COM ports share an IRQ setting, you can use either port as necessary, but **you may not be able to use them both at the same time**.*

For more information about built-in ports, port designations, IRQs, and the remapping of ports, see "Connecting External Devices" in your online *System User's Guide*.

Parallel Port

PARALLEL PORT configures the system's built-in parallel port. This category can be set to **378H** (the default), to alternate addresses **278H** or **3BCH**, or to **OFF** to disable the port.

*NOTE: Do not set **PARALLEL PORT** to **278H** if you have an Enhanced Capabilities Port (ECP) device connected to the port.*

Parallel Mode

PARALLEL MODE controls whether the system's built-in parallel port acts as an AT-compatible (unidirectional) or PS/2-compatible (bidirectional) port.

Your system also supports ECP mode, which can be used by the Windows 95 operating system. Windows 95 uses ECP protocol automatically if it detects an ECP-capable device, removing the necessity for an ECP option in this category.

Set this category according to the type of peripheral device connected to the parallel port. To determine the correct mode to use, see the documentation that came with the device.

Hard Disk

HARD DISK enables or disables the system's built-in EIDE hard-disk drive interface.

With **AUTO** (the default option) selected, the system turns off the built-in EIDE interface when necessary to accommodate a controller card installed in an expansion slot.

As part of the boot routine, the system first checks for a primary hard-disk drive controller card installed in an expansion slot. If no card is found, the system enables the built-in EIDE interface to use IRQ14 and IRQ15.

If a primary controller is detected on the expansion bus, the built-in EIDE interface is disabled.

Selecting **OFF** disables the built-in EIDE interface.

Diskette

DISKETTE controls the operation of the system's built-in diskette drive controller.

With **AUTO** (the default option) selected, the system turns off the built-in diskette drive controller when necessary to accommodate a controller card installed in an expansion slot.

With **WRITE-PROTECT** selected, nothing can be written to diskette drives and tape drives using the system's built-in diskette drive controller. (The system can still read from the drives.) When this option is selected, the **AUTO** option (whereby the system turns off the built-in diskette drive controller as necessary) is also in effect.

Selecting **OFF** turns off the built-in diskette/tape drive controller; this option is used primarily for troubleshooting purposes.

USB

USB determines whether the Universal Serial Bus (USB) connectors on the system board are turned **ON** or **OFF** (the default). You must reboot your system before a change takes effect.

Speaker

SPEAKER determines whether the onboard speaker is **ON** (the default) or **OFF**. A change to this category takes effect immediately (rebooting the system is not required).

ECC

ECC determines whether the system's error correction code (ECC) capability is turned **ON** (the default) or **OFF**. Your system supports ECC only if all the installed DIMMs are ECC DIMMs. If any of the installed DIMMs are not ECC DIMMs, this category does not appear.

System Data Categories

The following categories, which are not selectable, display information about the system:

- **MICROPROCESSOR** displays the type of micro-processor installed in the computer.

- **EXTERNAL CACHE** displays the size of the onboard cache (**256 KB** or **512 KB**).

- **VIDEO MEMORY** displays the amount of video memory detected in your system.

- **SYSTEM MEMORY** indicates the entire amount of installed memory detected in your system, except for memory on Expanded Memory Specification (EMS) expansion cards. After adding memory, check this category to confirm that the new memory is installed correctly and is recognized by the system.

- **SERVICE TAG** displays the system's five-character service tag number, which was programmed into NVRAM by Dell during the manufacturing process. Refer to this number during technical assistance or service calls. The service tag number is also accessed by certain Dell support software, including the diagnostics software.

- **ASSET TAG** displays the customer-programmable asset tag number for the system if an asset tag number has been assigned. You can use the Asset Tag utility, which is included with your software support utilities, to enter an asset tag number up to ten characters long into NVRAM. For information on using the utility, see "Using Drivers and Utilities" in your online *System User's Guide*.

Using the System Password Feature

> **CAUTION: The password features provide a basic level of security for the data on your system. However, they are not foolproof. If your data requires more security, it is your responsibility to obtain and use additional forms of protection, such as data encryption programs.**

Your Dell system is shipped to you without the system password feature enabled. If system security is a concern, you should operate your system only with system password protection.

You can assign a system password, as described in the next subsection, "Assigning a System Password," whenever you use the System Setup program. After a system password is assigned, only those who know the password have full use of the system.

When the **SYSTEM PASSWORD** category is set to **ENABLED**, the computer system prompts you for the system password just after the system boots.

To change an existing system password, you must know the password (see "Deleting or Changing an Existing System Password" found later in this section). If you assign and later *forget* a system password, you need to be able to remove the computer cover to change a jumper setting that disables the system password feature (see "Disabling a Forgotten Password" found later in this chapter). Note that you erase the *setup password* at the same time.

> **CAUTION: If you leave your system running and unattended without having a system password assigned or leave your computer unlocked so that someone can disable the password by changing a jumper setting, anyone can access the data stored on your hard-disk drive.**

Assigning a System Password

Before you can assign a system password, you must enter the System Setup program and check the **SYSTEM PASSWORD** category.

When a system password is assigned, the option shown in the **SYSTEM PASSWORD** category is **ENABLED**. When the system password feature is disabled by a jumper setting on the system board, the option shown is **DISABLED BY JUMPER**. *You cannot change or enter a new system password if either of these options is displayed.*

When no system password is assigned and the password jumper on the system board is in the enabled position (its default setting), the option shown for the **SYSTEM PASSWORD** category is **NOT ENABLED**. *Only when this category is set to* **NOT ENABLED** *can you assign a system password*, using the following procedure:

1. **Verify that the PASSWORD STATUS category is set to UNLOCKED.**

   For instructions on changing the setting for **PASSWORD STATUS**, see "Password Status" found earlier in this chapter.

2. **Highlight the SYSTEM PASSWORD category, and then press the left- or right-arrow key.**

   The category heading changes to **ENTER PASSWORD**, followed by an empty seven-character field in square brackets.

3. **Type in your new system password.**

   You can use up to seven characters in your password.

   As you press each character key (or the <SPACEBAR> for a blank space), a placeholder appears in the field.

   The password assignment operation recognizes keys by their location on the keyboard, without distinguishing between lowercase and uppercase characters. For example, if you have an *M* in your password, the system recognizes either *M* or *m* as correct.

Certain key combinations are not valid. If you enter one of these combinations, the speaker emits a beep.

To erase a character when entering your password, press the <BACKSPACE> key or the left-arrow key.

NOTE: To escape from the field without assigning a system password, press the <TAB> key or the <SHIFT><TAB> key combination to move to another field, or press the <ESC> key at any time prior to completing step 5.

4. **Press <ENTER>.**

   If the new system password is less than seven characters, the whole field fills with placeholders. Then the category heading changes to **VERIFY PASSWORD**, followed by another empty seven-character field in square brackets.

5. **To confirm your password, type it in a second time and press <ENTER>.**

   The password setting changes to **ENABLED.** Your system password is now set; you can exit the System Setup program and begin using your system. Note, however, that password protection does not take effect until you reboot the system by pressing the reset button or by turning the system off and then on again.

Using Your System Password to Secure Your System

Whenever you turn your system on, press the reset button, or reboot the system by pressing the <CTRL><ALT><DEL> key combination, the following prompt appears on the screen:

```
Type in the password and ...
— press <ENTER> to leave password
security enabled.
— press <CTRL><ENTER> to disable password
security.
Enter password:
```

After you type the correct system password and press <ENTER>, your system boots and you can use the keyboard to operate your system as usual.

NOTE: If you have assigned a setup password (see "Using the Setup Password Feature" found later in this chapter), the system accepts your setup password as an alternate system password.

If a wrong or incomplete system password is entered, the following message appears on the screen:

```
** Incorrect password. **

Enter password:
```

If an incorrect or incomplete system password is entered again, the same message appears on the screen.

The third and subsequent times an incorrect or incomplete system password is entered, the system displays the following message:

```
** Incorrect password. **
Number of unsuccessful password
attempts: 3
System halted! Must power down.
```

The number of unsuccessful attempts made to enter the correct system password can alert you to an unauthorized person attempting to use your system.

Even after your system is turned off and on, the previous message is displayed each time an incorrect or incomplete system password is entered.

NOTE: You can use the **PASSWORD STATUS** *category in conjunction with* **SYSTEM PASSWORD** *and* **SETUP PASS-WORD** *to further protect your system from unauthorized changes. For more information, see "Password Status" found earlier in this chapter.*

Deleting or Changing an Existing System Password

To delete or change an existing system password, perform the following steps:

1. **Enter the System Setup program and verify that the PASSWORD STATUS category is set to UNLOCKED.**

   Enter the System Setup program by pressing the <CTRL><ALT><ENTER> key combination. Press the <ALT><P> key combination to move to Page 2 of the System Setup screens. For instructions on changing the setting for **PASSWORD STATUS**, see "Password Status" found earlier in this chapter.

2. **Reboot your system to force it to prompt you for a system password.**

3. **When prompted, type in the system password.**

4. **Press the <CTRL><ENTER> key combination to disable the existing system password, instead of pressing <ENTER> to continue with the normal operation of your system.**

5. **Confirm that NOT ENABLED is displayed for the SYSTEM PASSWORD category of the System Setup program.**

   If **NOT ENABLED** appears in the **SYSTEM PASSWORD** category, the system password has been deleted. If you want to assign a new password, continue to step 6. If **NOT ENABLED** is *not* displayed for the **SYSTEM PASSWORD** category, press the <ALT><B> key combination to reboot the system, and then repeat steps 3 through 5.

6. **To assign a new password, follow the procedure in "Assigning a System Password" found earlier in this section.**

Using the Setup Password Feature

Your Dell system is shipped to you without the setup password feature enabled. If system security is a concern, you should operate your system with setup password protection.

You can assign a setup password, as described in the next subsection, "Assigning a Setup Password," whenever you use the System Setup program. After a setup password is assigned, only those who know the password have full use of the System Setup program.

To change an existing setup password, you must know the setup password (see "Deleting or Changing an Existing Setup Password" found later in this section). If you assign and later *forget* a setup password, you need to be able to remove the computer cover to change a jumper setting that disables the setup password feature (see "Disabling a Forgotten Password" found later in this chapter). Note that you erase the *system password* at the same time.

Assigning a Setup Password

A setup password can be assigned (or changed) only when the **SETUP PASSWORD** category is set to **NOT ENABLED**. To assign a setup password, highlight the

SETUP PASSWORD category and press the left- or right-arrow key. The system prompts you to enter and verify the password. If a character is illegal for password use, the system emits a beep.

NOTES: The setup password can be the same as the system password.

If the two passwords are different, the setup password can be used as an alternate system password. However, the system password cannot be used in place of the setup password.

After you verify the password, the **SETUP PASSWORD** setting changes to **ENABLED**. The next time you enter the System Setup program, the system prompts you for the setup password.

A change to the **SETUP PASSWORD** category becomes effective immediately (rebooting the system is not required).

Operating With a Setup Password Enabled

If **SETUP PASSWORD** is set to **ENABLED**, you must enter the correct setup password before you can modify the majority of the System Setup categories.

When you start the System Setup program, Page 2 of the System Setup screens appears with the **SETUP PASSWORD** category highlighted, prompting you to type in the password.

If you do not enter the correct password in three tries, the system lets you view, but not modify, the System Setup screens—with the following exceptions:

- You can still modify the **DATE**, **TIME**, **CPU SPEED**, **NUM LOCK**, and **SPEAKER** categories.

- If **SYSTEM PASSWORD** is not enabled and is not **LOCKED** via the **PASSWORD STATUS** category, you can assign a system password (however, you cannot disable or change an existing system password).

   *NOTE: You can use the **PASSWORD STATUS** category in conjunction with **SETUP PASSWORD** to protect **SYSTEM PASSWORD** from unauthorized changes. For more information, see "Password Status" found earlier in this chapter.*

Deleting or Changing an Existing Setup Password

To delete or change an existing setup password, perform the following steps:

1. **Enter the System Setup program.**

2. **Highlight the SETUP PASSWORD category, and press the left- or right-arrow key to delete the existing setup password.**

   The setting changes to **NOT ENABLED**.

3. **If you want to assign a new setup password, follow the procedure in "Assigning a Setup Password" found earlier in this section.**

Disabling a Forgotten Password

If you forget your system or setup password, you cannot operate your system or change settings in the System Setup program until you remove the computer cover, change the password jumper setting to disable the passwords, and erase the existing passwords.

To disable a forgotten password, perform the following steps:

1. **Remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

   > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

2. **Remove the jumper plug from the PSWD jumper to disable the password feature.**

   Refer to "Jumpers" in Chapter 5 for jumper information and to Figure 5-7 for the location of the password jumper (labeled "PSWD") on the system board.

3. **Replace the computer cover.**

4. **Reconnect your computer and peripherals to their power sources, and turn them on. Proceed to step 5 if you want to assign a new password.**

Booting your system with the PSWD jumper plug removed erases the existing password(s).

NOTE: Before you assign a new system and/or setup password, you must replace the PSWD jumper plug.

5. **Repeat step 1.**

6. **Replace the PSWD jumper plug.**

7. **Replace the computer cover, reconnect the computer and peripherals to their power sources, and turn them on.**

Booting with the PSWD jumper installed reenables the password feature. When you enter the System Setup program, both password categories appear as **NOT ENABLED**, meaning that the password feature is enabled but that no password has been assigned.

8. **Assign a new system and/or setup password.**

To assign a new system password, see "Assigning a System Password" found earlier in this chapter. To assign a new setup password, see "Assigning a Setup Password" found earlier in this chapter.

Responding to Error Messages

If an error message appears on your monitor screen while the system is booting, make a note of the message. Then, before entering the System Setup program, refer to your *Diagnostics and Troubleshooting Guide* for an explanation of the message and suggestions for correcting any errors. However, it is normal to receive an error message the first time you boot the system after a memory upgrade. In that case, you do not need to refer to the *Diagnostics and Troubleshooting Guide*; instead, refer to the instructions in "Performing a Memory Upgrade" in Chapter 6 of this guide.

If you are given an option of pressing either <F1> to continue or <F2> to run the System Setup program, press the <F2> key.

Chapter 3
Using the ISA Configuration Utility

*T*he ISA Configuration Utility (ICU) is used by the system to track what expansion cards are installed and what resources are used. With this information, the system automatically configures Plug and Play expansion cards and Peripheral Component Interconnect (PCI) expansion cards and can tell you how to configure non-Plug and Play Industry-Standard Architecture (ISA) expansion cards manually by setting jumpers or switches. Plug and Play and PCI expansion cards do not contain jumpers and switches; they are configured only through software.

CAUTION: The ICU is intended only for configuring non-Plug and Play ISA expansion cards. It should not be used for assigning resources to Plug and Play expansion cards and PCI expansion cards. These cards should be configured automatically by the basic input/output system (BIOS).

NOTES: The Windows NT operating system does not provide full Plug and Play support. Therefore, some Plug and Play cards (such as modem, sound, and network cards) may not work with Windows NT. If your system is running a Dell-installed Windows NT operating system and you want to use Plug and Play cards, Dell recommends that you use the card manufacturer's utility to set the card to legacy mode, enter the card's resources through the manufacturer's utility, and then use the ICU to add the Plug and Play card to your system configuration. On systems with a Dell-installed Windows NT operating system, the ICU is installed on the hard-disk drive as a diskette image. Use the Dell DiskMaker (located in the Dell Accessories program group or folder) to make an ICU diskette from this diskette image.

If you are using the Windows 95 operating system, the functions provided by the ICU are handled by the Device Manager, which can be accessed by double-clicking the

System icon in the Control Panel. See your Windows 95 documentation for instructions on using the Device Manager to manage resources and resolve conflicts.

The remainder of this chapter describes the various features of, and the various ways to use, the ICU.

Quick Start

To quickly get started using this utility, follow these steps:

1. **Determine whether you need to run the ICU.**

   See "When to Run the ICU" found later in this chapter for detailed instructions.

2. **Perform any required preparatory steps before starting the utility.**

   Preparatory steps include making a program diskette, copying your mouse driver to this diskette, and making a backup copy of this diskette. See "Preparing to Use the ICU" found later in this chapter for detailed instructions.

3. **Start the system using your ICU diskette.**

   Verify that the **BOOT SEQUENCE** category in the System Setup program is set to **DISKETTE FIRST**. Then insert the backup copy of the ICU diskette into drive A, and turn on your computer or press the reset button.

   NOTE: The ICU takes a few minutes to load. During this time, the cursor may appear as a pointer rather than as an hourglass.

   When the utility has finished loading, the ICU window (see Figure 3-1) is displayed.

4. **Add, modify, or remove a card, or view resources for a card or other device.**

   Depending on what you need to accomplish with the ICU, you may need to perform one or more of these tasks:

   - If you are adding a non-Plug and Play ISA expansion card, see your online *System User's Guide* or "Adding a Listed Card" found later in this chapter for detailed instructions. If the card you are adding does not have a configuration file, see your online *System User's Guide* or "Adding an Unlisted Card" found later in this chapter for detailed instructions.

   - If you are modifying a card that is already installed, see your online *System User's Guide* or "Modifying a Card" found later in this chapter for detailed instructions.

   - If you are removing a card, see your online *System User's Guide* or "Removing a Card" found later in this chapter for detailed instructions.

   - If you want to examine the resources already assigned in the system, see your online *System User's Guide* or "Viewing Resources" found later in this chapter for detailed instructions.

5. **Save your configuration, and exit the utility.**

   See your online *System User's Guide* or "Saving the System Configuration" and "Exiting From the ICU," found later in this chapter for detailed instructions.

About the ICU

Before your system was shipped from Dell, a technician used the ICU to enter the correct information for the expansion cards initially installed in your computer.

If your system was shipped with Dell-installed software, the ICU diskette image (from which you can make an ICU diskette) is installed on your hard-disk drive. (Your system may also be accompanied by an *ISA Configuration Utility Diskette*.)

The ICU is also available through online services such as Dell's TechConnect bulletin board service (BBS). See your online *System User's Guide* or the chapter titled

"Getting Help" in your *Diagnostics and Troubleshooting Guide* for information on accessing the BBS.

Whenever you add or remove a non-Plug and Play ISA expansion card, use the ICU to reconfigure your system. The utility reads the card's corresponding configuration file (**.cfg** file), which describes the card's characteristics and required system resources. After the resources identified in these configuration files are assigned to all non-Plug and Play ISA expansion cards, the system assigns resources to all Plug and Play expansion cards, as well as PCI expansion cards, thereby creating a conflict-free configuration.

ICU Database

The ICU provides a database of configuration files for a large variety of non-Plug and Play ISA expansion cards. The database is located in the **\db** subdirectory. *Listed cards* are non-Plug and Play ISA expansion cards that have configuration files stored in this database.

Unlisted cards are non-Plug and Play ISA expansion cards that do not have configuration files stored in the ICU database. Unlisted cards are not displayed in the list of cards provided for the various card categories. The unlisted cards may be cards for which no configuration file exists or new cards that include a manufacturer-supplied configuration file on diskette.

When you supply a configuration file and the ICU is running from the hard-disk drive, the configuration file is copied to the directory that contains the rest of the ICU database.

See your online *System User's Guide* or "Adding a Listed Card" found later in this chapter for directions on how to add a listed non-Plug and Play ISA expansion card. See your online *System User's Guide* or "Adding an Unlisted Card" found later in the chapter for instructions on how to add an unlisted non-Plug and Play ISA expansion card.

When to Run the ICU

Whenever you add or remove non-Plug and Play ISA expansion cards, you must run the ICU to ensure that no two cards attempt to use the same resources (such as interrupt request [IRQ] lines).

Run the program *before* adding or removing any non-Plug and Play ISA expansion cards. The ICU can identify and resolve any resource conflicts and indicate the proper jumper and switch settings for each expansion card to avoid such conflicts. Running the program first helps you determine how to configure a non-Plug and Play ISA expansion card before you install it in your computer.

After you have run the ICU for your non-Plug and Play ISA expansion cards and it has configured all your Plug and Play and PCI expansion cards, you can use the utility to *lock* the configuration of your Plug and Play and PCI expansion cards so that they are always assigned the same resources. See your online *System User's Guide* or "Locking and Unlocking Cards" found later in this chapter for details.

*P*reparing to Use the ICU

Before using the ICU for the first time, you must complete the following steps:

1. **If your system includes Dell-installed software, make a program diskette of the utility from the diskette image on your hard-disk drive.**

    For instructions on how to create a program diskette from the diskette image, see the online help provided in the Dell DiskMaker program, which is available in the Dell Accessories folder or program group.

    NOTE: If you received an ISA Configuration Utility Diskette with your system, skip to step 2.

2. **If you want to use your mouse with the ICU, copy your mouse driver file** (mouse.exe) **to your ICU diskette.**

3. **Make a backup copy of your ICU diskette, as described in the next subsection, "Backing Up the ICU Diskette."**

    Use the backup copy whenever you run the utility; store the original diskette in a safe place.

Backing Up the ICU Diskette

Before using the ICU, make a backup copy of the ICU diskette by performing the following steps.

NOTE: If you received an ISA Configuration Utility Diskette with your system, you should use this procedure to create a backup of that diskette.

1. **Make sure you have a blank, high-density, 3.5-inch diskette.**

2. **Turn on your computer system if it is not already on.**

3. **In the Windows File Manager, select COPY DISK from the Disk menu; or, at the system prompt, type the following command line and press <ENTER>:**

    ```
    diskcopy a: a:
    ```

4. **Follow the instructions on the screen for inserting the *source* diskette (the original copy) and the *target* diskette (the backup copy).**

    You may be prompted to swap diskettes several times during the duplication process.

5. **Store your original ICU diskette in a safe place.**

    Use only the backup diskette when running the ICU.

*S*tarting the ICU

After you have completed the procedure in "Preparing to Use the ICU" found earlier in this chapter, insert the backup copy of the ICU diskette into drive A. Then either turn on your computer or reboot it by pressing the reset button.

Accessing Help

You can access online help in the ICU in four ways:

*   You can select **CONTENTS** from the Help menu. The table of contents of topics is displayed. Select a topic and click Help. Help text on that topic appears in a dialog box.

*   For most dialog boxes, you can click Help to display information on the action you are performing.

*   From the ICU window, you can press the <F1> key to display the table of contents for the available help topics.

- To redisplay the last message you received from the ICU, you can select **PREVIOUS MESSAGE** from the Help menu.

Making Selections in the ICU

The ICU window is the main window of the utility and the starting point for making any changes to your expansion-card configuration. This window displays a list of all non-Plug and Play ISA, Plug and Play, and PCI expansion cards currently installed in the computer. The ICU window contains menus and a tool bar, as shown in Figure 3-1. When you choose a course of action, the ICU displays dialog boxes to guide you through the various steps.

```
[-]                  ISA Configuration Utility             [↓][↑]
 File  Configure  View  Advanced  Help
   Add     Remove   Modify    View
 Card Configured In System:
 Unknown Card                                          ▲
 Unknown Card                                          ■
 Motherboard System Devices
 PCI Card: VGA Controller
 PCI Card: IDE Controller                              ▼
```
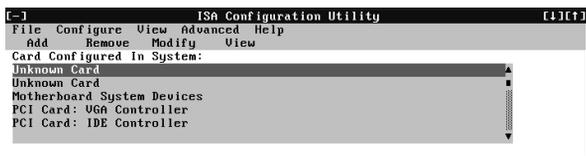
Figure 3-1. ICU Window

You can maneuver through each menu and dialog box using a mouse. If a mouse is not available, you can use the keys shown in Table 3-1.

Each menu and menu option has an underlined character in its name; when you press the <ALT> key in conjunction with the key for the underlined character, that menu or menu option is selected.

Table 3-1. ICU Keys

Keys	Action
<ALT><*x*><*y*>	Displays the menu containing the underlined letter *x* and performs the operation indicated by the menu item containing the underlined letter *y*. For example, to save a file (that is, to display the File menu and select the **SAVE** menu option), press <ALT><f> and <s>.
<TAB>	Moves from one control button or list to another.
Up- and down-arrow keys	Moves up and down through items in a list.
<SPACEBAR>	Highlights an item in a list.
<ENTER>	Selects the highlighted button or item in a list.

Adding a Listed Card

*NOTE: If you want to add a configuration file that you received on diskette with a new expansion card, you must copy the configuration file to the **db** subdirectory on the backup copy of the ICU diskette. You should then reboot your system and perform the following procedure to add the expansion card.*

Use the following procedure to add a listed card with the ICU:

1. **Start the ICU as described in "Starting the ICU" found earlier in this chapter.**

2. **From the ICU window, click Add or select ADD CARD from the Configure menu.**

3. **Click the name of the category of card that you want to add. If you clicked Add in step 2, click OK.**

   A dialog box like the one in Figure 3-2 appears listing the names of all available cards of that type.
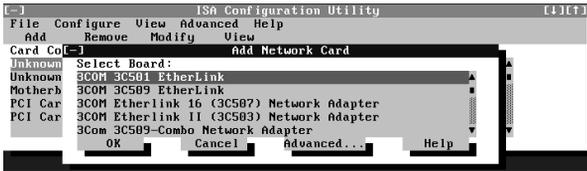
Figure 3-2. Add Network Card Dialog Box

4. **Select the name of the card you want to add.**

   If the name of the card that you want to add is not on the list, see "Adding an Unlisted Card" found later in this chapter for instructions on how to add the card.

5. **If you want the ICU to select the resources for the card, click OK. Otherwise, skip to step 6.**

   The ICU uses the default resources set by the card manufacturer whenever possible. If the ICU cannot find a resource that is valid for the card and available in the system, the utility generates an error message. See Appendix B, "ISA Configuration Utility Messages," for an explanation of the message and a possible solution to the conflict.

   If you are satisfied with the default resources assigned to the card, you can skip the remainder of this procedure.

6. **To select the resources yourself, click Advanced.**

   The Card Configuration dialog box (see Figure 3-3) displays all resources used by the card. Some cards have multiple functions, each having one or more resources associated with it. For example, a communications card can have fax, modem, and scanner functions, each of which may have one or more associated resources.
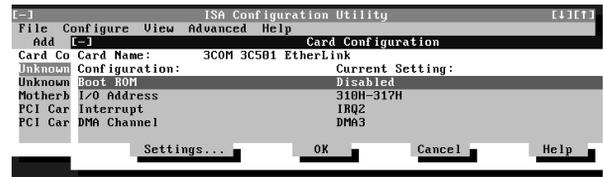
Figure 3-3. Card Configuration Dialog Box

7. **To change any of the resource settings for the card, select the resource setting and then click Settings.**

   The Configuration Settings dialog box (see Figure 3-4) displays the name of the resource that you selected in the upper-left corner of the box. The resource values currently associated with the selected function are displayed in the Resources for Choice box. The resource values displayed are **INTERRUPT (IRQ)**, **DMA**, **MEMORY (HEX)**, and **I/O PORT (HEX)**.
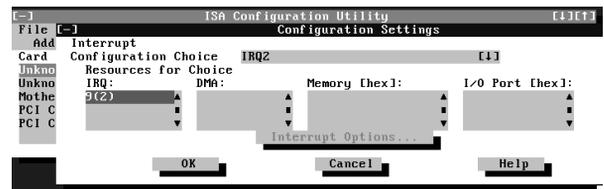
Figure 3-4. Configuration Settings Dialog Box

8. **To change the resource settings, click the down arrow next to the Configuration Choice box. Then click the new resource setting from the list of available settings (see Figure 3-5).**

   You cannot manually enter a value; you must choose a setting from the list. If there is only one setting listed, no other settings are available.

   The setting that you select may affect the resources available. For example, if you are offered the **DISABLED** option and select it, all resource values are blank, indicating that a disabled setting uses no resources.
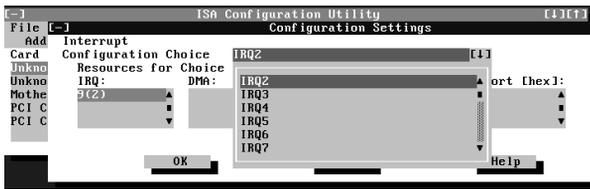
Figure 3-5. Available Settings List Box

9. **To change individual resource values for the current configuration setting, select the resource value that you want to change and click the Options button located below the resource values (see Figure 3-6).**

   For example, when you click the value under **DMA**, the Options button changes to the DMA Options button. When you click this button, a smaller dialog box appears. By clicking the down arrow next to the current resource value, you can display a list of the available values for the resource.
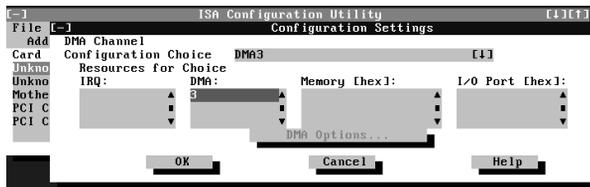
Figure 3-6. Configuration Settings Dialog Box

   Choose the desired value and click OK. The value you selected is displayed under the resource heading in the Configuration Settings dialog box.

   The Options button is disabled if no alternative values are available for the selected resource.

   NOTE: If you change one or more resource values using the Options button and later change the setting in the Configuration Choice box, the changes that you made to the resource values are overwritten by the default values for the new configuration choice.

10. **Click OK in the Configuration Settings dialog box when you have finished selecting resources for the function.**

NOTE: After modifying the system configuration, you must turn off the system to install, remove, or change jumper settings on the non-Plug and Play ISA expansion cards to match the settings you selected in the ICU.

Adding an Unlisted Card

Unlisted cards are non-Plug and Play ISA expansion cards that do not have configuration files stored in the ICU database.

NOTE: If you want to add a configuration file that you received on diskette with a new expansion card, see "Adding a Listed Card" found earlier in this chapter.

To add an unlisted card with the ICU, perform the following steps:

1. **Start the ICU as described in "Starting the ICU" found earlier in this chapter.**

2. **From the ICU window, click Add or select ADD CARD from the Configure menu.**

3. **Click the name of the category of card that you want to add. If you clicked Add in step 2, click OK.**

   A dialog box appears listing the names of all available cards of that type.

4. **Select UNLISTED CARD from the bottom of the list of cards displayed in the dialog box that appears. Then click OK.**

5. **Click No when the ICU asks if you have a configuration file for the card.**

   The Configure Unlisted Card dialog box appears with blank fields.

6. **Enter the name of the card that you want to add in the CARD NAME field.**

7. **For each resource you want to assign to the card, click the box beneath the name of the resource to be assigned and then click Add.**

   For example, if you click the box beneath **INTERRUPT (IRQ)**, the button changes to Add Interrupt. When you click this button, a Specify dialog box (in this case, Specify Interrupt) appears. Figure 3-7 shows the Configure Unlisted Card dialog box with the Specify Interrupt dialog box opened.

Figure 3-7. Specify Interrupt Dialog Box

If you are providing a value for the IRQ or direct memory access (DMA) resource, click the down arrow beneath **AVAILABLE RESOURCES**. A smaller Specify list box appears (see Figure 3-8). Click the value you want to assign to the resource. Then click OK.

Figure 3-8. Specify Interrupt List Box

If none of the values for the DMA or IRQ resources match the allowable values for your unlisted card (as indicated in the card's documentation), select one of the available values offered by the utility and click OK.

If you are providing values for the input/output (I/O) port or memory resources, you must enter the starting and ending addresses in hexadecimal format using the two fields provided by the Specify Memory or Specify I/O Port dialog box. Click each box in succession to enter the beginning and ending addresses, and then click OK to complete the selection. Figure 3-9 shows the two fields.

Figure 3-9. Specify I/O Port Dialog Box

8. **When you have finished selecting resources for the unlisted card, click OK in the Configure Unlisted Card dialog box.**

    A message box appears, notifying you either that the card is using its default settings or that it cannot use its default settings and must be reconfigured.

9. **Click OK. If the card must be reconfigured, record the resource settings recommended by the ICU. Click Close to accept the resource settings currently displayed.**

10. **If you had to assign a disallowed resource value to the card in steps 7, 8, and 9, click each of the other cards, and then click View until you find another card using a resource value that is allowed for the unlisted card. Reassign the resource setting for this other card using the pro-cedure in the next section, "Modifying a Card." Then modify the resource settings for the unlisted card so that it uses an allowable value.**

NOTE: After modifying the system configuration, you must turn the system off to install, remove, or change jumper settings on the non-Plug and Play ISA expansion cards to match the settings you selected in the ICU.

Modifying a Card

Modifying a card allows you to change the system resources used by a card. This feature is helpful when you want to add a card that requires resources already in use by other cards or devices in your computer. You can allocate different resources to the cards currently in your computer to free the resources necessary for the card you want to install.

You can also use this feature to force Plug and Play or PCI expansion cards to use specific resource values. This procedure is called *locking* a card. You should lock a card only if it uses static device drivers. See "Locking and Unlocking Cards" found later in this chapter for more information.

NOTE: You cannot modify the resources of a Plug and Play or PCI expansion card. You can only view the resources currently assigned and lock or unlock them.

To modify the resource settings for a listed or unlisted card, complete the following steps:

1. **Start the ICU as described in "Starting the ICU" found earlier in this chapter.**

2. **Select the card from the list of installed cards in the ICU window, and choose MODIFY CARD from the Configure menu or click Modify.**

   If the Card Configuration dialog box appears, the selected card is listed (it has a configuration file in the ICU database). Continue with step 3.

   If the Configure Unlisted Card dialog box appears, the card is unlisted (it does not have a configuration file). Proceed to step 5.

   NOTE: When you modify an unlisted card, the ICU cannot show you the valid resources for the card. Therefore, you must have documentation from the card manufacturer that describes the resources and resource settings that the card can use.

3. **Follow steps 7 through 9 in "Adding a Listed Card" found earlier in this chapter. Then continue with step 4 of this procedure.**

4. **Click OK to complete the card modifications and return to the ICU window.**

   You have completed this procedure; do not proceed to step 5.

5. **To add, modify, or remove a resource value, select the box beneath the resource to be assigned, and then click Add, Modify, or Remove, respectively.**

   For example, if you click the box beneath **INTERRUPT (IRQ)**, the Add, Modify, and Remove buttons change to Add Interrupt, Modify Interrupt, and Remove Interrupt. When you click one of these buttons, a smaller Specify list box (in this case, Specify Interrupt) appears.

If you are providing a value for the IRQ or DMA resource, click the down arrow beneath **AVAILABLE RESOURCES**. Click the value you want to assign to the resource. If the resource can be shared with another card or device, click Sharable. Then click OK.

If none of the values for the DMA or IRQ resource match the allowable values for your unlisted card (as indicated in the card's documentation), select one of the available values offered by the utility and click OK.

If you are providing values for the I/O port or memory resource, you must enter the starting and ending addresses in hexadecimal format using the two fields provided by the Specify Memory or Specify I/O Port dialog box.
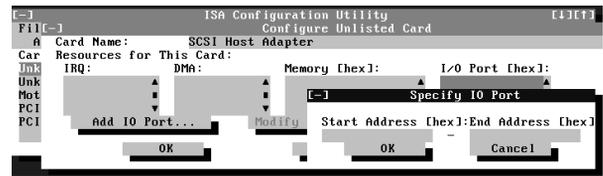
6. **When you have finished selecting resources for the unlisted card, click OK in the Configure Unlisted Card dialog box.**

   A message box appears, notifying you either that the card is using its default settings or that it cannot use its default settings and must be reconfigured.

7. **Click OK. If the card must be reconfigured, record the resource settings recommended by the ICU. Click Close to accept the resource settings currently displayed.**

8. **If you had to assign a disallowed resource value to the card in steps 5, 6, and 7, click each of the other cards, and then click View until you find another card using a resource value that is allowed for the unlisted card. Reassign the resource setting for this other card. Then modify the resource settings for the unlisted card so that it uses an allowable value.**

NOTE: After modifying the system configuration, you must turn off the system to install, remove, or change jumper settings on the non-Plug and Play ISA expansion cards to match the settings you selected in the ICU.

Removing a Card

Before you remove a non-Plug and Play ISA expansion card from your computer, you must use the ICU to remove the card from the system configuration.

NOTE: When you remove a Plug and Play or PCI expansion card from your computer, you do not need to run the ICU. To remove a Plug and Play or PCI expansion card, complete steps 2 through 9 in "Removing an Expansion Card" in Chapter 6.

Use the following procedure to remove a non-Plug and Play ISA expansion card from your computer:

1. **Start the ICU as described in "Starting the ICU" found earlier in this chapter.**

2. **Select the card from the current system configuration list in the ICU window.**

3. **Select REMOVE CARD from the Configuration menu, or click Remove.**

   The ICU requests verification that you want to remove the card.

4. **Click Yes to free the resources allocated to the card and remove its name from the list of active cards, or click No to cancel the operation.**

   The ICU returns to the ICU window.

> **CAUTION: After removing a card from the system configuration using the ICU, you must turn off the system and physically remove the card. Failure to do so can damage your system.**

5. **Remove the non-Plug and Play ISA expansion card from the computer.**

   See "Removing an Expansion Card" in Chapter 6 for instructions.

*V*iewing Resources

The ICU displays all resources currently used by your system.

To view all system resources, select **SYSTEM RESOURCES** from the View menu or click View. The System Resource Usage dialog box (see Figure 3-10) displays all resources currently used by the system.
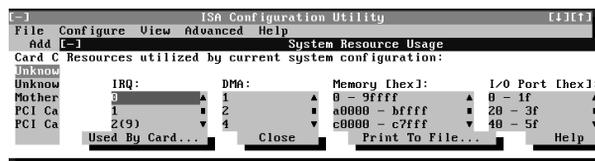
Figure 3-10. System Resource Usage Dialog Box

To determine which card uses a particular resource shown in the System Resource Usage dialog box, select the resource in question and then click Used By Card. The Card Resource Usage dialog box appears with the information.

To view the resources that a particular card is using, select the card from the list displayed in the ICU window, and then select **CARD RESOURCES** from the View menu or click View. The Card Resource Usage dialog box displays the resources assigned to that card. Figure 3-11 shows resources that might be assigned to a network adapter card.
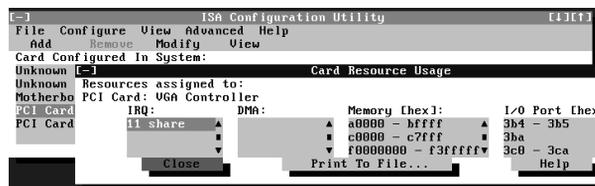
Figure 3-11. Card Resource Usage Dialog Box

You can save the information displayed in the resource usage dialog box by clicking Print To File. The ICU then prompts you for a filename.

*S*aving the System Configuration

You can save the system configuration to nonvolatile random-access memory (NVRAM) as you configure each card's resources. To do so, select **SAVE** from the File menu and continue with your operation.

Exiting From the ICU

At the ICU window, select **EXIT** from the File menu to exit the utility. If you have made any changes to the system configuration, you are asked whether you want to save the changes.

If you click Yes, the ICU saves the updated system configuration information into NVRAM. If you click No, you exit the ICU without saving any of your configuration changes. If you click Cancel, nothing is saved and the utility continues to operate.

Advanced Features of the ICU

The ICU provides the following advanced features:

* Locking cards and resources, which allows you to force specific resource assignments every time the system boots rather than allowing certain resources to be assigned dynamically

* Modifying the Configuration Manager, which allows you to reduce the amount of memory used by the ICU

Each of these advanced features is described in more detail in the following subsections.

> **CAUTION: The ICU also contains an advanced feature called an image file, which allows you to save a particular configuration and then replicate the configuration on multiple systems. However, configuration information stored in an image file is actually saved to the system's RAM drive, which is then erased the next time the system is restarted. For this reason, Dell does not recommend using image files.**

Locking and Unlocking Cards

The ICU includes a locking mechanism that enables you to allocate the system resources for all or for some functions of a Plug and Play expansion card. Plug and Play expansion cards are dynamic, which means that they are allocated resources at system boot. Some device drivers support this dynamic card configuration, but some do not. Device drivers that do not support dynamic card configuration are referred to as *static device drivers*.

To determine whether your expansion card has static device drivers, check the documentation that came with your device driver. If you are using a static device driver, you need to permanently associate resources with a Plug and Play expansion card, instead of relying on the default Plug and Play behavior. Otherwise, the device driver might not be able to find the card the next time the system boots. This procedure is referred to as *locking* a card.

NOTE: The locking feature of the ICU is valid only for Plug and Play and PCI expansion cards.

To lock the card resources or particular functions of the card, you must first enable the locking feature. You must also select a Plug and Play or PCI expansion card from the list of cards installed.

Locking and Unlocking All Resources

To lock or unlock all the resources and configurations for a Plug and Play or PCI expansion card, perform the following steps:

1. **If it is not already installed, install the Plug and Play or PCI expansion card. Then turn on the system.**

   Complete steps 2 through 9 in "Installing an Expansion Card" in Chapter 6. The Plug and Play expansion card should be configured automatically by the system.

2. **Start the ICU.**

   See "Starting the ICU" found earlier in this chapter.

3. **Select LOCKING ENABLED from the Advanced menu in the ICU window.**

   A check mark next to **LOCKING ENABLED** signifies that the feature is active; a Lock button appears on the tool bar.

4. **Select the Plug and Play expansion card that you want to lock or unlock from the Cards Configured in System list.**

5. **Click Lock or select LOCK/UNLOCK CARD from the Advanced menu.**

   Both options toggle the lock state of the selected card.

Locking and Unlocking Configuration Resources

You can also lock and unlock individual resources for a card. To do so, perform the following steps:

1. **If it is not already installed, install the Plug and Play expansion card. Then turn on the system.**

   Complete steps 2 through 9 in "Installing an Expansion Card" in Chapter 6. The Plug and Play expansion card is configured automatically by the system.

2. **Start the ICU.**

   See "Starting the ICU" found earlier in this chapter.

3. **Select LOCKING ENABLED from the Advanced menu in the ICU window.**

   A check mark next to LOCKING ENABLED signifies that the feature is active; a Lock button appears on the tool bar.

4. **Select the Plug and Play expansion card that you want to lock or unlock from the Cards Configured in System list.**

5. **Click Modify or select MODIFY CARD from the Configure menu.**

6. **From the Card Configuration dialog box, select the function you want to lock or unlock.**

7. **Click Settings.**

8. **Modify the resource setting and/or resources offered on the Configuration Settings dialog box, if necessary.**

   See "Modifying a Card" found earlier in this chapter for more information.

9. **Select LOCK RESOURCES.**

   The Lock Resources box toggles the lock state of the selected configuration setting.

10. **Repeat steps 6 through 9 for any other configuration settings that you want to lock or unlock.**

11. **Click OK in the Card Configuration dialog box when you have finished making your selections.**

Modifying the Configuration Manager

PCI and Plug and Play expansion cards are automatically assigned resources when you start up your system. The Configuration Manager makes this resource information available to the ICU.

You can modify the Configuration Manager in two ways to conserve system memory. One option for conserving memory is to set the **/nolock** parameter in the **config.sys** file. The **/nolock** parameter disables the Lock Resources box in the Configuration Settings dialog box and saves 30 kilobytes (KB) of memory.

*NOTE: The **/nolock** parameter does not affect the Lock button or the LOCK/UNLOCK CARD option in the Advanced menu of the ICU.*

You can specify the **/nolock** parameter in the **config.sys** file by modifying the file to include the following command line:

```
device=c:\directory\config\dwcfgmg.sys /nolock
```

*NOTE: See your MS-DOS reference documentation for instructions on how to modify the **config.sys** file.*

Be sure to replace directory with the name of the directory in which you loaded the Configuration Manager. The default location for the Configuration Manager is the **c:\plugplay** directory.

A second method for conserving memory is to load the Configuration Manager driver, **dwcfgmg.sys**, into high memory using a memory manager, such as EMM386. To do so, you must modify the **config.sys** file to include the following command lines:

```
device=c:\windows\emm386.exe noems
devicehigh /size=a700
c:\plugplay\config\dwcfgmg.sys
```

If you want to take advantage of both options for conserving system memory by setting the **/nolock** parameter as well as loading the Configuration Manager into high memory, modify the **config.sys** file to contain the following command lines:

```
device=c:\windows\emm386.exe noems
devicehigh /size=32e0 c:\plugplay\con-
fig\dwcfgmg.sys /nolock
```

Chapter 4
Using Integrated Devices

*T*his chapter describes the configuration software provided with your system for the following integrated devices:

- Video controller
- Audio controller
- Network interface controller (NIC)

See the corresponding section in this chapter for the device you want to configure or reconfigure.

Video Controller

Your system has an S3 Trio64V+ 86C765 video controller, which includes video drivers for the following operating systems:

- Microsoft Windows 3.1*x* and Windows for Workgroups
- Microsoft Windows 95
- Microsoft Windows NT Workstation and Server

The video drivers for your operating system have already been installed on your hard-disk drive. For information on reinstalling video drivers, see "Using Drivers and Utilities" in your online *System User's Guide*. For instructions on changing to a different video driver, see your operating system documentation.

Audio Controller

Your system has a Crystal CS4236 audio controller and includes audio drivers for the following operating systems:

- Microsoft Windows 3.1*x* and Windows for Workgroups
- Microsoft Windows 95
- Microsoft Windows NT Workstation and Server

The audio drivers for your operating system have already been installed on your hard-disk drive. For information on reinstalling audio drivers, reconfiguring the audio controller, or using the audio utilities provided with your system, see "Using the Integrated Audio Controller" in your online *System User's Guide*.

NIC

This section describes how to connect your computer system to an Ethernet network using the built-in 3Com Peripheral Component Interconnect (PCI) 3C905TX NIC, which uses the 3C916 chip. The NIC provides all the functions normally provided by a separate network expansion card.

Your system includes drivers for running any of the following operating systems in a Novell® NetWare® environment:

- Microsoft Windows 95
- Microsoft Windows NT
- Microsoft Windows for Workgroups
- Microsoft Windows 3.*x*
- MS-DOS

You can also obtain client drivers for OS/2 from the Dell bulletin board service (BBS). See the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for the contact number for your location.

Your system also includes server drivers for NetWare 3.12 and 4.10 and can update the following Network Driver Interface Specification (NDIS) 2.01 drivers:

- MS-DOS and Microsoft Windows 3.*x*
- NDIS 2.01 for DEC PATHWORKS
- Banyan VINES Client
- IBM LAN Server
- Microsoft LAN Manager
- Artisoft LANtastic

See the appropriate subsection found later in this chapter for instructions on installing and configuring any of these drivers.

The NIC connector on the computer's back panel has the following indicators:

- A yellow *activity indicator* flashes when the system is transmitting or receiving network data. (A high volume of network traffic may make this indicator appear to be in a steady "on" state.)
- A green *link integrity indicator* lights up when there is a good connection between the network and the NIC. When the green indicator is off, the computer is not detecting a physical connection to the network.
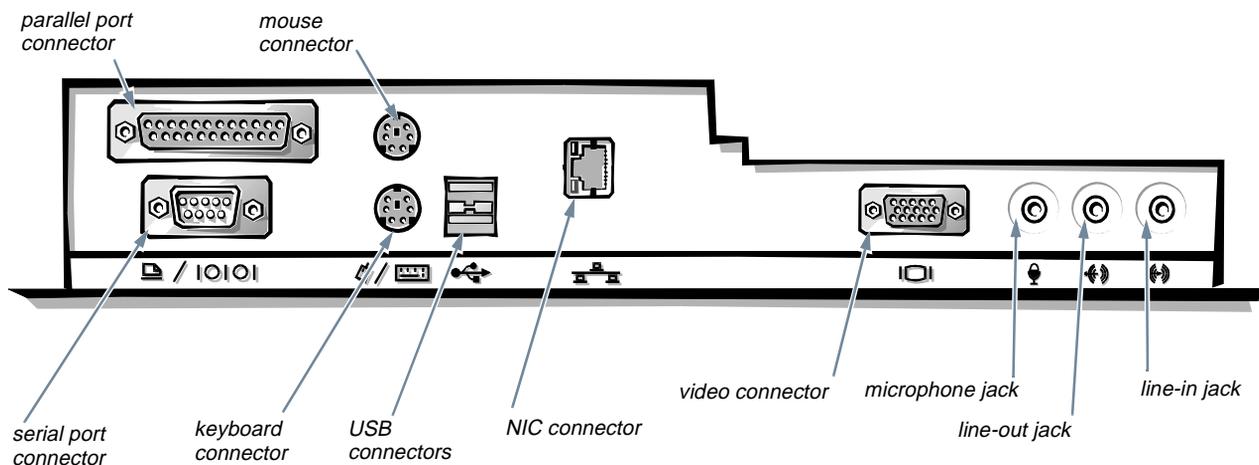

Figure 4-1. I/O Ports and Connectors

Connecting to a Network

To connect your system to and configure it for use on an Ethernet network, you must complete the following steps:

1. **Connect the network cable to the back of your computer.**

   See the following subsection, "Network Cable Requirements," for detailed instructions.

2. **Verify that the NIC is enabled in the System Setup program.**

   See "NIC" in Chapter 2 for instructions.

3. **Configure the NIC, and install the network drivers by running the 3Com Install program.**

   See "Configuring the NIC" found later in this chapter for detailed instructions.

4. **Run the Network Interface Test Group in the diskette-based diagnostics to verify that the NIC is operating properly.**

   See the chapter titled "Running the Diskette-Based Diagnostics" in your *Diagnostics and Troubleshooting Guide* for detailed instructions.

Network Cable Requirements

Your computer's NIC connector (an RJ45 connector located on the back panel; see Figure 4-1) is designed for attaching an unshielded twisted pair (UTP) Ethernet cable. Press one end of the UTP cable into the NIC connector until the cable snaps securely into place.

Connect the other end of the cable to an RJ45 jack wall plate or to an RJ45 port on a UTP concentrator or hub, depending on your network configuration. Observe the following cabling restrictions for 10Base-T and 100Base-TX networks:

- For 10-megabit (Mb) operation, use Category 3 or greater wiring and connectors. For 100-Mb operation, use Category 5 wiring and connections. Voice and data lines should be in separate sheaths.

- The maximum cable run length (from a workstation to a concentrator) is 328 feet (ft) (100 meters [m]).

- The maximum number of workstations (not counting concentrators) on a network is 1024.

- The maximum number of daisy-chained concentrators on one network segment is four.

Configuring the NIC

To configure the NIC, you must first use the Dell Disk-Maker to make a NIC driver diskette from the diskette image installed on your hard-disk drive. The Dell Disk-Maker is located in the Dell Accessories program group or folder. For instructions on using Dell DiskMaker, see the online help provided in the program. After you have made a NIC driver diskette, see the appropriate subsection found later in this chapter for your particular network environment.

Client Drivers for Novell NetWare Environments

You can configure your system as a client computer under Novell NetWare running any of the following operating systems:

- Microsoft Windows 95

- Microsoft Windows NT 3.5*x*

- Microsoft Windows for Workgroups

- Microsoft Windows 3.*x*

- MS-DOS

- IBM OS/2

NOTE: The drivers for Windows NT 4.0 are provided on the Windows NT CD in the **\drvlib\netcard\x86\3c90x** *and* **\i386\drvlib.nic\3c90x** *directories.*

Microsoft Windows 95 Client Driver

Install the Microsoft Windows 95 client driver as follows:

1. **Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.**

2. **Start Windows 95.**

3. **If you are prompted to insert a diskette containing the network drivers, skip to step 11. Otherwise, continue to step 4.**

4. From the Start menu, select SETTINGS, and then select CONTROL PANEL. Then double-click the System icon.

5. Click the Device Manager tab.

6. If there are *no* PCI Ethernet network adapters listed under the Other Devices category and *no* 3COM FAST ETHERLINK XL 10/100MB ETHERNET ADAPTER entries listed under Network Adapters, continue to step 7.

   If there *are* any PCI Ethernet network adapters listed under the Other Devices category, select them and click Remove. If there *are* any entries named 3COM FAST ETHERLINK XL 10/100MB ETHERNET ADAPTER listed under Network Adapters, select them and click Remove. Then exit the Control Panel, restart Windows 95, and skip to step 11.

7. From the Start menu select SETTINGS, and then select CONTROL PANEL. Then double-click the Network icon.

8. Click Add.

9. Select ADAPTER, and then click Add.

10. Click Have Disk.

11. Insert the NIC driver diskette into a drive and click OK. Ensure that the path in the Install From Disk dialog box reflects the diskette drive containing the NIC driver diskette.

12. Select 3COM FAST ETHERLINK XL 10/100MB ETHERNET ADAPTER. Then click OK.

13. Click the Identification tab and enter your computer name and workgroup/domain.

    See your network administrator for more information.

14. If you are prompted for the location of additional files, specify the c:\windows\options\cabs or the \win95 directory on your CD-ROM drive and click OK.

15. When prompted, restart your system.

Microsoft Windows NT 3.5x Client Driver

Install the Microsoft Windows NT 3.5*x* client driver as follows:

1. Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.

2. Start Windows NT and log in as user administrator or as a user with administrator privileges.

3. From the Control Panel, double-click the Network icon.

4. From the Network Settings window, click Add Adapter.

5. From the Add Adapter window, select <OTHER> REQUIRES DISK FROM MANUFACTURER and click Continue.

6. Insert the NIC driver diskette into drive A. Then press <ENTER>.

7. At the Select OEM Option window, select 3COM FAST ETHERLINK XL ADAPTER (3C905) and click OK.

8. From the Network Settings window, click OK.

9. Remove the NIC driver diskette from the diskette drive. Then, from the Network Settings Change window, click Restart to restart your system.

Microsoft Windows for Workgroups Client Driver

Install the Microsoft Windows for Workgroups client driver as follows:

1. Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.

2. Start Windows for Workgroups.

3. In the Network program group, double-click the Network Setup icon.

4. In the Network Setup dialog box, click Drivers.

5. In the Network Drivers dialog box, click Add Adapter.

6. Select UNLISTED OR UPDATE NETWORK ADAPTER and click OK.

7. **Insert the NIC driver diskette into drive A. Then type** `a:\wfw311` **in the Install Driver dialog box and click OK.**

8. **In the Unlisted or Updated Network Adapter dialog box, select 3COM FAST ETHERLINK XL / ETHERLINK XL ADAPTER (3C90X) and click OK.**

9. **In the Network Drivers dialog box, click Close.**

10. **In the Network Setup dialog box, click OK.**

11. **Remove the NIC driver diskette from drive A, save changes to any open files, and then click Restart Computer.**

Microsoft Windows 3.x Client Driver

Install the Microsoft Windows 3.*x* client driver as follows:

1. **Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.**

2. **If Windows is not yet installed on the system, follow the instructions in "Using AutoLink to Configure a Single 3C90*x* NIC" or "Using Install to Configure Multiple 3C90*x* NICs" found later in this chapter. Otherwise, continue to step 3.**

3. **If Windows is already installed, double-click the Windows Setup icon in the Main program group.**

4. **From the Options menu, select CHANGE NETWORK SETTINGS.**

5. **From the Network Setup menu, click Drivers.**

6. **From the Network Drivers menu, click Add Adapter.**

7. **Select 3COM FAST ETHERLINK XL/ETHERLINK XL ADAPTER (3C90X) and click OK.**

8. **After the driver has been installed, restart Windows.**

MS-DOS Client Driver

You can use the 3Com AutoLink program to automatically configure the NIC if you do not have any additional NICs installed in the system, your network is using NetWare 3.12 or 4.10, and your system will be used as a NetWare DOS Open Data Link Interface (ODI) client.

Otherwise, you must use the 3Com Install program to configure the NIC.

Using AutoLink to Configure a Single 3C90*x* NIC

To configure a single 3C90*x* NIC, follow these steps:

1. **Boot the system to MS-DOS.**

   For instructions, see your MS-DOS reference documentation.

2. **Insert the NIC driver diskette into drive A. Then type** `a:` **and press <ENTER>.**

3. **Type** `autolink` **and press <ENTER>.**

   The first time you run the Install program, a license agreement screen appears. To accept the terms and conditions of the license agreement, type `y` and press <ENTER>. Several messages appear while AutoLink is running. A final message indicates that the installation was successful.

   If the installation is unsuccessful, view or print the contents of the **autolink.log** file stored on the NIC driver diskette.

   When the installation is complete, you are asked if you want to restart the computer.

4. **Remove the NIC driver diskette and restart the computer.**

Using Install to Configure Multiple 3C90*x* NICs

NOTE: Use multiple NICs in a client computer only if you plan to run multiple protocols or connect to more than one network. For information on multiple protocols, see your operating system documentation.

To configure multiple 3C90x NICs (the integrated NIC and a NIC expansion card) under MS-DOS, Windows 3.*x*, or Windows for Workgroups, follow these steps:

1. **Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.**

2. **Configure the integrated NIC according to the instructions in the preceding subsection, "Using AutoLink to Configure a Single 3C90*x* NIC."**

3. **Install the NIC expansion card according to the instructions in "Installing an Expansion Card" in**

Chapter 6. Then connect the NIC expansion card to its network.

4. **Turn on the system.**

5. **When the** `Starting MS-DOS` **message is displayed, press <F5> to prevent loading any drivers or memory managers.**

6. **Insert the NIC driver diskette into drive A. Then type** `a:` **and press <ENTER>.**

7. **Type** `install` **and press <ENTER>.**

8. **Select CONFIGURATION AND DIAGNOSTIC PROGRAM from the Main Menu.**

9. **Scroll the list of NICs and find the integrated NIC and the NIC expansion card you installed. Write down the slot number and bus number for each.**

10. **Type the following commands and press <ENTER> after each:**

    ```
    cd c:\nwclient
    edit net.cfg
    ```

11. **Find the following** `LINK Driver 3C90X` **section in the file:**

    ```
    LINK Driver 3C90X
    ;
    ; BUS NN
    ; SLOT 7
    ```

12. **Delete the semicolon from the** `BUS NN` **line and replace** `NN` **with the bus number for the integrated NIC.**

    Use the bus number you recorded in step 9.

13. **Delete the semicolon from the** `SLOT 7` **line and replace** `7` **with the slot number for the integrated NIC.**

    Use the slot number you recorded in step 9.

14. **Copy the four modified lines shown in step 11 and paste them below the original four lines. Then modify the** `BUS` **and** `SLOT` **lines to reflect the bus number and slot number for the NIC expansion card.**

15. **Restart the system.**

OS/2 Client Driver

NOTE: The OS/2 drivers are available from the Dell BBS. See the chapter titled "Getting Help" in your Diagnostics and Troubleshooting Guide *for the contact number for your location.*

Install the OS/2 client driver as follows:

1. **Connect the integrated NIC to its network according to the instructions in "Connecting to a Network" found earlier in this chapter.**

2. **Exit to MS-DOS by doing one of the following:**

    • Restart the system with a clean, bootable MS-DOS diskette in drive A.

    • Type the following commands in an OS/2 window, pressing <ENTER> after each:

      ```
      cd /os2
      boot /dos
      ```

3. **Insert the NIC driver diskette into drive A. Then type** `a:` **and press <ENTER>.**

4. **Type** `install` **and press <ENTER>.**

5. **From the Main Menu, select DRIVER INSTALLATION AND UPDATE and press <ENTER>.**

6. **From the Network Drivers menu, select INSTALL NOVELL NETWARE DRIVERS and press <ENTER>.**

7. **From the Novell NetWare Drivers menu, select COPY OS/2 ODI DRIVER and press <ENTER>.**

8. **If you want to copy the driver to** c:\netware**, press <ENTER>. To copy the driver to another directory, type the path and press <ENTER>.**

Server Drivers for Novell NetWare Environments

You can configure your system as a server computer under either Novell NetWare 3.12 or 4.10. The drivers for these network operating systems are located in the **\nw312** and **\nw410** directories on the NIC driver diskette. Instructions for installing and configuring these drivers are contained in the **help.exe** program on the NIC driver diskette.

Updating NDIS 2.01 Drivers

For instructions on updating the NDIS 2.01 drivers, insert the NIC driver diskette into a diskette drive, switch to the drive containing the diskette, type install, and press <ENTER>. Select **DRIVER INSTALLATION AND UPDATE** and then select **NDIS DRIVER INSTALLATION AND INFORMA-TION**. If you are updating MS-DOS or Windows 3.*x* NDIS drivers, you must then select **UPDATE NDIS DRIV-ERS**. Follow the instructions on the screen for your operating system.

Chapter 5
Working Inside Your Computer

Your Dell computer system supports a variety of internal options that expand system capabilities. This chapter prepares you to install options inside the computer. It describes how to remove and replace the computer cover and expansion-card cage, and it familiarizes you with the internal components you may handle if you install Dell hardware options.

Before You Begin

To make working inside your computer easier, make sure you have adequate lighting and a clean work space. If you temporarily disconnect cables or remove expansion cards, note the position of the connectors and slots so that you can reassemble the system correctly.

You will use the information in this section every time you install a hardware option inside your computer. *Read this section carefully*, because the information is not repeated in detail elsewhere in this guide.

Safety First—For You and Your Computer

Working inside your computer is safe—*if* you observe the following precautions.

WARNING FOR YOUR PERSONAL SAFETY AND PROTECTION OF YOUR EQUIPMENT

Before starting to work on your computer, perform the following steps in the sequence indicated:

1. **Turn off your computer and all peripherals.**

2. **Disconnect your computer and peripherals from their alternating current (AC) power sources. Also, disconnect any telephone or telecommunication lines from the computer. Doing so reduces the potential for personal injury or shock.**

3. **If you are disconnecting a peripheral from the computer or are removing a component from the system board, wait 5 seconds after turning off the computer before disconnecting the peripheral or removing the component to avoid possible damage to the system board.**

4. **Touch an unpainted metal surface on the computer chassis, such as the power supply, before touching anything inside your computer.**

   While you work, periodically touch an unpainted metal surface on the computer chassis to dissipate any static electricity that might harm internal components. Also avoid touching components or contacts on a card and avoid touching pins on a chip.

In addition, Dell recommends that you periodically review the safety instructions at the front of this guide.

Unpacking Your Hardware Option

When you remove an option from its shipping carton, you may find it wrapped in antistatic packing material designed to protect it from electrostatic damage. Do not remove the packing material until you are ready to install the option.

> **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

Removing the Computer Cover

Use the following procedure to remove the computer cover:

1. **Turn off your computer and peripherals, and observe the *Warning for Your Personal Safety and Protection of Your Equipment* found earlier in this chapter. Also observe the safety instructions at the front of this guide.**

2. **If you have installed a padlock through the two rings on the cover and the back panel (see Figure 5-1), remove the padlock.**
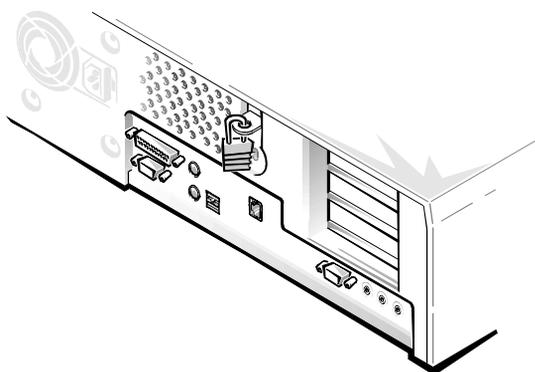

Figure 5-1. Padlock Installed

3. **Remove the floor stand if attached.**

   See "Using the Optional Floor Stand" in Chapter 1 for instructions.

4. **Remove the cover.**

   From the front of the computer, press in the two securing buttons (located on the sides of the cover toward the back). With the buttons depressed, lift the cover at the back, allowing it to pivot up toward you (see Figure 5-2).

   Disengage the plastic hooks that secure the cover to the front of the chassis, and lift the cover away.

front of computer

securing button

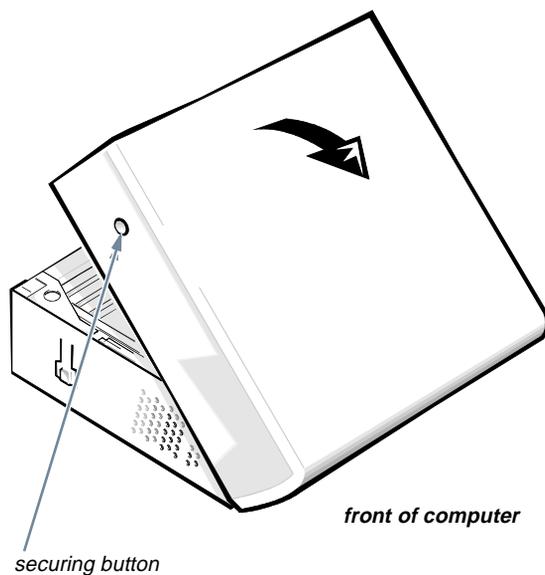**Figure 5-2. Removing the Computer Cover**

Replacing the Computer Cover

Use the following procedure to replace the computer cover:

1. **Check all cable connections, especially those that might have come loose during your work. Fold cables out of the way so that they do not catch on the computer cover. Make sure cables are not routed over the drive cage—they will prevent the cover from closing properly.**

2. **Check to see that no tools or extra parts (including screws) are left inside the computer's chassis.**

3. **Replace the cover.**

   From the front of the computer, hold the cover at about a 45-degree angle as shown in Figure 5-3. Fit the three cover hooks into the rectangular slots on the chassis. (It may be helpful to look down into the chassis to verify that the hooks are in place.)

   Pivot the cover down toward the back and into position. Make sure the securing buttons click into place.

   NOTE: The computer should be placed fully on a flat surface. It is difficult to align the cover if the front of the computer is hanging over the edge of a table.
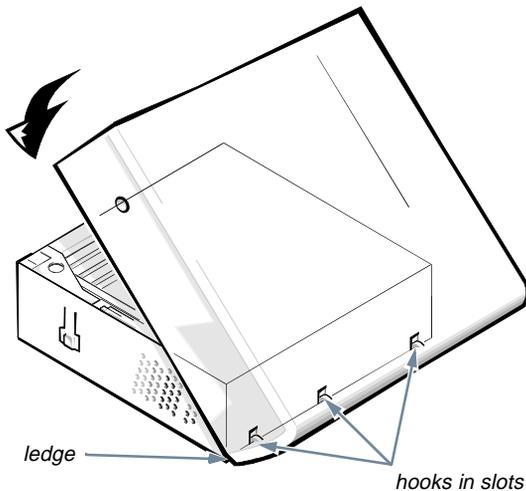

Figure 5-3. Replacing the Computer Cover

4. **If you are using the optional floor stand, reattach the floor stand.**

   See "Using the Optional Floor Stand" in Chapter 1 for instructions.

5. **If you are using a padlock to secure your system, reinstall the padlock.**

Removing and Replacing the Expansion-Card Cage

Your Dell computer has a removable expansion-card cage, which greatly simplifies many installation procedures by allowing you to remove the riser board and all installed expansion cards in a single step.

Removing the Expansion-Card Cage

Use the following procedure to remove the expansion-card cage:

1. **Remove the computer cover as instructed in "Removing the Computer Cover" found earlier in this chapter.**

2. **Check any cables connected to expansion cards through the back-panel openings. Disconnect any cables that will not reach to where the cage must be placed upon removal from the chassis.**

3. **Locate the card-cage securing lever (see Figure 5-4). Rotate the lever upward until it stops in an upright position.**
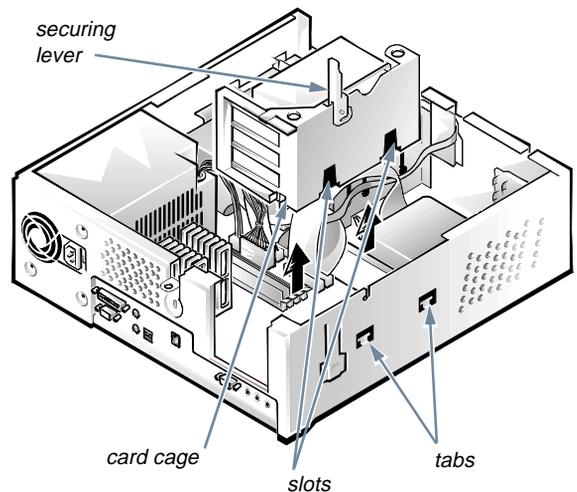

Figure 5-4. Removing the Expansion-Card Cage

4. **Lift the expansion-card cage up and away from the chassis.**

Replacing the Expansion-Card Cage

Use the following procedure to replace the expansion-card cage:

1. **With the securing lever in the upright position, align the slots in the left side of the expansion-card cage with the tabs on the left side of the chassis (see Figure 5-4). Then lower the expansion-card cage into place.**

2. **Rotate the securing lever downward until it is flush with the top of the chassis. Make sure the riser board is fully seated in the RISER connector on the system board.**

3. **Reconnect any cables you removed in step 2 of the previous procedure, "Removing the Expansion-Card Cage."**

Inside Your Computer

Figure 5-5 shows an overhead view of your computer to help you orient yourself when installing hardware options. Some procedures may provide different orientation instructions if you are not facing the front of the computer while performing the procedure.
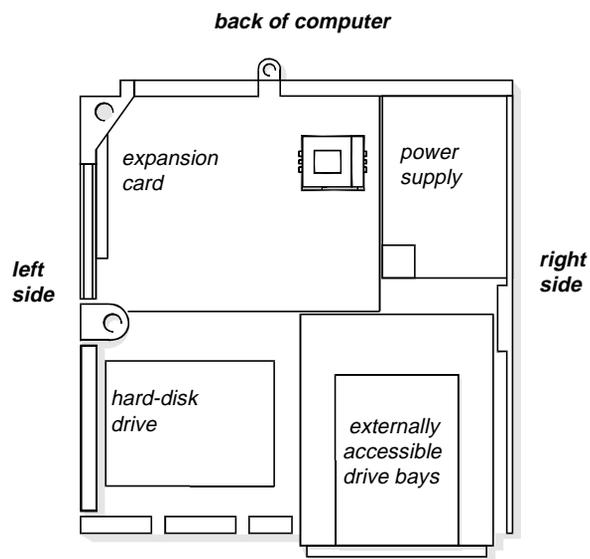

Figure 5-5. Computer Orientation View

Figure 5-6 shows your computer with its cover removed. Refer to this illustration to locate interior features and components discussed in this guide.

When you look inside your computer, note the *direct current (DC) power cables* coming from the power supply. These cables supply power to the system board; to internal diskette drives, hard-disk drives, and tape drives; and to certain expansion cards that connect to external peripherals.

The flat ribbon cable in Figure 5-6 is typical of the *interface cables* for internal drives. An interface cable connects a drive to a connector on the system board or on an expansion card.

The *system board*—the large printed circuit board at the bottom of the chassis—holds the computer's control circuitry and other electronic components. Some hardware options are installed directly onto the system board.

During an installation procedure, you may be required to change a *jumper* setting on the system board and/or a jumper or *switch* setting on an expansion card or on a drive. Jumpers and switches provide a convenient and reversible way of reconfiguring the circuitry on a printed circuit board. For information on jumpers and switches, see the next two subsections, "Jumpers" and "Switches."

Jumpers

Jumpers are small blocks on a circuit board with two or more pins emerging from them.

Plastic plugs containing a wire fit down over the pins. The wire connects the pins and creates a circuit.

To change a jumper setting, pull the plug off its pin(s) and carefully fit it down onto the pin(s) indicated.

> **CAUTION: Make sure your system is turned off before you change a jumper setting. Otherwise, damage to your system or unpredictable results may occur.**

A jumper is referred to as *open* or *unjumpered* when the plug is pushed down over only one pin or if there is no plug at all. When the plug is pushed down over two pins, the jumper is referred to as *jumpered*. In some documents, the jumper setting may be shown in text as two numbers, such as *1-2*. The number *1* is printed on the circuit board so that you can identify each pin number based on the location of pin 1.

Figure 5-7 shows the location and default settings of the jumper blocks on your system board. See Table 5-1 for the designations, default settings, and functions of your system's jumpers.

Switches

Switches control various circuits or functions in your computer system. The switches you are most likely to encounter are dual in-line package (DIP) switches, which are normally packaged in groups of two or more switches in a plastic case. Two common types of DIP switches are *slide* switches and *rocker* switches (see the following illustration).
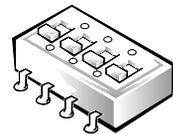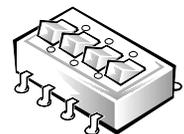
slide switches   rocker switches

Each of these switches has two positions, or *settings* (usually *on* and *off*). To change the setting of a slide switch, use a small, pointed object such as a small screwdriver or a straightened paper clip to slide the switch to the proper position. To change the setting of a rocker switch, use the screwdriver or paper clip to press down on the appropriate side of the switch. In either case, do not use a pen, pencil, or other object that might leave a residue on the switch.

DC power cable

drive in upper bay

drive interface cable

hard-disk drive

power supply

AC power
receptacle

fan guard

voltage selection
switch

parallel port connector

serial port connector

mouse connector

keyboard connector

USB connectors

padlock ring

security cable slot

front of computer

NIC connector

video connector

microphone jack

line-out jack

line-in jack

system board

expansion-card cage

Figure 5-6. Inside the Chassis

100
133
166
200
PSWD
BIOS

NICRST
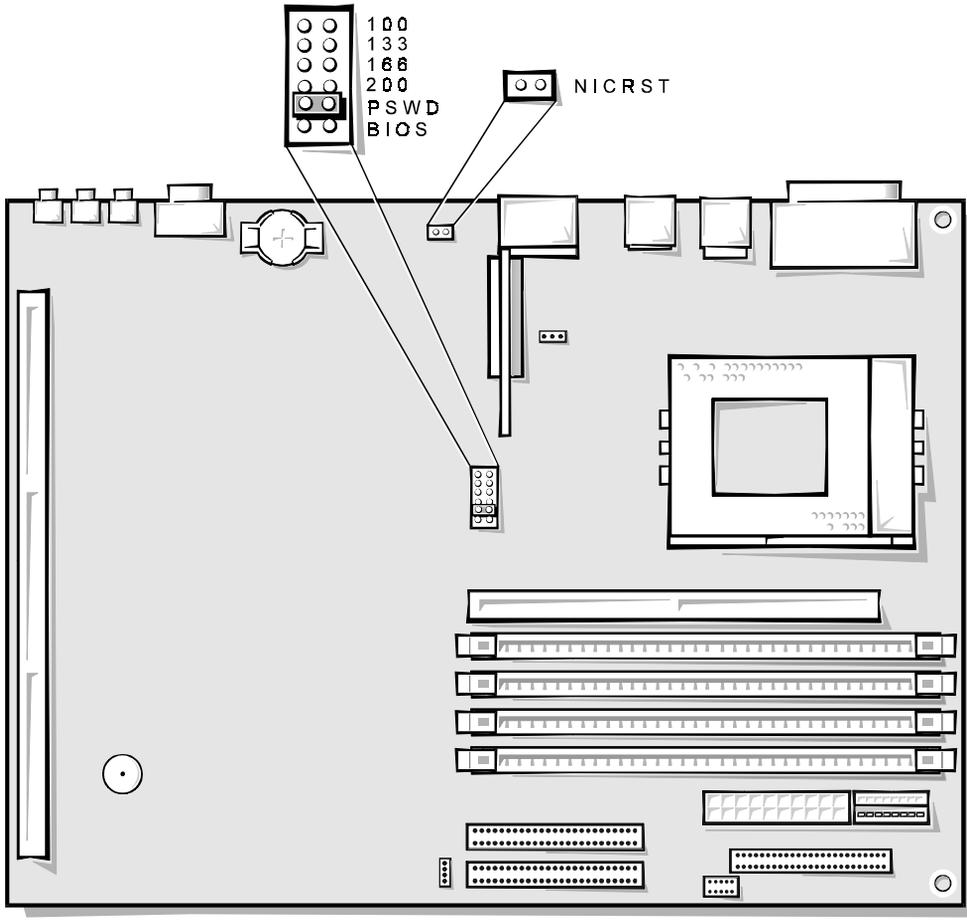
jumpered   unjumpered

Figure 5-7. System Board Jumpers

Table 5-1. System-Board Jumper Settings

Jumper	Setting		Description
100			Reserved (*do not use*).
133*			Jumpered when the microprocessor's internal speed is 133 MHz.
166*			Jumpered when the microprocessor's internal speed is 166 MHz.
200*			Jumpered when the microprocessor's internal speed is 200 MHz.
PSWD		(default)	Password feature enabled.
			Password feature disabled.
BIOS		(default)	Reserved (*do not use*).
NICRST		(default)	Reserved (*do not use*).

*   *One set of the speed jumper pins must have a jumper plug installed; otherwise, the system will operate at an undetermined speed.*

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

 jumpered   *unjumpered*

System Board Labels

Table 5-2 lists the connectors and sockets on your system board and riser board, and it gives a brief description of their functions.

Table 5-2. System Board and Riser Board Connectors and Sockets

Connector or Socket	Description
BATTERY	Battery socket
CACHE	Cache-memory card connector
CD_IN	CD-ROM drive interface connector
DIMM_*x*	DIMM socket
DSKT	Diskette/tape drive interface connector
ENET	NIC connector (on NIC daughter card)
FAN	Microprocessor cooling fan
IDE*n*	EIDE interface connector
ISA*n**	ISA expansion-card connector (on riser board)
KYBD	Keyboard connector
LINE-IN	Audio line-in connector
LINE-OUT	Audio line-out connector
MIC	Microphone connector
MICROPROCESSOR	Microprocessor socket
MONITOR	Video connector
MOUSE	Mouse connector
NETWORK	NIC daughter card connector
PANEL	Control panel connector
PARALLEL	Parallel port connector; sometimes referred to as *LPT1*
PCI*n**	PCI expansion-card connector (on riser board)
POWER_1	Main power input connector
POWER_2	3.3-V power input connector
RISER	Riser board connector
SERIAL	Serial port connector; sometimes referred to as *COM1*
USB	USB connectors

*   *The ISA1/PCI2 connector pair shares a single card-slot opening, so only one of the two connectors can be used.*

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in your online System User's Guide.

Chapter 6
Installing System Board Options

This chapter describes how to install the following options:

- Industry-Standard Architecture (ISA) and Peripheral Component Interconnect (PCI) expansion cards

- System memory
- Microprocessor

This chapter also includes instructions for replacing the system battery, if necessary.
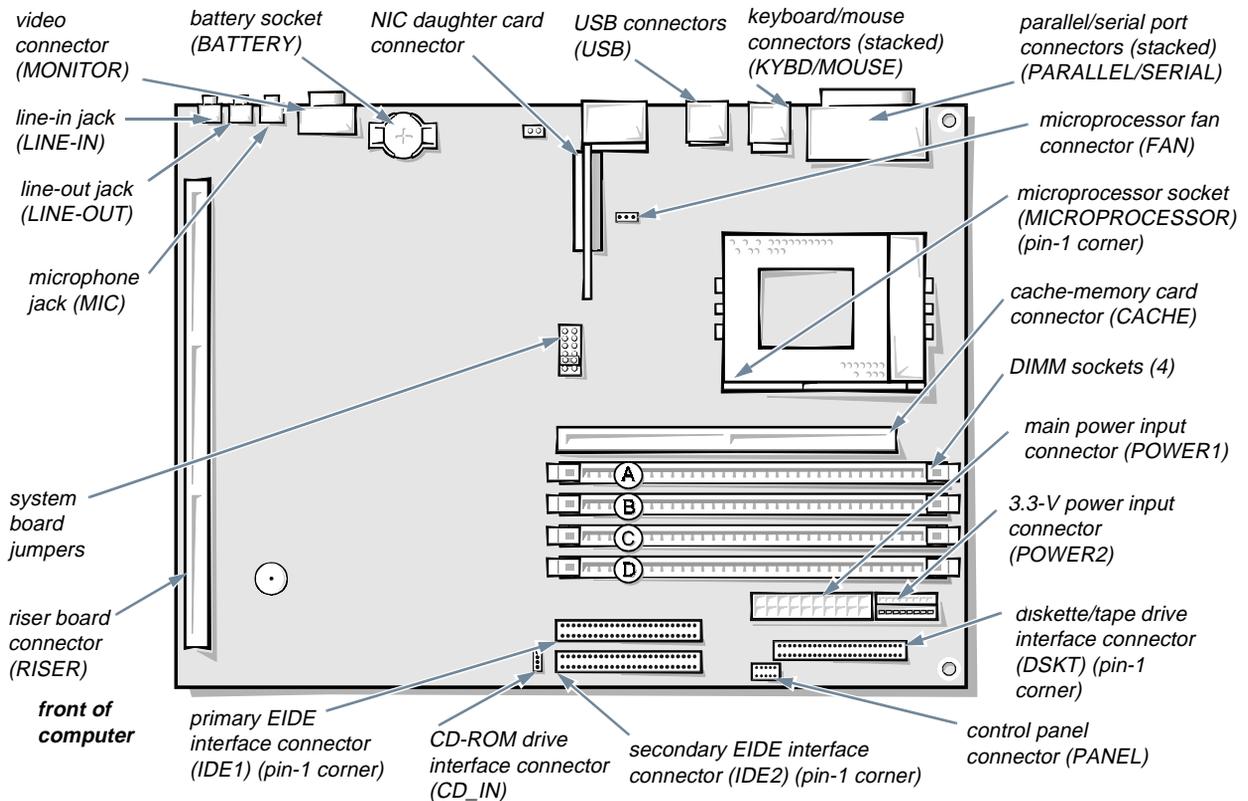
Use Figure 6-1 to locate the system board features.

Figure 6-1. System Board Features

Expansion Cards

Expansion cards can be installed on the computer's *riser board* (see Figure 6-3). The vertical riser board plugs into the RISER connector on the system board (see Figure 6-1) and is considered an extension of the system board.

The system accommodates up to three expansion cards, which can be a mix of 32-bit PCI expansion cards and 8- and 16-bit ISA expansion cards. (See Figure 6-2 for examples of ISA and PCI expansion cards.)

8-bit ISA expansion card

16-bit ISA expansion card

32-bit PCI expansion card
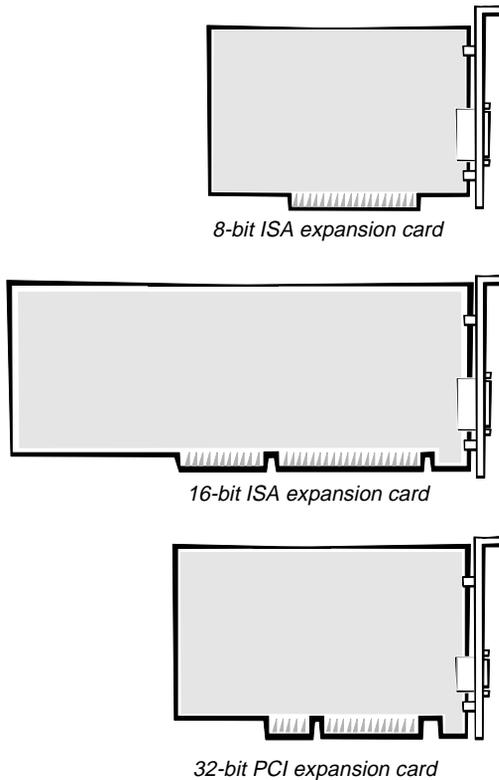
Figure 6-2. Expansion Cards

Expansion Slots

Four expansion-card connectors reside on the *riser board* (see Figure 6-3). Because two expansion-card connectors share slot space, a maximum of three expansion cards can be installed.

- Expansion-card connectors ISA2 (at the top of the card) and ISA1 can accommodate 8- or 16-bit ISA expansion cards.

- Expansion-card connectors PCI1 and PCI2 support PCI expansion cards.

  NOTES: Connector PCI2 shares expansion-slot space with connector ISA1, so only one card of either type can be installed in the common slot.

  Because of the height of the hard-disk drive, expansion-card connector PCI1 is limited to an 8.75-inch-long card.

Figure 6-3. Riser-Board Expansion-Card Connectors

Installing an Expansion Card

Follow this general procedure to install an expansion card:

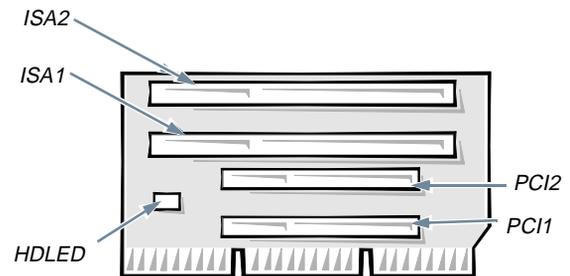1. **If you are installing an ISA expansion card, enter the ISA Configuration Utility (ICU) and add the new expansion card to your configuration.**

    See Chapter 3, "Using the ISA Configuration Utility," for instructions.

    NOTE: If you install a PCI or Plug and Play expansion card, your system automatically performs any required configuration tasks during the boot routine.

2. **Prepare the expansion card for installation, and remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

    > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

    See the documentation that came with the expansion card for information on configuring the card, making internal connections, or otherwise customizing it for your system.

3. **Remove the expansion-card cage as instructed in "Removing the Expansion-Card Cage" in Chapter 5.**

4. **Unscrew and remove the metal filler bracket that covers the card-slot opening for the expansion slot you intend to use (see Figure 6-4).**

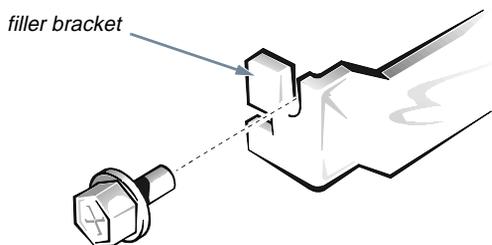   Save the screw to use when installing the expansion card later in this procedure.

Figure 6-4. Removing the Filler Bracket

5. **Install the expansion card.**

    Position the expansion-card cage so that the riser board lies horizontally on your work surface.

    Insert the card-edge connector firmly into the expansion-card connector on the riser board. Gently rock the card into the connector until it is fully seated (see Figure 6-5).
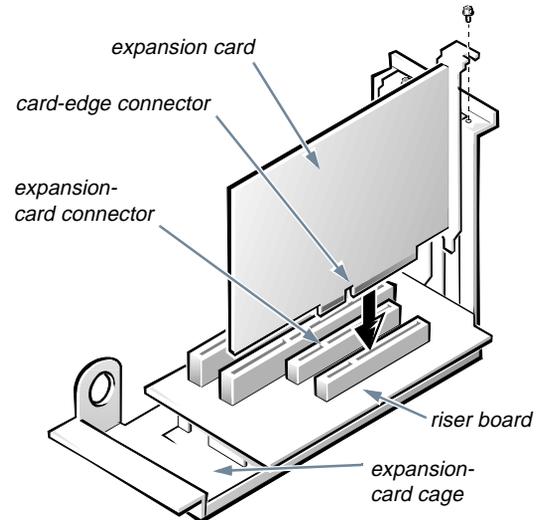
Figure 6-5. Installing an Expansion Card

6. **When the card is firmly seated in the connector and the card-mounting bracket is flush with the brackets on either side of it, secure the bracket with the screw you removed in step 4.**

7. **Replace the expansion-card cage in the chassis as instructed in "Replacing the Expansion-Card Cage" in Chapter 5.**

8. **Connect any cables that should be attached to the card.**

    See the documentation that came with the card for information about its cable connections.

9. **Replace the computer cover; reconnect your computer and peripherals to their power sources, and turn them on.**

Removing an Expansion Card

Follow this general procedure to remove an expansion card:

1. **If you are removing an ISA expansion card, enter the ICU and remove the expansion card from your configuration.**

    See Chapter 3, "Using the ISA Configuration Utility," for instructions.

2. **Remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

    > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

3. **If necessary, disconnect any cables connected to the card.**

4. **Remove the expansion-card cage as instructed in "Removing the Expansion-Card Cage" in Chapter 5.**

5. **Position the expansion-card cage so that the riser board lies horizontally on your work surface, and unscrew the mounting bracket of the card you want to remove.**

6. **Grasp the card by its outside corners, and ease it out of its connector.**

7. **If you are removing the card permanently, install a metal filler bracket over the empty card-slot opening.**

    NOTE: Installing filler brackets over empty card-slot openings is necessary to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of your computer.

8. **Replace the expansion-card cage in the chassis as instructed in "Replacing the Expansion-Card Cage" in Chapter 5.**

9. **Replace the computer cover; reconnect your computer and peripherals to their power sources, and turn them on.**

Adding Memory

Memory can be increased to a maximum of 512 megabytes (MB) by installing combinations of 8-, 16-, 32-, 64-, or 128-MB dual in-line memory modules (DIMMs) in the four DIMM sockets on the system board. Figure 6-6 shows the DIMMs and DIMM sockets.

Your system can support both error correction code (ECC) and non-ECC extended-data out (EDO) DIMMs. However, ECC support is available only if all DIMMs are ECC DIMMs. ECC DIMMs enable your system to correct all single-bit memory errors and detect multibit memory errors.

Figure 6-6. DIMMs and DIMM Sockets
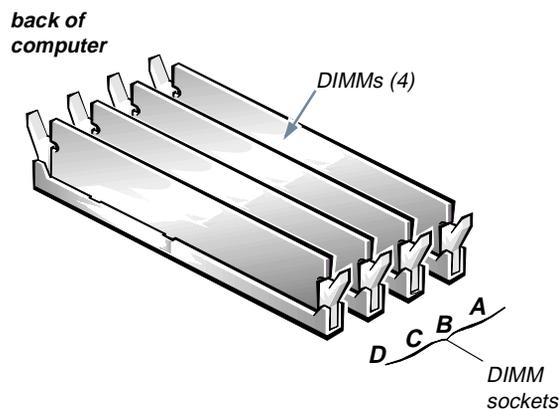
Table 6-1 lists sample memory configurations and shows valid DIMM combinations and socket placement for each configuration.

> **CAUTION: Do not use 32-MB DIMMs from the Dell OptiPlex GX*pro* that contain a silver sticker with the designation Kmm373F000Ak-6 in your OptiPlex GX*i* system. These DIMMs may not work reliably or will not be recognized in your OptiPlex GX*i* system.**

Table 6-1. Sample DIMM Configuration Options

Total Desired Memory	DIMM Socket			
	A	B	C	D
16 MB	16 MB			
24 MB	16 MB	8 MB		
32 MB	32 MB			
40 MB	32 MB	8 MB		
48 MB	32 MB	16 MB		
56 MB	32 MB	16 MB	8 MB	
64 MB	64 MB			
64 MB	32 MB	32 MB		
72 MB	32 MB	32 MB	8 MB	
80 MB	32 MB	32 MB	16 MB	
88 MB	32 MB	32 MB	16 MB	8 MB
96 MB	32 MB	32 MB	32 MB	
104 MB	32 MB	32 MB	32 MB	8 MB
112 MB	32 MB	32 MB	32 MB	16 MB
128 MB	128 MB			
128 MB	32 MB	32 MB	32 MB	32 MB
192 MB	128 MB	64 MB		
256 MB	128 MB	128 MB		
320 MB	128 MB	128 MB	64 MB	
384 MB	128 MB	128 MB	128 MB	
448 MB	128 MB	128 MB	128 MB	64 MB
512 MB	128 MB	128 MB	128 MB	128 MB

NOTES: For optimum performance, install DIMMs in consecutive sockets starting with socket A (see Figure 6-1).

Table 6-1 is not a complete list of all valid DIMM configurations.

Performing a Memory Upgrade

Follow this procedure to perform a memory upgrade:

1. **Remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

   > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

2. **Identify the DIMM sockets in which you will install DIMMs or replace existing DIMMs.**

   See Table 6-1.

3. **Install or replace DIMMs as necessary to reach the desired memory total.**

   Follow the instructions in "Installing a DIMM" or "Removing a DIMM," as appropriate, found later in this section.

4. **Replace the computer cover; reconnect your computer and peripherals to their power sources, and turn them on.**

   After the system completes the power-on self-test (POST) routine, the system runs a memory test that displays the total memory of all installed DIMMs, including those you just installed.

   NOTE: If the memory total is incorrect, turn off your computer and peripherals and disconnect them from their power sources, remove the computer cover, and make sure that the installed DIMMs are seated properly in their sockets. Then repeat this step.

   The system detects that the new memory does not match the existing system configuration information, which is stored in nonvolatile random-access memory (NVRAM), and generates the following message:

   ```
   The amount of system memory has
   changed.
   Strike the F1 key to continue, F2 to
   run the setup utility
   ```

5. **Press <F2> to enter the System Setup program, and check the SYSTEM MEMORY category in the lower-right corner of Page 1.**

   The system should have already changed the value in the **SYSTEM MEMORY** category to reflect the newly installed memory. Verify the new total.

   NOTES: The value of **SYSTEM MEMORY** *is given in kilobytes. To convert kilobytes to megabytes, divide the kilobyte total by 1024.*

   If the memory total is incorrect, turn off your computer and peripherals and disconnect them from their power sources, remove the computer cover, and check the installed DIMMs to make sure that they are seated properly in their sockets. Then repeat steps 4 and 5.

6. **When the SYSTEM MEMORY total is correct, press the <ESC> key to exit the System Setup program.**

7. **Run the Dell diagnostics to verify that the DIMMs are operating properly.**

   See your *Diagnostics and Troubleshooting Guide* for information on running the diskette-based diagnostics and troubleshooting any problems that may occur.

Installing a DIMM

Use the following procedure (and see Figure 6-7) to install a DIMM:

1. **Locate the first empty socket in which you plan to install a DIMM.**

   For optimum performance, DIMMs should be installed in consecutive sockets beginning with socket A.

2. **Locate the plastic securing clips at each end of the socket. Press the clips outward until they snap open.**

3. **Orient the DIMM to the socket by aligning the notches in the DIMM's edge connector with the crossbars in the socket.**

4. **Press the DIMM straight down into the slot running down the center of the socket until the securing tabs snap into place around the ends of the DIMM.**
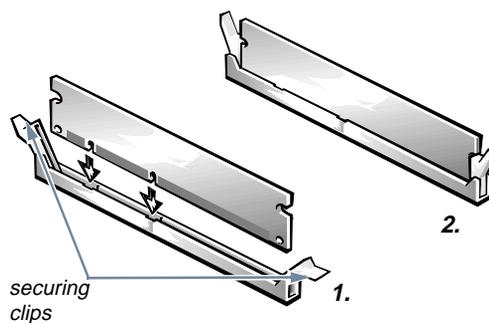

securing clips

Figure 6-7. Installing a DIMM

Removing a DIMM

To remove a DIMM, press the securing clips outward simultaneously until the DIMM disengages from the socket (it should pop up slightly) (see Figure 6-8).

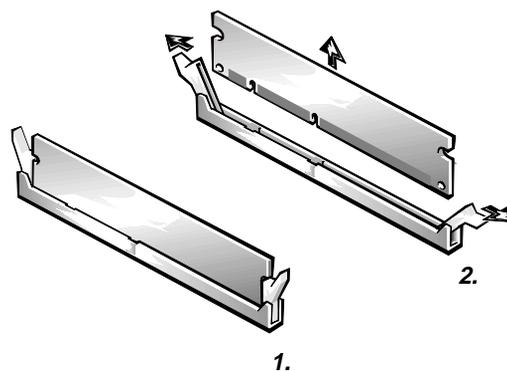*Figure 6-8. Removing a DIMM*

Upgrading the Microprocessor

To take advantage of future options in speed and functionality, you can replace the microprocessor on your system board with any Dell-supported microprocessor upgrade. Call your Dell sales representative for information on available microprocessor upgrades. You can replace the microprocessor with any Dell-supported microprocessor upgrade.

The following items are included in a microprocessor upgrade kit:

- The new microprocessor chip
- A new heat sink with thermal interface adhesive

The following procedure describes how to replace the microprocessor.

NOTE: Dell recommends that only a technically knowledgeable person perform this procedure.

1. **Remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

   > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

2. **See Figure 6-1 to locate the microprocessor socket (labeled "MICROPROCESSOR") on the system board.**

3. **Remove the metal clip that secures the heat sink to the microprocessor socket. Then remove the heat sink from the microprocessor chip.**

   Press down on the folded part of the clip with a small screwdriver to release the clip (see Figure 6-9).
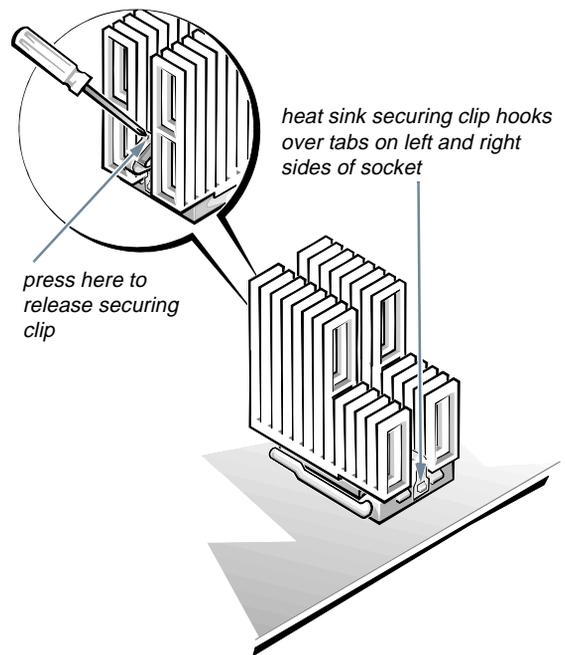

heat sink securing clip hooks over tabs on left and right sides of socket

press here to release securing clip

Figure 6-9. Heat Sink Securing Clip

4. **Remove the microprocessor chip from the socket.**

   > **CAUTION: Be careful not to bend any of the pins when removing the microprocessor chip from its socket. Bending the pins can permanently damage the microprocessor chip.**

   Your microprocessor socket is a zero insertion force (ZIF) socket with a lever-type handle that secures the chip in, or releases it from, the socket.

   To remove the chip, pull the microprocessor-socket release lever straight up until the chip is released (see Figure 6-10). Then lift the chip out of the socket. Leave the release lever up so that the socket is ready for the new microprocessor.
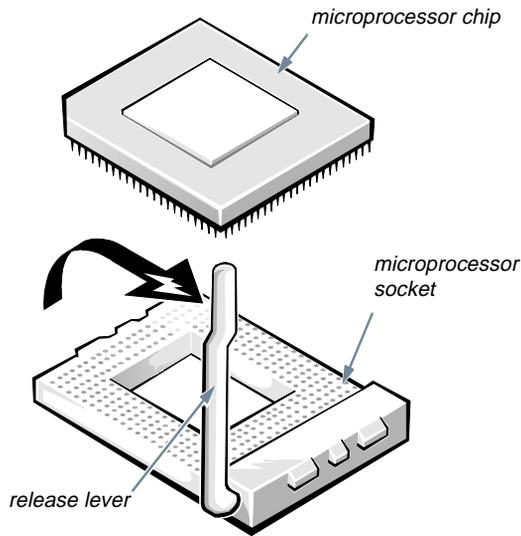
microprocessor chip

microprocessor socket

release lever

Figure 6-10. Removing the Microprocessor

5. **Unpack the new microprocessor.**

    CAUTION: Be careful not to bend any of the pins when unpacking the microprocessor. Bending the pins can permanently damage the microprocessor.

    If any of the pins on the chip appear to be bent, see the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for instructions on obtaining technical assistance.

6. **Align the pin-1 corner of the microprocessor chip (see Figure 6-11) with the pin-1 corner of the microprocessor socket (see Figure 6-12).**

    NOTE: Identifying the pin-1 corners is critical to positioning the chip correctly.

    Identify the pin-1 corner of the microprocessor by turning the chip over and locating the tiny gold finger that extends from one corner of the large central rectangular area. The gold finger points toward pin 1, which is also uniquely identified by a square pad.
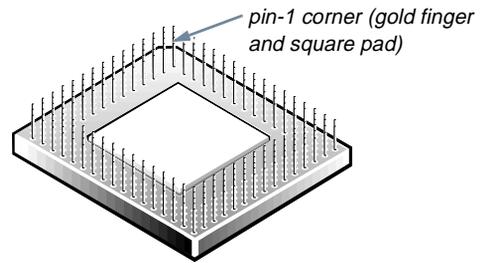

pin-1 corner (gold finger and square pad)

Figure 6-11. Pin-1 Corner Identification

The pin-1 corner of the socket is the corner to your *left* and closest to the *front* of the chassis as you face the front of the computer (see Figure 6-1).

7. **Install the microprocessor chip in the socket (see Figure 6-12).**

    CAUTION: Positioning the microprocessor chip incorrectly in the socket can permanently damage the chip and the computer when you turn on the system.

    If the release lever on the microprocessor socket is not all the way up, move it to that position now.

    With the pin-1 corners of the chip and socket aligned, align the pins on the chip with the holes in the socket. Set the chip lightly in the socket and make sure all pins are headed into the correct holes. Because your system uses a ZIF microprocessor socket, there is *no need to use force* (which could bend the pins if the chip is misaligned). When the chip is positioned correctly, it should drop down into the socket with minimal pressure.

    CAUTION: When placing the microprocessor chip in the socket, be sure that all of the pins go into the corresponding holes on all sides of the socket. Be careful not to bend the pins.

    When the chip is fully seated in the socket, pivot the microprocessor-socket release lever back down until it snaps into place, securing the chip.
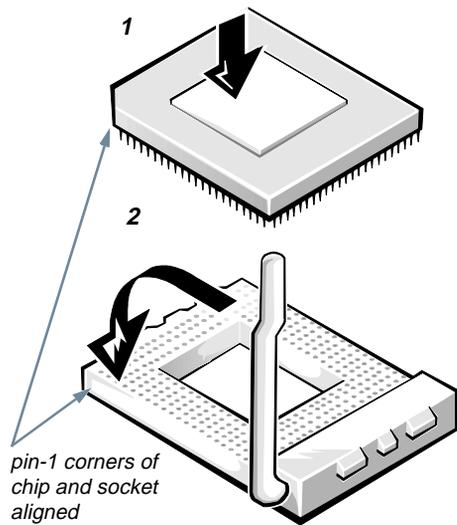
Figure 6-12. Installing the Microprocessor Chip

pin-1 corners of chip and socket aligned

8. Unpack the heat sink included in your upgrade kit.

Peel the release liner from the adhesive tape that is attached to the bottom of the heat sink.

9. Place the heat sink on top of the microprocessor chip (see Figure 6-13).

clip

heat sink

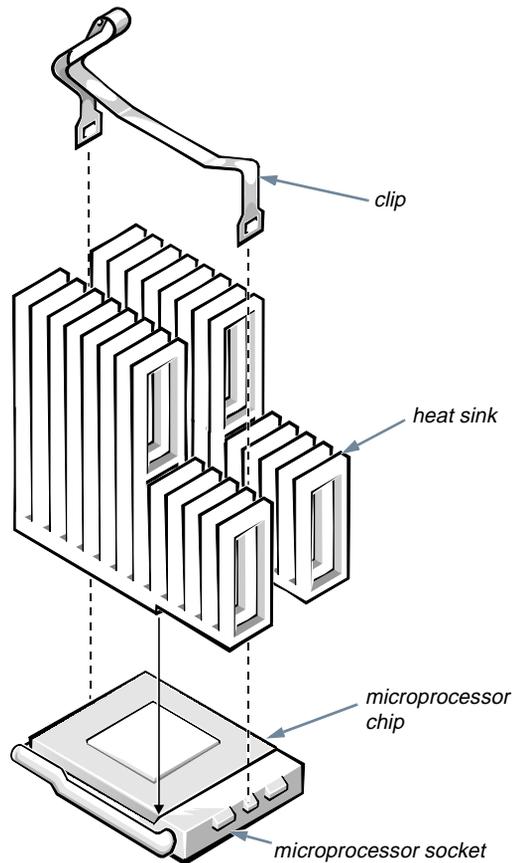microprocessor chip

microprocessor socket

Figure 6-13. Installing the Heat Sink

10. Replace the heat sink securing clip.

Orient the clip as shown in Figure 6-13, and hook the unfolded end of the clip over the tab on the edge of the socket facing the right side of the computer. Then press down on the folded end of the clip to snap the clip over the tab on the left side of the socket.

11. **If necessary, change the microprocessor speed jumper setting (see Figure 5-7 to locate system board jumpers).**

    The microprocessor speed jumper should be set for the installed microprocessor's rated internal speed. For example, for a 166-megahertz (MHz) Intel Pentium processor, a jumper plug should be installed on the pins labeled "166." (See "Jumpers" in Chapter 5 for more information.)

12. **Replace the computer cover; reconnect your computer and peripherals to their power sources, and turn them on.**

    As the system boots, it detects the presence of the new microprocessor and automatically changes the system configuration information in the System Setup program.

13. **Enter the System Setup program, and confirm that the MICROPROCESSOR category correctly identifies the installed microprocessor.**

    See Chapter 2, "Using the System Setup Program."

14. **Run the Dell diagnostics to verify that the new microprocessor is operating correctly.**

    See your *Diagnostics and Troubleshooting Guide* for information on running the diskette-based diagnostics and troubleshooting any problems that may occur.

Replacing the System Battery

A 3.0-V CR2032 coin-cell battery installed on the system board maintains system configuration, date, and time information in a special section of memory.

The operating life of the battery can extend up to ten years. The battery may need replacing if an incorrect time or date is displayed during the boot routine along with a message such as:

```
Time-of-day not set — please run SETUP
program
```

or

```
Invalid configuration information —
please run SETUP program
```

or

```
Strike the F1 key to continue,
F2 to run the setup utility
```

To determine whether the battery needs replacing, reenter the time and date through the System Setup program (not through the MS-DOS **time** and **date** commands) and exit the program properly to save the information. (See Chapter 2, "Using the System Setup Program," for instructions.) Turn off and disconnect your system from alternating current (AC) power for a few hours; then reconnect and turn on your system. Enter the System Setup program. If the date and time are not correct in the System Setup program, replace your battery.

You can operate your system without a battery; however, without a battery, the system configuration information maintained by the battery is erased if the system is turned off or AC power is lost. In this case, you must enter the System Setup program and reset the configuration options.

> **WARNING: There is a danger of the new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**

Use the following procedure to replace the system battery with another CR2032 coin-cell battery:

1. **If you have not already done so, make a copy of your system configuration information in the System Setup program.**

   If the settings are lost while you are replacing the battery, refer to your written or printed copy of the system configuration information to restore the correct settings. See Chapter 2, "Using the System Setup Program," for instructions.

2. **Remove the computer cover according to the instructions in "Removing the Computer Cover" in Chapter 5.**

   > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

3. **To access the battery on the system board, remove the expansion-card cage as described in "Removing the Expansion-Card Cage" in Chapter 5.**

4. **Locate the battery and remove it.**

   The battery is mounted in a socket labeled "BATTERY" at the back left of the system board next to the video connector (see Figure 6-1).

   > **CAUTION: If you pry the battery out of its socket with a blunt object, be careful not to touch the system board with the object. Make certain that the object is inserted between the battery and the socket before attempting to pry the battery out. Otherwise, you may damage the system board by prying off the socket or by breaking circuit traces on the system board.**

   Pry the battery out of its socket with your fingers or with a blunt, nonconductive object, such as a plastic screwdriver.

5. **Install the new battery.**

   Orient the battery with the side labeled "+" facing up (see Figure 6-14). Then insert the battery into the socket, and snap it into place.
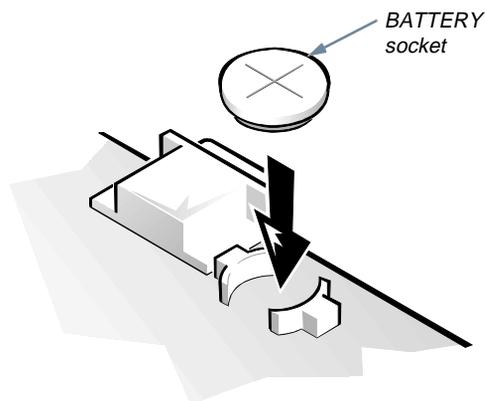

Figure 6-14. System Battery and Battery Socket

6. **Replace the expansion-card cage as described in "Replacing the Expansion-Card Cage" in Chapter 5.**

7. **Replace the computer cover; reconnect your computer and peripherals to their power sources, and turn them on.**

8. **Enter the System Setup program, and confirm that the battery is operating properly.**

   See Chapter 2, "Using the System Setup Program," for information on running the System Setup program.

   Enter the correct time and date through the System Setup program's **TIME** and **DATE** categories. Also, use the copy you made in step 1 to restore correct settings for other system configuration categories.

9. **Turn your computer off, and unplug it for at least ten minutes.**

10. **After ten minutes, plug in the computer, turn it on, and enter the System Setup program. If the time and date are still incorrect, see the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for instructions on obtaining technical assistance.**

Chapter 7
Installing Drives

*Y*our Dell computer has three drive bays for installing the following types of drives (see Figure 7-1):

- The externally accessible drive bays at the front of the computer consist of one 3.5-inch drive bay (dedicated to a 3.5-inch diskette drive) and one 5.25-inch bay that can hold one half-height, 5.25-inch device—typically a tape drive or CD-ROM drive.

- The hard-disk drive bay (located to the left of the externally accessible drive bays) can hold a 3.5-inch enhanced integrated drive electronics (EIDE) or small computer system interface (SCSI) hard-disk drive.

The next two sections contain information that you will need in several of the installation procedures described later in the chapter. The remaining sections of this chapter cover each type of drive installation.

*NOTE: In all of the following procedures, **left** and **right** refer to your left and right as you face the **front** of the computer (see Figure 7-1).*
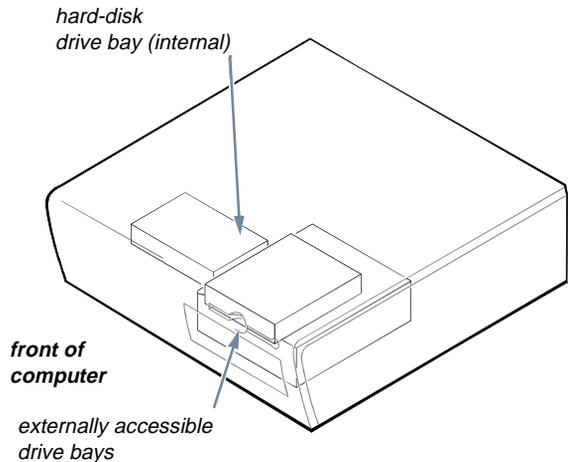

hard-disk drive bay (internal)

front of computer

externally accessible drive bays

Figure 7-1. Drive Locations

Removing and Replacing Front-Panel Inserts

Empty drive bays contain a front-panel insert to protect the inside of the computer from dust particles and ensure proper airflow within the computer. Before you install a drive in an empty drive bay, you must first remove the front-panel insert.

To remove the insert covering the 5.25-inch bay, follow these steps:

1. **Turn off the system, including any attached peripherals, and disconnect all the alternating current (AC) power cables from their power sources.**

2. **Remove the computer cover as instructed in "Removing the Computer Cover" in Chapter 5.**

3. **Lay the computer cover upside down on a flat work surface, with the front of the cover facing toward you.**

4. **With your thumbs, press in each end of the insert until it snaps free of the cover (see Figure 7-2).**
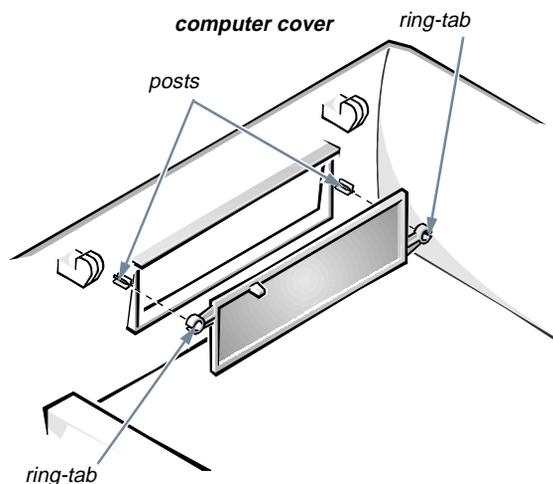

Figure 7-2. Removing the Front-Panel Insert for the 5.25-Inch Bay

To remove the insert covering the 3.5-inch bay, follow these steps:

1. **Complete steps 1 through 3 of the procedure for removing the 5.25-inch insert.**

2. **Inside the cover, locate the eject button mechanism for the 3.5-inch bay. Press the mechanism toward the front panel to snap the plastic insert out of its opening (see Figure 7-3).**
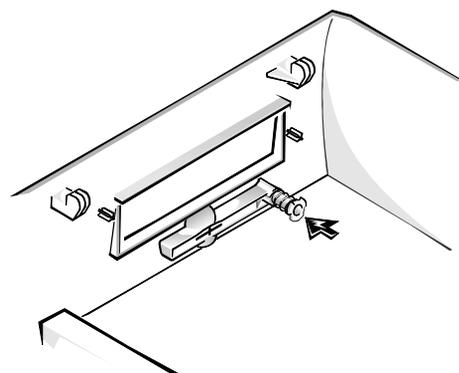

Figure 7-3. Removing the Front-Panel Insert for the 3.5-Inch Bay

To replace the front-panel insert for the 5.25-inch bay, work from inside the cover. Position the insert behind the bay opening, insert the two ring-tabs (see Figure 7-2) over the posts on the inside of the opening, and firmly press both ends of the insert into place.

To replace the front-panel insert for the 3.5-inch bay, work from outside the cover. Place the insert in position and press it into the opening.

Connecting Drives

When installing a drive, you connect two cables—a direct current (DC) power cable and an interface cable—to the back of the drive. Your drive's power input connector (to which you connect the DC power cable) resembles the connector shown in Figure 7-4.
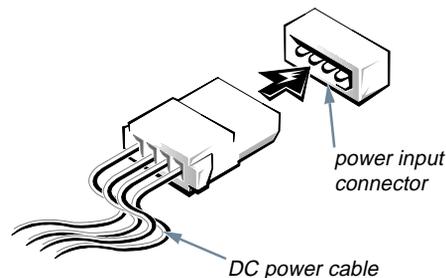

Figure 7-4. DC Power Cable Connector

The drive's interface connector is a card-edge connector or a header connector, as shown in Figure 7-5.

card-edge connector on drive

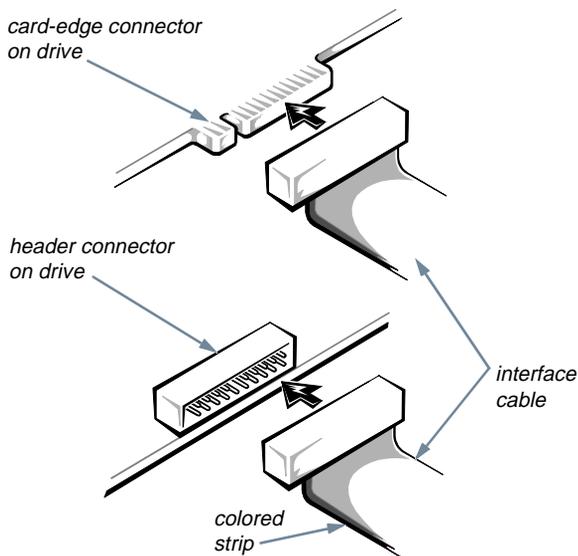header connector on drive

interface cable

colored strip

Figure 7-5. Drive Interface Connectors

When attaching the interface cable to a drive, be sure to match the colored strip on the cable to pin 1 of the drive's interface connector. For the location of pin 1 on the drive's interface connector, see the documentation that came with the drive.

Most interface connectors are keyed for correct insertion; that is, a notch or a missing pin on one connector matches a tab or a filled-in hole on the other connector. Keying ensures that the pin-1 wire in the cable (indicated by the colored strip along one edge of the cable) goes to the pin-1 end of the connector.

The pin-1 end of a card-edge connector is usually identified by a notch cut about a quarter of an inch from the end of the connector, as shown in Figure 7-5. A header connector is usually keyed by the omission of one of its pins, while the corresponding hole is filled in on the cable connector.

The pin-1 end of a connector on a board or a card is usually indicated by a silk-screened "1" printed directly on the board or card.

> **CAUTION: When connecting an interface cable, do not reverse the interface cable (do not place the colored strip away from pin 1 on the connector). Reversing the cable prevents the drive from operating and could damage the controller, the drive, or both.**

Installing a Drive in the 5.25-Inch Drive Bay

The 5.25-inch drive bay can accommodate any of the following types of drives:

- A diskette drive or tape drive that uses the diskette/tape drive interface on the system board

- A CD-ROM or tape drive that uses the secondary EIDE interface on the system board

- A CD-ROM or tape drive that uses its own controller card

For information on configuring, connecting, and installing SCSI drives, see "Installing SCSI Devices" found later in this chapter.

To install a drive in the 5.25-inch drive bay, follow these steps:

1. **Unpack the drive and prepare it for installation.**

   Ground yourself by touching an unpainted metal surface on the back of the computer, and unpack the drive. Check the documentation that accompanied the drive to verify that the drive is configured for your computer system. Change any settings necessary for your configuration.

   NOTE: If you are installing a non-EIDE tape drive, check the documentation for the drive to determine the jumper or switch settings used to designate the drive as drive address DS4 (not DS2 or DS3 as may be indicated in the drive documentation). Unless the drive is already set to drive 4, reconfigure its jumper or switch setting (see "Jumpers" and "Switches" in Chapter 5).

If you are installing an EIDE CD-ROM or EIDE tape drive, configure the drive as a master drive or single drive.

2. **Remove the computer cover as instructed in "Removing the Computer Cover" in Chapter 5.**

> **CAUTION: See "Protecting Against Electro-static Discharge" in the safety instructions at the front of this guide.**

3. **Remove the 3.5-inch diskette drive/bracket assembly.**

   Press outward on the two tabs on the left side of the drive bay to disengage the bracket from the chassis (see Figure 7-6). Then rotate the bracket upward and remove it from the chassis.
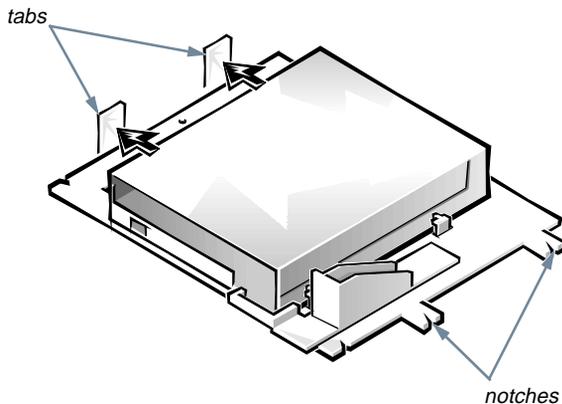

Figure 7-6. Removing the 3.5-Inch Diskette Drive/Bracket Assembly

4. **Lift the 5.25-inch drive bracket straight up and out of the chassis (see Figure 7-7).**

   If a drive is already installed in the bay and you are replacing it, be sure to disconnect the DC power cable and interface cable from the back of the drive before removing the drive/bracket assembly. To remove the old drive from the bracket, turn over the drive/bracket assembly and unscrew the four screws that secure the drive to the bracket (shown in Figure 7-7).
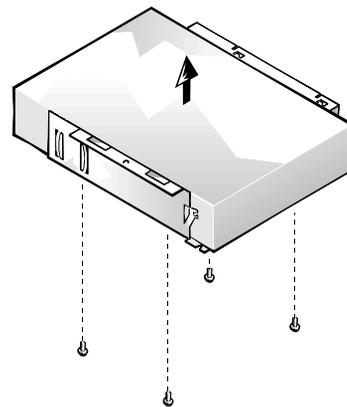
Figure 7-7. Removing the 5.25-Inch Drive Bracket

5. **Attach the bracket to the new drive.**

   Turn the drive upside down and locate the four screw holes around its perimeter. Fit the bracket over the drive so that the notched end aligns with the front of the drive. Use the score marks on the drive bracket to help align the screw holes on the drive with the screw holes on the bracket (see Figure 7-8).

Figure 7-8. Installing a Drive in the 5.25-Inch Drive Bracket

   To ensure proper positioning of the drive in the chassis, insert and tighten all four screws *in the order in which the holes are numbered* (the holes are marked "1" through "4").

6. **Reinstall the 5.25-inch drive/bracket assembly in the chassis.**

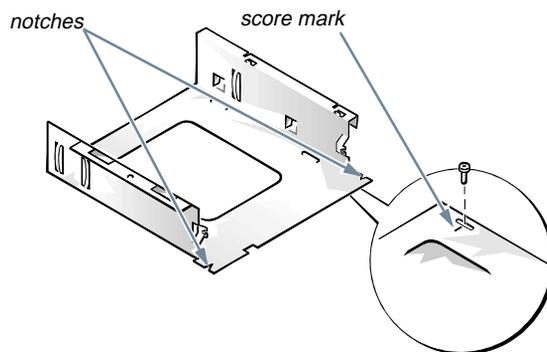Align the notches on the front of the drive bracket (see Figure 7-8) with the front of the computer. Hold the bracket level, and lower the assembly straight down into place (see Figure 7-9).
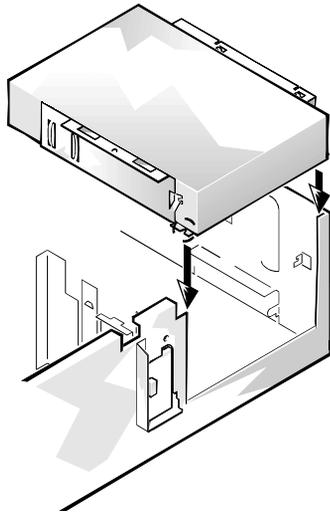

Figure 7-9. Inserting the Drive Bracket into the Drive Bay

7. **If you are installing a drive that has its own controller card, install the controller card in an expansion slot.**

See "Installing an Expansion Card" in Chapter 6.

8. **Connect a DC power cable to the power input connector on the back of the drive (see Figure 7-10).**

9. **Connect the appropriate interface cable to the interface connector on the back of the drive (see Figure 7-10).**

Match the colored strip on the interface cable to the pin-1 end of the connector on the drive.

> **CAUTION: You must match the colored strip on the cable with pin 1 on the drive's interface connector to avoid possible damage to your system.**
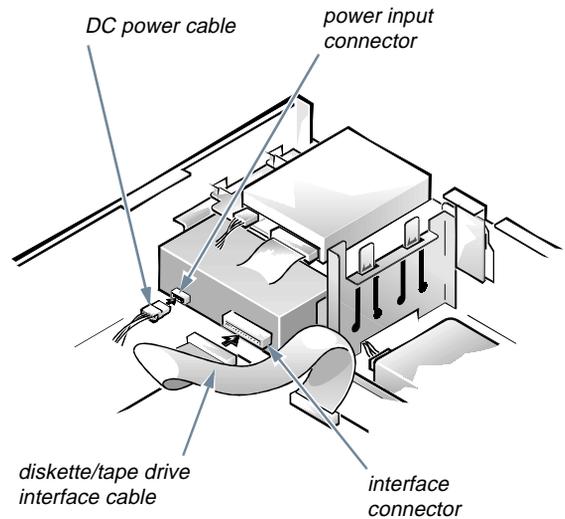
Figure 7-10. Attaching Cables to a Drive in the 5.25-Inch Drive Bay

10. **For an EIDE tape drive or CD-ROM drive, connect the other end of the interface cable to the interface connector labeled "IDE2" on the system board.**

For a diskette drive, connect the cable from the drive to the interface connector labeled "DSKT" on the system board.

For a drive that comes with its own controller card, connect the other end of the interface cable to the controller card.

Check all cable connections. Fold cables out of the way to provide airflow for the fan and cooling vents.

11. **Reinstall the 3.5-inch diskette drive/bracket assembly.**

Fit the notches in the tabs on the right side of the bracket (see Figure 7-6) into the slots on the right wall of the chassis. Then rotate the bracket downward, and press down on the left side of the bracket until it locks under the tabs on the left side of the drive bay.

12. **If the 5.25-inch drive bay was previously empty, remove the front-panel insert from the computer cover.**

   See "Removing and Replacing Front-Panel Inserts" found earlier in this chapter.

13. **Replace the computer cover.**

   If the bezel on your drive is not flush with the bezel on your computer, remove the drive and adjust the position of the drive on the bracket, making sure to insert and tighten the screws in the order marked. Replace the drive in the drive bay, and then replace the computer cover.

14. **Reconnect your computer and peripherals to their power sources, and turn them on.**

15. **Update your system configuration information.**

   For a diskette drive, enter the System Setup program and update the appropriate **DISKETTE DRIVE** category (**A** or **B**) on Page 1 of the System Setup screens to reflect the size and capacity of your new diskette drive. (For more information, see Chapter 2, "Using the System Setup Program.")

   If you installed a non-EIDE tape drive as the second drive, set the **DISKETTE DRIVE B** category to **NOT INSTALLED**.

   For EIDE CD-ROM and tape drives, set the appropriate **DRIVE** category (**0** or **1**) in the **SECONDARY DRIVE** section to **AUTO**.

16. **Verify that your system works correctly.**

   See your *Diagnostics and Troubleshooting Guide* for information on running the diskette-based diagnostics and troubleshooting any problems that may occur. Use the following guidelines to determine which test to use:

   • If you installed a diskette drive, test it by running all of the subtests in the Diskette Drive(s) Test Group of the Dell diagnostics.

   • If you installed a CD-ROM drive, see the documentation that came with the drive for instructions on loading device drivers and using the drive. If it is an EIDE CD-ROM drive, test it by running all of the subtests in the IDE CD-ROM Drives Test Group of the Dell diagnostics.

   • If you installed a tape drive, first verify that your diskette drive is still running correctly by running all the subtests in the Diskette Drive(s) Test Group of the Dell diagnostics. Then perform a tape backup and verification test with the drive as instructed in the software documentation that came with the tape drive.

   NOTE: The tape drives sold by Dell come with their own operating software and documentation. After you install a tape drive, refer to the documentation that came with the drive for instructions on installing and using the tape drive software.

Installing an EIDE Hard-Disk Drive

This section includes information on installing, partitioning, and formatting an EIDE hard-disk drive. For instructions on installing, partitioning, and formatting a SCSI hard-disk drive, see "Installing SCSI Devices" found later in this chapter.

An EIDE drive (which must be 1 inch high or less) can be installed in the hard-disk drive bracket in the left front corner of the chassis. Install an EIDE hard-disk drive in the hard-disk drive bracket as follows:

1. **If you are replacing a hard-disk drive that contains data you want to keep, be sure to make a backup of your files before you begin this procedure.**

   See your operating system documentation for instructions.

2. **Prepare the drive for installation.**

   Ground yourself by touching an unpainted metal surface on the back of the computer, and unpack the drive. Check the documentation that accompanied the drive to verify that it is configured for your computer system.

3. **Remove the computer cover as instructed in "Removing the Computer Cover" in Chapter 5.**

   > **CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions at the front of this guide.**

4. **Remove the expansion-card cage as instructed in "Removing and Replacing the Expansion-Card Cage" in Chapter 5.**

5. **Remove the hard-disk drive bracket from the chassis.**

   If a hard-disk drive is already installed on the drive bracket and you are replacing it, disconnect the DC power cable and EIDE cable from the drive.

   Loosen the captive screw that secures the hard-disk drive bracket to the chassis (see Figure 7-11). Then rotate the bracket upward and lift it out of the chassis.

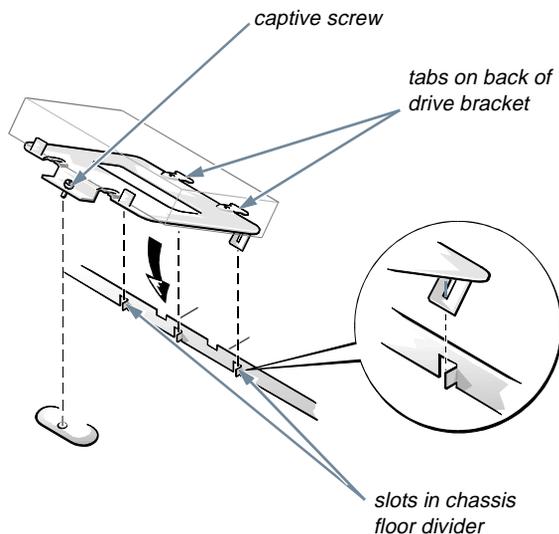   Detach the hard-disk drive from the bracket by removing the four screws.

Figure 7-11. Removing the Hard-Disk Drive Bracket

6. **Secure the drive bracket to the new drive.**

   Turn the drive upside down and locate the four screw holes around its perimeter. Orient the drive bracket so that the end labeled "CONNECTOR" faces the side of the drive containing the interface and power connectors. Place the bracket on the drive and secure it with four screws (see Figure 7-12).
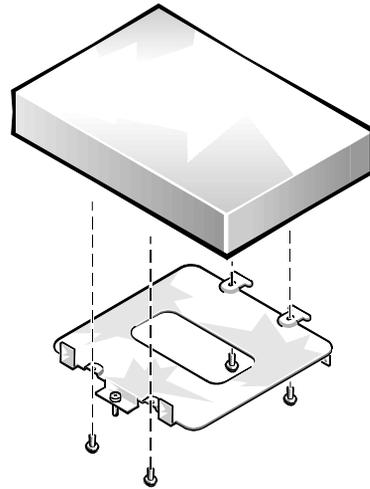

Figure 7-12. Securing the Hard-Disk Drive to the Bracket

7. **Reinstall the hard-disk drive/bracket assembly in the chassis.**

   Grasp the bracket by the tab containing the captive screw and hold the bracket at a 45-degree angle to the chassis floor. Align the two tabs on the other side of the bracket with the score marks on the chassis floor. Insert the two tabs into the slots in the chassis floor divider, and rotate the assembly downward. Then tighten the captive screw until the bracket is securely fastened to the chassis floor (see Figure 7-11).

8. **Connect one end of the EIDE cable to the 40-pin interface connector on the back of the hard-disk drive (see Figure 7-13).**

   The cable is keyed so that the colored edge of the EIDE cable lines up with the pin-1 end of the interface connector.

   CAUTION: You must match the colored strip on the EIDE cable with pin 1 on the drive's interface connector to avoid possible damage to your system.
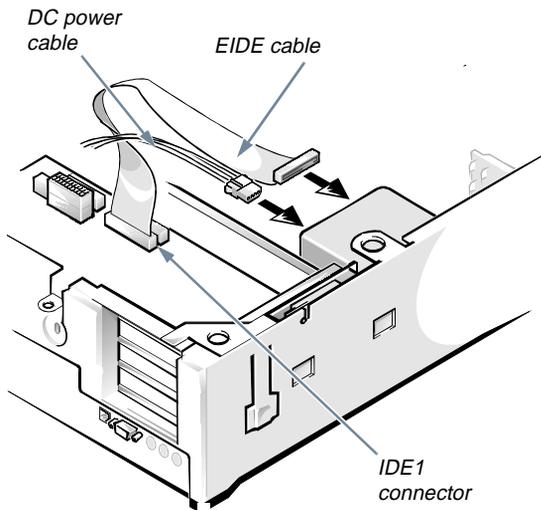   ---

DC power cable

EIDE cable

IDE1 connector

Figure 7-13. Attaching Hard-Disk Drive Cables

9. **If it is not already connected, connect the other end of the EIDE cable to the IDE1 connector on the system board.**

   > **CAUTION: You must match the colored strip on the EIDE cable with pin 1 on the IDE1 connector to avoid possible damage to your system.**

   To locate the IDE1 connector, see Figure 6-1.

10. **Connect a DC power cable to the power input connector on the back of the drive (see Figure 7-13).**

    Check all connectors to be certain that they are properly cabled and firmly seated.

11. **Replace the expansion-card cage as instructed in "Replacing the Expansion-Card Cage" in Chapter 5.**

12. **Replace the computer cover. Then reconnect your computer and peripherals to their power sources, and turn them on.**

13. **Insert a bootable diskette (such as the diagnostics diskette) into drive A, and turn on the computer system.**

14. **Enter the System Setup program, and update the DRIVE 0 category under DRIVES: PRIMARY.**

    See "Drives: Primary and Secondary" in Chapter 2.

    After you update the drive setting, reboot the system.

15. **Partition and logically format your drive, as described in the next subsection, before proceeding to the next step.**

16. **Test the hard-disk drive by running the Hard-Disk Drive(s) Test Group in the Dell diagnostics.**

    See your *Diagnostics and Troubleshooting Guide* for information on running the diskette-based diagnostics and troubleshooting any problems that may occur.

17. **Install your operating system on your hard-disk drive.**

    Refer to the documentation that came with your operating system.

Partitioning and Logically Formatting Your EIDE Hard-Disk Drive

EIDE hard-disk drives must be physically formatted, partitioned, and logically formatted before they can be used to store data. Every hard-disk drive from Dell is physically formatted before it is sent to you.

NOTE: On systems with hard-disk drives larger than 2 gigabytes (GB), create a primary partition of 2 GB and divide the remaining capacity into partitions of 2 GB or less. For example, a system with a 2.5-GB hard-disk drive would have a primary partition of 2 GB (drive C) and a second partition of 500 megabytes (MB) (drive D). Hard-disk drives must be partitioned this way because MS-DOS–based operating systems (including Windows NT when using a FAT16 file system) do not support drive partitions larger than 2 GB.

To partition and logically format your hard-disk drive, use the program(s) offered by your operating system.

For MS-DOS, use the **fdisk** and **format** commands to perform these procedures. The **fdisk** and **format** commands are described in the MS-DOS reference documentation.

For OS/2, see the discussion on partitioning and logical formatting in the documentation that came with the operating system.

> **CAUTION: If you format your hard-disk drive under the OS/2 High Performance File System (HPFS), you cannot reformat the drive for MS-DOS without losing all HPFS data. See your OS/2 documentation for details.**

For Windows NT, see the discussion on partitioning and logical formatting in the documentation that came with the operating system.

> **CAUTION: If you format your hard-disk drive under the Windows NT File System (NTFS), you cannot reformat the drive for MS-DOS without losing all NTFS data. See your Windows NT documentation for details.**

For the UNIX® operating system, refer to your UNIX documentation.

Installing SCSI Devices

To use SCSI devices in your Dell computer, you must have a SCSI host adapter card, which comes with its own SCSI cable. This cable can be used to attach a variety of SCSI devices (hard-disk drives, tape drives, and so on). The SCSI host adapter configures the devices attached to it as one subsystem—not as independent devices.

Although SCSI devices are installed essentially the same way as other devices, their configuration requirements are different.

SCSI Configuration Guidelines

For details on configuring your SCSI subsystem, refer to the documentation that came with your SCSI devices and/or your host adapter card. The following subsections offer some general guidelines.

SCSI ID Numbers

Each device attached to a SCSI host adapter card, as well as the card itself, must have a unique SCSI identification (SCSI ID) number from 0 to 7. When SCSI devices are shipped from Dell, the default SCSI ID numbers are assigned as follows:

- A SCSI host adapter card is configured as SCSI ID 7 (the default ID for a host adapter card).

- A SCSI tape drive is configured as SCSI ID 6 (the default ID number for a tape drive).

- SCSI hard-disk drives are usually configured as SCSI ID 0. (The drive used to boot your system should always be configured as SCSI ID 0.)

*NOTE: There is **no** requirement that SCSI ID numbers be assigned sequentially or that devices be attached to the cable in order by ID number.*

SCSI Cable and SCSI Termination

The type of cabling you receive with your SCSI device depends on the type of device you are installing, as follows:

- *If you are installing an internal narrow SCSI device (such as a CD-ROM drive or tape drive)*, you have a 50-pin internal SCSI cable as shown in Figure 7-14. One end of this cable attaches to the narrow SCSI device and the other end attaches to the narrow SCSI connector on your SCSI host adapter card.
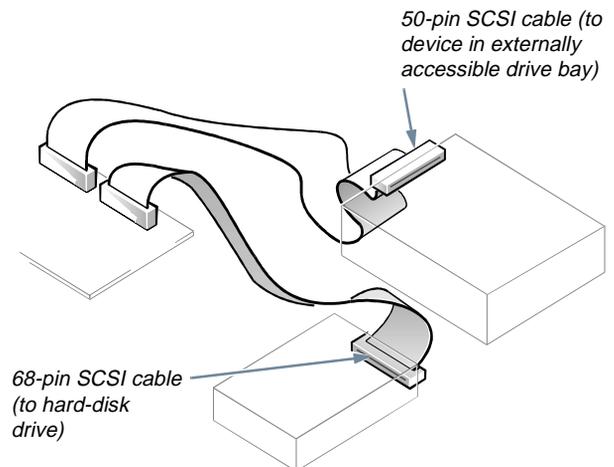

50-pin SCSI cable (to device in externally accessible drive bay)

68-pin SCSI cable (to hard-disk drive)

Figure 7-14. Internal SCSI Cable

- *If you are installing an internal wide SCSI device (such as a wide SCSI hard-disk drive)*, you have a 68-pin internal SCSI cable as shown in Figure 7-14. One end of this cable attaches to the wide SCSI device and the other end attaches to the wide SCSI connector on your SCSI host adapter card.

- *If you are installing an external SCSI device*, you have a shielded external cable that connects to the external SCSI connector on the SCSI host adapter card. You have a separate power cable to connect the SCSI device to an AC power source.

Before installing SCSI devices in your computer, you must configure the termination on your SCSI device(s) to conform to the guidelines shown in Table 7-1. In Table 7-1, the term "last device" refers to the device attached to the end connector on the corresponding SCSI cable. For instructions on enabling and disabling termination, see the documentation for your SCSI host adapter card.

> **CAUTION: Do not connect devices to all three connectors (internal narrow connector, internal wide connector, and external connector) on a single SCSI host adapter card. Such a configuration is a violation of the SCSI specification. You can safely connect devices to any two of these three connectors on a single SCSI host adapter card.**

Table 7-1. SCSI Termination Guidelines

Configuration	SCSI Host Adapter Card	Internal Narrow SCSI Device(s)	Internal Wide SCSI Device(s)	External SCSI Device(s)
Internal narrow and wide SCSI devices	Termination enabled for upper 8 bits	Termination enabled for lower 8 bits on last device	Termination enabled for all 16 bits on last device	Not applicable
Internal wide SCSI and external narrow SCSI devices	Termination enabled for upper 8 bits	Not applicable	Termination enabled for all 16 bits on last device	Termination enabled for lower 8 bits
Internal wide SCSI and external wide SCSI devices	Termination disabled	Not applicable	Termination enabled for all 16 bits on last device	Termination enabled for all 16 bits
Internal narrow SCSI and external narrow SCSI devices	Termination disabled	Termination enabled for lower 8 bits on last device	Not applicable	Termination enabled for lower 8 bits
Internal narrow SCSI devices only	Termination enabled for lower 8 bits	Termination enabled for lower 8 bits on last device	Not applicable	Not applicable
Internal wide SCSI devices only	Termination enabled for lower 8 bits	Not applicable	Termination enabled for all 16 bits on last device	Not applicable

General Procedure for Installing SCSI Devices

Configure and install one or more SCSI devices in your computer as follows:

1. **Determine which connector on the internal SCSI cable you will attach to each SCSI device.**

    See "SCSI Configuration Guidelines" found earlier in this section.

2. **Unpack each SCSI device and prepare it for installation.**

    Ground yourself by touching an unpainted metal surface on the back of the computer. Configure the device for a SCSI ID number and termination, if necessary. For instructions, see the documentation that came with the SCSI device as well as "SCSI Configuration Guidelines" found earlier in this section.

3. **If you are installing a SCSI host adapter card, configure the adapter card.**

    For instructions on configuring the card, see the documentation that came with the adapter card as well as "SCSI Configuration Guidelines" found earlier in this section.

4. **Install the SCSI devices as appropriate.**

    *   *To install a SCSI hard-disk drive*, complete steps 3 through 7 of "Installing an EIDE Hard-Disk Drive" found earlier in this chapter. Then continue with step 5 of this procedure.

    *   *To install a SCSI tape drive, CD-ROM drive, or DAT drive,* complete steps 2 through 6 of "Installing a Drive in the 5.25-Inch Drive Bay" found earlier in this chapter. Then continue with step 5 of this procedure.

    *   *To install an external SCSI tape drive*, continue with step 5 of this procedure.

5. **If you are installing a new SCSI host adapter card, install it in an expansion slot now.**

    See "Installing an Expansion Card" in Chapter 6.

    If a SCSI host adapter card is already installed, remove, reconfigure, and reinstall the card at this time. See the documentation that came with the

SCSI host adapter card as well as "Removing an Expansion Card" and "Installing an Expansion Card" in Chapter 6.

Connect the hard-disk drive access cable to the SCSI host adapter card and to the HDLED connector on the riser board (see Figure 6-3). This cable carries a signal from the SCSI host adapter card to the hard-disk drive access indicator on the computer's front panel whenever one of the SCSI hard-disk drives is accessed.

6. **Attach the SCSI cable to each SCSI device.**

    For additional instructions on connecting SCSI devices, see "SCSI Cable and SCSI Termination" found earlier in this section.

    If you are installing an internal SCSI device, firmly press the SCSI cable's header connector onto the 50- or 68-pin connector on the back of the device.

    > **CAUTION: You must match the colored strip on the cable with pin 1 on the drive's interface connector to avoid possible damage to your system.**

    The connectors on narrow SCSI cables are keyed for proper positioning—a raised area on the outside of the header connector fits into a notch in the shroud surrounding the 50-pin connector on the device. The connectors on wide SCSI cables are shaped so that they can be attached one way only.

    If you are installing an external SCSI device, connect one end of the external SCSI cable to the SCSI bus connector on the back of the device.

7. **Attach the SCSI cable to the connector on the SCSI host adapter card.**

    *   *If you are installing an internal SCSI device*, connect the colored edge on the internal SCSI cable to the pin-1 end of the 50-pin connector (for a narrow SCSI device) or 68-pin connector (for a wide SCSI device) on the host adapter card, and

then press the cable connector firmly onto the adapter card connector.

> **CAUTION: You must match the colored strip on the internal SCSI cable with pin 1 on the adapter card connector to avoid possible damage to your system.**

- *If you are installing an external SCSI device*, connect the other end of the external SCSI cable to the external connector on the host adapter card.

For additional instructions, see the documentation that came with the adapter card.

8. **Connect the SCSI device(s) to power.**

- *If you are installing an internal SCSI device*, connect a DC power cable to the power input connector on the SCSI device.

- *If you are installing an external SCSI device*, connect the socket end of the power cable into the AC power receptacle on the back of the SCSI device. Connect the other end of the power cable into a standard electrical wall outlet.

Check all other cable connections. Fold all internal cables out of the way to provide airflow for the fan or cooling vents.

If you are installing a SCSI hard-disk drive, replace the expansion-card cage according to the instructions provided in "Replacing the Expansion-Card Cage" in Chapter 5.

9. **Replace the computer cover. Then reconnect your computer and peripherals to their power sources, and turn them on.**

10. **If necessary, enter the System Setup program to update the system configuration information.**

If you installed a SCSI hard-disk drive, set the **DRIVE 0** and **DRIVE 1** System Setup categories under **DRIVES: PRIMARY** to **NONE**. For instructions, see Chapter 2, "Using the System Setup Program."

Tape drives attached to a SCSI host adapter card are not part of the system configuration information.

11. **If you installed a SCSI hard-disk drive, partition and format the drive. Then install the operating system.**

For instructions, see the next subsection, "Partitioning and Formatting SCSI Hard-Disk Drives," and your operating system documentation.

12. **Test the SCSI devices.**

Test a SCSI hard-disk drive by running the SCSI Devices Test Group of the Dell diagnostics. See your *Diagnostics and Troubleshooting Guide* for information on running the diskette-based diagnostics and troubleshooting any problems that may occur.

To test a SCSI tape drive, refer to the documentation for the tape drive software to perform a tape drive backup and verification test.

Partitioning and Formatting SCSI Hard-Disk Drives

You may need to use different programs than those provided with the operating system to partition and format SCSI hard-disk drives. Refer to the documentation that came with your SCSI software drivers for information on installing the appropriate drivers and preparing your SCSI hard-disk drive for use.

NOTE: On systems with hard-disk drives larger than 2 GB, create a primary partition of 2 GB and divide the remaining capacity into partitions of 2 GB or less. For example, a system with a 2.5-GB hard-disk drive would have a primary partition of 2 GB (drive C) and a second partition of 500 MB (drive D). Hard-disk drives must be partitioned this way because MS-DOS–based operating systems (including Windows NT when using a FAT16 file system) do not support drive partitions larger than 2 GB.

Appendix A
Technical Specifications

Table A-1. Technical Specifications

Microprocessor	
Microprocessor type	Intel Pentium microprocessor that runs at 133 MHz internally/66 MHz externally; at 166 MHz internally/66 MHz externally; or at 200 MHz internally/66 MHz externally. Design provides for future Dell-supported upgrades. A slower compatibility speed can be set through the System Setup program.
Internal cache	16-KB first-level (8-KB data cache; 8-KB instruction cache)
Math coprocessor	internal to Pentium microprocessor
System Information	
System chip set	Intel 430HX PCIset
Data bus width	64 bits
Address bus width.	32 bits
DMA channels	seven
Interrupt levels	15
System BIOS chip.	1 Mb

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Expansion Bus

Bus types.	PCI (version 2.1) and ISA
Bus speed	PCI: 33 MHz ISA: 8.25 MHz
PCI expansion-card connectors	two (one PCI connector shares a card-slot opening with an ISA connector)
ISA expansion-card connectors.	two (one ISA connector shares a card-slot opening with a PCI connector)
ISA expansion-card connector size.	98 pins
ISA expansion-card connector data width (maximum)	16 bits
PCI expansion-card connector size.	120 pins
PCI expansion-card connector data width (maximum)	32 bits

System Clocks

System clock.	66 MHz (matches external processor speed)
Diskette/communications ports.	24 MHz from the system clock

Memory

Architecture	64-bit (non-ECC) or 72-bit (ECC), non-interleaved
DIMM sockets	four, gold contacts
DIMM capacities	8-, 16-, 32-, 64-, and 128-MB EDO; ECC support provided with parity/ECC DIMMs
Standard RAM	16 MB

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Memory (Continued)	
Maximum RAM	512 MB
Cache memory	256- or 512-KB pipelined burst direct-mapped, write-back SRAM
BIOS address	F0000h

Drives	
Externally accessible bays	one 5.25-inch bay for diskette, tape, or CD-ROM drive; one 3.5-inch bay for a diskette drive
Internally accessible bays	one 3.5-inch bay for 1-inch-high hard-disk drive

Ports	
Externally accessible:	
Serial (DTE).	one 9-pin connector; 16550-compatible
Parallel.	one 25-hole connector (bidirectional)
Video	one 15-hole connector
NIC	RJ45 connector
PS/2-style keyboard.	6-pin mini-DIN
PS/2-compatible mouse	6-pin mini-DIN
USB	two USB-compliant connectors
Audio line in	miniature audio jack
Audio line out	miniature audio jack
Microphone	miniature audio jack
Internally accessible:	
Primary EIDE hard-disk drive.	40-pin connectors on PCI local bus
Secondary EIDE hard-disk drive.	40-pin connectors on PCI local bus
Diskette drive.	34-pin connector

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Video

Video type.	S3 Trio64V+ 86C765 SVGA controller
Video memory	2 MB
Maximum resolution.	1280 x 1024 pixels, 256 colors

Key Combinations

\<CTRL>\<ALT>\<DEL>.	restarts (reboots) the system
\<CTRL>\<ALT>\<ENTER>.	starts System Setup program (during POST only)
\<CTRL>\<ALT>\<\>.	toggles microprocessor speeds on 101-key keyboard (in MS-DOS real mode only)
\<CTRL>\<ALT>\<#>	toggles microprocessor speeds on 102-key keyboard (in MS-DOS real mode only)

Controls and Indicators

Reset control	push button
Power control	push button
Power indicator.	green LED
Hard-disk drive access indicator.	green LED
Link integrity indicator (on NIC connector).	green LED
Activity indicator (on NIC connector)	yellow LED

Power

DC power supply:	
Wattage	145 W
Heat dissipation	913 BTUs (fully loaded system without monitor)
Voltage.	90 to 135 V at 60 Hz; 180 to 265 V at 50 Hz
Backup battery	3-V CR2032 coin cell

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Physical	
Height	10.9 cm (4.3 inches)
Width	40.89 cm (16.1 inches)
Depth.	43.69 cm (17.2 inches)
Weight	10.89 kg (24 lb) or more, depending on options installed

Environmental	
Temperature**:**	
Operating	10° to 35°C (50° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)
Relative humidity	8% to 80% (noncondensing)
Maximum vibration:	
Operating	0.25 G at 3 to 200 Hz at 1 octave/min
Storage	0.5 G at 3 to 200 Hz at 1 octave/min
Maximum shock:	
Operating	left side (for mini tower orientation) and bottom half-sine pulse with a change in velocity of 20 inches/sec (50.8 cm/sec)
Storage	27-G faired square wave with a velocity change of 200 inches/sec (508 cm/sec)
Altitude:	
Operating	–16 to 3048 m (–50 to 10,000 ft)
Storage	–16 to 10,600 m (–50 to 35,000 ft)

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Appendix B
ISA Configuration Utility Messages

The ISA Configuration Utility (ICU) and its Configuration Manager are capable of identifying problems and alerting you to them. Both utilities can alert you to problems with card configuration as well as problems that prevent proper operation of the utility. This appendix describes each type of message and lists the possible causes and actions you can take to resolve any problems indicated by a message. See the following tables to locate your message and identify any possible corrective actions.

ICU Error Messages

The ICU can display a variety of error messages while in operation. These messages alert you to problems that prevent the ICU from running correctly, as well as informing you of resource conflicts that prevent the configuration of various cards in your computer. If you receive a message from the ICU, see Table A-1 for suggestions on resolving any problems indicated by the message.

Table B-1. Configuration Utility Messages

Message	Probable Cause	Corrective Action
Out of memory Memory allocation failed	Either of these messages can appear if the system runs out of memory during your operation.	Disable any TSR programs or any unneeded device drivers. Another possible solution is to load the **dwcfgmg.sys** driver into high memory. See "Modifying the Configuration Manager" in Chapter 3 for an example of loading the **dwcfgmg.sys** driver into high memory using a memory manager.
Not enough memory to run the ICU	This message appears when you start the ICU if the system does not have enough memory to run the utility.	
Can't open index file. This file is required for ICU to run.	The ICU cannot find the index file for its database.	Verify that you are starting the ICU from the directory where it is installed. Make sure to switch to drive A before attempting to start the utility.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action
`No Configuration Man-ager.`	The device driver needed by the ICU is corrupted or is not correctly configured.	Verify that the following **device** statement appears in your **config.sys** file: `device=`*drive*`:\`*directory*`\drivers\dos\dwcf-gmg.sys` In this statement, *drive* and *directory* represent the drive and directory where the driver resides. The default is `c:\plugplay`.

`At least one Plug and Play card in your sys-tem is not configured due to conflicts. These are marked "con-fig err" in the list of configured cards.`
 	
`Due to conflicts, the ICU could only config-ure some Plug and Play cards in your system. Unconfigured cards are marked "config err" in the list of configured cards.`
	The Configuration Manager or the ICU cannot configure at least one Plug and Play expansion card because of resource conflicts with one or more cards.	You must reconfigure the conflicting card(s). To find the conflicting card, perform the following steps:
		
		1. **Select the Plug and Play expansion card marked with** `config err`**, and then click the Modify button.**
		
		   The Card Configuration dialog box displays the functions assigned to the Plug and Play expansion card.
		
		2. **Select a function and then click the Settings button. Click the Cancel button if the ICU does not display a message naming the conflicting card.**
		
		3. **Repeat step 2 until the ICU displays a message box naming the conflicting card and the resource(s) in conflict. See the following table entry for an explanation of this message box.**

`This device is un-configurable because of a resource conflict with card `*card_name*`. The conflicting resource is `*resource_name*`. To fix, reconfigure the con-flicting card.`	The selected card is un-configurable because one of its resources is already being used by another device.	Perform the following procedure: 1. **Make a note of the card name and the type of conflicting resource.** 2. **Follow the procedure in "Modifying a Card" in Chapter 3, and change the value for** *resource_name* **used by** *card_name***.**

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action
`The ICU has successfully config-ured all Plug and Play cards in your system. For the new configuration to take effect, save the con-figuration, then reboot your system.`	The ICU has successfully configured all of the Plug and Play expansion cards that were not configured by the Configuration Manager.	To accept these settings, save the configuration information into NVRAM by selecting **EXIT** from the File menu and then selecting **YES** to save. You must reboot your system for these settings to take effect.
`The loaded card is not a` *category* `card. Press OK to proceed.`	The category you have chosen is not the correct cat-egory under which to add this card.	Select **OK**. The ICU automatically opens the correct category's dialog box. Continue the pro-cedure for adding the card as described in "Adding a Listed Card" or "Adding an Unlisted Card" in Chapter 3.

`No more DMA values can be added.`
 	
`No more interrupt val-ues can be added.`
 	
`No more memory values can be added.`
 	
`No more I/O port val-ues can be added.`
	No more values are avail-able for the resource you are trying to add or modify.	The maximum number of values for each resource is as follows:
		
		• 4 DMA channels
		• 7 IRQ lines
		• 9 memory address blocks
		• 20 I/O ports
		
		To free values for the resource you are trying to add or modify, delete some of the values listed in the resource box for the card. If your card requires all of the values listed, contact your card manufacturer to resolve the issue.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action
`The ICU detects a resource conflict between this card and` `conflicting_card`. `The conflicting resource was:` `resource.`	You added or modified a card that now requires a `resource` value already in use by `conflicting_card`.	Try each of the following options until the problem is resolved: • Modify the card you are adding so that it uses a different value for `resource`. See "Modifying a Card" in Chapter 3 for instructions. • Modify `conflicting_card` so that it uses a different value for `resource`. See "Modifying a Card" in Chapter 3 for instructions. • If `conflicting_card` is not the system board, remove it from the computer. See "Removing a Card" in Chapter 3 for instructions. • Remove all expansion cards from the ICU, and then add them back one at a time, beginning with the new card and resolving resource conflicts as they arise. See "Removing a Card" and "Adding a Listed Card" or "Adding an Unlisted Card" in Chapter 3 for instructions. • If you cannot resolve the resource conflict by any of the preceding methods, remove the new card. If you were modifying an existing card, reset the modified card to its previous resource value.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action

`The configuration (.cfg) file used by the ICU for this card is now invalid or does not exist. Do you wish to load the file?`
 	
`No configuration (.cfg) file exists for the card being modi-fied. Do you want to load one?`
	This message appears when you try to add a listed card and the configuration file for this card has been corrupted or deleted from the data-base.
	
	This message appears when you modify a card and its configuration file does not exist or has been deleted.
		You can get a copy of the configuration file from the *ISA Configuration Utility Diskette*. Use the following procedure:
		
		1. **Insert the** *ISA Configuration Utility Dis-kette* **into drive A.**
		
		2. **Change to the** db **subdirectory on the dis-kette drive.**
		
		   For example, type cd a:\db.
		
		3. **Use a text editor to search the** icu.ndx **file for the card ID of the card you want to add or modify.**
		
		   The name of the configuration file is part of this card ID. For example, if the card ID is ICU0200, the configuration file is **!icu0200.cfg**.
		
		4. **Copy the configuration file from the dis-kette into the directory containing the ICU on your hard-disk drive.**

`This is an EISA sys-tem. Use an ECU, not the ICU, to configure your system.`	This message appears if you attempt to run the ICU on an EISA system.	To use the ICU, you must load the utility onto a non-EISA system.
`You have added a card using settings differ-ent from factory default. Reconfigure the card to the set-tings in the next display (see the card's manual) before installing it.`	This message can appear in two situations: • You added an ISA expansion card, selected **OK**, and the ICU had to use resource values different from the card's defaults to avoid conflicts. • You added an ISA expansion card, selected **ADVANCED**, and chose resource val-ues different from the card's defaults.	Make a note of the new card configuration shown in the Card Resource Usage dialog box displayed after this message. Change jumper settings on the ISA expansion card to match the new card configuration.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Configuration Manager Messages

The Configuration Manager for the ICU identifies problems following system boot and generates messages if necessary. These messages alert you to any unsuccessful attempts to configure Plug and Play or Peripheral Component Interconnect (PCI) expansion cards, as well as any problems that interfere with the operation of the Configuration Manager. If you receive a message from the Configuration Manager, see Table A-2 for suggestions on resolving any problems indicated by the message.

Table B-2. Configuration Manager Messages

Message	Probable Cause	Corrective Action
Found Plug and Play ISA card: *Plug and Play ISA Card Name*.	This message appears at system boot for each Plug and Play ISA expansion card recognized by the Configuration Manager.	Status message; no action is required.
NOTICE: Boot Device Not Active! CSN=*Card Select Number*.	A boot device was found to be inactive.	Status message; no action is required. The Configuration Manager automatically configures and activates the device.
One or more active devices have been reconfigured -- system requires reboot. Press any key to reboot system.	You modified the resource values of one or more PCI or Plug and Play ISA expansion cards.	Reboot the system to reconfigure the card(s).
The Plug and Play ISA card has been successfully configured. *Card Count* Plug and Play ISA cards have been successfully configured.	The Configuration Manager has successfully configured the given number of cards.	If this message does not match the number of Plug and Play ISA expansion cards installed in your computer, reinstall any Plug and Play expansion cards not listed and reboot the system.
ERROR: Insufficient CM Memory	There is not enough memory available to the Configuration Manager for it to run.	Disable any TSR programs or any unneeded device drivers. Another possible solution is to load the **dwcfgmg.sys** driver into high memory. See "Modifying the Configuration Manager" in Chapter 3 for an example of loading the **dwcfgmg.sys** driver into high memory using a memory manager.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action
`ERROR: Fatal BIOS error` *`Internal Error Code`*`.`	A BIOS call failed with an internal error. The most likely cause is an incompatibility between the BIOS and the Configuration Manager.	See the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for instructions on obtaining technical assistance.
`ERROR: Could not read NVS, Error=`*`Internal Error Code`*`.`	An attempt to read the NVRAM failed.	See the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for instructions.
`ERROR: Failed NVS write. Error=`*`Internal Error Code`*`.`	An attempt to write to NVRAM failed.	Run the diskette-based diagnostics to verify the integrity of your system NVRAM. See the chapter titled "Running the Diskette-Based Diagnostics" in your *Diagnostics and Troubleshooting Guide* for instructions. If you are unable to determine the cause of the error, see the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* for instructions.
`ERROR: Failed to activate device, CSN=`*`Card Select Number`*`.`	A Plug and Play expansion card could not be activated.	Use the following procedure: **1. Exit the ICU and turn off your system.** **2. Remove the Plug and Play expansion card that could not be activated.** Follow steps 2 through 6 of "Removing an Expansion Card" in Chapter 6, and then return to this procedure. **3. Reinstall the Plug and Play expansion card.** Follow steps 5 through 9 of "Installing an Expansion Card" in Chapter 6, and then return to this procedure. If you still receive the error message, contact the manufacturer of the Plug and Play expansion card for assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action

`WARNING: Could not configure ` *`Plug and Play Card Name`*`.`
 	
`WARNING: Could not configure PCI device, ID=`*`DeviceID`*`.`
 	
`Failed to configure ` *`Number`* ` of ` *`Total Count`* ` Plug and Play ISA devices. Use your system's configuration utility to resolve conflicts. Press any key to continue.`
	The card(s) mentioned are not fully configured due to resource conflicts.	If you have documentation that lists the allowable resource values for your Plug and Play or PCI expansion card, you can use the following procedure to locate and resolve the resource conflict.
		
		NOTE: If you do not have documentation listing the allowable resource values, see the corrective action for these messages on the following page.
		
		1. **Start the ICU.**
		Any Plug and Play or PCI expansion cards that could not be configured should be marked `config err` on the list of cards in the ICU window.
		
		2. **Select the SYSTEM RESOURCES option from the View menu.**
		The System Resource Usage dialog box displays all resources currently used by the system.
		
		3. **Select one of the resources used by your Plug and Play or PCI expansion card, and click the Used By Card button.**
		The Card Resources Usage dialog box identifies which device is using the resource.
		
		4. **Repeat step 3 until you have identified all conflicting resources and the cards that use them.**
		
		5. **Modify the cards as needed to free the resources required by the unconfigured Plug and Play or PCI expansion card.**
		See "Modifying a Card" in Chapter 3 for instructions.

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Message	Probable Cause	Corrective Action
WARNING: Could not configure *Plug and Play Card Name*. WARNING: Could not configure PCI device, ID=*DeviceID*. Failed to configure *Number* of *Total Count* Plug and Play ISA devices. Use your sys-tem's configuration utility to resolve conflicts. Press any key to continue.	The card(s) mentioned are not fully configured due to resource conflicts.	If you do not know the allowable resource values for your Plug and Play or PCI expansion card, use the following procedure to locate and resolve the resource conflict: 1. **Remove all card configurations from the ICU.** See "Removing a Card" in Chapter 3 for instructions. 2. **Reboot your system.** The ICU should automatically configure your Plug and Play or PCI expansion card. 3. **Add the ISA expansion cards back into the ICU, resolving any resource conflicts as they arise.** See "Adding a Listed Card" in Chapter 3 for instructions. If your Plug and Play or PCI expansion card is not automatically configured when you reboot the system with all other cards removed, you should contact the manufacturer of the card or see the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide*.
WARNING: Boot Device conflict detected! CSN=*Card Select Number* Error=*Error*.	One of the devices is attempting to use one or more resources assigned to the system's boot device.	Perform the following procedure: 1. **Start the ICU.** 2. **Identify the card marked** config err**.** This should be the card that is attempting to use one or more resources required by the system's boot device. 3. **Follow the procedure for the preceding error message in this table.**

NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary in the online System User's Guide.

Appendix C
Regulatory Notices

FCC Notices (U.S. Only)

Most Dell computer systems are classified by the Federal Communications Commission (FCC) as Class B digital devices. However, the inclusion of certain options changes the rating of some configurations to Class A. To determine which classification applies to your computer system, examine all FCC registration labels located on the back panel of your computer, on card-mounting brackets, and on the cards themselves. If any one of the labels carries a Class A rating, your entire system is considered to be a Class A digital device. If *all* labels carry the Class B rating, your system is considered to be a Class B digital device.

Once you have determined your system's FCC classification, read the appropriate FCC notice. Note that FCC regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

> **A Notice About Shielded Cables: Use only shielded cables for connecting peripherals to any Dell device to reduce the possibility of interference with radio and television reception. Using shielded cables ensures that you maintain the appropriate FCC radio frequency emissions compliance (for a Class A device) or FCC certification (for a Class B device) of this product. For parallel printers, a cable is available from Dell Computer Corporation.**

Class A

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

Class B

NOTE: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. 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. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that the computer and the receiver are on different branch circuits.

If necessary, consult a representative of Dell Computer Corporation or an experienced radio/television technician for additional suggestions. You may find the following

booklet helpful: *FCC Interference Handbook, 1986*, available from the U.S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-00450-7.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

• This device may not cause harmful interference.

• This device must accept any interference received, including interference that may cause undesired operation.

The following information is provided on the device or devices covered in this document in compliance with FCC regulations:

• Product name: Dell OptiPlex GX*i*

• Model number: DCS

• Company name: Dell Computer Corporation
  Regulatory Department
  2214 W. Braker Lane
  Austin, Texas 78758 USA
  512-338-4400

IC Notice (Canada Only)

Most Dell computer systems (and other Dell digital apparatus) are classified by the Industry Canada (IC) Interference-Causing Equipment Standard #3 (ICES-003) as Class B digital devices. To determine which classification (Class A or B) applies to your computer system (or other Dell digital apparatus), examine all registration labels located on the bottom or the back panel of your computer (or other digital apparatus). A statement in the form of "IC Class A ICES-3" or "IC Class B ICES-3" will be located on one of these labels.

Note that Industry Canada regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

This Class B (or Class A, if so indicated on the registration label) digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe B (ou Classe A, si ainsi indiqué sur l'étiquette d'enregistrement) respecte toutes les exigences du Reglement sur le Materiel Brouilleur du Canada.

EN 55022 Compliance (Czech Republic Only)

This device belongs to category B devices as described in EN 55022, unless it is specifically stated that it is a category A device on the specification label. The following applies to devices in category A of EN 55022 (radius of protection up to 30 meters). The user of the device is obliged to take all steps necessary to remove sources of interference to telecommunication or other devices.

Pokud není na typovém štitku počítače uvedeno, že spadá do třídy A podle EN 55022, spadá automaticky do třídy B podle EN 55022. Pro zařízení zařazená do třídy A (ochranné pásmo 30m) podle EN 55022 platí následující. Dojde-li k rušení telekomunikačních nebo jinych zařízení, je uživatel povinen provést taková opatření, aby rušení odstranil.

C_E Notice

Marking by the symbol **CE** indicates compliance of this Dell system to the EMC (Electromagnetic Compatibility) directive of the European Community. Such marking is indicative that this Dell system meets or exceeds the following technical standards:

- EN 55022 — "Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment."

  NOTE: EN 55022 emissions requirements provide for two classifications—Class A and Class B. If any one of the registration labels (located on the bottom or back panel of your computer, on card-mounting brackets, or on the cards themselves) carries an FCC Class A rating, the following warning applies to your system.

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

- EN 50082-1 — "Electromagnetic compatibility—Generic immunity standard Part 1: Residential, commercial, and light industry."

- IEC 801-2 — "Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements." — Severity level 3.

- IEC 801-3 — "Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiated electromagnetic field requirements." — Severity level 2.

- IEC 801-4 — "Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements." — Severity level 2.

- EN60950:1992 + Amd.1:1993 + Amd.2:1993 — "Safety of Information Technology Equipment including Electrical Business Equipment."

A "Declaration of Conformity" in accordance with the above standards has been made and is on file at Dell Products Europe BV, Limerick, Ireland.

V_CCI Notices (Japan Only)

Most Dell computer systems are classified by the Voluntary Control Council for Interference (VCCI) as Class 2 information technology equipment (ITE). However, the inclusion of certain options changes the rating of some configurations to Class 1. To determine which classification applies to your computer system, examine the FCC classification on the registration labels located on the back panel of your computer, on card-mounting brackets, and on the cards themselves. If any one of the labels carries an FCC Class A designation, your entire system is considered to be VCCI Class 1 ITE. If *all* labels carry an FCC Class B identification number, your system is considered to be VCCI Class 2 ITE.

Once you have determined your system's VCCI classification, read the appropriate VCCI notice. Note that VCCI regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

Class 1 Notice

This equipment complies with the limits for a Class 1 digital device (devices used in commercial and/or industrial environments) and conforms to the standards for information technology equipment that are set by the Voluntary Control Council for Interference for preventing radio frequency interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an area adjacent to a residential area, this equipment may cause radio interference with radio and television receivers or other communications equipment.

To ensure that such radio interference does not occur, it is important to install and use this equipment in accordance with the manufacturer's instruction manual.

Class 2 Notice

This equipment complies with the limits for a Class 2 digital device (devices used in or adjacent to a residential environment) and conforms to the standards for information technology equipment that are set by the Voluntary Control Council for Interference for preventing radio frequency interference in residential areas.

However, this equipment does generate, use, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. Therefore, it is important to adhere to the manufacturer's instructions for installing and using this equipment.

Korean Regulatory Notice

To determine which classification (Class A or B) applies to your computer system (or other Dell digital apparatus), examine all registration labels located on the bottom or the back panel of your computer (or other digital apparatus), on card-mounting brackets, and on the cards themselves. If any one of the labels carries a Class A rating, your entire system is considered to be a Class A digital device. If *all* labels carry the Class B rating, your system is considered to be a Class B digital device.

NOTE: Class A devices are for business purposes. Class B devices are for nonbusiness purposes.

Class A Device

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you may exchange it for a device that has been approved for use in residential as well as business environments.

Class B Device

Please note that this device has been approved for non-business purposes and may be used in any environment, including residential areas.

Polish Center for Testing and Certification Notice

The equipment should draw power from a socket with an attached protection circuit (a three-prong socket). All equipment that works together (computer, monitor, printer, and so on) should have the same power supply source.

The phasing conductor of the room's electrical installation should have a reserve short-circuit protection device in the form of a fuse with a nominal value no larger than 10 amperes (A).

All the equipment that works together must switch off when the power supply cable plug is removed from the power supply socket, which should be located near the equipment and easily accessible.

A protection mark "B" confirms that the equipment is in compliance with the protection usage requirements of standards PN-93/T-42107 and PN-89/E-06251.

Wymagania Polskiego Centrum Badań i Certyfikacji

Urządzenie powinno być zasilane z gniazda z przyłączonym obwodem ochronnym (gniazdo z kołkiem). Współpracujące ze sobą urządzenia (komputer, monitor, drukarka) powinny być zasilane z tego samego źródła.

Instalacja elektryczna pomieszczenia powinna zawierać w przewodzie fazowym rezerwową ochronę przed zwarciami, w postaci bezpiecznika o wartości znamionowej nie większej niż 10A (amperów).

Całkowite odłączenie urządzenia od sieci zasilającej następuje po wyjęciu wtyczki sznura zasilającego z gniazda sieciowego, które powinno być usytuowane w pobliżu urządzenia i być łatwo dostępne.

Znak bezpieczeństwa "B" potwierdza zgodność urządzenia z wymaganiami bezpieczeństwa użytkowania zawar-tymi w PN-93/T-42107 i PN-89/E-06251.

Pozostałe instrukcje bez pieczeństwa

- Nie należy używać wtyczek adapterowych lub usuwać kołka obwodu ochronnego z wtyczki. Jeżeli konieczne jest użycie przedłużacza to należy użyć przedłużacza 3-żyłowego z prawidłowo połączonym przewodem ochronnym.

- System komputerowy należy zabezpieczyć przed nagłymi, chwilowymi wzrostami lub spadkami napięcia, używając eliminatora przepięć, urządzenia

dopasowującego lub bezzakłóceniowego źródła zasilania.

- Należy upewnić się, aby nic nie leżało na kablach systemu komputerowego, oraz aby kable nie były umieszczone w miejscu, gdzie można byłoby na nie nadeptywać lub potykać się o nie.

- Nie należy rozlewać napojów ani innych płynów na system komputerowy.

- Nie należy wpychać żadnych przedmiotów do otworów systemu komputerowego, gdyż może to spowodować pożar lub porażenie prądem, poprzez zwarcie elementów wewnętrznych.

- System komputerowy powinien znajdować się z dala od grzejników i źródeł ciepła. Ponadto, nie należy blokować otworów wentylacyjnych. Należy unikać kładzenia luźnych papierów pod komputer oraz umieszczania komputera w ciasnym miejscu bez możliwości cyrkulacji powietrza wokół niego.

Appendix D
Warranties and Return Policy

Limited Three-Year Warranty (U.S. Only)

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is three years beginning on the date of invoice, as described in the following text.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell's system integration department; accessories or parts that are not installed in the Dell factory; or DellWare® products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell's standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those sold through the DellWare program) are not covered. Batteries for portable computers are covered only during the initial one-year period of this warranty.

Coverage During Year One

During the one-year period beginning on the invoice date, Dell will repair or replace products covered under this limited warranty that are returned to Dell's facility. To request warranty service, you must call Dell's Customer Technical Support within the warranty period. Refer to the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in the continental U.S. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards. Dell does not accept liability for lost data or software.

Dell owns all parts removed from repaired products. Dell uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Dell repairs or replaces a product, its warranty term is not extended.

Coverage During Years Two and Three

During the second and third years of this limited warranty, Dell will provide, on an exchange basis, replacement parts for the Dell hardware product(s) covered under this limited warranty when a part requires replacement. You must report each instance of hardware failure to Dell's Customer Technical Support in advance to obtain Dell's concurrence that a part should be replaced and to have Dell ship the replacement part. Dell will ship parts using next-business-day delivery, shipping prepaid if you use an address in the continental U.S. Shipments to other locations will be made freight collect. Dell will include a prepaid shipping container with each replacement part for your use in returning the replaced part to Dell. Replacement parts are new or reconditioned. Dell may provide replacement parts made by various manufacturers when supplying parts to you. The warranty term for a replacement part is the remainder of the limited warranty term.

You will pay Dell for replacement parts if the replaced part is not returned to Dell within 30 days after the date the replacement part was shipped by Dell and for parts used to repair systems not covered by this limited warranty. In these events, replacement parts will be priced at Dell's then-current standard prices. Payment for these parts is due within 30 days from the date of invoice.

NOTE: You accept full responsibility for your software and data. Dell is not required to advise or remind you of appropriate backup and other procedures.

General

DELL MAKES NO EXPRESS WARRANTIES BEYOND THOSE STATED IN THIS WARRANTY STATEMENT. DELL DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES, SO THIS LIMITATION MAY NOT APPLY TO YOU.

DELL'S RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS WARRANTY STATEMENT. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

DELL DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES SET FORTH IN THIS WARRANTY STATEMENT OR LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LIABILITY FOR PRODUCTS NOT BEING AVAILABLE FOR USE OR FOR LOST DATA OR SOFTWARE.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE PRECEDING EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

These provisions apply to Dell's U.S. limited three-year warranty only. For provisions of any service contract covering your system, refer to the separate service contract that you will receive.

NOTE: If you chose one of the available warranty and service options in place of the standard limited three-year warranty described in the preceding text, the option you chose will be listed on your invoice.

Limited Three-Year Warranty (Canada Only)

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is three years beginning on the date of invoice, as described in the following text. This warranty is transferrable with the warranted products.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell's system integration department; accessories or parts that are not installed in the Dell factory; or DellWare products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell's standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those sold through the DellWare program) are not covered. Batteries for portable computers are covered only during the initial one-year period of this warranty.

Coverage During Year One

During the one-year period beginning on the invoice date, Dell will repair or replace products covered under this limited warranty that are returned to Dell's facility. To request warranty service, you must call Dell's Customer Technical Support within the warranty period. Refer to the chapter titled "Getting Help" in your *Diagnostics and Troubleshooting Guide* to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in Canada. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards. Dell does not accept liability for lost data or software.

Dell owns all parts removed from repaired products. Dell uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Dell repairs or replaces a product, its warranty term is not extended, except as may be required by law.

Coverage During Years Two and Three

During the second and third years of this limited warranty, Dell will provide, on an exchange basis, replacement parts for the Dell hardware product(s) covered under this limited warranty when a part requires replacement. You must report each instance of hardware failure to Dell's Customer Technical Support in advance to obtain Dell's concurrence that a part should be replaced and to have Dell ship the replacement part. Dell will ship parts using next-business-day delivery, shipping prepaid if you use an address in Canada. Shipments to other locations will be made freight collect. Dell will include a prepaid shipping container with each replacement part for your use in returning the replaced part to Dell. Replacement parts are new or reconditioned. Dell may provide replacement parts made by various manufacturers when supplying parts to you. The warranty term for a replacement part is the remainder of the limited warranty term.

You will pay Dell for replacement parts if the replaced part is not returned to Dell within 30 days after the date the replacement part was shipped by Dell and for parts used to repair systems not covered by this limited warranty. In these events, replacement parts will be priced at Dell's then-current standard prices. Payment for these parts is due within 30 days from the date of invoice.

NOTE: You accept full responsibility for your software and data. Dell is not required to advise or remind you of appropriate backup and other procedures.

General

DELL MAKES NO EXPRESS WARRANTIES BEYOND THOSE STATED IN THIS WARRANTY STATEMENT. DELL DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME JURISDICTIONS DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES, SO THIS LIMITATION MAY NOT APPLY TO YOU.

DELL'S RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN

THIS WARRANTY STATEMENT. THESE WARRAN-
TIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND
YOU MAY ALSO HAVE OTHER RIGHTS, WHICH
VARY FROM ONE JURISDICTION TO ANOTHER.

DELL DOES NOT ACCEPT LIABILITY BEYOND
THE REMEDIES SET FORTH IN THIS WARRANTY
STATEMENT OR LIABILITY FOR INCIDENTAL OR
CONSEQUENTIAL DAMAGES, INCLUDING WITH-
OUT LIMITATION ANY LIABILITY FOR
PRODUCTS NOT BEING AVAILABLE FOR USE OR
FOR LOST DATA OR SOFTWARE.

SOME JURISDICTIONS DO NOT ALLOW THE
EXCLUSION OR LIMITATION OF INCIDENTAL OR
CONSEQUENTIAL DAMAGES, SO THE PRECED-
ING EXCLUSION OR LIMITATION MAY NOT
APPLY TO YOU.

These provisions apply to Dell's Canadian limited three-
year warranty only. For provisions of any service contract
covering your system, refer to the separate service con-
tract that you will receive.

*NOTE: If you chose one of the available warranty and
service options in place of the standard limited three-
year warranty described in the preceding text, the option
you chose will be listed on your invoice.*

"Total Satisfaction" Return Policy (U.S. and Canada Only)

If you are an end-user customer who bought products
directly from a Dell company, you may return them to
Dell up to 30 days from the date of invoice for a refund of
the product purchase price if already paid. This refund
will not include any shipping and handling charges
shown on your invoice. If your organization bought the
products from Dell under a written agreement with Dell,
there may be different terms for the return of products
under this policy, based on your agreement with Dell. To
return products, you must call Dell Customer Service at
the telephone number shown in the chapter titled "Get-
ting Help" in your *Diagnostics and Troubleshooting
Guide* to receive a Credit Return Authorization Number.
You must ship the products to Dell in their original pack-
aging, prepay shipping charges, and insure the shipment
or accept the risk of loss or damage during shipment. You
may return software for refund or credit only if the sealed
package containing the diskette(s) or CD(s) is unopened.
Returned products must be in as-new condition, and all of
the manuals, diskette(s), CD(s), power cables, and other
items included with a product must be returned with it.

This "Total Satisfaction" Return Policy does not apply to
DellWare products, which may be returned under
DellWare's current return policy.

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