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Dell® Latitude® CP

REFERENCE AND TROUBLESHOOTING GUIDE

www.dell.com

October 1997 P/N 54723

Safety Instructions

Use the following safety guidelines to help protect your computer from potential damage and to help ensure your own personal safety.

When Using Your Computer

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

- When setting up the computer for work, place it on a level surface.
- When traveling, do not check the computer as baggage. You can put your computer through an X-ray security machine, but *never* put your computer through a metal detector. If you have the computer checked by hand, be sure to have a charged battery available in case you are asked to turn on the computer.
- When traveling, do not place the computer in overhead storage compartments where it could slide around. Do not drop your computer or subject it to other mechanical shocks.
- Do not carry a battery in your pocket, purse, or other container where metal objects (such as car keys) could short-circuit the battery terminals. The resulting excessive current flow can cause extremely high temperatures and may result in damage from burns.
- Protect your computer, battery, hard-disk drive, CD-ROM drive, and diskette drive from environmental hazards such as dirt, dust, food, liquids, temperature extremes, and overexposure to sunlight.
- Do not press down on the top of the hard-disk drive, CD-ROM drive, or diskette drive, or place heavy objects on them. Store these drives in a safe place.
- Do not push objects into the air intake and fan openings of your computer. Doing so can cause fire or electric shock by shorting out interior components. Protect the air intake from dust and other foreign particles.
- When you move your computer between environments with very different temperature and/or humidity ranges, condensation may form on or within the computer. To avoid damaging the computer, allow sufficient time for the moisture to evaporate before using the computer.

CAUTION: When taking the computer from low-temperature conditions into a warmer environment or from high-temperature conditions into a cooler environment, allow the computer to acclimate to room temperature before turning on power.

- If using alternating current (AC) power, plug the AC adapter power cable into a properly grounded power source. Be sure that nothing rests on your adapter's power cable and that the cable is not located where it can be tripped over or stepped on.
- The AC adapter should be in a ventilated area, such as on a desktop or on the floor, when used to power the computer or charge the battery. Do not use the AC adapter in a poorly ventilated environment, such as inside a carrying case.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. As you pull out the connector, keep it evenly aligned to avoid bending any connector pins. Also, before you connect a cable make sure both connectors are correctly oriented and aligned.

- Do not attempt to service the computer yourself. Always follow installation instructions closely.
- Handle components with care. Hold a component such as a memory module by its edges, not by the card-edge connector.
- When removing a memory module from the system board or disconnecting a peripheral device from the computer, wait five seconds after turning off the computer before removing the memory module or disconnecting the device to help avoid possible damage to the system board.
- Before you clean your computer, turn it off, unplug it from its power source, and remove the battery.
- Clean your computer with a soft, clean cloth dampened with water. Stroke the damp cloth across the display in one direction, moving from the top of the display to the bottom.
- If your computer gets wet or is damaged, follow the procedures described in Chapter 3, "Troubleshooting Your Computer." If, after following these procedures, you confirm that your computer is not operating properly, contact Dell Computer Corporation. (See Chapter 5, "Getting Help," for the appropriate telephone number.)

Ergonomic Computing Habits

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

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

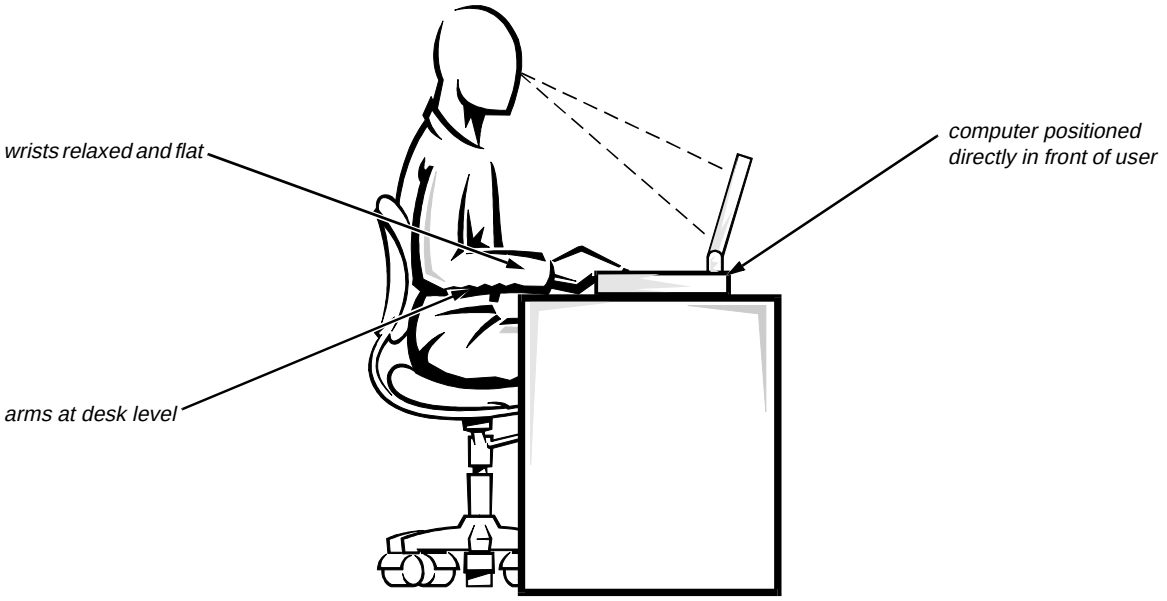
- Position your computer directly in front of you as you work.
- Adjust the tilt of the computer's display, its contrast and/or brightness settings, and the lighting around you (such as overhead lights, desk lamps, and the curtains or blinds on nearby windows) to minimize reflections and glare on the display.
- When using an external monitor with your computer, set the monitor at a comfortable viewing distance (usually 510 to 610 millimeters [mm] [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.
- 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, trackball, or external mouse.
- Always use the palmrest with the keyboard or trackball. Leave space to rest your hands when using an external 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 without stopping. When you stop typing, try to do things that use both hands.

When Removing or Installing Memory Modules

Before removing or installing memory modules, perform the following steps in the sequence indicated.

CAUTION: The only time you should ever access the inside of your computer is when you are installing memory modules. Wait five seconds after turning off the computer before disconnecting a peripheral device or removing a memory module to help prevent possible damage to the system board.

1. **Turn off your computer and any attached peripherals.**
2. **Disconnect your computer and peripherals from AC power to reduce the potential for personal injury or shock. Also, disconnect any telephone or telecommunication line from the computer.**



3. **Remove all installed batteries.**
4. **Ground yourself by touching the unpainted metal surface of an I/O connector on the back of the computer.**

   While you work, periodically touch the connector to dissipate any static electricity that might harm internal components.

Protecting Against Electrostatic Discharge

Static electricity can harm electronic 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 a memory module. You can do so by touching an unpainted metal surface on the computer's I/O panel.

As you continue to work inside the computer, periodically touch an I/O connector 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 from the antistatic packing material until you are ready to install the component. 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 may appear 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 the Dell Latitude CP portable computer. It can be used by both first-time and experienced computer users who want to learn about the features of the computer. This guide also provides basic troubleshooting procedures and instructions for using the Dell Diagnostics to test your computer and its components.

Summaries of the chapters and appendixes of this guide follow:

- Chapter 1, “Introduction,” gives an overview of the computer features and a list of available upgrades.
- Chapter 2, “Customizing System Features,” describes how to use the System Setup program to change system settings, such as those that control the computer’s power conservation features.
- Chapter 3, “Troubleshooting Your Computer,” provides some initial checks and procedures you can use to solve basic computer problems and some general guidelines on analyzing software problems. This chapter also discusses messages and beep codes.
- Chapter 4, “Running the Dell Diagnostics,” describes how to check the computer’s hardware and use the Dell Diagnostics to isolate component problems.
- Chapter 5, “Getting Help,” describes the help tools Dell provides to assist you if you have a problem with the computer. It also explains how and when to call Dell for technical assistance.
- Appendix A, “Technical Specifications,” is intended primarily as reference material if you are interested in learning more about the details of your computer.
- Appendix B, “Diagnostic Video Tests,” provides samples of screens displayed when the Video test group of the Dell Diagnostics is run. These screens help you check a particular video function or group of functions on the built-in display or an external monitor.
- Appendix C, “Regulatory Notices,” is for users who are interested in which regulatory agencies have tested and approved the Dell Latitude CP portable computer.
- Appendix D, “Warranties and Return Policy,” describes the warranty and return policy for the Dell computer.

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 and return policy, see Appendix D, “Warranties and Return Policy.”

Other Documents You May Need

Besides this *Reference and Troubleshooting Guide*, the following online documentation is included with your computer:

The Windows-based *System User's Guide* contains essential information you need to use your portable computer. Look for the System User's Guide icon in the Dell Accessories folder.

The *Dell Q&A* provides quick and detailed answers to the questions most commonly asked about using a portable computer. Read this online document before calling Dell for technical assistance. Look for the Dell Q&A icon in the Dell Accessories folder.

The Dell Program Diskette Maker helps you with one of the most critical parts of setting up your system—creating program diskette sets. Look for the Program Diskette Maker icon in the Dell Accessories folder.

Dell Service and Support Policies provides information about service and support policies, guarantees, and warranties (in the United States and Canada only). Look for the Dell Services and Support Policies icon in the Dell Accessories folder.

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

NOTE: Documentation updates are sometimes included with your computer to describe changes to your computer or software. Always read these updates ***before*** *consulting any other documentation because the updates 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 computer. This documentation includes information that you need to configure and install these options in your Dell computer.
- "Readme" files may be installed on your hard-disk drive to provide last-minute updates about technical changes to your computer 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 color 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.

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 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>

- *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 New` font are intended to be typed as part of an instruction.

  Example: "Type `format` 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 New` font.

  Example: `del c:\myfile.doc`

- *Screen text* is text that appears on the screen of your display or external monitor. 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 New` font.

  Example: The following message appears on your screen:

  ```
  No boot device available
  ```

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

  Example: module *n* (where *n* represents the memory module number)

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Chapter 1
Introduction

The Dell® Latitude® CP portable computer is an expandable multimedia system designed around an Intel® Pentium® microprocessor with MMX™ and Peripheral Component Interconnect (PCI) technologies. This chapter describes the major hardware and software features of your computer.

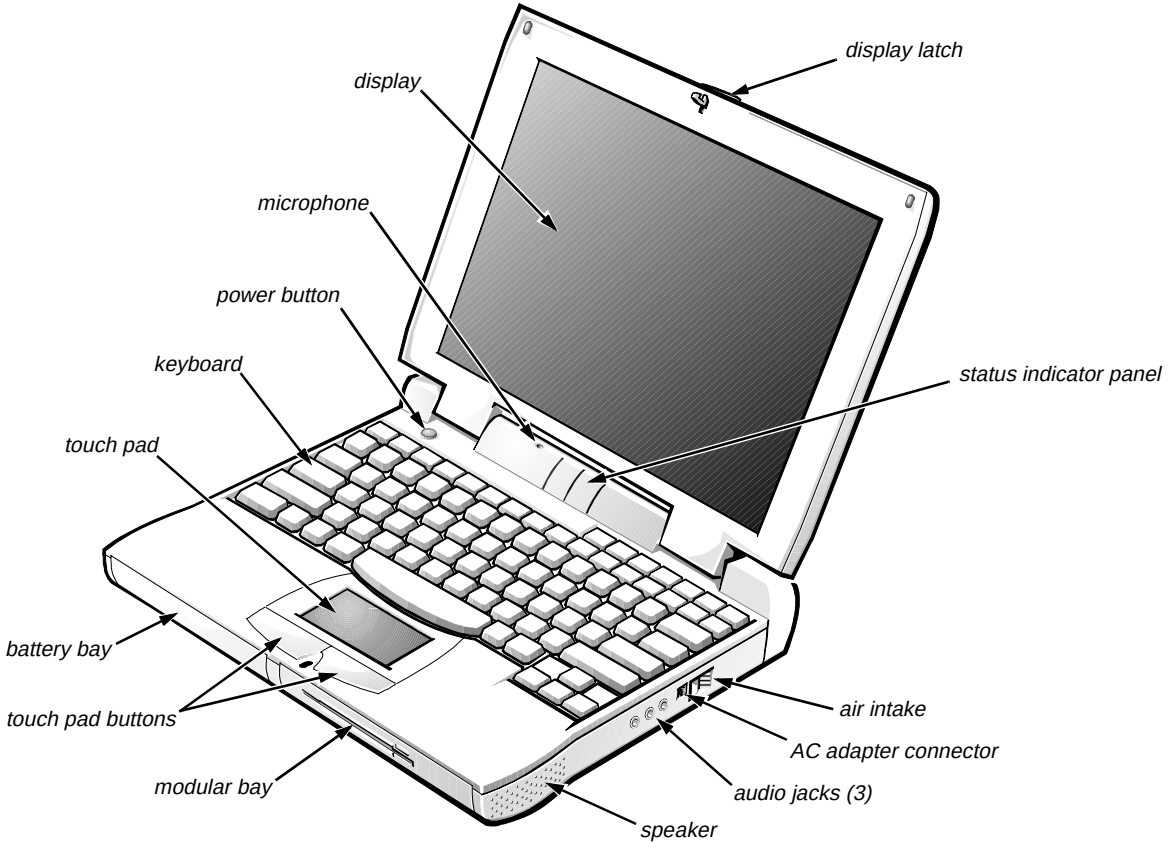


Figure 1-1. Front View of the Computer

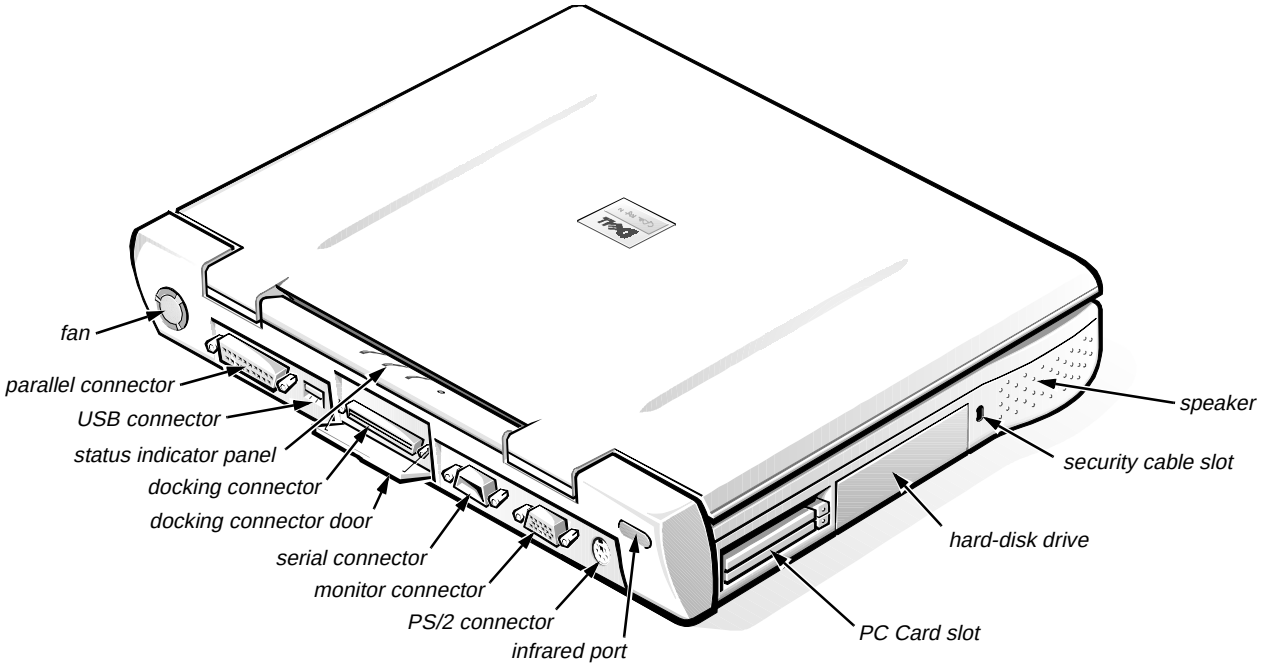


Figure 1-2. Back View of the Computer

Hardware Features

Your Dell computer has the following features:

- A Pentium microprocessor running at 133, 166, or 233 megahertz (MHz) and a 12.1-inch super video graphics array (SVGA) active-matrix color display or a 13.3-inch extended graphics array (XGA) (1024 x 768) active-matrix color display.
- Full multimedia capability through the following standard features:
  - — A CD-ROM drive that can be used in the modular bay. When you unpack your computer, look for the CD-ROM drive in the accessories box of the shipping carton.
  - — 128-bit hardware-accelerated video support, with 2 megabytes (MB) of video memory.
  - — Support for a zoom video PC Card in the upper PC Card connector.
  - — Software wavetable support, Sound Blaster Pro-compatible voice and music functions, and SRS 3-D audio control.
  - — Three audio jacks for connecting external speakers or headphones, a microphone, and a record/playback device to your computer.
  - — Built-in microphone and two stereo speakers.
- A modular bay that supports a CD-ROM drive, diskette drive, or second battery. To make the computer as light as possible when you travel, use the special travel module in the modular bay.

  NOTE: Your computer was shipped with a diskette drive in the modular bay. For information on removing the diskette drive and installing a CD-ROM drive, battery, or travel module in the modular bay, see the topic titled "Modular Bay" in the online System User's Guide.
- A 16- or 32-megabyte (MB) extended-data out (EDO) memory module standard on the system board. Memory can be increased up to 128 MB by

installing combinations of 16-, 32-, and 64-MB 3.3-volt (V) EDO small-outline, dual-inline memory modules (SoDIMMs) in the two memory module sockets on the system board.

- A 256-kilobyte (KB) static random-access memory (SRAM) external cache (also called *level 2*, or *L2*, cache) on the Latitude CP M133ST and Latitude CP M166ST. The Latitude CP M233ST and Latitude CP M233XT have a 512-KB SRAM external cache. Cache memory enhances the speed of many microprocessor operations by storing the most recently accessed contents of system memory.
- Two power conservation modes—*suspend mode* and *suspend-to-disk mode*—which help you conserve battery power. If the batteries run out of power, suspend-to-disk mode prevents data loss by copying all system data to the hard-disk drive and turning off the computer.
- Connectors for two 3.3-volt (V) or 5-V PC Cards. The upper PC Card connector supports zoomed video PC Cards.

  NOTE: The PC Card controller supports the CardBus standard for 32-bit data transfer on the PC Card.
- Hardware and software support for the Dell Latitude C/Port Advanced Port Replicator (C/Port APR) and the Dell Latitude C/Dock Expansion Station.
- A touch-pad pointing device positioned for both left- and right-handed users. The left and right touch-pad buttons mimic mouse buttons; you can also perform many pointing functions by tapping the touch pad itself. "Click and drag" buttonless functions are also supported.
- A lithium ion battery standard in the battery bay, with support for a second battery in the modular bay. ExpressCharge technology charges a single battery in 1 hour (when the computer is off or in suspend mode).

  NOTE: The batteries are designed to work only with Dell Latitude CP portable computers. Do not use the batteries with other computers, and do not use batteries from other computers with the Dell Latitude CP.

WARNING: Do not puncture or incinerate the battery. When your battery no longer holds a charge, call your local waste disposal agency or environmental agency for advice on disposing of the computer's lithium ion battery. The lithium ion technology used in the battery is significantly less hazardous to the environment than the lithium metal technology used in some other batteries (such as watch batteries).

- High-performance parallel and serial ports, and a multipurpose Personal System/2 (PS/2) connector for attaching external devices. There is also a monitor connector for attaching an external monitor to your computer, and a USB connector that supports standalone and hub devices.
- An infrared port that permits file transfer without using cable connections. The port is compatible with the Infrared Data Association (IrDA) Standard 1.1 (Fast IR) and Standard 1.0 (Slow IR) for use with external devices.
- An integrated 16-bit audio controller that provides sound functions and is Sound Blaster Pro-compatible.
- An automatic thermal management system that uses a variable-speed fan and microprocessor speed changes to keep the system running at the optimum temperature.

The following software is included with your Dell computer system:

- The Microsoft® Windows® 95 or Windows NT® 4.0 or higher operating system is installed on your hard-disk drive. For more information, see your operating system documentation.
- The System Setup program lets you view and change the system configuration. For more information, search on "System Setup program" in the online *System User's Guide* or see Chapter 2, "Customizing System Features."
- The Program Diskette Maker, which allows you to create program diskette sets of software that Dell installed on your computer's hard-disk drive.
- Dell Diagnostics for evaluating the computer's components and devices.

NOTE: If Dell did not install an operating system on your hard-disk drive, the drivers, system utilities, and diagnostics are available separately from Dell. To order, see Chapter 5, "Getting Help," for the appropriate telephone number in your location.

Before turning on your computer for the first time, read all license agreements that came with your computer. When you turn on your computer for the first time, if you agree with the license terms, indicate your acceptance by typing y when prompted by the computer. Then complete the installation of your operating system.

Next, use the Program Diskette Maker in the Dell Accessories folder to create program diskette sets of your installed software. A program diskette set contains the complete software package on diskettes. These diskettes can be used to reinstall or reconfigure the software.

Available Options

As your computing requirements change, you can extend your computer's capabilities with the C/Port Advanced Port Replicator or C/Dock Expansion Station. You can also install a hard-disk drive of larger capacity, increase system memory, and add functionality with PC Cards.

Dell offers the following devices and upgrade options:

- C/Port APR and C/Dock Expansion Station
- Additional batteries
- External keyboards and a numeric keypad
- External monitors
- External pointing devices
- External speakers, headphones, and microphones
- Printers
- Hard-disk drives
- AC adapter
- PC Cards
- 16-, 32-, and 64-MB memory modules
- Carrying case
- Air/auto adapter (for powering the computer from a special outlet on an airplane or from the cigarette lighter in a car)

Instructions for connecting or installing these options are contained in the online *System User's Guide* or are included in the upgrade kit you receive from Dell.

Accessing Online Documentation

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

- System features
- Traveling with the computer
- Customizing system features
- Powering the computer and extending battery life
- Using internal and external devices
- Maintaining the system
- Contacting Dell

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

To access this guide, select the System User's Guide icon in the Dell Accessories folder.

To print any screen from the online *System User's Guide*, display the screen you want and select Print Topic from the File menu. To print pop-up windows, open the window, click the right touch-pad button, and select Print Topic from the pop-up menu.

NOTE: If Dell did not install an operating system on your hard-disk drive, or if you need to reinstall the online guide and did not make a program diskette set, you can download the online System User's Guide *from Dell's World Wide Web site at* **www.dell.com**. *Click the Service and Support icon on Dell's home page. From the product line menu, select Latitude Notebooks and then Dell Latitude CP. Select Technical Information and then select Documentation. When prompted, save the file to your hard-disk drive.*

Getting Help

If at any time you don't understand a procedure described in this guide, or if your computer does not perform as expected, Dell provides a number of tools to help you. For more information on these help tools, see Chapter 5, "Getting Help."

Chapter 2
Using the System Setup Program

Each time you turn on your computer, it compares the installed hardware with the system configuration information stored in NVRAM. If the system detects a discrepancy, it generates an error message for each incorrect configuration setting.

You can use the System Setup program as follows:

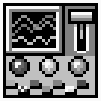
- To set or change user-selectable features—for example, your password or power management features
- To verify information about your computer's current configuration, such as the amount of system memory

For some setup options, you must reboot the computer before any changes take effect. Changes for other options take effect immediately.

NOTE: If you change an option that is activated by rebooting, the System Setup program displays the setting you selected rather than the setting currently in effect. You ***must*** *reboot for the new setting to take effect.*

After you set up your computer, run the System Setup program to familiarize yourself with your system configuration information and optional settings. Dell recommends that you write down the information for future reference.

If the computer is using the Microsoft Windows NT 4.0 operating system, you must use the System Setup program to view and change your system configuration.



If the computer is using the Microsoft Windows 95 operating system, you can also use the Dell Control Center to view and change the system configuration. Access the Dell Control Center from the Dell Accessories folder. See the topic titled "Dell Control Center" in the online *System User's Guide* for more information. The Dell Control Center also contains detailed help that gives you all the information you need to set options.

Entering the System Setup Program

Enter and use the System Setup program as follows:

If you are using Windows 95, press <Fn><F1> at any time on the built-in keyboard (or <Scroll Lock><F1> on an external keyboard if the External Hot Key option is enabled). If you press <Fn><F3> (or <Scroll Lock><F3> on an external keyboard if the External Hot Key option is enabled), the System Setup program opens directly to the battery status screen.

If you are using Windows NT 4.0 or any other operating system that is not Plug and Play aware, close all open application programs and exit the operating system. When prompted, reboot the computer and press <Fn><F1> (or <Scroll Lock><F1> from an external keyboard if the External Hot Key option is enabled). 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.

In either operating system, press <Esc> to exit the System Setup program. If you change the setting of an option that requires rebooting in order to take effect, exit the operating system *before* rebooting. (The Help text in the upper-right corner of System Setup screens 1, 2, and 4 tells you if the computer must be rebooted.)

NOTE: If the System Setup program is running when the computer enters suspend mode, the computer exits the System Setup program and then activates suspend mode.

Using the System Setup Program

The System Setup screens display the current setup and configuration information and optional settings for your

computer. Information on the screens is organized in five boxed areas:

- **Title**

  The box at the top of all screens lists the page number, the system name, and the version number of the basic input/output system (BIOS).

- **Options**

  The box on the left half of screens 1, 2, and 4 lists options that define the installed hardware in your computer and the power conservation and security features for your computer.

  Fields next to the options contain settings or values. You can change those values that appear bright on the screen. Options or values that you cannot change (because they are determined or calculated by the computer) appear less bright.

- **Help**

  The box on the upper-right half of screens 1, 2, and 4 displays help information for the option with a currently highlighted field.

- **Computer data**

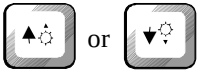
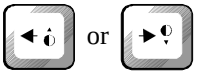
  The box in the lower-right corner of screens 1, 2, and 4 displays information about your computer.

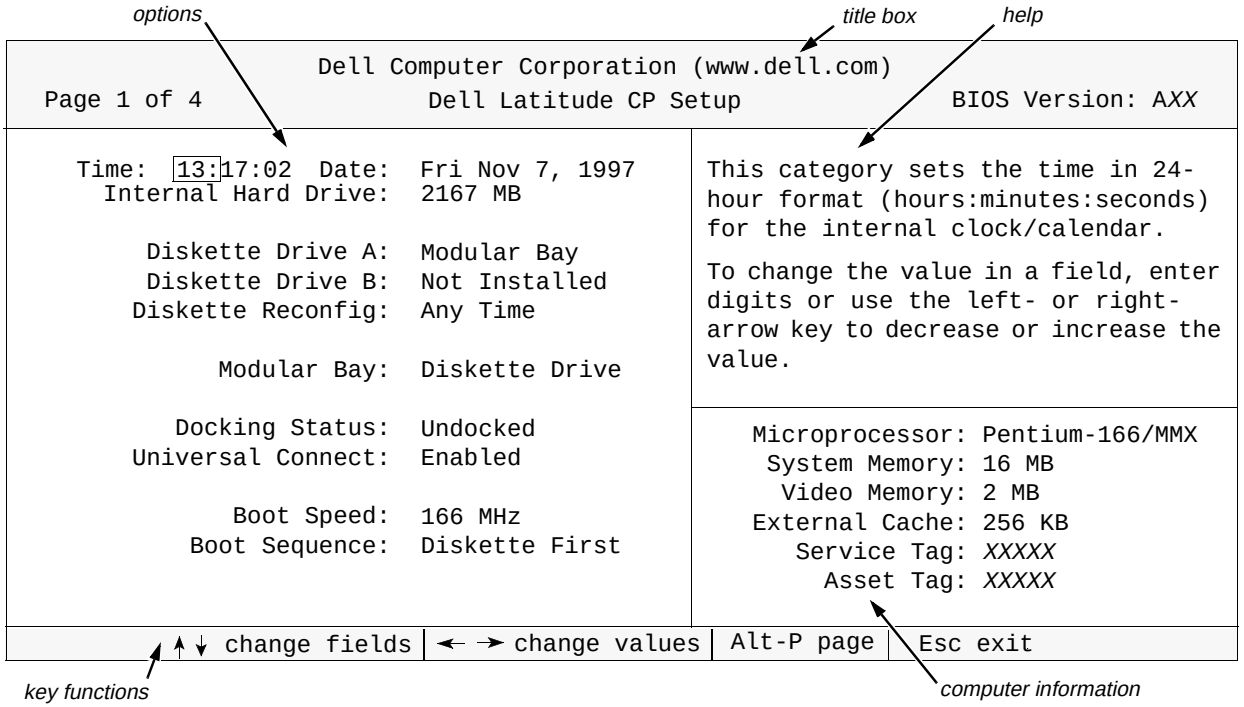
- **Key functions**

  The line of boxes across the bottom of all screens lists keys and their functions within 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
	Moves the cursor to the next field or previous field.
	Cycles through available settings for an option.
	Cycles through the System Setup pages.
	Exits the System Setup program without rebooting the computer and returns the system to its previous state. If you changed options that do not take effect immediately, the changes are recorded but *do not take effect until you reboot the computer.*
	Resets all values to their defaults.



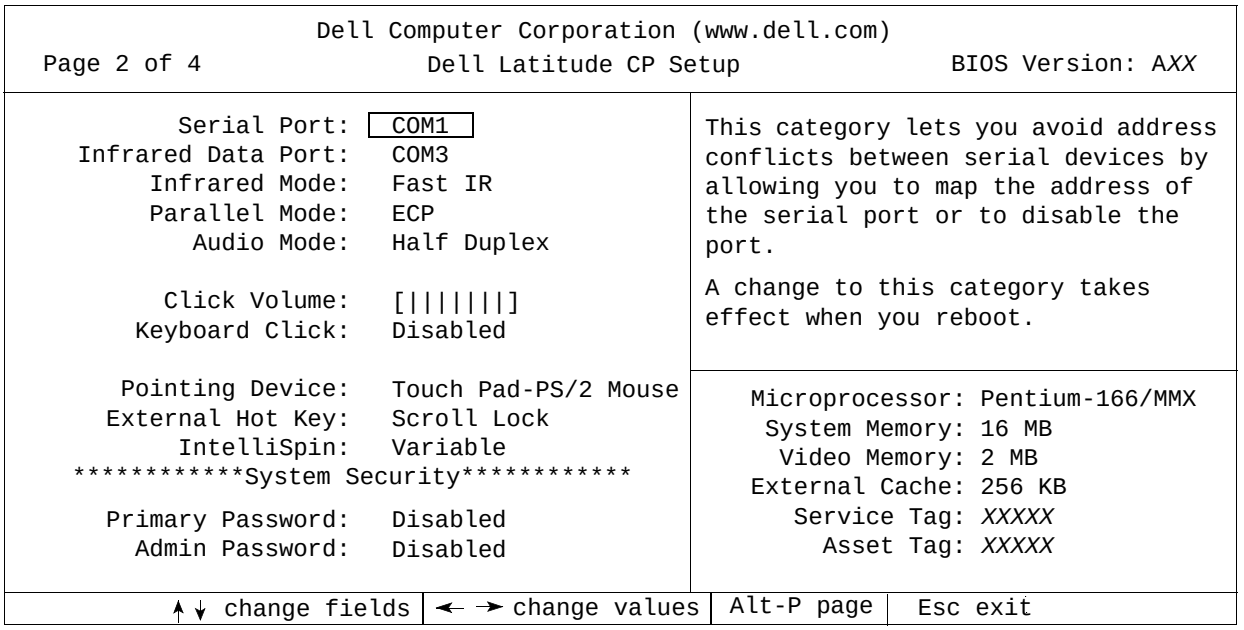
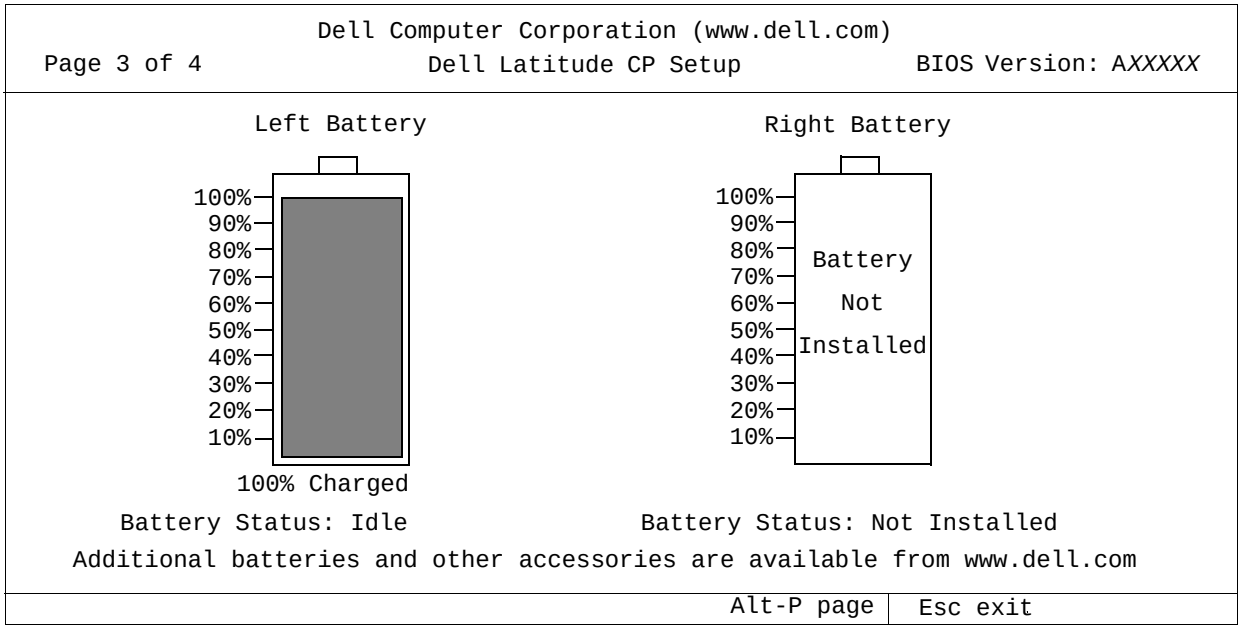


Figure 2-1. Pages 1 and 2 of the System Setup Program



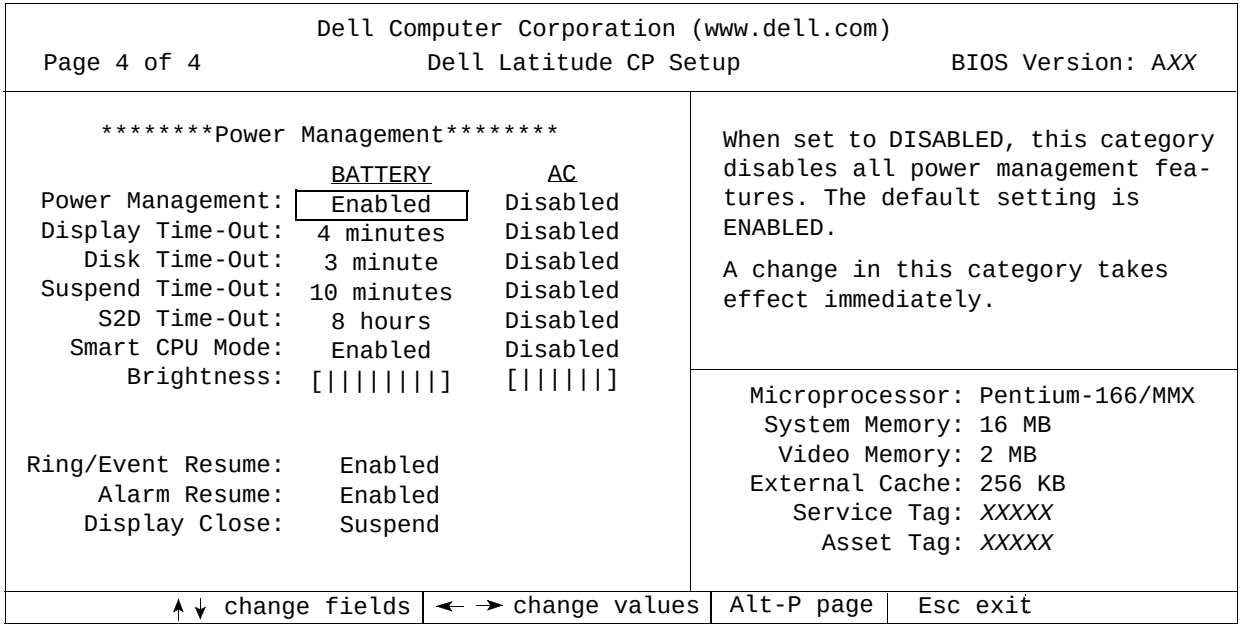


Figure 2-2. Pages 3 and 4 of the System Setup Program

System Setup Options

The following subsections explain in detail the options found in the System Setup program. The subsections are *alphabetized* to make it easy for you to find the appropriate option.

AC

AC is one of the categories of Power Management. You can set different time-outs for the following options when you operate your computer from alternating current (AC) power: Display Time-Out, Disk Time-Out, Suspend Time-Out, S2D Time-Out, Smart CPU Mode, and Brightness.

A change to the AC option takes effect immediately (rebooting is not required).

Admin Password

Admin Password displays the current status of your administrator password and allows you to assign or change this password. Settings for this option are:

- Disabled (the default) — Indicates that no administrator password is assigned
- Enabled — Indicates that an administrator password is currently assigned

The administrator password is designed for use by system administrators and service technicians in corporate environments. If an administrator password is assigned, you can use it to access the computer even if you do not know the primary password.

CAUTION: The password features provide a high level of security for the data in your computer. 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 or PC Cards with encryption features.

Alarm Resume

The Alarm Resume option directs the computer to resume normal operation when it is in suspend mode and detects an alarm from the real-time clock (RTC). Such alarms can be set through various application programs. In order for the alarms in these programs to work, the Alarm Resume option must be set to Enabled.

Settings for this option are:

- Enabled (the default) — Resumes normal operation when the computer detects an alarm
- Disabled — Keeps the computer in suspend mode even if the computer detects an alarm

A change to the Alarm Resume option takes effect immediately (rebooting is not required).

Asset Tag

The Asset Tag option displays the asset tag code if you or your organization assigned one to your computer.

See the topic titled “Asset Tag Utility” in the online *System User’s Guide* for information on assigning an asset tag code.

Audio Mode

Audio Mode helps you manage the resources of the computer and the external devices you use with it.

Settings for this option are:

- Half Duplex (the default) — Allows you to play or record sounds, but not both at the same time. Use this setting if the Parallel Mode option is set to ECP and the Infrared Mode option is set to Fast IR.
- Disabled — Disables the audio controller and makes the direct memory access (DMA), interrupt request (IRQ), and input/output (I/O) resources available for another serial device to use.
- Full Duplex — Allows the computer’s audio system to play and record sounds simultaneously.

For a change in the Audio Mode option to take effect, you must reboot your computer.

NOTES: The System Setup program limits the options available for Audio Mode, depending on how the Parallel Mode and Infrared Mode options are set. If Parallel Mode is set to ECP and Infrared Mode is set to Fast IR, the Audio Mode option cannot be set to Full Duplex. This limitation is based on the number of available 8-bit DMA channels.

The value selected for Audio Mode determines the boot configuration for the device. If Windows 95 finds other available resources, the operating system may upgrade the configuration.

Battery

Battery is one of the categories of Power Management. You can set different time-outs for the following options when you operate your computer from battery power: Display Time-Out, Disk Time-Out, Suspend Time-Out, S2D Time-Out, Smart CPU Mode, and Brightness.

A change to the Battery option takes effect immediately (rebooting is not required).

Battery Status

Battery Status (Page 3 of the System Setup screens) is a graphical representation of the approximate amount of charge left in the main and secondary batteries. There are no user-selectable settings for this option. If there is no battery installed in the main battery compartment or in the modular Bay, the battery gauge illustration says `Battery Status: Not Installed`.

If you are not in the System Setup program, you can see the battery gauge illustration at any time by pressing <Fn><F3>.

BIOS Version

BIOS Version displays the version number and release date of the BIOS in your computer. A service technician may ask you for this version number if you call Dell for technical assistance.

NOTE: Dell may periodically offer revisions of the BIOS that add features or solve specific problems. Because the BIOS for your computer is stored on a reprogrammable flash-memory chip, you can use the Flash BIOS Update program to update your computer's BIOS entirely through software.

Boot Sequence

Boot Sequence determines which disk device your computer uses to find the software needed to start the operating system.

The term *boot* refers to the computer's start-up procedure. When you turn on the computer, it "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 computer where to find the files that it needs to load.

Settings for this option are:

- Diskette First (the default) — Causes your computer to attempt first to boot from a bootable diskette

  If the computer detects no diskette in the diskette drive, it tries to boot from the hard-disk drive. If the computer encounters a diskette without the required boot files or detects a problem with the diskette drive, it displays an error message.

- Hard Disk Only — Causes your computer to boot only from the hard-disk drive

  If it fails to boot from the hard-disk drive for any reason, your computer does *not* attempt to boot from the diskette drive.

For a change in the Boot Sequence option to take effect, you must reboot your computer.

Boot Speed

Boot Speed allows you to choose between the computer's processing speed (the default) and Compatible, a slower compatibility speed. The compatibility speed varies, depending on the configuration of your system.

When you change the setting in the Boot Speed option, the System Setup program stores and continues to display the new setting even if you do not reboot your computer when you exit the System Setup program. If you start the System Setup program again during your current work session, the processing speed displayed for the Boot Speed option may not match the actual speed at which your computer is running.

For a change in the Boot Speed option to take effect, you must reboot your computer.

Brightness

Brightness allows you to select the brightness of the display when the computer is operating on battery power. Use the left- and right-arrow keys to change the brightness of the display. When the computer is powered by a battery, the default setting for Brightness is the minimum. If the computer is using AC power, the default setting is maximum.

A change to the Brightness option becomes effective immediately (rebooting is not required).

Click Volume

Click Volume allows you to disable or adjust the volume of the keyboard clicks if the Keyboard Click option is enabled. The default setting for Click Volume is maximum.

A change to the Click Volume option takes effect immediately (rebooting is not required).

Date

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

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

A change to the Date option becomes effective immediately (rebooting is not required). However, you must reboot to make the change apparent to the operating system.

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 in numbers in the *month* and *day-of-the-month* fields.

Disk Time-Out

Disk Time-Out lets you determine how long your hard-disk drive remains idle before the drive motor turns off to conserve battery power.

The AC category is set to Disabled. There are no user-selectable settings for this option. Settings for the Battery category are:

- Disabled
- 15 Seconds
- 1 Minute
- 2 Minutes
- 3 Minutes
- 4 Minutes
- 5 Minutes
- 10 Minutes
- 15 Minutes
- 30 Minutes
- 1 Hour

The default setting is 3 Minutes if the computer is powered by a battery or 1 Minute if the computer is using AC power. To increase battery operating time, set Disk Time-Out to a lower number. However, if your software requires frequent hard-disk drive accesses, using a higher time-out setting may save battery power and time by minimizing the number of times the hard-disk drive must power up.

NOTE: Set Disk Time-Out to Disabled if using it causes compatibility problems with your software.

A change to the Disk Time-Out option takes effect immediately (rebooting is not required).

If you are not in the System Setup program, you can turn off the hard-disk drive immediately by pressing <Fn><h>. The drive resumes normal operation automatically when it is accessed by the microprocessor.

Diskette Drive A

Diskette Drive A identifies the location of the 3.5-inch diskette drive: Modular Bay, Parallel Port, or Not Installed. There are no user-selectable settings for the Diskette Drive A option.

Diskette Drive B

Diskette Drive B identifies the location of a second 3.5-inch diskette drive: Parallel Port, Modular Bay, or Not Installed. There are no user-selectable settings for the Diskette Drive B option.

Diskette Reconfig

Diskette Reconfig allows application programs that access the diskette drive to run at their optimum speed. Settings are At Reboot Only and Any Time.

When Diskette Reconfig is set to Any Time (the default), you do not have to reboot after installing a diskette drive in the modular bay or attaching a diskette drive to the parallel connector on the back of the computer. However, some application programs—such as virus scans—that access the diskette drive will run very slowly if the diskette drive is not in the modular bay or connected to the parallel port. When Diskette Reconfig is set to At Reboot Only, such application programs run at normal speed, but you must reboot after installing or attaching a diskette drive.

Display Close

Display Close lets you determine whether your computer enters suspend mode when the display is closed, or whether only the display is turned off.

Settings for this option are:

- Suspend (the default) — Allows the computer to enter suspend mode when the display is closed
- Active — Turns off the display, but does not put the computer into suspend mode

Display Time-Out

Display Time-Out lets you decide how long the computer operates with no input/output (I/O) activity before turning off the display to conserve battery power.

Settings for this option in both the AC and Battery categories are:

- Disabled
- 1 Minute
- 2 Minutes
- 3 Minutes
- 4 Minutes
- 5 Minutes
- 10 Minutes
- 15 Minutes
- 30 Minutes
- 1 Hour

The default setting is 4 Minutes. To increase battery operating time, set Display Time-Out to a lower number of minutes.

NOTE: Set the Display Time-Out option to Disabled if using it causes compatibility problems with your software.

A change to the Display Time-Out option takes effect immediately (rebooting is not required).

If you are not in the System Setup program, you can turn off the display immediately by pressing <Fn><d>. The display resumes normal operation automatically when you press a key, move the cursor, or press the power button.

Docking Status

Docking Status shows whether the computer is attached to the Dell Latitude C/Port Advanced Port Replicator (APR) or C/Dock Expansion Station. There are no user-selectable settings for the Docking Status option.

External Cache

External Cache tells you how much external cache your computer has. There are no user-selectable settings for the External Cache option.

External Hot Key

External Hot Key lets you use the <Scroll Lock> key on an external keyboard the same way you use the <Fn> key on the computer's built-in keyboard. Set this option to Scroll Lock (the default) if you are using an external keyboard. Set this option to Not Installed to disable this function on the external keyboard.

Infrared Data Port

Infrared Data Port allows you to avoid resource conflicts by remapping the address of the infrared port or disabling the port. The COM1, COM2, COM3, and COM4 settings allow you to take advantage of the computers's Fast IR support.

Settings for this option are:

- Disabled — Disables the infrared data port and makes the DMA, IRQ, and I/O resources available for another serial device to use
- COM1 — Maps the infrared data port to COM1
- COM2 — Maps the infrared data port to COM2
- COM3 (the default) — Maps the infrared data port to COM3
- COM4 — Maps the infrared data port to COM4

For a change in the Infrared Data Port option to take effect, you must reboot your computer.

Infrared Mode

The Infrared Mode option appears on the screen only after an address is assigned in the Infrared Data Port option. Infrared Mode lets you select Fast IR mode or Slow IR mode for use with an infrared device. Select Slow IR if the Parallel Mode option is set to ECP and the Audio Mode option is set to Full Duplex.

NOTES: The System Setup program limits the options available for Infrared Mode, depending on how the Parallel Mode and Audio Mode options are set. If Parallel Mode is set to ECP and Audio Mode is set to Full

Duplex, the Infrared Mode option cannot be set to Fast IR. This limitation is based on the number of available 8-bit direct-memory access (DMA) channels.

The value selected for Infrared Mode determines the boot configuration for the device. If Windows 95 finds other available resources, the operating system may upgrade the configuration.

IntelliSpin

IntelliSpin lets you compensate for unbalanced or warped CDs, which can cause the computer to vibrate when the CD-ROM drive is in use. This option allows you to use discs that might otherwise be unreadable. This option is available for CD-ROM drives with speeds of 6X or higher.

If this option is set to High Performance (the default), the CD-ROM drive always runs at the highest speed. If this option is set to Variable, the CD-ROM drive automatically lowers its speed to reduce or stop the vibration caused by an unbalanced CD.

NOTE: When this option is set to Variable, the CD-ROM drive may take several seconds to determine the proper speed. You cannot access the disc during that time.

Internal Hard Drive

Internal Hard Drive displays the capacity of the computer's hard-disk drive. This option does not have any user-selectable settings.

Keyboard Click

Keyboard Click lets you choose whether the built-in keyboard makes audible clicking sounds. The Click Volume option must be enabled for this option to function. The volume of the simulated key clicks is controlled by the setting in the Click Volume option.

Settings for this option are Disabled (the default) and Enabled.

A change to the Keyboard Click option takes effect immediately (rebooting is not required).

Modular Bay

Modular Bay identifies the kind of device—Diskette Drive, Battery, or CD-ROM Drive—that is installed in the modular bay. If there is no device in the modular bay—or if a travel bay is installed—this option reads Not Installed. There are no user-selectable settings for this option.

Microprocessor

Microprocessor displays the type and speed of the microprocessor installed on your computer's system board. There are no user-selectable settings for this option.

Parallel Mode

Parallel Mode controls whether the computer's built-in parallel port acts as a PS/2-compatible (Bidirectional) port, AT-compatible (Normal) port, or Extended Capabilities Port (ECP)-compatible port. The default setting for Parallel Mode is ECP.

Windows 95 uses ECP protocol automatically if it detects an ECP-capable device.

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.

NOTE: The ECP settings also work for most software written for the AT (unidirectional) and PS/2 (bidirectional or normal) modes. Devices that use ECP mode may come with special drivers that need to be installed in order to use these modes.

Setting Parallel Mode to Disabled disables the parallel port and its assigned LPT address, freeing its interrupt for another device to use.

For a change in the Parallel Mode option to take effect, you must reboot your computer.

NOTES: The System Setup program limits the options available for Parallel Mode, depending on how the Audio Mode and Infrared Mode options are set. If Audio Mode is set to Full Duplex and Infrared Mode is set to Fast IR, the Parallel Mode option cannot be set to ECP. This limitation is based on the number of available 8-bit direct-memory access (DMA) channels.

The value selected for Parallel Mode determines the boot configuration for the device. If Windows 95 finds other available resources, the operating system may upgrade the configuration.

Pointing Device

Pointing Device enables and disables the computer's touch pad.

Settings for this option are:

- Touch Pad-PS/2 Mouse (the default)
- Serial Mouse — Disables the touch pad and allows you to use a mouse connected to the serial connector on the I/O port

If you want to use a serial mouse, you must first set the Pointing Device option to Serial Mouse.

For a change in the Pointing Device option to take effect, you must reboot your computer.

Power Management

Power Management (Page 4 of the System Setup screens) allows you to enable or disable power conservation features when the computer is being powered by a battery or AC power.

If you want to use any of the time-out options while using battery power, the Battery option must be set to Enabled. If you want to use the time-out options while using AC power, the AC option must be set to Enabled.

A change to the Power Management option takes effect immediately (rebooting is not required).

Primary Password

Primary Password displays the current status of the primary password and allows you to assign or change this password.

Settings for this option are:

- Disabled (the default) — Indicates that no primary password is assigned
- Enabled — Indicates that a primary password is currently assigned

If you assign a primary password, the computer prompts you for the password each time you boot the computer.

CAUTION: The password features provide a high level of security for the data in your computer. 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 or PC Cards with encryption features.

Ring/Event Resume

Ring/Event Resume lets you determine if the computer exits suspend mode when an installed modem card receives an incoming call. This feature must be supported by your modem PC Card and your operating system, and must be enabled in the modem device driver.

Settings for this option are:

- Enabled (the default) — Resumes normal operation when the computer detects a modem ring
- Disabled — Keeps the computer in suspend mode when the computer detects a modem ring

*NOTES: Dell recommends that you set Ring/Event Resume to Disabled when an external serial device, **other than a modem**, is connected to your computer.*

In order for the Ring/Event Resume option to work properly, this feature must be enabled in the device driver for your modem PC Card. All drivers supplied by Dell with your computer are configured to allow the computer to resume normal operation when a modem receives an incoming call. If you use a PC Card that you did not receive from Dell, check the documentation to make sure this feature is enabled.

A change to the Ring/Event Resume option takes effect immediately (rebooting is not required).

S2D Time-Out

S2D Time-Out lets you determine how long your computer remains idle (no I/O activity) before activating suspend-to-disk mode to conserve battery power.

Settings for this option in both the AC and Battery categories are:

- Disabled
- 30 Minutes
- 1 Hour
- 2 Hours
- 3 Hours
- 4 Hours
- 6 Hours
- 8 Hours (default)
- 12 Hours

A change to the S2D Time-Out option takes effect immediately (rebooting is not required).

If you are not in the System Setup program, you can activate suspend-to-disk mode at any time by pressing <Fn><a>. Press the power switch to resume from suspend-to-disk mode.

Serial Port

Serial Port allows you to map the address of the serial port or to disable the serial port.

Settings for this option are:

- COM1 (the default) — Maps the serial port to COM1
- COM2 — Maps the serial port to COM2
- COM3 — Maps the serial port to COM3
- COM4 — Maps the serial port to COM4
- Disabled — Disables the serial port and its assigned COM address, freeing that interrupt for another device to use

For a change in the Serial Port option to take effect, you must reboot your computer.

Service Tag

Service Tag displays the computer's five-character service code, which was programmed into NVRAM by Dell during the manufacturing process. Be prepared to supply this identification during technical assistance or service calls. The service tag is also accessed by certain Dell support software, including diagnostics.

There are no user-selectable settings for this option.

NOTE: Convert the service tag number into an express service code when prompted to do so the first time you turn on the computer (or use the program in the Dell Accessories folder). Keep the code handy in case you call Dell for technical assistance. The code helps Dell's automated support telephone system direct your call more efficiently.

Smart CPU Mode

Smart CPU Mode allows the computer to slow down the microprocessor automatically if it is not being actively used.

Settings for this option are:

- Enabled — Allows the computer to slow down the microprocessor when it is inactive
- Disabled — Keeps the microprocessor running at its normal operating speed regardless of microprocessor inactivity

The default for Smart CPU Mode is Enabled if the computer is operating on battery power. If the computer is using AC power, the default for this option is Disabled. To increase battery operating time, set the Smart CPU Mode option to Enabled.

When the Smart CPU Mode option is enabled and the microprocessor is inactive, the computer slows the microprocessor to save power.

NOTES: Some communications software may not work properly when Smart CPU Mode is enabled. Dell recommends that you set Smart CPU Mode to Disabled if you are using communications software.

Interactive application programs should function well when Smart CPU Mode is enabled. (Examples of interactive programs include spreadsheet, text editor, graphics design, entertainment, educational, and utility programs.) However, you may experience performance degradation when recalculating a large spreadsheet or during an extensive screen redraw in a graphical program. Benchmark utilities may not perform as intended when doing microprocessor speed tests. If the software you use suffers significant performance degradation, set Smart CPU Mode to Disabled.

A change to the *Smart CPU Mode* option takes effect immediately (rebooting is not required).

Suspend Time-Out

Suspend Time-Out lets you determine how long your computer remains idle before activating suspend mode to conserve battery power.

Settings for this option in both the AC and Battery categories are:

- Disabled
- 1 Minute
- 2 Minutes
- 3 Minutes
- 4 Minutes
- 5 Minutes
- 10 Minutes (default)
- 15 Minutes
- 30 Minutes
- 1 Hour

To increase battery operating time, set the Suspend Time-Out option to a lower number of minutes.

NOTE: Set the Suspend Time-Out option to Disabled if using it causes compatibility problems with your software.

A change to the Suspend Time-Out option takes effect immediately (rebooting is not required).

If you are not in the System Setup program, you can activate suspend mode at any time by pressing <Fn><Esc>. The computer resumes normal operation automatically when you press a key on the built-in keyboard.

System Memory

System Memory displays the total amount of dynamic random-access memory (DRAM) installed in your computer. The amount of memory displayed includes a standard 16-megabyte (MB) memory module, plus any memory modules installed in your computer.

There are no user-selectable settings for this option. The amount of memory displayed changes if you install or remove a memory module.

Time

Time resets the time on the computer's internal clock. Time is kept in a 24-hour format (*hours*:*minutes*:*seconds*).

NOTE: If a network server controls the time reflected by the Time option, changing this option has no effect.

A change to the Time option becomes effective immediately (rebooting is not required). However, you must reboot to make the change apparent to the operating system.

Universal Connect

The Universal Connect option functions with the Dell Latitude C/Port APR if the computer uses Windows 95.

Set this category to Enabled (the default) if you often use more than one C/Port APR and want to minimize the initialization time when you connect the replicator to the computer. When this category is set to Disabled, the C/Port APR is reinitialized each time it is connected to the computer.

Video Memory

Video Memory displays the amount of video memory installed on the system board. There are no user-selectable settings for this option.

Chapter 3
Troubleshooting Your Computer

If your Dell computer is not working as expected, this chapter provides initial checks for solving basic computer problems as well as detailed troubleshooting procedures. It lists system messages and flash codes, their possible causes, and actions you can take to resolve any problems indicated by a message or code. This chapter also offers general guidelines for analyzing some software problems.

NOTES: When you see the question "Is the problem resolved?" *in a troubleshooting procedure, repeat the operation that caused the problem to see if it still occurs.*

To use key combinations on an external keyboard, enable the External Hot Key option in the System Setup program and use the <Scroll Lock> key instead of the <Fn> key.

Backing Up Your Files

You can lose data when a computer failure occurs. If your computer is behaving erratically, back up your files immediately. See your operating system documentation for instructions on backing up files.

Basic Checks

The following procedure leads you through the checks necessary to solve some basic computer problems:

1. **Is your computer wet or damaged?**

   Yes. Go to "Troubleshooting a Wet Computer" or "Troubleshooting a Damaged Computer" found later in this chapter.

   No. Continue to step 2.

2. **Perform the steps in the next subsection, "Checking Connections."**

   Is the problem resolved?

   Yes. A connection to your computer was loose. You have fixed the problem.

   No. Continue to step 3.

3. **Perform the steps in "Look and Listen" found later in this chapter.**

   Did your computer complete the start-up (boot) routine?

   NOTE: The boot routine is the operating system's attempt to load its files into memory from the boot-up sector on the hard-disk drive or bootable diskette. It is normal for the computer's keyboard indicators to flash briefly during the boot routine.

   Yes. Continue to step 4.

   No. Call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

4. **Did you receive a system message or flash code?**

   Yes. Go to "Messages and Codes" found later in this chapter.

   No. Continue to step 5.

5. **Verify, and correct if necessary, the System Setup settings as explained in Chapter 2, "Customizing System Features."**

   Is the problem resolved?

   Yes. The system configuration information was incorrect. You have fixed the problem.

   No. Continue to step 6.

6. **Run the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics.")**

Checking Connections

Loose or improperly connected cables are likely sources of problems for your computer, external monitor, or other peripherals (such as a printer, external keyboard, or mouse). A quick check of all cable connections can easily solve these problems. If a connector has two small screws, make sure the screws are tight. In addition, check for damaged or frayed cables.

Be sure the following items are properly connected or installed:

- The AC adapter and power cable

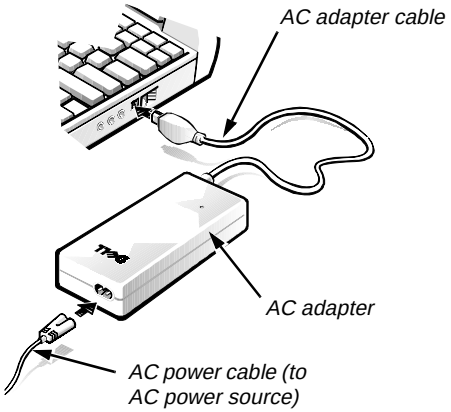


Figure 3-1. AC Adapter and Power Cable

- The battery

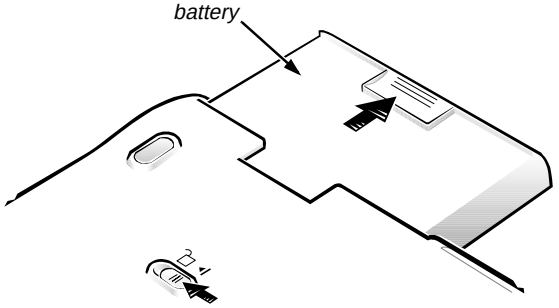


Figure 3-2. Removing the Battery

- All cables to external devices

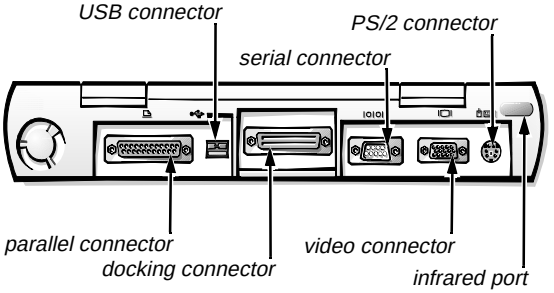


Figure 3-3. External Cables

Look and Listen

Looking at and listening to your computer is important in determining the source of a problem. Look and listen for the indications described in Table 3-1. If looking and listening to the computer does not resolve the problem, see the next subsection, "System Setup Options."

Table 3-1. Boot Routine Indications

Look for:	Action
An error message	See "Messages and Codes" found later in this chapter.
The power indicator	If the computer's power indicator does not come on, see "Troubleshooting a Power Failure" found later in this chapter.
The keyboard indicators	If the Num Lock, Caps Lock, and Scroll Lock indicators flash simultaneously after the boot routine, see "System Flash Codes" found later in this chapter. Press the <Num Lock>, <Caps Lock>, and <Scroll Lock> keys to toggle their respective keyboard indicators on and off. If the indicators do not light up, run the Keyboard test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
The drive access indicator	The drive access indicator should flicker when you access data on the diskette drive, hard-disk drive, or CD-ROM drive. If the power indicator, drive access indicator, and battery indicator flash simultaneously, see "System Flash Codes" found later in this chapter.
A series of flashing lights	See "Messages and Codes" found later in this chapter.
An unfamiliar constant scraping or grinding sound when you access a drive	Make sure the sound is not caused by the application program you are running. The sound could also be caused by a hardware malfunction. See Chapter 5, "Getting Help," for instructions on obtaining technical assistance from Dell.
The absence of a familiar sound	When you turn on your computer, you can hear the hard-disk drive spin up and the computer trying to access the boot files from the hard-disk drive or the diskette drive. If your computer does not boot, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.) Otherwise, see Chapter 4, "Running the Dell Diagnostics."

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

System Setup Options

You can easily correct certain system problems by verifying the settings for system setup options. When you boot your computer, it compares the system configuration information with the current hardware configuration. If your computer's hardware configuration doesn't match the information recorded by the system setup options, an error message may appear on your display.

To fix this problem, correct the appropriate system setup options and reboot your computer. See Chapter 2, "Customizing System Features," for detailed information.

If, after checking the system setup options, you have not resolved the problem, see Chapter 4, "Running the Dell Diagnostics."

Messages and Codes

Your application programs, operating system, and the computer itself are capable of identifying problems and alerting you to them. When this occurs, a message may appear on the computer's display or on an external monitor (if one is attached), or a flash code may sound.

If an error message appears on the display or external monitor, make a note of the message. See Table 3-2 for an explanation of the message and suggestions for correcting any errors. The messages are listed alphabetically.

NOTE: If the message is not listed in Table 3-2, check the documentation for the application program that was running at the time the message appeared and/or the operating system documentation for an explanation of the message and a recommended action.

Table 3-2. System Error Messages

Message	Cause	Action
`Auxiliary device failure`	The integrated touch pad or external PS/2 mouse may be faulty.	If you are using an external mouse only, check the connection for a loose or improperly connected cable. (See "Checking Connections" found earlier in this chapter.) If the problem persists, enable the Pointing Device option. (For instructions, see "Pointing Device" in Chapter 2, or see the topic titled "Dell Control Center" in your online *System User's Guide*.) If the problem persists, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)
`Bad command or file name`	The command you entered does not exist or is not in the pathname you specified.	Make sure you have typed the command correctly, placed spaces in the proper location, and used the correct pathname.
`Cache disabled due to failure`	The primary cache internal to the microprocessor has failed.	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
`Data error`	The diskette or hard-disk drive cannot read the data.	Run the appropriate utility to check the file structure of the diskette drive or hard-disk drive. See the documentation that came with your operating system.
`Decreasing available memory`	One or more memory modules may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.

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

Table 3-2. System Error Messages *(continued)*

Message	Cause	Action
`Disk C: failed initialization`	The hard-disk drive failed initialization.	See "Troubleshooting the Hard-Disk Drive" found later in this chapter.
`Diskette drive 0 seek failure`	A cable may be loose, or the system configuration information may not match the hardware configuration.	See "Troubleshooting the Diskette Drive" found later in this chapter.
`Diskette read failure`	A cable may be loose, or the diskette may be faulty.	If the diskette-drive access indicator lights up, try a different diskette. If the problem persists, see "Troubleshooting the Diskette Drive" found later in this chapter.
`Diskette subsystem reset failed`	The diskette drive controller may be faulty.	Run the Diskette Drive test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Diskette write-protected`	Because the diskette is write-protected, the operation cannot be completed.	Slide the write-protect notch up.
`Drive not ready`	No diskette is in the diskette drive, or no hard-disk drive is in the drive bay. The operation requires a diskette in the drive or a hard-disk drive in the bay before it can continue.	Put a diskette in the drive, or push the diskette all the way into the drive until the eject button pops out. Or, install a hard-disk drive in the drive bay.
`Error reading PCMCIA card`	The computer cannot identify the PC Card.	Reseat the card or try another PC Card that you know works. If the problem persists, see "Troubleshooting a PC Card" found later in this chapter.
`Extended memory size has changed`	The amount of memory recorded in NVRAM does not match the memory installed in the computer.	Reboot the computer. If the error appears on the display again, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)
`Gate A20 failure`	An installed memory module may be loose.	See "Troubleshooting Memory" found later in this chapter.
`General failure`	The operating system is unable to carry out the command.	This message is usually followed by specific information—for example, `PRINTER OUT OF PAPER`. Respond by taking the appropriate action.

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

Table 3-2. System Error Messages *(continued)*

Message	Cause	Action
`Hard-disk drive configuration error`	The computer cannot identify the drive type.	Turn off the computer, remove the drive, and boot the computer from a bootable diskette. Then turn off the computer, reinstall the drive, and reboot the computer. Run the Hard-Disk Drive test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Hard-disk drive controller failure 0`	The hard-disk drive does not respond to commands from the computer.	Turn off the computer, remove the drive, and boot the computer from a bootable diskette. Then turn off the computer again, reinstall the drive, and reboot the computer. If the problem persists, try another drive. Then run the Hard-Disk Drive test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Hard-disk drive controller failure 1`	The CD-ROM drive does not respond to commands from the computer.	See "Troubleshooting the CD-ROM Drive" found later in this chapter.
`Hard-disk drive failure`	The hard-disk drive does not respond to commands from the computer.	Turn off the computer, remove the drive, and boot the computer from a bootable diskette. Then turn off the computer again, reinstall the drive, and reboot the computer. If the problem persists, try another drive. Then run the Hard-Disk Drive test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Hard-disk drive read failure`	The hard-disk drive may be faulty.	See "Troubleshooting the Hard-Disk Drive" found later in this chapter.
`Invalid configuration information–please run System Setup program`	The system configuration information does not match the hardware configuration. This message is most likely to occur after a memory module is installed.	Correct the appropriate options in the System Setup program. (For instructions, see "Using the System Setup Program" in Chapter 2.)
`Keyboard clock line failure`	A cable or connector may be loose, or the keyboard may be faulty.	Run the Keyboard Controller Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Keyboard controller failure`	A cable or connector may be loose, or the keyboard may be faulty.	Reboot the computer, and avoid touching the keyboard or the mouse during the boot routine. If the problem persists, run the Keyboard Controller Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")

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

Table 3-2. System Error Messages *(continued)*

Message	Cause	Action
`Keyboard data line failure`	A cable or connector may be loose, or the keyboard may be faulty.	Run the Keyboard Controller Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Keyboard stuck key failure`	If an external keyboard or keypad is being used, a cable or connector may be loose or the keyboard may be faulty. If the built-in keyboard is being used, the keyboard may be faulty. A key on the built-in keyboard or external keyboard may have been pressed while the computer was booting.	Run the Stuck Key Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Memory address line failure at` *`address`*`, read` *`value`* `expecting` *`value`*	An installed memory module may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.
`Memory allocation error`	The software you are attempting to run is conflicting with the operating system, another application program, or a utility.	Turn off the computer, wait 30 seconds, and then restart it. Try to run the program again. If the problem persists, contact the software company.
`Memory data line failure at` *`address`*`, read` *`value`* `expecting` *`value`*	An installed memory module may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.
`Memory double word logic failure at` *`address`*`, read` *`value`* `expecting` *`value`*	An installed memory module may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.
`Memory odd/even logic failure at` *`address`*`, read` *`value`* `expecting` *`value`*	An installed memory module may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.

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

Table 3-2. System Error Messages *(continued)*

Message	Cause	Action
`Memory write/read failure at address, read value expecting value`	An installed memory module may be faulty or improperly seated.	See "Troubleshooting Memory" found later in this chapter.
`No boot device available`	The computer cannot find the diskette or hard-disk drive.	If the diskette drive is your boot device, make sure there is a bootable diskette in the drive. If the hard-disk drive is your boot device, make sure the drive is installed, properly seated, and partitioned as a boot device.
`No boot sector on hard-disk drive`	The operating system may be corrupted.	Reinstall your operating system. See the documentation that came with your operating system.
`No timer tick interrupt`	A chip on the system board may be malfunctioning.	Run the System Set test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Non-system disk or disk error`	The diskette in drive A or your hard-disk drive does not have a bootable operating system installed on it.	If you are trying to boot from the diskette, replace it with one that has a bootable operating system. If you are trying to boot from the hard-disk drive, see "Troubleshooting the Hard-Disk Drive" found later in this chapter.
`Not a boot diskette`	There is no operating system on the diskette.	Boot the computer with a diskette that contains an operating system.
`Optional ROM bad checksum`	The optional ROM apparently failed.	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
`Sector not found`	The operating system cannot locate a sector on the diskette or hard-disk drive. You probably have a bad sector or corrupted FAT on the diskette or hard-disk drive.	Run the appropriate utility to check the file structure on the diskette or hard-disk drive. If a large number of sectors are defective, back up the data (if possible), and then reformat the diskette or hard-disk drive.
`Seek error`	The operating system cannot find a specific track on the diskette or hard-disk drive.	If the error is on the diskette drive, try another diskette in the drive. If the error persists, see "Troubleshooting the Diskette Drive" found later in this chapter. If the error is on the hard-disk drive, see "Troubleshooting the Hard-Disk Drive" found later in this chapter.

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

Table 3-2. System Error Messages *(continued)*

Message	Cause	Action
`Shutdown failure`	A chip on the system board may be malfunctioning.	Run the System Set test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Time-of-day clock lost power`	Data stored in NVRAM has become corrupted.	Connect your computer to AC power to charge the battery. If the problem persists, try to restore the data. To restore the data, press <Fn><F1> to enter the System Setup program. Then immediately exit it (as described in "Using the System Setup Program" in Chapter 2). If the message reappears, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
`Time-of-day clock stopped`	The reserve battery that supports the data stored in NVRAM may be dead.	Connect your computer to AC power to charge the battery. If the problem persists, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
`Time-of-day not set—please run the System Setup program`	The time or date stored in the System Setup program does not match the system clock.	Correct the settings for the Date and Time options. (For instructions, see "Using the System Setup Program" in Chapter 2.)
`Timer chip counter 2 failed`	A chip on the system board may be malfunctioning.	Run the System Set test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Unexpected interrupt in protected mode`	The keyboard controller may be malfunctioning, or an installed memory module may be loose.	Run the RAM test group and the Keyboard Controller Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
`Warning! Battery is critically low.`	The battery is running out of charge.	Replace the battery, or connect the computer to AC power. Otherwise, activate suspend-to-disk mode or turn off the computer. (For more information, see the topic titled "Final Low-Battery Warning" in the online *System User's Guide*.)

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

System Flash Codes

When errors that occur during the boot routine cannot be reported on the built-in display or on an external monitor (if attached), the Num Lock, Caps Lock, and Scroll Lock indicators may flash together in a pattern of lights (or *flash code*) that identifies the problem. For example, one flash, followed by a second flash, and then a burst of three flashes (code 1-1-3) means that the computer was unable to read the data in nonvolatile random-access memory (NVRAM). This information is important to the Dell support staff if you need to call for technical assistance.

The Num Lock, Caps Lock, and Scroll Lock indicators flash briefly when the computer is turned on. The flash codes, if needed, occur after the boot routine.

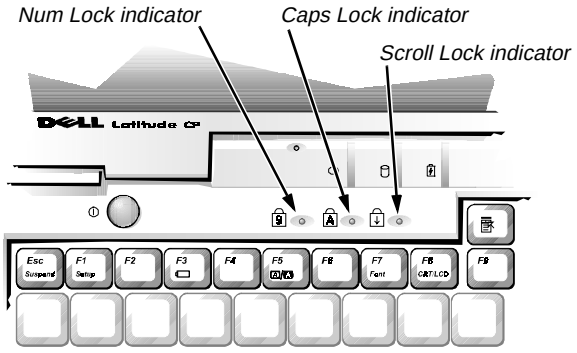


Figure 3-4. Flash Code Indicators

When a flash code is emitted, write it down on a copy of the Diagnostics Checklist found in Chapter 5, and then look it up in Table 3-3. If you are unable to resolve the problem by looking up the meaning of the flash code, use the Dell Diagnostics to identify a more serious cause. (See Chapter 4, "Running the Dell Diagnostics.") If you are still unable to resolve the problem, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

Table 3-3 lists the flash codes and possible corrective actions.

Table 3-3. Flash Codes

Message	Cause	Action
1-1-3	NVRAM write/read failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
1-1-4	ROM BIOS checksum failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
1-2-1	Programmable interval timer failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
1-2-2	DMA initialization failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
1-2-3	DMA page register write/read failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
1-3-1 through 2-4-4	An installed memory module is not being properly identified or used.	Make sure a memory module is installed in one of the memory module sockets on the system board. The computer will not function unless there is at least one installed memory module. If there is a memory module installed, see "Troubleshooting Memory" found later in this chapter.
3-1-1	Slave DMA register failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
3-1-2	Master DMA register failure.	Run the System Set test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the program does not load, call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
3-1-3	Master interrupt mask register failure.	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
3-1-4	Slave interrupt mask register failure.	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
3-2-4	Keyboard controller test failure.	Run the Keyboard Controller Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
3-3-4	Display memory test failure.	Run the Video Memory Test in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")

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

Table 3-3. Flash Codes *(continued)*

Message	Cause	Action
3-4-1	Display initialization failure	Run the Video test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
3-4-2	Display retrace test failure	Run the Video test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
4-2-1	No timer tick	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-2-2	Shutdown failure	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-2-3	Gate A20 failure	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-2-4	Unexpected interrupt in protected mode	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-3-1	Memory failure above address 0FFFFh	Run the RAM test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
4-3-3	Timer chip counter 2 failure	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-3-4	Time-of-day clock stopped	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
4-4-1	Serial port failure	Run the Serial/Infrared Ports test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")
5-1-2	No usable memory	Run the RAM test group in the Dell Diagnostics. (For instructions, see Chapter 4, "Running the Dell Diagnostics.")

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

Finding Software Solutions

Because most computers have several application programs installed in addition to the operating system, isolating a software problem can be confusing. Software errors can also appear to be hardware malfunctions at first. Software problems can result from the following circumstances:

- Improper installation or configuration of a program
- Input errors
- Device drivers that may conflict with certain application programs
- Memory conflicts resulting from the use of terminate-and-stay-resident (TSR) programs, such as device drivers
- Interrupt conflicts between devices

You can confirm that a computer problem is caused by software by running the System Set test group as described in Chapter 4, "Running the Dell Diagnostics." If all tests in the test group complete successfully, the error condition is most likely caused by software.

The following subsections provide some general guidelines for analyzing software problems. For detailed troubleshooting information on a particular program, see

the documentation that accompanied the software or consult the support service for the software.

Installing and Configuring Software

When you obtain software, check it for viruses with virus-scanning software before installing it on your computer's hard-disk drive. Viruses, which are pieces of code that can replicate themselves, can quickly use all available system memory, damage and/or destroy data stored on the hard-disk drive, and permanently affect the performance of the programs they infect. Several commercial virus-scanning programs are available for purchase, and most bulletin board services (BBSs) archive freely distributed virus-scanning programs that you can download with a modem.

Before installing a program, read its documentation to learn how the program works, what hardware it requires, and what its defaults are. A program usually includes installation instructions in its accompanying documentation and a software installation routine on its program diskettes.

The software installation routine assists you in transferring the appropriate program files to your computer's hard-disk drive. Installation instructions may provide details about how to configure your operating system to run the program successfully. Always read the installation instructions before running a program's installation routine. You may be instructed to modify the initialization or startup files of your operating system.

When you run the installation routine, be prepared to respond to prompts for information about how your computer's operating system is configured, what type of computer you have, and what peripherals are connected to your computer.

Initialization or Startup Files

Whenever you start or reboot your computer, your operating system executes commands it finds in its initialization or startup files.

These files contain commands that automatically configure the operating environment by setting system parameters, starting memory-resident programs, and loading device driver software. If you experience program conflicts or memory error messages, check the commands for memory-resident programs in the initialization or startup files of your operating system. If a program or peripheral does not work correctly, check the documentation that came with the product to see if you need to modify these files.

Using Software

The following subsections discuss errors that can occur while using your software.

Error Messages

Error messages can be produced by an application program, the operating system, or the computer. "Messages and Codes," found earlier in this chapter, discusses the error messages that are generated by the computer. If you receive an error message that is not listed in that section, check your operating system or application program documentation.

Input Errors

If a specific key or set of keys is pressed at the wrong time, a program may give you unexpected results. See the documentation that came with your application program to make sure the values or characters you are entering are valid.

Make sure the operating environment is set up to accommodate the programs you use. Keep in mind that whenever you change the parameters of the computer's operating environment, you may affect the successful operation of your programs. Occasionally, when you modify the operating environment, you may need to reinstall a program that no longer runs properly.

Memory-Resident Programs

There are a variety of utilities and supplementary programs that can be loaded either when the computer boots or from an operating system prompt. These programs are designed to stay resident in system memory and thus always be available for use. Because they remain in the computer's memory, memory conflicts and errors can result when other programs require use of all or part of the memory already occupied by these TSR programs.

Typically, your operating system's initialization or startup files contain commands to start TSR programs when you boot your computer. If you suspect that one of these TSR programs is causing a memory conflict, remove the

commands that start them from the start-up file. If the problem you were experiencing does not recur, one of the TSR programs probably created the conflict. Add the TSR commands back into the start-up files one at a time until you identify which TSR program is creating the conflict.

Program Conflicts

Some programs may leave portions of their setup information behind, even though you have exited from them. As a result, other programs cannot run. Rebooting your computer can confirm whether or not these programs are the cause of the problem.

Other programs use specialized subroutines called *device drivers* that can cause problems in your computer. For example, a variation in the way the data is sent to an external monitor may require a special screen driver program that *expects* a certain kind of video mode or monitor. In such cases, you may have to develop an alternative method of running that particular program—the creation of a boot file made especially for that program, for example. For help with this situation, call the support service offered by the manufacturer of the software you are using.

Avoiding Interrupt Assignment Conflicts

Problems can arise if two devices attempt to use the same interrupt request (IRQ) line. To avoid this type of conflict, check the documentation for the default IRQ line setting for each installed device. Then consult Table 3-4 to configure the device for one of the available IRQ lines.

NOTES: Installed devices cannot share the same COM port address. The default address of your computer's serial port is COM1.

To view IRQ line assignments in the Windows 95 operating system, select the Start button, and point to Settings and then to Control Panel. Double-click the System icon. Select the Device Manager tab, and then double-click Computer.

Table 3-4. IRQ Line Assignments

IRQ Line	Reserved/Available
IRQ0	Reserved; generated by the system timer
IRQ1	Reserved; generated by the keyboard controller to signal that the keyboard output buffer is full
IRQ2	Reserved; generated internally by the interrupt controller to enable IRQ8 through IRQ15
IRQ3	Available for use by a PC Card unless the built-in serial port or infrared port is configured for COM2 or COM4
IRQ4	Available for use by a PC Card unless the built-in serial port or infrared port is configured for COM1 (the default) or COM3
IRQ5	Generated by the audio controller
IRQ6	Generated by the diskette drive controller to indicate that the diskette drive requires the attention of the microprocessor
IRQ7	Available for use by a PC Card or audio controller if the parallel port is disabled
IRQ8	Reserved; generated by the system I/O controller's RTC
IRQ9	Reserved; generated by the video controller
IRQ10	Available for use by a PC Card or audio controller unless the C/Port Advanced Port Replicator (APR) or C/Dock Expansion Station is attached
IRQ11	Generated by the USB and PC Card controllers; available for use by a PC Card
IRQ12	Reserved; generated by the keyboard controller to indicate that the output buffer of the touch pad or external PS/2 mouse is full
IRQ13	Reserved; generated by the math coprocessor

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

Table 3-4. IRQ Line Assignments *(continued)*

IRQ Line	Reserved/Available
IRQ14	Reserved; generated by the hard-disk drive to indicate that the drive requires the attention of the microprocessor
IRQ15	Reserved; generated by CD-ROM drive in the modular bay to indicate that the drive requires the attention of the microprocessor

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 Allocations

Table 3-5 provides a map of the conventional memory area. When the microprocessor or a program addresses a location within the conventional memory range, it is physically addressing a location in main memory.

NOTE: To view memory allocations in Windows 95, select the Start button, and point to Settings and then to Control Panel. Double-click the System icon. Select the Device Manager tab, and then double-click Computer.

Table 3-5. Conventional Memory Map

Address Range	Use
00000h–003FFh	Interrupt vector table
00400h–00FFFF	BIOS data area
00500h–005FFh	MS-DOS® and BASIC work area
00600h–9FBFFh	User memory

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

Table 3-6 provides a map of the upper memory area. Some of these addresses are dedicated to various system devices, such as the system/video basic input/output system (BIOS). Others are available for use by expansion cards and/or an expanded memory manager (EMM). When the microprocessor or a program addresses a location within the upper memory area, it is physically addressing a location within one of these devices.

Table 3-6. Upper Memory Map

Address Range	Use
0009FC00–0009FFFF	PS/2-mouse data area
000A0000–000BFFFF	Video RAM
000C0000–000CBFFF	Video BIOS
000CC000–000CDFFF	Reserved for PC Card
000F0000–000FFFFF	System BIOS
00100000–03FFFFFF	High memory area
FD000000–FDFFFFFF	Video RAM
FF200000–FF2FFFFF	Video RAM
FFFE0000–FFFFFFFF	BIOS ROM

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

I/O Memory Map

Table 3-7 provides a map of memory addresses reserved by the system for peripheral I/O devices. Use the information in Table 3-7 to determine if the memory address of an external peripheral (such as a PC Card) conflicts with a memory address reserved by the system.

Check the documentation of the external I/O device to determine its memory address. If there is a conflict with a memory address reserved by the system, change the address of the device.

NOTE: To view I/O addresses in Windows 95, select the Start button, and point to Settings and then to Control Panel. Double-click the System icon. Select the Device Manager tab, and then double-click Computer.

Table 3-7. I/O Memory Map

Address	Device
0000–001F	DMA controller #1
0020–003F	Interrupt controller #1
0040–005F	System timers
0060–006F	Keyboard controller
0070–007F	RTC and NMI enable
0080–009F	DMA page registers
00A0–00BF	Interrupt controller #2
00C0–00DF	DMA controller #2
00F0–00FF	Math coprocessor
0170–0177	CD-ROM controller
01F0–01F7	Hard-disk drive controller
0210–0217	Audio controller
0220–022F	Audio controller
0270–0277	Fast IR
0376–0376	IDE controller
0378–037F	LPT1
0388–038B	Audio controller
038B–03BB	VGA
03C0–03DF	VGA
03E0–03E1	PC Card controller
03E8–03EF	Fast IR
03F0–03F7	Diskette controller
03F8–03FF	COM1
0530–0537	Audio controller

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

Table 3-7. I/O Memory Map *(continued)*

Address	Device
0778–077B	ECP registers
ECE0–ECFF	USB controller
FFA0–FFAF	PCI-IDE bus registers

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

Troubleshooting Procedures

This section provides troubleshooting procedures for components inside your computer (such as a memory module) and for external devices that connect to your computer (such as an external monitor). Before performing any of the procedures in this section, see "Basic Checks" found at the beginning of this chapter and read the safety instructions at the front of this guide. Then perform the appropriate troubleshooting procedure for the component or equipment that is malfunctioning.

NOTE: When you see the question "Is the problem resolved?" *in a troubleshooting procedure, perform the operation that caused the problem to see if the problem still occurs.*

Many of the following procedures refer to the power, drive access, and battery indicators (Figure 3.5)

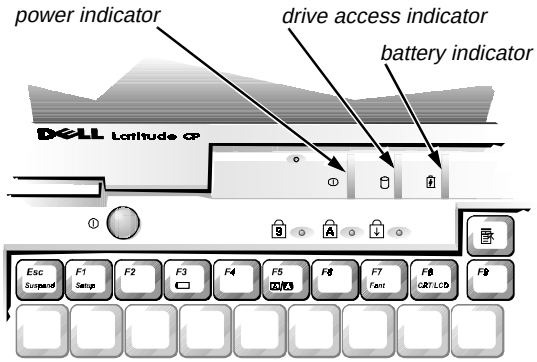


Figure 3-5. Power, Drive Access, and Battery Indicators

Troubleshooting a Wet Computer

Liquids, spills and splashes, rain, and excessive humidity can cause moisture damage to your computer. If your computer gets wet or if condensation forms on the computer because of humid conditions, use the following procedure.

WARNING: Perform step 1 of the following procedure only after you are certain that it is safe to do so. If your computer is connected to an alternating current (AC) power source, Dell recommends turning off AC power at the circuit breaker before attempting to remove the power cables from AC power. Use the utmost caution when removing wet cables from live power.

1. **Save all your work, and exit any open application programs. Then *immediately* turn off your computer, and disconnect it from the AC adapter. Disconnect the AC adapter from AC power. Turn off any attached peripherals, and disconnect them from their power sources and then from the computer. Disconnect any telephone or telecommunication line from the computer.**
2. **Remove any installed batteries.**

   Wipe off each battery, and store it in a safe place to dry.
3. **If the diskette drive, hard-disk drive, or either of the PC Card slots is wet, remove any installed diskette, hard-disk drive, or PC Cards, and put them in a safe place to dry.**
4. **Ground yourself by touching the unpainted metal surface of the I/O panel.**
5. **Remove the options cover from the bottom of the computer. Remove any memory modules from their sockets on the system board.**

   To remove a memory module, *carefully* spread apart the *inner* metal tabs of the memory module socket just far enough for the memory module to disengage from the socket (the module should pop up slightly). Then lift the memory module away from the socket.
6. **Open the display, and place the computer across two books or similar props to let air circulate all around it. Let the computer dry for at least 24 hours.**

   Place the computer in a dry area at room temperature. Do not use artificial means to speed up the drying process.

WARNING: Before continuing with the remainder of this procedure, verify that the computer is thoroughly dry.

7. **Ground yourself again by touching the unpainted metal surface of the I/O panel.**
8. **Reinstall the memory modules into their sockets on the system board. Then replace the options cover on the bottom of the computer.**

   To reinstall a memory module, align the memory module's edge connector with the slot in the center of the memory module socket. Press the memory module's edge connector firmly into the socket. Pivot the memory module down until it clicks into place. If you do not hear a sharp click, remove the memory module and reinstall it.

   NOTE: Memory modules are keyed, or designed, to fit into their sockets in only one direction. The sockets on the system board are notched so that the memory module can be firmly seated only one way.
9. **Reinstall the diskette drive, hard-disk drive, or PC Cards that you removed in step 3.**
10. **Replace any batteries you removed in step 2.**
11. **Reconnect your computer and peripherals to AC power, and turn them on.**
12. **Does the computer work properly?**

    Yes. The problem is resolved.

    No. If the computer is able to boot, run the Dell Diagnostics to identify computer damage. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If the computer is unable to boot, see "Troubleshooting a Power Failure" found later in this section. If you cannot identify the damaged component(s), call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")

Troubleshooting a Damaged Computer

If your computer is dropped or damaged, use the following procedure.

1. **Turn off your computer, and disconnect it from the AC adapter. Then disconnect the AC adapter from AC power. Turn off any attached peripherals, and disconnect them from their power sources and then from the computer.**
2. **Save all your work, exit any open application programs, and remove any installed batteries.**
3. **Ground yourself by touching the unpainted metal surface of the I/O panel.**
4. **Remove the options cover from the bottom of the computer. Remove and reinstall any memory modules in the memory module sockets, and then replace the options cover.**

   To remove a memory module, *carefully* spread apart the *inner* metal tabs of the memory module socket just far enough for the memory module to disengage from the socket (the module should pop up slightly). Then lift the memory module away from the socket.

   To reinstall a memory module, align the memory module's edge connector with the slot in the center of the memory module socket. Press the memory module's edge connector firmly into the socket. Pivot the memory module down until it clicks into place. If you do not hear a sharp click, remove the memory module and reinstall it.

   NOTE: Memory modules are keyed, or designed, to fit into their sockets in only one direction. The sockets on the system board are notched so that the memory module can be firmly seated only one way.
5. **Verify that any installed PC Cards are properly seated in the PC Card connectors. Verify that the hard-disk drive is properly installed.**
6. **Replace any batteries you removed in step 2.**
7. **Reconnect your computer and peripherals to AC power, and turn them on.**
8. **Run the Dell Diagnostics to verify that the computer is operating properly. (See Chapter 4, "Running the Dell Diagnostics," for instructions.)**
9. **If the computer does not operate properly, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out. Then call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")**

Troubleshooting a Power Failure

Occasionally, you may experience a power failure in all or part of your computer. A total power failure is indicated by the absence of electrical activity (such as lights and sounds) from the keyboard, display, hard-disk drive, and diskette drive. In a partial power failure, one or more of these indicators shows that there is power to a part of the computer.

To determine if there is any power to the computer, make a copy of the Diagnostics Checklist found in Chapter 5, "Getting Help," and fill it out as you complete the following procedure.

1. **Turn on the computer. Does the green power indicator light up?**

   Yes. Continue to step 2.

   No. Go to step 3.
2. **Save all your work, exit any open application programs, turn off the computer, disconnect the AC adapter, and remove any installed batteries. Then reinstall the batteries, reconnect the AC adapter, and turn on the computer. Does the green power indicator turn on?**

   Yes. Go to step 6.

   No. Continue to step 3.
3. **Turn off the computer. Then press the power button. Does the power indicator light up?**

   Yes. Your computer is receiving power. Continue to step 4.

   No. Your computer is not receiving power. Go to step 5.
4. **Does the computer boot successfully?**

   Yes. The problem is resolved.

   No. Go to step 6.
5. **Reseat the batteries, and check the AC adapter connection. Do the indicators light up?**

   Yes. The problem is resolved.

   No. If the computer is powered by the AC adapter, see the next subsection, "Total Power Failure When Using the AC Adapter." If the computer is powered

by a battery, see "Total Power Failure When Using the Battery" found later in this section.

6. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Total Power Failure When Using the AC Adapter

If no signs of power are present in the computer when using the AC adapter, make a copy of the Diagnostics Checklist found in Chapter 5, "Getting Help," and fill it out as you complete the following procedure.

1. **Turn off the computer and peripherals. Disconnect the peripherals from AC power. If you are using a surge protector, remove it. Remove any installed batteries.**
2. **Make sure the AC adapter is connected to the computer, and verify that the power cable is firmly attached to the AC adapter and to the AC power source.**

   See "Checking Connections" found earlier in this chapter.

3. **Turn on the computer. Does the green power indicator light up?**

   Allow one minute for the computer to initialize its components before checking for signs of power.

   Yes. The problem is resolved.

   No. Continue to step 4.

4. **Turn off the computer, and disconnect the AC adapter from its power source.**
5. **Connect another electrical device, such as a lamp, to the power source from which you disconnected the AC adapter.**
6. **Turn on the electrical device. Does the device function properly?**

   If no other electrical device is available, continue to step 7.

   Yes. Power is available at the power source. See "No Power to a Part of the Computer" found later in this section.

   No. Continue to step 7.

7. **Connect the AC adapter to a different AC power source, and turn on the computer. Does the green power indicator light up?**

   Allow one minute for the computer to initialize its components before checking for signs of power.

   Yes. The problem is resolved.

   No. Continue to step 8.

8. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Total Power Failure When Using a Battery

If an AC adapter is not connected to your computer, the computer's power source is a battery. If the battery indicator flashes amber or is a steady amber, the battery needs to be charged. If the battery is flashing green and amber, the battery may be defective. To troubleshoot this problem, make a copy of the Diagnostics Checklist found in Chapter 5, "Getting Help," and fill it out as you complete the following procedure.

1. **Turn off the computer and peripherals, and disconnect them from AC power.**
2. **Reseat each installed battery by removing it and then replacing it.**
3. **Turn on the computer. Does the green power indicator light up?**

   Allow one minute for the computer to initialize its components before checking for signs of power.

   Yes. Continue to step 4.

   No. Use the AC adapter to connect your computer to AC power. If the computer operates normally when using AC power, go to step 7. If the computer does not boot when using the AC adapter, see the previous subsection, "Total Power Failure When Using the AC Adapter."

4. **Does the battery indicator flash amber or show a a steady amber light?**

   Yes. The battery needs to be charged. Go step 5.

   No. Go to step 7.

5. **Connect the computer to AC power, and fully charge the battery.**

   For instructions, see the topic titled "Charging the Battery" in the online *System User's Guide.*

6. **As the battery charges, does the green battery indicator light up?**

   Yes. Go to step 9.

   No. Go to step 7.

7. **Is the battery indicator flashing green and amber?**

   Yes. Your computer may be in a hot environment. Charging the battery in this condition may affect the life span of the battery. Continue to step 8.

   No. The problem is resolved.

8. **Disconnect the computer from AC power. Is the the battery indicator still flashing amber?**

   Yes. You may have a defective battery. Continue to step 9.

   No. The problem is resolved.

9. **Remove the battery, and press its test button. Is the uppermost indicator in the charge gauge of the battery flashing?**

   Yes. You have a defective battery. Continue to step 9.

   No. The problem is resolved.

10. **If a spare battery is available, fully charge it, and then install it in the computer.**

11. **Turn on the computer. Is the power indicator off?**

    Yes. Your original battery is defective. Call Dell for a replacement. (See Chapter 5, "Getting Help," for instructions.)

    No. Call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

No Power to a Part of the Computer

If the power indicator shows that your computer is receiving power, but the display remains blank, part of your computer is probably not receiving power. To troubleshoot this problem, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

1. **Turn off the computer and peripherals, and disconnect them from AC power. Disconnect any attached peripherals from the computer.**

2. **Make sure that the AC adapter is connected to the computer and to AC power, or confirm that a fully charged battery is properly seated in its compartment.**

3. **Turn on the computer. Is the display on?**

   Allow one minute for the computer to initialize its components before checking for signs of power.

   Yes. The entire computer is receiving power; the problem is resolved.

   No. Adjust the brightness of the display. If the display still does not show an image, continue to step 4.

4. **Turn off the computer, and reseat (remove and reinstall) any installed memory modules.**

   To remove a memory module, *carefully* spread apart the *inner* metal tabs of the memory module socket just far enough for the memory module to disengage from the socket (the module should pop up slightly). Then lift the memory module away from the socket.

   To reinstall a memory module, align the memory module's edge connector with the slot in the center of the memory module socket. Press the memory module's edge connector firmly into the socket. Pivot the memory module down until it clicks into place. If you do not hear a sharp click, remove the memory module and reinstall it.

   NOTE: Memory modules are keyed, or designed, to fit into their sockets in only one direction. The sockets on the system board are notched so that the memory module can be firmly seated only one way.

5. **Turn on the computer. Is the display on?**

   Yes. The entire computer is receiving power; the problem is resolved.

   No. The display may be defective. See "Troubleshooting the Built-In Display" found later in this section. If the display still does not work, connect an external monitor and run the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If you cannot isolate the problem after running the diagnostics, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

Troubleshooting the Diskette Drive

During the power-on self-test (POST), the computer checks the diskette drive, comparing its characteristics with the system configuration information. (The diskette-drive access indicator blinks as the computer performs this check.)

If a failure occurs with the drive, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

1. **Reboot the computer. Does the access indicator blink during the boot routine (or does the activity indicator light up on the external diskette drive)?**

   Yes. Go to step 3.

   No. Go to step 2.

2. **Remove and reinsert the diskette drive (or disconnect and reconnect the drive if used externally). Reboot the computer. Does the drive access indicator blink during the boot routine?**

   Yes. Go to step 3.

   No. Go to step 6.

3. **Does the computer display a drive error message?**

   Yes. See Table 3-2 for an explanation of the message, and then go to step 4.

   No. Go to step 6.

4. **Insert a bootable 1.44-MB diskette into the drive, and reboot the computer.**

5. **Does the drive access indicator blink during the boot routine, and does the drive boot the operating system?**

   Yes. The diskette drive problem has probably been resolved. If you continue to experience trouble, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

   No. Go to step 6.

6. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Troubleshooting the CD-ROM Drive

During POST, the computer checks the CD-ROM drive, comparing its characteristics with the system configuration information. (The drive access indicator blinks as the computer performs this check.)

NOTE: Check the **config.sys** *and* **autoexec.bat** *files before using the following procedure. If necessary, add the following statement to the* **config.sys** *file:* `device=c:\tsy\tsycdrom.sys`. *If necessary, add the following statement to the* **autoexe.bat** *file:* `c:\dos\mscdex.exe /d:tsycdl`. *Then save the changes and reboot the computer. If the problem persists, use the following troubleshooting procedure before calling Dell.*

If a failure occurs with the drive, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure:

1. **Turn off the computer, and then install the CD-ROM drive in the modular bay. Reboot the computer. Does the drive access indicator blink during the boot routine.**

   Yes. Go to step 3.

   No. Go to step 2.

2. **Remove and reinsert the CD-ROM drive. Reboot the computer. Does the drive access indicator blink during the boot routine?**

   Yes. Go to step 3.

   No. Go to step 7.

3. **Remove the hard-disk drive, and boot the computer. Does the drive access indicator blink during the boot routine?**

   Yes. Go to step 4.

   No. Go to step 7.

4. **Reinstall the hard-disk drive. Then check the CD-ROM configuration in the Settings folder. Is the CD-ROM driver (**tsycdrom.sys**) installed?**

   Yes. Go to step 5.

   No. Load the driver and return to step 1 to begin this procedure again. (To load the driver, use the program diskette sets you made when you first received your Dell computer.)

5. **Attach the diskette drive to the parallel port. Insert a bootable diskette, and reboot the computer.**

6. **Check drive D in the Windows 95 Explorer. Are the root directory contents for drive D displayed?**

   Yes. The problem is resolved.

   No. Go to step 7.

7. **Insert your Dell Diagnostics diskette into the diskette drive, and reboot the computer. Then run the IDE CD ROM Drives test group. Does your CD-ROM drive pass all the tests?**

   Yes. Return to step 1, and perform this troubleshooting procedure again. If you continue to experience trouble, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

   No. Go to step 8.

8. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Troubleshooting the Hard-Disk Drive

During POST, the computer checks the hard-disk drive, comparing its characteristics with the system configuration information. (The hard-disk drive/CD-ROM drive access indicator blinks as the computer performs this check.) If a failure occurs with the drive, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

NOTE: If you have another hard-disk drive that you know is in good condition, install it in your computer before you begin this procedure and perform the operation that caused you to suspect a hard-disk drive failure. If there is no evidence of a drive failure with the second drive installed, the first drive is probably defective. If the second drive fails, reinstall the first drive and start the following procedure.

1. **Reboot the computer. Does the drive access indicator blink during the boot routine, and does the drive boot the operating system?**

   Yes. If a message appears on the display, see Table 3-2 for an explanation of the message and possible corrective actions. Then go to step 6.

   No. Continue to step 2.

2. **Insert your operating system diskette into drive A, and reboot the computer.**

3. **Check drive C in the Windows 95 Explorer. Are the root directory contents for drive C displayed?**

   Yes. Go to step 5.

   No. Continue to step 4.

4. **If your hard-disk drive has more than one logical drive, check drive D. Are the root directory contents for drive D displayed?**

   Yes. Continue to step 5.

   No. You may have a corrupted boot sector or file allocation table (FAT) on drive C. Go to step 8.

5. **Rename your** autoexec.bat **and** config.sys **files, remove the operating system diskette from drive A, and reboot the computer. Does the operating system load now?**

   Yes. You have an error in your **autoexec.bat** or **config.sys** file. Use a text editor to examine the contents of these files and locate the error. For information on the correct syntax for commands in these files, see the documentation that came with your operating system.

   No. Continue to step 6.

6. **Insert your diagnostics diskette into drive A, and reboot the computer. Then run the Hard-Disk Drive test group. Does your drive pass all the tests?**

   Yes. Continue to step 7.

   No. Go to step 8.

7. **Replace your diagnostics diskette with the operating system diskette, and reboot the computer. Does the operating system load now?**

   Yes. The hard-disk drive may contain a corrupted operating system or it may have bad sectors. Reinstall the operating system as described in the documentation that accompanied your operating system. If reinstalling the operating system does not correct the problem, continue to step 8.

   No. Continue to step 8.

8. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Troubleshooting an External Keyboard or External Keypad

During POST, the computer checks to see if an external keyboard or keypad is connected. If an external keyboard is connected, the computer recognizes both the built-in and the external keyboards. If an external keypad is connected, the computer recognizes the external keypad and the built-in keyboard, but does not recognize the embedded numeric keypad. If an attached external keyboard or keypad does not work when you boot the computer, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

NOTE: The computer's PS/2 connector supports two devices with the use of a PS/2 "Y" adapter.

1. **Make sure the cable from the external keyboard or keypad is firmly connected to the external keyboard/keypad/mouse connector on the back of the computer. (See "Checking Connections" found earlier in this chapter.)**

2. **If you are using a keyboard with various switch settings, make sure the switch is set to PS/2, Enhanced XT/AT, or PC/AT.**

   The switch settings are usually on the bottom of the keyboard, sometimes behind a panel tab.

3. **Reboot the computer. During the boot routine, do the Num Lock, Caps Lock, and Scroll Lock indicators on the external keyboard flash momentarily?**

   Yes. Continue to step 4.

   No. You may have a defective keyboard port fuse. Go to step 7.

4. **Does the computer recognize the external keyboard or keypad?**

   Use the external keyboard or keypad to type some characters. Do they appear on the display?

   Yes. The problem is resolved.

   No. Continue to step 5.

5. **Turn off the computer, and disconnect the external keyboard or keypad from the computer.**

6. **Reboot the computer. Is the computer recognizing the built-in keyboard?**

   Allow one minute for the computer to initialize its components. Then use the computer's built-in keyboard to type some characters. Do the characters appear on the display?

   Yes. The external keyboard may be defective. Run the Keyboard test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If you cannot isolate the problem after running the diagnostics, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

   No. The computer's keyboard controller on the system board may be defective. Run the Keyboard Controller Test in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If you cannot isolate the problem after running the diagnostics, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

7. **Call Dell for technical assistance.**

   See Chapter 5, "Getting Help," for instructions.

Troubleshooting Memory

If the memory count displayed in the lower-right corner of the System Setup program is less than the amount installed, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

NOTE: Before beginning this procedure, make sure a memory module is installed in one of the memory module sockets on the system board. The computer will not function unless there is at least one installed memory module.

1. **Reboot the computer, and open the System Setup program by pressing the <Fn><F1> key combination. Does the memory total displayed match the actual amount of memory installed in the computer?**

   Yes. The computer needed to update the memory; the memory check phase is now OK.

   No. Continue to step 2.

2. **Turn off the computer, and reseat (remove and reinstall) any installed memory modules in your computer.**

   Loose or disconnected memory modules may cause intermittent memory problems. Removing and reinstalling, or *reseating*, memory modules often corrects the problem.

To remove a memory module, *carefully* spread apart the *inner* metal tabs of the memory module socket just far enough for the memory module to disengage from the socket (the module should pop up slightly). Then lift the memory module away from the socket.

To reinstall a memory module, align the memory module's edge connector with the slot in the center of the memory module socket. Press the memory module's edge connector firmly into the socket. Pivot the memory module down until it clicks into place. If you do not hear a sharp click, remove the memory module and reinstall it.

NOTE: Memory modules are keyed, or designed, to fit into their sockets in only one direction. The sockets on the system board are notched so that the memory module can be firmly seated only one way.

3. **Turn on your computer, and press the <Fn><F1> key combination to open the System Setup program. Does the memory total displayed in the System Setup program match the actual amount of memory installed in the computer?**

   Yes. A memory module was loose; the memory check phase is now OK.

   No. Continue to step 4.

4. **Run the Dell Diagnostics.**

   For instructions, see Chapter 4, "Running the Dell Diagnostics." If you get any error messages when running the tests, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

Troubleshooting the Built-In Display

If the computer is receiving power, but nothing appears on your display (such as light, text, or graphics) or the display image does not appear as you would expect, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

NOTES: The highest video resolution supported by the built-in display on the Dell Latitude CP M133ST, M166ST, and M233ST is 800 x 600 pixels. The highest resolution supported by the built-in display on the Dell Latitude CP M233XT is 1024 x 768 pixels. If your application program requires a higher resolution, attach an external monitor to the computer.

1. **Press the <Fn><F8> key combination several times. Does an image appear on the built-in display?**

   Yes. The video image was being sent to an external monitor. The problem is resolved.

   No. Go to step 2.

2. **If the computer is running, press the power button to exit suspend mode or to reactivate the display. Is the full display readable?**

   Yes. The computer was in suspend mode, or the display time-out feature was activated. The problem is resolved.

   No. Continue to step 3.

3. **If the computer is running, is the battery indicator showing a steady amber light?**

   Yes. The display turns off when the final low-battery warning occurs. Replace the battery or connect the computer to alternating current (AC) power through the AC adapter. Press the power button. If the display is still not readable, continue to step 4.

   No. Continue to step 4.

4. **Turn off the computer and any attached peripherals. Disconnect all peripherals from the computer.**

5. **Make sure the AC adapter is firmly connected to the computer and to an AC power source, or verify that a fully charged battery is properly seated in its compartment.**

6. **Turn on the computer. Is the display on?**

   Allow one minute for the computer to initialize its components.

   Yes. Continue to step 7.

   No. Go to step 9.

7. **Press the <Fn> down-arrow or <Fn> up-arrow key combination to adjust the brightness. Is the full display readable?**

   Yes. Continue to step 8.

   No. Go to step 9.

8. **Did an error message appear on the display, or did you see a flash code?**

   Yes. Refer to Table 3-2 or Table 3-3 to find the message or flash code, respectively, along with its explanation. If you can't find the message or code, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

   No. If you still have a display problem but the display is not completely blank, run the Video test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) Then call Dell for technical assistance. (See Chapter 5, "Getting Help.")

9. **Turn off your computer, and connect an external monitor to the computer.**

   Follow the procedure in the topic titled "Connecting an External Monitor" in the online *System User's Guide.*

10. **Turn on the computer and the monitor, and adjust the monitor's brightness controls. Is the monitor readable?**

    Yes. The computer's display may be defective. Call Dell for technical assistance. (See Chapter 5, "Getting Help.")

    No. The computer's video controller on the system board may be defective. Run the Video test group of the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If you cannot isolate the problem after running the diagnostics, call Dell for technical assistance. (See Chapter 5, "Getting Help.")

Troubleshooting an External Monitor

During POST, the computer checks to see if an external monitor is attached to the computer; if so, the video control circuitry sends information to the external monitor rather than to the computer's display. If no image appears on the external monitor you are using when the computer boots, make a copy of the Diagnostics Checklist found in Chapter 5 and fill it out as you complete the following procedure.

1. **Make sure the external monitor's video cable is firmly connected to the computer's monitor connector, and verify that the monitor's power cable (if it has one) is firmly plugged into an AC power source. Make sure the monitor is turned on.**

2. **Reboot the computer, and then adjust the monitor's brightness controls. Is the monitor readable?**

   Allow one minute for the computer to initialize its components.

   Yes. The problem is resolved.

   No. Continue to step 3.

3. **Raise the built-in display into viewing position, if necessary, and press the <Fn><F8> key combination to switch the video image from the external monitor to the display.**

4. **Use the <Fn> down-arrow key or <Fn> up-arrow key combination to adjust the brightness. Is the full display readable?**

   Yes. The external monitor may be defective. Continue to step 5.

   No. The video controller on the system board may be defective. Run the Video test group of the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics," for instructions.) If you cannot isolate the problem, call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

5. **Turn off the computer and any attached peripherals. Disconnect all peripherals from the computer. Attach another external monitor to the computer.**

   For instructions, see the topic titled "Connecting an External Monitor" in the online *System User's Guide*. If you do not have another external monitor, call Dell for technical assistance. See Chapter 5, "Getting Help," for instructions.

6. **Reboot the computer, and adjust the monitor's brightness and contrast. Is the monitor readable?**

   Allow one minute for the computer to initialize its components.

   Yes. The original monitor is defective. Call Dell for technical assistance. See Chapter 5, "Getting Help," for instructions.

   No. Call Dell for technical assistance. See Chapter 5, "Getting Help," for instructions.

Troubleshooting Serial and Parallel Ports

This section provides a procedure for troubleshooting the ports on your computer's serial and parallel ports (shown in Figure 3-3) and any attached peripheral devices. This section also provides a procedure for troubleshooting the computer's infrared ports.

If a system error message indicates a port problem or if equipment connected to a port seems to perform incorrectly or not at all, the source of the problem may be any of the following:

- A faulty connection between the I/O port and the peripheral device
- Incorrect settings for system setup options
- Incorrect settings in the operating system's configuration files
- A faulty cable between the I/O port and the peripheral device
- A faulty peripheral device
- Faulty I/O port logic on the system board
- Conflicting COM port settings
- Lack of device drivers

Troubleshooting the Basic I/O Functions

Make a copy of the Diagnostics Checklist found in Chapter 5, and fill it out as you complete the following procedure.

1. **Check the settings for the Serial Port and Parallel Mode setup options.**

   For information on configuring the ports, see Chapter 2, "Customizing System Features." Are the communication port options set correctly for the peripheral devices connected to the computer?

   Yes. Go to step 3.

   No. Continue to step 2.

2. **Change the Serial Port and Parallel Mode options to the appropriate settings; then reboot the system.**

   Is the problem resolved?

   Yes. You have fixed the problem.

   No. Continue to step 3.

3. **Check the contents of the initialization and start-up files. (See "Installing and Configuring Software" found earlier in this chapter.)**

   Are the port configuration commands correct?

   Yes. Go to step 5.

   No. Continue to step 4.

4. **Change the necessary statements in the start-up files.**

   If the port problem is confined to a particular application program, see the application program's documentation for specific port configuration requirements.

   Is the problem resolved?

   Yes. You have fixed the problem.

   No. Continue to step 5.

5. **Insert the *Dell Diagnostics Diskette* into drive A, reboot the computer, and run the Serial/Infrared Ports test group and/or the Parallel Ports test group. (See Chapter 4, "Running the Dell Diagnostics.")**

   The Serial/Infrared Ports test group and the Parallel Ports test group check the basic functions of the system board's I/O port logic. Also, if a parallel printer is connected to the parallel port, the Parallel Ports test group tests the communication link between the system board's I/O port logic and the printer.

   Do the tests complete successfully?

   Yes. The problem may be with the external device. Check the documentation that came with the device for any troubleshooting procedures.

   No. Call Dell for technical assistance. See Chapter 5, "Getting Help," for instructions.

6. **The problem may be with the external device.**

Troubleshooting the Infrared Port

This section provides a procedure for troubleshooting the computer's infrared port. Make a copy of the Diagnostics Checklist found in Chapter 5, and fill it out as you complete the following procedure.

NOTE: Before beginning this procedure, check the infrared settings in Windows 95. Select the Start button, and point to Settings and then to Control Panel. Double-click the Infrared icon.

1. **Check the setting for the Infrared Data Port option in the System Setup program. Is the setting correct?**

   For information on the System Setup program, see Chapter 2, "Customizing System Features." Is the Infrared Data Port option set correctly for the external device with which you are communicating? You may need to check the documentation that accompanied the device to determine the proper setting.

   Yes. Go to step 3.

   No. Go to step 2.

2. **Change the Infrared Data Port option to the appropriate setting, and then reboot the system.**

   Is the problem resolved?

   Yes. The problem is resolved.

   No. Go to step 3.

3. **Insert the *Dell Diagnostics Diskette* into drive A, reboot the computer, and run the Serial/Infrared Ports test group in the Dell Diagnostics. (See Chapter 4, "Running the Dell Diagnostics.") Do the tests complete successfully?**

   The Serial/Infrared Ports test group checks the basic functions of the computer's infrared logic.

   Yes. The infrared ports are functioning properly. There may be a problem with the infrared application program or with the external device. Check the documentation that came with the application program and the external device.

   No. Call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

Chapter 4
Running the Dell Diagnostics

Unlike many diagnostic programs, the Dell Diagnostics helps you check the computer's hardware without any additional equipment and without destroying any data. By using the Dell Diagnostics, you can have confidence in the computer's operation. If you find a problem you cannot solve by yourself, the diagnostic tests can provide you with important information you will need when talking to Dell's service and support personnel.

CAUTION: Use the Dell Diagnostics to test *only* your Dell computer. Using this program with other computers may cause incorrect computer responses or result in misleading error messages.

NOTE: If the computer does not boot, call Dell for technical assistance. See Chapter 5, "Getting Help," for instructions.

Features of the Dell Diagnostics

To troubleshoot components or devices, run the appropriate test (test group *or* subtest) in the diagnostics on your *Dell Diagnostics Diskette*. The diagnostics program exercises the functional components and devices of the computer more vigorously and thoroughly than they are exercised during normal operation.

The Dell Diagnostics provides a series of menus and options from which you choose particular test groups or subtests. Each diagnostic test group or subtest allows you to control important testing parameters. You can also control the sequence in which the tests are run. The diagnostic test groups or subtests also have these helpful features:

- Options that let you run tests individually or collectively
- An option that allows you to choose the number of times a test group or subtest is repeated
- The ability to display test results, print them, or save them in a file
- Options to suspend testing when an adjustable error limit is reached
- A menu option called About that briefly describes each test and its parameters
- Status messages that inform you whether test groups or subtests were completed successfully
- Error messages that appear if any problems are detected

When to Use the Dell Diagnostics

Whenever a major component or device in the computer does not function properly, the component or device may have failed. As long as the microprocessor and input/output (I/O) components of the computer (the display, keyboard, and diskette drive) are working, use the Dell Diagnostics. If you are experienced with computers and know which component(s) you need to test, select the appropriate diagnostic test group(s) or subtest(s). If you are unsure about how to begin diagnosing a problem, read the rest of this chapter.

Before You Start Testing

Follow these steps to safeguard your master copy of the *Dell Diagnostics Diskette*:

1. **Make a working copy of the *Dell Diagnostics Diskette* on a blank diskette.**

   Refer to your operating system's documentation for information on how to duplicate diskettes. Put the original diskette away for safekeeping.

2. **Turn on your printer, if one is attached, and make sure it is online.**

3. **Confirm the computer's system configuration information, and enable all its components and devices, such as ports.**

   For instructions, see Chapter 2, "Customizing System Configurations."

4. **Disable all system setup options for power management.**

   For instructions, see the topics titled "Using the Dell Control Center Power Saver Window" and "Dell Control Center" in the online *System User's Guide*. Or, see "Power Management" in Chapter 2 of this guide.

5. **Attach an AC adapter to the computer.**

   Although it is possible to run the Dell Diagnostics on a computer using battery power, connecting the computer to AC power helps ensure that power will not be lost during the tests.

Starting the Dell Diagnostics

After you complete the preliminary instructions specified in the previous section, follow these steps to start the diagnostics:

NOTE: You must have a diskette-drive cable to perform the following procedure. If you do not have a diskette-drive cable, you can get one from Dell. See Chapter 5, Getting Help," for information on contacting Dell.

1. **Install a CD-ROM drive in the modular bay.**

   For instructions, see the topic titled "CD-ROM Drive" in the online *System User's Guide*.

2. **Attach the diskette drive to the parallel port connector on the back of the computer.**

   For instructions, see the topic titled "Diskette Drive" in the online *System User's Guide*.

3. **Turn off the computer.**

4. **Place the *Dell Diagnostics Diskette* in the diskette drive, and boot the computer.**

NOTE: Before you read the rest of this chapter, you may want to start the Dell Diagnostics so you can see the menus on your display.

When you start the diagnostics, the Dell logo screen appears, and a program tests the random-access memory (RAM) that will be used by the diagnostics.

If a failure in RAM is detected, a message appears on the screen telling you the memory address of the defective memory module. Write down the memory address and see Chapter 5, "Getting Help," for instructions on obtaining technical assistance.

If no errors are found in RAM, the diagnostics loads and the Diagnostics Menu appears (see Figure 4-1). The menu allows you to exit to the MS-DOS prompt.

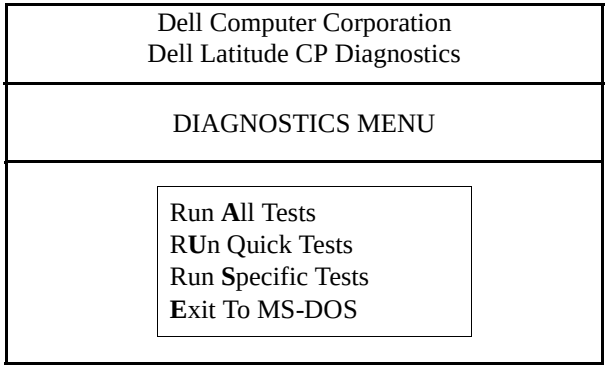


Figure 4-1. Diagnostics Menu

For a quick check of your system, select the Run Quick Tests option. This option runs only the subtests that do not require user interaction and that do not take a long time to run. Dell recommends that you choose this option first to increase the odds of tracing the source of the problem quickly. For a complete check of your system, select the Run All Tests option. To check a particular area of your system, select the Run Specific Tests option.

How to Use the Dell Diagnostics

When you select Run All Tests or Run Specific Tests from the Diagnostics Menu, the main screen of the diagnostics appears (see Figure 4-2). The main screen lists the diagnostic test groups, gives information about the configuration of the computer, and allows you to select options from a menu.

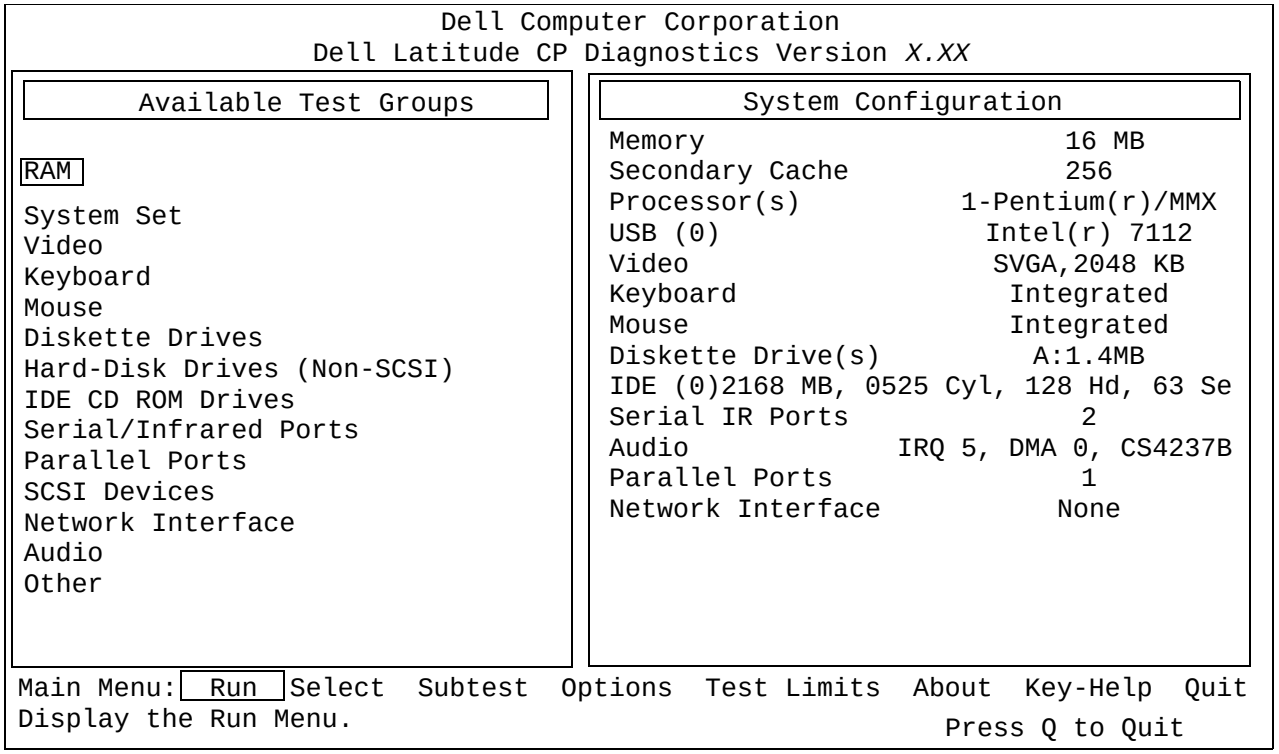
To select an option from the Diagnostics Menu, highlight the option and press <Enter>, or press the key that corresponds to the highlighted letter in the option.

Information on the main screen of the diagnostics is presented in the following five areas:

- Two lines at the top of the screen identify the diagnostics and give its version number.
- On the left side of the screen, the Available Test Groups area lists the diagnostic test groups in the order they will be run if you select Run and then All. Press the up- or down-arrow key to highlight a test group.
- On the right side of the screen, the System Configuration area lists the computer's current hardware settings.
- On the lower-right side of the screen, the IDE Drive Information area displays information about your hard-disk drive.

The menu area is at the bottom of the screen. The first line lists the options you can select; press the left- or right-arrow key to highlight a menu option. The second line gives information about the option currently highlighted.

CAUTION: While the diagnostic tests are running, do not interrupt the tests, do not unplug the AC adapter, and do not reboot the computer. Interrupting the tests in any of these ways could lead to the loss of system data. It is important to quit the diagnostics program correctly, because the program writes data to the computer's memory that can cause problems unless properly cleared.



NOTE: The options displayed on your screen reflect the hardware configuration of the computer.

Figure 4-2. Main Screen of the Dell Diagnostics

Confirming the System Configuration Information

When you boot the computer from your diagnostics diskette, the diagnostics checks your system configuration information and displays it in the System Configuration area on the main screen.

The following sources supply this configuration information for the diagnostics:

- The system configuration information that you selected through the system setup options
- Identification tests of the microprocessor, the video controller, the keyboard controller, and other key components
- Basic input/output system (BIOS) configuration information temporarily saved in RAM

Do not be concerned if the System Configuration area does not list the names of all the components or devices you know are part of the computer. For example, you may not see a printer listed, although you know one is attached to the computer. Instead, the printer is listed as a parallel port. The computer recognizes the parallel port as LPT1, which is an address that tells the computer where to send outgoing information and where to look for incoming information. Because your printer is a parallel communications device, the computer recognizes the printer by its LPT1 address and identifies it as a parallel port.

How to Use the Menu

One of the menu options is already highlighted at the bottom of the screen. You can move the highlighting from one option to another by pressing the left- or right-arrow key. As you move from one menu option to another, a brief explanation of the currently highlighted option appears on the bottom line of the screen.

If you want more information about a test group or subtest, move the highlight to the About option and press <Enter>. After reading the information, press <Esc> to return to the previous screen.

Main Menu Options

The Main menu of the diagnostics main screen lists eight options: Run, Select, Subtest, Options, Test Limits, About, Key-Help, and Quit.

NOTE: Before running any test groups or subtests (by selecting Run and then All), you should consider setting global parameters within the Options option. They offer you greater control over how the test groups or subtests are run and how their results are reported.

There are two ways to select a menu option:

- Type the capitalized letter in the option (for example, type `r` to select the Run option).
- Use the left- or right-arrow key to highlight the option, and then press <Enter>.

Whenever one of the eight options is selected, additional choices become available.

The following subsections explain the menu options as listed from left to right in the Main menu.

Run

Run displays five options: One, Selected, All, Key-Help, and Quit Menu. If you select One, only the highlighted test group is run. If you choose Selected, the computer runs the test groups or the subtests selected within the test groups that you selected. (Specify the test groups or subtests to be run within each test group, using the Select or Subtest option, respectively, as described in the following subsections.) If you select All, all of the subtests in all of the test groups are run. (The test groups or subtests are run in the same order as they are listed.)

The Key-help option displays a list of key controls available for the selected option. The Quit Menu option returns you to the Main menu.

Select

Select allows you to select individual test groups to tailor the testing process to your particular needs. You can choose one or more test groups and run them sequentially or individually. When you choose Select, five options are displayed: All, One, Clear All, Key-Help, and Quit Menu.

To select all the test groups, highlight All in the Select menu and press <Enter>. To select an individual test group, either press the up- or down-arrow key to highlight the test group and then press the <Spacebar>, or highlight One in the Select menu and press <Enter>.

To reverse a test group selection, highlight the test group and press the <Spacebar>. To clear all selected test groups, select Clear All.

The Key-Help option displays a list of key controls available for the selected option. The Quit Menu option returns you to the Main menu.

Subtest

Most of the test groups consist of several subtests. Use the Subtest option to select individual subtests within the test group(s).

When you select Subtest, many of the same options as those on the Main menu are displayed: Run, Select, Options, Test Limits, About, Key-Help, and Quit Menu. Each of these options is explained in the following subsections.

Run (Under Subtest)

Run in the Subtest menu displays five options: One, Selected, All, Key-Help, and Quit Menu. If you select One, only the highlighted subtest is run. If you choose Selected, only the selected subtests are run. If you select All, every subtest in the selected test group is run. (The subtests are run in the order they are listed.)

The Key-Help option displays a list of available key controls. The Quit Menu option returns you to the previous menu.

Select (Under Subtest)

Select in the Subtest menu allows you to select individual subtests to tailor the testing process to your particular needs. You can choose one or more subtests from the list. When you choose Select, five options are displayed: All, One, Clear All, Key-Help, and Quit Menu.

To select all the test groups, highlight All in the Select menu and press <Enter>. To select an individual subtest, either highlight the subtest and press the <Spacebar> or highlight One and press <Enter>.

To reverse a subtest selection, highlight the subtest and press the <Spacebar>. To clear all selected subtests, select Clear All.

The Key-Help option displays a list of available key controls. The Quit Menu option returns you to the previous menu.

Options (Under Subtest)

The Options option in the Subtest menu functions in the same manner as the Options option in the Main menu. For information on that option, see "Options" found later in this section.

Test Limits (Under Subtest)

The Test Limits option in the Subtest menu functions in the same manner as the Test Limits option in the Main menu. For information on that option, see "Test Limits" found later in this section.

About (Under Subtest)

The About option in the Subtest menu displays information about the highlighted subtest, such as its limits and parameters and how to set them.

Key-Help (Under Subtest)

The Key-Help option in the Subtest menu displays a list of available key controls.

Quit Menu (Under Subtest)

The Quit Menu option in the Subtest menu returns you to the Main menu.

Options

Table 4-1 lists all possible values for each global parameter of Options. A brief description of each parameter follows the table. To select a parameter, press the up- or down-arrow key. To change the values within fields, use the left- or right-arrow key, the <Spacebar> key, or the plus (+) and minus (–) keys. If the value within a field is numeric, you can type in the number. (If you make a mistake, type in zeros until the field is filled with zeros and then start again.)

Table 4-1. Option Parameters

Option Limit	Possible Values
Number of Times to Repeat Test(s)	0001 through 9999, or 0000, which loops indefinitely until you press the <Ctrl> and <Break> keys. The default is 1.
Maximum Errors Allowed	0000 through 9999, where 0000 means that there is no error limit. The default is 1.
Pause for User Response	Yes, No Allows you to decide whether tests will wait for user input. The default is Yes to wait for user input.
Output Device for Status Messages	Display, Printer, File If you have a printer attached to the computer, you can use it to print the *status* messages, if any, that are generated when a test runs. (The printer must be turned on and in the online mode to print.) If you select File, the status messages are printed to a file named **result** on the diagnostics diskette. The default is Display.
Output Device for Error Messages	Display, Printer, File If you have a printer attached to the computer, you can use it to print the *error* messages, if any, that are generated when a test runs. (The printer must be turned on and in the online mode to print.) If you select File, the error messages are printed to a file named **result** on the diagnostics diskette. (Make sure the diskette is not write-protected.) The default is Display.

Number of Times to Repeat Test(s)

This parameter specifies the number of times the tests run when you select Run. To change the default, type in the desired value. If you type `0` (zero), the test is run until you press <Ctrl><Break>.

Maximum Errors Allowed

This parameter specifies the maximum number of errors that can occur before testing is suspended. The error count begins from zero each time you run a subtest or test group individually or each time you select All to run all of them. To change the default, type in the desired value. If you type `0` (zero), testing continues—regardless of the number of errors found—until you press <Ctrl><Break>.

Pause for User Response

If this parameter is set to Yes, the diagnostics pauses when one of the following occurs:

- For example, your interaction is needed to verify the Video test group screens, the Keyboard test group key functions, or insert a diskette.
- The maximum error limit is reached.

To continue testing, press any key.

If this parameter is set to No, the diagnostics ignores subtests that require your interaction; certain subtests can run only if this option is set to Yes because they require user interaction. Set this parameter to No when you want to bypass subtests that require user interaction—such as when you run the diagnostics overnight.

Output Device for Status Messages

Ordinarily, all status messages appear only on the display. This parameter allows you to direct status messages to either a printer or a file, in addition to the display. Use the right-arrow key to select the option you want. If you choose the Printer option, status messages print as they occur. If you choose the File option, status messages are written to a file named **result**. This file is automatically created on the diagnostics diskette when you run the diagnostics. If the **result** file already exists on the diskette, new status messages are added to it.

The **result** file is an ordinary American Standard Code for Information Interchange (ASCII) text file. You can access the **result** file through Windows Notepad by performing the following steps:

1. **Select Quit Menu to exit the diagnostics and return to the MS-DOS prompt.**
2. **Remove the *Dell Diagnostics Diskette* from the diskette drive.**
3. **Reboot the computer.**
4. **If necessary, start your operating system.**
5. **Insert the *Dell Diagnostics Diskette* into the diskette drive.**
6. **Double-click the Notepad icon. Then select Open from the File menu.**
7. **In the File Name text box, type `a:\result` and press <Enter>.**

   The contents of the file appear on the display.

You can also access the **result** file with the MS-DOS **type** command:

1. **Select Quit Menu to exit the diagnostics and return to the operating system prompt.**
2. **At the operating system prompt, type the following command and press <Enter>:**

   ```
   type result
   ```

   The contents of the file appear on the display.

After running particular diagnostic tests and viewing the status messages generated by the tests in the **result** file, you can delete the contents of the file so that it is empty for the next set of messages generated. Otherwise, the next messages are added to the end of the previous ones in the file.

Output Device for Error Messages

Ordinarily, all error messages appear only on the display. This parameter allows you to direct error messages to either a printer or a file, in addition to the display. Use the right-arrow key to select the option you want. If you choose the Printer option, error messages print as they occur. If you choose the File option, error messages are written to the **result** file used for status messages. This file is automatically created on your diagnostics diskette when you run the diagnostics. If the **result** file already exists on the diskette, new error messages are added to it.

The **result** file is an ordinary ASCII text file. You can access and review the **result** file in Windows Notepad or with the MS-DOS **type** command as described in the previous subsection, "Output Device for Status Messages."

After running particular diagnostic tests and viewing the error messages generated by the tests in the **result** file, you can delete the contents of the file so that it is clear for the next set of messages generated. Otherwise, the next messages are added to the end of the previous ones in the file.

Test Limits

NOTE: The diagnostics program sets default limits on all tests. The only reason to change the defaults would be to limit the amount of testing done. An exception is the default limit for testing super video graphics array (SVGA) modes. If you are testing an external monitor, change the default to Yes.

The RAM test group, the Video test group, the Serial/Infrared Ports test group, the Diskette Drives test group, the Parallel Ports test group, the SCSI Devices test group, and the Hard-Disk Drives (Non-SCSI) test group allow you to designate limits. Whether you select Test Limits for a entire test group (from the Main menu) or a single subtest (from the Subtest menu), you set the limits for all the subtests in that test group. When you select Test Limits, a new screen appears and the Key Help area lists keys to use with the new screen.

How you change a value for the limits of a test group or subtest depends on the type of parameter associated with it. Different keys are used to change values for different types of parameters. For example, memory address limits specified for the RAM test group are changed by typing in numbers over the digits of a given limit or by pressing the plus (+) or minus (–) key to increase or decrease the given limit. In contrast, to set limits for the Serial Ports test group, use the <Spacebar> to toggle between Yes and No.

After you are satisfied with the limits, press <Page Down> to select the next menu or submenu in the Test Limits category. Press <Esc> to return to the main Test Limits menu. The values you selected under Test Limits remain in effect until you change them or exit the diagnostics. The values are reset to their defaults when you restart the diagnostics.

About

About in the Main menu displays information about the highlighted test group, such as limits and parameters and how to set them.

Key-Help

Key-Help displays a list of key controls available for the selected option.

Quit

Select Quit from the Main menu (or press <q>) to exit the diagnostics and return to an MS-DOS prompt.

After you return to the operating system environment, remove your diagnostics diskette from drive A and reboot the computer.

CAUTION: It is important that you quit the diagnostics program correctly, because the program writes data to the computer's memory that can cause problems unless properly cleared.

Tests in the Dell Diagnostics

The diagnostics is organized by components into test groups and subtests within each test group. Each subtest is designed to detect any errors that may interfere with the normal operation of a specific device of the computer.

NOTE: Any subtest requiring hardware not listed in the System Configuration area appears to run, but the subtest concludes with a status message stating `Component not available`.

Table 4-2 lists the diagnostic test groups, their subtests, and comments concerning their use.

Table 4-2. Dell Diagnostics Tests

Test Groups	Subtests	Description
RAM	Quick Test Comprehensive Test Secondary Cache Test	Tests the RAM.
System Set	CMOS Confidence Test DMA Controller Test Real-Time Clock Test System Speaker Test System Timers Test Interrupt Controller Test	Tests the system board's support chips, DMA controller, computer timer, NVRAM, speaker controller, and, if appropriate, the external cache and the thermal-control device.
	Coprocessor Calculation Test Coprocessor Error Exception Test	Tests the math coprocessor that is internal to the microprocessor.
	PC Card Controller Test	Tests the PC Card controller on the system board.
	USB Register Test USB Memory Structure Test	Tests the computer's USB connector.
Video	Video Memory Test Video Hardware Test Text Mode Character Test Text Mode Color Test Text Mode Pages Test Graphics Mode Test Color Palettes Test Solid Colors Test	Tests the display by checking various aspects of video output.
Keyboard	Keyboard Controller Test Keyboard Key Sequence Test Keyboard Interactive Test Stuck Key Test	Tests the keyboard by checking the keyboard controller and by finding keys that *stick* or respond incorrectly.
Mouse	Mouse Test	Tests the electronic pointing device (integrated touch pad, external serial mouse, or external PS/2 mouse).
Diskette Drives	Change Line Test Seek Test Read Test Write Test	Tests a drive that uses removable diskettes. Also tests the associated controlling devices and important parts of the cabling.

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

Table 4-2. Dell Diagnostics Tests *(continued)*

Test Groups	Subtests	Description
Hard-Disk Drives (Non-SCSI)	Disk Controller Test Forced Error-Correction-Code Test Seek Test Read Test Write Test	Tests a drive that uses fixed, internal disks. Also tests the associated controlling devices.
IDE CD ROM Drives	Drive Controller Test Seek Test Read Test Audio Output Test Eject Removable Media	Tests an IDE drive that uses removable CD media. Also tests the associated controlling devices.
Serial/Infrared Ports	Serial/Infrared Baud Rate Test Serial/Infrared Interrupt Test Serial/Infrared Internal Transmission Test Serial External Transmission Test	Tests the components through which peripherals that use the serial or infrared port, such as communications devices, send and receive data. Requires an external loopback connector.
Parallel Ports	Parallel Internal Test Parallel External Loopback Test Parallel External Interrupt Test Parallel Printer Pattern Test	Tests the components through which peripherals that use the parallel port, such as printers, send and receive data.
SCSI Devices	Internal Diagnostic Test Seek Test Read Test Write Test Audio Output Test Eject Removable Media Test Display Information Test	Tests the SCSI controller in the C/Port Advanced Port Replicator (APR) or C/Dock Expansion Station, and all SCSI devices attached to either. This test runs only if the computer is docked.
Network Interface	Registers Test Loopback Test Shared RAM Test Display Information Test	Tests the read and write access capability of the network controller registers in the Dell Latitude C/Port APR or C/Dock Expansion Station. This test runs only if the computer is docked.

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

Table 4-2. Dell Diagnostics Tests *(continued)*

Test Groups	Subtests	Description
Audio	Software Reset Test Interrupt Test DMA Test FM Sound Playback Test Analog Sound Playback Test Record and Playback Test	Tests the operation of the audio chip set. Tests the record and playback ability of the internal microphone and speakers.
Other	Fan Control Test	Tests the function of the fan.

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

Error Messages

When you run a test group or subtest in the diagnostics, error messages may result. These particular error messages are not covered in this guide because the errors that generate these messages can be resolved only with a technician's assistance. Record the messages on a copy of the Diagnostics Checklist found in Chapter 5, and read that chapter for instructions on obtaining technical assistance.

RAM Test Group

The RAM test group subtests check all the directly addressable RAM. You should run the stand-alone RAM Test program (**ramtest.exe**) from the MS-DOS prompt if, for some reason, the diagnostics cannot load into memory.

The RAM Test program has switches that allow you to set both test limits and options for the subtests from the MS-DOS prompt. The switches listed in Table 4-3 can be added to the end of the **ramtest** command line.

The switches can be used in any order, but they must be separated by a space.

For example, to run the RAM comprehensive subtest 10 times without pausing, stopping at a maximum of 20 errors, and outputting the results to a file named **ramtst.rpt**, type the following command line at the MS-DOS prompt and press <Enter>:

```
ramtest -r10 -np -m20 -oframtst.rpt
```

To view the Help screen that lists all of the **ramtest** command-line switches, type the following command at the MS-DOS prompt and press <Enter>:

```
ramtest?
```

Table 4-3. RAM Test Switches

Switch	Description
–r *number*	Repeats the subtest this number of times. Valid numbers are 1 through 9999. A value of 0 causes the test to run until you press <Ctrl><Break>. The default value is 1.
–m *number*	Stops the test if this number of errors occur. Valid numbers are 1 through 9999. A value of 0 causes the test to accept an unlimited number of errors. The default value is 0.
–s *hexadecimal memory address*	Starts the test at this hexadecimal address. Valid hexadecimal values are 0 up to the highest memory address. The default value is 0.
–e *hexadecimal memory address*	Stops the test at this hexadecimal address. Valid hexadecimal values are 0 up to the highest memory address. The default is the highest memory address.
–o[**f** *filename*,**p**]	Outputs the test report to a file (**f**) or a printer (**p**). If you output to a file, append the *filename* after the **f** parameter. If you do not specify a filename when using the **f** parameter, the test report is output to a file named **result**. If you output to the printer, the test file is output to LPT1.
–[**q**,**c**]	Runs the quick (**q**) or comprehensive (**c**) subtest. The comprehensive subtest is the default value.
–np	Does not pause when an error occurs or a subtest finishes. Pause (**p**) is the default value.

Why Run a RAM Test?

Faulty memory can cause a variety of problems that may not, at first glance, appear to be happening in RAM. If the computer is displaying one or more of the following symptoms, run both the subtests in the RAM test group to verify that the memory is not at fault:

- A program is not running as usual, or a proven piece of software appears to malfunction and you confirm that the software itself is not at fault. (You can confirm that the software is functioning properly by moving it to another computer and running it there.)
- The computer periodically *locks up* (becomes unusable and must be rebooted), especially at different places and times in different programs.

Subtests

Three subtests are available for the RAM test group: the Quick Test, the Comprehensive Test, and the Secondary Cache Test. The Quick Test performs an address check to determine whether the computer is properly setting and clearing individual bits in RAM, and whether the RAM read and write operations are affecting more than one memory address location at a time. This subtest checks all available RAM, including the secondary cache. The Comprehensive Test also performs an address check, as well as the following:

- Data pattern checks, to look for RAM bits that are stuck high or low, short-circuited data lines, and some data pattern problems that are internal to the memory chips
- A parity check that verifies the ability of the memory subsystem to detect errors
- A refresh check, to verify that the dynamic RAM (DRAM) is being recharged properly

System Set Test Group

The subtests in the System Set test group check the computer's basic system board components and verify their related functions.

Why Run a System Set Test?

The System Set subtests double-check many system board components, such as the computer's I/O circuitry, that are tested by other test groups or subtests in the diagnostics. You should run the System Set test group if you are having a

problem and cannot isolate the failure or malfunction to a particular system board component.

The System Set test group also verifies the proper operation of other computer components, such as the speaker, that are not tested elsewhere in the diagnostics.

The following symptoms usually suggest a problem with a component or subassembly that warrants running a System Set subtest:

- A program is not running as usual, or a proven piece of software appears to malfunction and you confirm that the software itself is not at fault. (You can confirm that the software is functioning properly by moving it to another computer and running it there.)
- A PC Card you previously accessed can no longer be accessed.
- The computer periodically locks up, especially at different places and times in different programs.
- Parity errors or page fault failures (any error message that contains the word *parity* or *page fault*) occur at any time during operation. These errors are usually accompanied by a reference to an address, which you should record on a copy of the Diagnostics Checklist found in Chapter 5.
- Correcting errors in the system configuration information does not resolve a problem.
- The computer's clock/calendar stops.
- The speaker no longer functions. The problem could be a failure of the system timers as well as a failure of the speaker itself. Run the System Timers Test, followed by the System Speaker Test.
- If a peripheral device appears to malfunction, run the Interrupt Controllers Test. If the computer fails the test, the problem lies with the interrupt controller; if the computer passes, then the problem lies with the peripheral device.
- A spreadsheet program or other type of mathematical application runs abnormally slow, generates error messages concerning calculations or operations, runs incorrectly, or generates incorrect results; or a proven piece of the program appears to malfunction and you confirm that the software itself is not at fault. (You can confirm that the software is not at fault by moving the program to another computer and running it there.)
- The computer halts in the middle of performing calculations or complex mathematical operations.

Subtests

The 11 subtests in the System Set test group confirm the following computer functions:

- CMOS Confidence Test

  Checks the nonvolatile RAM (NVRAM) for accessibility and reliability of data storage by performing a data pattern check and verifying the uniqueness of memory addresses.

- DMA Controller Test

  Tests the direct memory access (DMA) controller and verifies the correct operation of its page and channel registers by writing patterns to the registers.

- Real-Time Clock Test

  Confirms the functionality and accuracy of the computer's real-time clock (RTC).

- System Speaker Test

  Checks the functionality of the speaker by generating eight tones.

- System Timers Test

  Checks the timers used by the microprocessor for event counting, frequency generation, and other functions. Only the functions that can be activated by software are tested.

- Interrupt Controller Test

  Generates an interrupt on each interrupt request (IRQ) line to verify that devices using that line can communicate with the microprocessor and that the interrupt controller sends the correct memory addresses to the microprocessor.

- Coprocessor Calculation Test

  Checks the use of different types of numbers and the math coprocessor's ability to calculate correctly.

- Coprocessor Error Exception Test

  Verifies the math coprocessor's ability to handle errors and to send IRQs to the microprocessor.

- PC Card Controller Test

  Checks the functionality of the PC Card controller on the system board.

- USB Register Test

  Checks the integrated registers of the USB interface. This subtest does not test USB peripherals.

- USB Memory Structure Test

  Monitors the ability of a USB controller to process a simple set of memory-resident instructions.

Video Test Group

The subtests in the Video test group verify the proper operation of the video controller and the video control circuitry installed in the computer. These subtests check for the correct operation of the readable registers in the video circuitry and the controller. They write, read, and verify data patterns in the cursor registers of the controller. The Video test group also provides additional subtests to test the color features of the color display or an external color monitor.

Why Run a Video Test?

Many of the symptoms that would prompt you to run a subtest in the Video test group are obvious, because the display is the visual component of the computer. Before you run the Video test group or any of its subtests, you should make sure that the problem is not occurring in the software or caused by a hardware change.

If the following symptoms still occur, run the appropriate test(s) as follows:

- If your display or external monitor shows a partially formed or distorted image, run *all* of the subtests in the Video test group.
- If the alignment of text or images is *off*, regardless of the program you are running, run the Text Mode Character Test, Text Mode Pages Test, and Graphics Mode Test.
- If the color on the display or external monitor is intermittent or not displayed at all, run the Text Mode Color Test, Color Palettes Test, and Solid Colors Test.
- If your display or external monitor malfunctions in one mode but works fine in another (for example, text is displayed correctly, but graphics are not), run the Text Mode Character Test, Text Mode Color Test, Text Mode Pages Test, and Graphics Mode Test.

Subtests

The eight subtests in the Video test group confirm the following video functions:

- Video Memory Test

  Checks the read/write capability of the video memory in various video modes

- Video Hardware Test

  Checks the cursor registers and the horizontal and vertical retrace bit registers in the video controller

- Text Mode Character Test

  Checks the video subsystem's ability to present data in text modes

- Text Mode Color Test

  Checks the video subsystem's ability to present color in text modes

- Text Mode Pages Test

  Checks the video subsystem's ability to map and present all available video pages on the screen, one page at a time

- Graphics Mode Test

  Checks the video subsystem's ability to present data and color in graphics modes

- Color Palettes Test

  Checks the video subsystem's ability to display all of the available colors

- Solid Colors Test

  Checks the video subsystem's ability to show screens full of solid colors and allows you to check for missing color pixels

Many of these tests display characters or graphics on the screen for you to verify. Samples of these screens are shown in Appendix B, "Diagnostic Video Tests."

NOTE: The default limit for testing SVGA modes is No. If you are testing an external monitor, change the limit to Yes.

Keyboard Test Group

The subtests in the Keyboard test group verify the correct operation of your keyboard and the keyboard controller chip.

Why Run a Keyboard Test?

Keyboard problems are not always caused by the keyboard. For example, a complete lockup of the computer, rendering the keyboard inoperable, is probably not caused by a problem with the keyboard. There are two symptoms that are likely to be keyboard-related. Sometimes, the configuration of a program changes the function of a key or key combination. Similarly, key configuration programs like ProKey can change a key's function. Because these programs are memory resident, be sure to clear them out of the computer's memory before running a subtest in the Keyboard test group. (Clear them from memory by booting the computer from the *Dell Diagnostics Diskette*.) When these possibilities have been eliminated, and if the following symptoms occur, you should run one or more of the subtests in the Keyboard test group:

- When you press a key, the character represented by that key appears repeatedly; the key seems to be stuck. Run the Stuck Key Test.
- When you press a key and the response is different from the usual response or the response you anticipated, the key contact may be damaged. Run the Keyboard Interactive Test.
- When a key does not work at all, run *all* of the subtests in the Keyboard test group.

Subtests

The four subtests in the Keyboard test group confirm the following keyboard functions:

- Keyboard Controller Test

  Confirms the ability of the keyboard controller chip to communicate with the keyboard and confirms the programming of the controller chip
- Keyboard Key Sequence Test

  Verifies that the keys on the keyboard function correctly when you press them in a predefined order
- Keyboard Interactive Test

  Checks the internal microcode of the keyboard and the external interface of the keyboard controller chip for a malfunctioning key
- Stuck Key Test

  Checks the internal microcode of the keyboard and the external interface of the keyboard controller chip for a repeating key signal

Mouse Test

The Mouse test checks the functionality of the mouse controller (which affects the ability to move the touch pad/mouse pointer around the screen with its corresponding movement on your desk or pad) and the operation of the touch pad/mouse buttons.

Why Run the Mouse Test?

Touch pad or mouse problems are as likely to be caused in RAM as they are to be caused by a faulty touch pad or mouse. Three sources of problems include the configuration of a program (which changes the function of the touch pad or mouse), memory-resident programs like Sidekick or ProKey, and failure of a device driver (the software that controls the functions of a touch pad or mouse). If these possibilities have been eliminated and the following symptoms persist, run the Mouse test:

- When you press a touch pad or mouse button, the function of the button continues—the button seems to be stuck.
- If the response, when you press a touch pad or mouse button, is different from the usual response or the response you anticipated, the button contact may be damaged.
- A touch pad or mouse button does not work at all.
- The cursor does not respond on the screen in accordance with the movements you make with the touch pad or external mouse.

Subtests

There are no subtests for the Mouse test.

Diskette Drives Test Group

The subtests in the Diskette Drives test group allow you to test diskette drives of all capacities.

NOTE: Before running the Diskette Drives test group, install a CD-ROM drive in the modular bay and attach the diskette drive to the parallel connector on the back of the computer. The subtests in the test group will fail if you do not have a diskette drive attached to the parallel connector.

Why Run a Diskette Drives Test?

Very often, a diskette drive problem may first appear to be a diskette problem. A box of defective diskettes might produce faulty-drive error messages. The test results can be confusing, so you should run the subtests in the Diskette Drives test group more than once using diskettes from different sources.

Another possible cause of diskette drive problems is human error—for example, typing a command in an incorrect form (usually called a *syntax* error). Be sure you have entered the command properly.

When the diskette and command syntax are eliminated as causes, the following symptoms usually suggest a drive problem and warrant running a subtest in the Diskette Drives test group:

- An error message appears on the screen stating that the computer cannot *read* from or *write* to a diskette.
- A diskette cannot be properly formatted, or format error messages appear on the screen.
- Data on diskettes is corrupted or lost; these problems may be intermittent.

Subtests

The four subtests available in the Diskette Drives test group confirm the following drive functions:

- Change Line Test

  Checks for bent pins on the diskette drive controller and for defective lines on the diskette cable

- Seek Test

  Checks the drive's ability to search for a specified track on the diskette and to position the read/write heads of the drive to all tracks

- Read Test

  Positions the read/write heads at each cylinder of the diskette and verifies that all tracks on the diskette can be read correctly

- Write Test

  Positions the read/write heads at each cylinder of the diskette and verifies that all tracks on the diskette can be written to correctly

Hard-Disk Drives (Non-SCSI) Test Group

The subtests in the Hard-Disk Drives (Non-SCSI) test group check the functionality of up to two hard-disk drives of any capacity. The subtests check the storage capability of a drive as well as the hard-disk drive controller (which affects the ability to read from and write to the drive).

Why Run a Hard-Disk Drives Test?

If you check your hard-disk drive to determine the amount of available space, your operating system will probably report problem areas. Problem areas on hard-disk drives are common, because most hard-disk drives have a small amount of space that is not usable. The hard-disk drive keeps a record of this space so that the computer will not attempt to use it. Identification of unusable disk space, unless it is an unusually large amount (over five percent of the possible total), should not be regarded as a cause for testing the hard-disk drive.

These are the most common symptoms that might prompt you to test the hard-disk drive:

- The hard-disk drive fails during the boot routine.
- *Seek* errors are reported by the operating system or application programs.
- An error message appears on the screen stating that the computer cannot *read* from or *write* to the hard-disk drive.
- Data on the hard-disk drive is corrupted or lost; these problems may be intermittent. Once saved by a program, files cannot be properly recalled.

Subtests

The five subtests in the Hard-Disk Drives (Non-SCSI) test group confirm the following drive functions:

- Disk Controller Test

  Checks the internal microcode of the hard-disk drive controller

- Forced Error-Correction-Code Test

  Checks the ability of the hard-disk drive to identify and correct errors

- Seek Test

  Checks the drive's ability to search for a specified track on the drive and to position the read/write heads of the drive to all tracks

- Read Test

  Positions the read/write heads at each cylinder of the drive and verifies that all tracks on the drive can be read correctly

- Write Test

  Positions the read/write heads at each cylinder of the drive and verifies that all tracks on the drive can be written to correctly

IDE CD ROM Drives Test Group

The subtests in the IDE CD ROM Drives test group check the functionality of the integrated drive electronics (IDE) CD-ROM drive. Before conducting an IDE CD ROM test, insert into the drive a CD with audio and data tracks (such as a multimedia CD).

NOTE: The Audio Output Test requires a CD with audio tracks; all other subtests in this test group require a CD with data tracks. If the CD-ROM drive contains a CD that does not have the required data or audio tracks, the subtest fails.

Why Run an IDE CD ROM Drives Test?

If you encounter a problem while using an application program on a CD, the problem could result from the disc or from the drive. When you encounter problems, first try using a different CD. If the problem recurs, run the IDE CD ROM Drives test group.

These are the most common symptoms that might prompt you to test an IDE CD-ROM drive:

- *Seek* errors are reported by the operating system or application programs.
- An error message appears on the screen stating that the computer cannot read from an IDE CD-ROM drive.

Subtests

The five subtests in the IDE CD ROM Drives test group confirm the following drive functions:

- Drive Controller Test

  Causes the drive to execute its internal self-test.

- Seek Test

  Checks the drive's ability to search for each block on the device.

- Read Test

  Positions the read heads at each block of the device for reading data and verifies that all blocks on the device can be read correctly.

- Audio Output Test

  Causes the drive to begin playing the first audio track on an audio CD. (To determine if the test passed, listen to the audio output of the drive.)

  NOTE: The Audio Output Test does not run automatically as part of the IDE CD ROM Drives test group; you must select this subtest individually.

- Eject Removable Media

  Checks the drive's ability to eject the CD tray.

Serial/Infrared Ports Test Group

The subtests in the Serial/Infrared Ports test group check the computer's interface with external devices (such as a serial mouse or a printer). The subtests in this test group are not intended as a diagnostic test for the external device itself.

Why Run a Serial/Infrared Ports Test?

It may not be immediately evident whether the port or the external device is faulty. In both cases, the external device (such as a serial mouse or a printer) might behave erratically or not operate at all. Eliminate incorrect system configuration information settings, peripheral malfunctions, and software errors as potential causes of infrared (IR) port problems, before you run the subtests in the Serial/Infrared Ports test group to check your hardware.

If the diagnostics do not recognize the computer's serial or infrared port, check the Serial Port or Infrared Data Port option in System Setup program to see if the port has been disabled. For instructions, see "Serial Port," "Infrared Data Port," or "Parallel Mode" in Chapter 2. The subtests in the Serial/Infrared Ports test group cannot test a port unless it is enabled.

Another possible cause for errors is a problem with the external device itself. Use the documentation that came with the peripheral to troubleshoot it and confirm that it is working properly.

Also, if the external device is not properly installed through software, the device may not function properly. Try operating the device from different programs or through the operating system. If it still does not work, you can eliminate the software configuration as the cause of the problem.

Although the following symptoms can be caused by faulty peripherals or software errors, these symptoms might also suggest a port problem:

- If a peripheral works intermittently or produces intermittent errors, the port may be faulty.
- If the computer displays an error message that is related to the external device connected to a port, but corrections to the device do not resolve the error, run the appropriate subtest in the Serial/Infrared Ports test group.

Subtests

The four subtests in the Serial/Infrared Ports test group confirm the following port functions:

- Serial/Infrared Baud Rate Test

  Checks the baud rate generator in each serial communications chip against the computer's clock

- Serial/Infrared Interrupt Test

  Checks the serial port's ability to send IRQs to the microprocessor

- Serial/Infrared Internal Transmission Test

  Checks several internal functions of the serial port using the internal loopback mode of the serial communications chip

- Serial External Transmission Test

  If a loopback device is attached, checks the line control bits of the serial port and sends a test pattern at several baud rates, checking the returned values

Parallel Ports Test Group

The subtests in the Parallel Ports test group check the computer's interface with external devices, such as a printer, that are connected to the computer through the parallel port. The subtests in this test group are not intended as a diagnostic test for the actual peripheral attached to each port.

Why Run a Parallel Ports Test?

If the diagnostics does not recognize the computer's parallel port, check the Parallel Mode option in the System Setup program to see if the port has been disabled. For instructions, see "Parallel Mode" in Chapter 2. The subtests in the Parallel Ports test group cannot test a port unless it is enabled.

When a port is faulty, it may not be immediately evident that the port, and not the device connected to the port, is faulty. Instead, the peripheral (such as a printer) might behave erratically or not operate at all. Also, if the external device is not properly installed through software, it may not function properly. Try operating the peripheral from different programs or through the operating system. If it still does not work, you can eliminate the software setup as the cause of the problem.

Another possible cause for errors is a problem with the external device itself. Use the documentation that came with the peripheral to troubleshoot it and confirm that it is working properly. (Most printers have a self-test.)

After you eliminate incorrect system configuration information settings, peripheral malfunctions, and software errors as potential causes of port problems, you can run

the subtests in the Parallel Ports test group to check your hardware. Although the following symptoms can be caused by faulty peripherals or software errors, they might also suggest a port problem:

- If a peripheral works intermittently or produces intermittent errors, the port may be faulty.
- If the computer displays an error message that is related to the external device connected to a port, but corrections to the device do not resolve the error, run the appropriate subtest in the Parallel Ports test group.
- If your software and the diagnostics do not recognize that you have a parallel port, you should check the Parallel Mode system setup option, and if necessary, run the appropriate subtest in the Parallel Ports test group.

Subtests

The four subtests in the Parallel Ports test group confirm the following port functions:

- Parallel Internal Test

  Checks several internal functions of the parallel port

- Parallel External Loopback Test

  Tests the functionality of the control lines through an external loopback connector, if an external loopback connector is available

- Parallel External Interrupt Test

  Tests the parallel port's ability to generate interrupts from all possible sources, if an external loopback connector is available

- Parallel Printer Pattern Test

  Tests whether the port(s) can retain data, print text on a printer, and generate interrupts

SCSI Devices Test Group

The subtests in the SCSI Devices test group check the functionality of the small computer system interface (SCSI) controller in the C/Port APR or C/Dock Expansion Station, and the SCSI devices attached to either. These tests run only if the computer is docked.

NOTES: Before conducting these subtests on an external SCSI CD-ROM drive, insert into the drive a CD with audio and data tracks (such as a multimedia CD). The Audio Output Test requires a CD with audio tracks; all other subtests require a CD with data tracks.

If the external CD-ROM drive is empty, or if it contains a CD that does not have the required data or audio tracks, the subtest fails.

Why Run a SCSI Devices Test?

If you check your SCSI hard-disk drive to determine the amount of available space, your operating system will probably report problem areas. Problem areas on hard-disk drives are common, because most hard-disk drives have a small amount of space that is not usable. The hard-disk drive keeps a record of this space so that your computer will not attempt to use it. Identification of unusable disk space, unless it is an unusually large amount (over five percent of the possible total), should not be regarded as a cause for testing the hard-disk drive.

These are the most common symptoms that might prompt you to test a SCSI device:

- A SCSI hard-disk drive fails during the boot routine.
- Seek errors are reported by the operating system or application programs.
- An error message appears on the screen stating that the computer cannot read from or write to a SCSI device.
- Data on a SCSI device is corrupted or lost; these problems may be intermittent. Once saved by a program, files cannot be properly recalled.

Subtests

The seven subtests in the SCSI Devices test group confirm the following drive functions:

- Internal Diagnostic Test

  Causes the device to run its internal self-test.

- Seek Test

  Checks the device's ability to search for a specified track on the device and to position its read/write heads to all tracks.

- Read Test

  Positions the read/write heads at each block of the device for reading data and verifies that all tracks on the device can be read correctly.

- Write Test

  Positions the read/write heads at each block of the device and verifies that all tracks on the device can be written to correctly.

- Audio Output Test

  Causes the drive to begin playing the first audio track on an audio CD. (To determine if the test passed, listen to the audio output of the drive.)

  NOTE: The Audio Output Test does not run automatically as part of the SCSI Devices test group; you must select this subtest individually.

- Eject Removable Media Test

  Causes a CD-ROM drive to eject its CD, or a SCSI tape drive to eject its tape cartridge.

- Display Information Test

  Displays information about the SCSI controller in an expansion device, the resources allocated to the controller, and a list of target devices attached to it.

Network Interface Test Group

The subtests in the Network Interface test group verify the basic operation of the network interface controller in the Dell Latitude C/Port APR or C/Dock Expansion Station. They test the controller's internal functions, including read and write access to its registers and internal transmit and receive (loopback) capability. These tests run only if the computer is docked.

Why Run a Network Interface Test?

Running a subtest in the Network Interface test group helps diagnose problems that may occur while using a Dell Latitude CP computer in a network environment. Most network failures are caused by one of the following:

- Poor network connections
- Failure in the network controller
- Interrupt conflict (the controller trying to use the same IRQ line as another device)
- Software configuration error

If a problem occurs while using the computer in a network environment, the network connection should be inspected. If the connection is good, run the Network Interface test group to determine if the network interface controller is functioning. If the test group is run in a loop, it can be used to detect intermittent failures.

Subtests

The four subtests in the Network Interface test group confirm the following functions:

- Registers Test

  Checks the interrupt generation capability of the controller by writing patterns to the writable registers in the controller and by reading the patterns back to verify whether they are accessible and able to retain data.

- Loopback Test

  Places the controller into its various loopback modes and tests its ability to transmit and receive data.

- Shared RAM Test

  Performs a memory test on controllers with memory-mapped shared RAM. On controllers with first-in first-out (FIFO) shared RAM, writes a data pattern to all locations and reads the pattern back to verify the operation. Some controllers do not support shared RAM tests.

- Display Information Test

  Displays address and configuration information about the network controller. This information includes the network address used for communication on the local area network (LAN) and the controller's IRQ level. You can make sure there is not an interrupt conflict by verifying that the IRQ level is not being used by another device connected to the system.

Audio Test Group

The subtests in the Audio test group check the functions of the audio controller and the computer's recording and playback features.

Why Run an Audio Test

If you do not hear sounds from your built-in speakers when you expect to, it is possible that your operating system or sound application uses resource settings different from those of the audio controller in the computer. In the absence of an expected sound, first check the documentation that accompanied your operating system or sound application to see if the sound features are correctly configured to work with the computer. The default resource settings for the audio controller are:

- DMA channel: 1
- IRQ line: 5
- Port address: 220h

If necessary, change the resource settings in your operating system or sound application to match these default settings.

If you still do not hear sound when you expect to, run the Audio test group.

NOTE: Before running the Audio test group, enable the built-in speaker(s) to make sure that the speaker volume has not been muted.

Subtests

The six subtests in the Audio test group confirm the following functions:

- Software Reset Test

  Checks for the presence of an active audio controller in your system

- Interrupt Test

  Checks whether the audio controller is generating an interrupt on the IRQ line configured for that controller

- DMA Test

  Tests for the presence of a DMA channel on the system chip set, and determines if the DMA controller and the audio controller can exchange signals

- FM Sound Playback Test

  Tests whether the system can synthesize sounds and play them through the built-in speakers

- Analog Sound Playback Test

  Tests whether the system can play sampled sounds through the built-in speakers

- Record and Playback Test

  Checks the ability of the audio controller to generate a sampled sound from signals received from the built-in microphone

The last three Audio subtests are interactive. In both the FM Sound Playback Test and the Analog Sound Playback test, a series of musical tones is played through the computer's built-in speaker(s). A message on the display asks if you hear the tones. Type y if you hear the tones; otherwise, type n.

The third interactive test, the Record and Playback Test, checks the computer's built-in microphone and speaker(s). When prompted, press any key on the built-in keyboard and say your name in a normal tone of voice.

NOTE: After you press the key, you have only a few seconds to speak your name.

When prompted again, hit any key on the built-in keyboard to play back your voice through the built-in speaker(s). Type y if you hear your voice; otherwise, type n. If you press n, you are given another opportunity to run the Record and Playback Test. When prompted, type y if you want to try the test again (for instance, if you did not speak quickly enough after pressing a key to begin the test). Otherwise, press n.

Other Test Group

The Fan Control Test in the Other test group checks the function of the fan. The fan works with the air intake on the computer as part of the automatic thermal management system.

Chapter 5
Getting Help

This chapter describes the tools Dell provides to help you when you have a problem with your computer. It also tells you when and how to call Dell Computer Corporation for technical or customer assistance in the following situations:

- *If you have a technical problem*, read the next section, "Technical Assistance."
- *If you are looking for information about a specific subject or about Dell's services*, read "Help Tools" found later in this chapter.
- *If you have a problem with your order*, read "Problems With Your Order" found later in this chapter.
- *If you need to return an item for warranty repair or credit*, read "Returning Items for Warranty Repair or Credit" found later in this chapter.
- *If you would like to place an order or need information about additional products available from Dell*, call Dell at the appropriate telephone number listed in "Dell Contact Numbers" found later in this chapter.

Technical Assistance

If you need assistance with a technical problem, perform the following steps:

1. **Review the *Dell Q&A*.**

   Look for the Dell Q&A icon in the Dell Accessories folder in the Windows 95 operating system.

2. **Review the remaining documentation that accompanied your Dell computer.**

   To decide which document has the answers you need, consult the Preface.

3. **Run the diagnostics for your Dell computer.**

   See Chapter 5, "Running the Dell Diagnostics," for instructions on using the Dell Diagnostics program.

4. **Make a copy of the Diagnostics Checklist (found later in this chapter), and fill it out.**

   NOTE: Save the Diagnostics Checklist in this chapter as a master so you can use it to make copies as needed.

   On your copy of the Diagnostics Checklist, document any error messages or beep codes as they occur so you can inform the Dell technician of them. Describe what you were doing when the error occurred. Note the steps you have taken to solve the problem.

5. **Use the AutoTech service for help with installation and troubleshooting procedures.**

   For instructions on using the AutoTech service, see "AutoTech Service" found later in this chapter

6. **If the preceding steps have not resolved the problem and you need to talk to a Dell technician, you can call Dell's customer technical support service.**

   Before you call Dell, convert your service tag number into an express service code. When prompted by Dell's automated telephone system, enter the express service code to route your call directly to the proper support personnel.

   If you did not convert your service tag number to an express service code the first time you turned on the computer, do it before you call Dell for technical assistance. Find the Express Service Code icon in the Dell Accessories folder or program group. Double-click the icon and follow the directions.

   NOTE: Dell's Express Service may not be available in all countries.

For instructions on using the technical support service, see “Technical Support Service” and “Before You Call” found later in this chapter.

Help Tools

Dell provides a number of tools to assist you. Table 5-1 lists subjects you may want information about, tasks you may want to perform, and the tool(s) you can use for help. Each tool is described later in this section.

Table 5-1. Help Tools

Subject or Task	Tool
BIOS revisions	TechConnect BBS
Frequently asked questions	*Dell Q&A*, AutoTech service
Information about Dell, its products, and its service and support policies	TechFax service, TechConnect BBS, World Wide Web on the Internet
Installation instructions	Online *System User’s Guide*, *Reference and Troubleshooting Guide*, technical support service, AutoTech service
Interrupt maps	TechFax service
Ordering parts	Technical support service, TechConnect BBS
Software update information	TechFax service
System board layouts	TechFax service, system documentation
Technical notes on system compatibility and revisions	TechFax service
Technical training class information	TechFax service
Technical specifications	TechFax service, online *System User’s Guide*, *Reference and Troubleshooting Guide*
Troubleshooting, step-by-step instructions	*Reference and Troubleshooting Guide*, Dell Diagnostics program, AutoTech service
Unresolved problems requiring assistance from a Dell technician	Technical support service, TechConnect BBS

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

Dell Q&A

The *Dell Q&A*, a Windows-based online help file that answers questions that are often asked by Dell computer users, is included with certain Dell systems that were purchased with the Dell-installed Windows 95.

To view the *Dell Q&A*, open the Dell Accessories folder and double-click on the Dell Q&A icon. If you need further instructions on using the *Dell Q&A*, click Help from the *Dell Q&A* button bar.

System User's Guide

The Windows-based online *System User's Guide* includes information about traveling with your portable computer, installing and using batteries, conserving battery power, and attaching external devices to the computer. This document is installed on your hard-disk drive for easy reference wherever you take the computer.

Reference and Troubleshooting Guide

The *Reference and Troubleshooting Guide* includes information about system features, customizing the operation of the computer, and diagnosing and troubleshooting computer problems.

World Wide Web on the Internet

Dell can be accessed electronically on the Internet via a World Wide Web site, a file transfer protocol (FTP) site, and electronic mail (e-mail) using the following addresses:

- World Wide Web

  http://www.dell.com/

  http://www.dell.com/intl/apcc/ (for Asian/Pacific countries only)

  http://www.dell.com/euro/ (for Europe only)

- Anonymous FTP

  ftp.dell.com/

  Log in as `user: anonymous`, and use your e-mail address as your password.

- Electronic Support Service

  support@dell.com

  apsupport@.dell.com (for Asian/Pacific countries only)

- Electronic Quote Service

  sales@dell.com

  apmarketing@dell.com (for Asian/Pacific countries only)

- Electronic Information Service

  info@dell.com

Commercial Online Services

Dell can be accessed electronically via CompuServe® by typing `GO DELL`.

Dell Diagnostics Program

Every Dell computer comes with the Dell Diagnostics, a program that can help you determine what is wrong with the computer when it does not operate correctly. This program provides valuable information for you and for Dell technicians should you need to call Dell.

See Chapter 4, "Running the Dell Diagnostics," for instructions on using the diagnostics. You can use this diagnostic program to test major components or devices in the computer, if the computer can boot.

AutoTech Service

Dell's automated technical support service—AutoTech—provides recorded answers to the questions most frequently asked by Dell customers.

When you call AutoTech, you use your touch-tone telephone to select the subjects that correspond to your questions. You can even interrupt an AutoTech session and continue the session later. The code number that the AutoTech service gives you allows you to continue your session where you ended it.

The information available through AutoTech includes:

- Specifications and prices for Dell computers currently on sale
- Installation instructions for Dell computers and peripherals
- Answers to questions about the Windows 95
- Help in troubleshooting your Dell computer

The AutoTech service is available 24 hours a day, seven days a week. You can also access this service through the technical support service. For the telephone number to

call, see “Dell Contact Numbers” found later in this chapter.

NOTE: AutoTech is not always available in all locations outside the continental U.S. Please call your local Dell representative for information on availability.

TechFax Service

Dell takes full advantage of fax technology to serve you better. Twenty-four hours a day, seven days a week, you can call the Dell TechFax line toll-free for all kinds of technical information.

Using a touch-tone phone, you can select from a full directory of topics. The technical information you request is sent within minutes to the fax number you designate. TechFax information includes:

- Interrupt maps and specifications.
- Technical notes on system compatibility and revisions.
- News on updates for operating systems and application programs.
- Descriptions of available technical training classes. For Dell-certified technicians, TechFax offers information such as parts lists, drawings, and maintenance and repair data.

For the TechFax telephone number, see “Dell Contact Numbers” found later in this chapter.

NOTE: TechFax is not always available in all locations outside the continental U.S. Please call your local Dell representative for information on availability.

TechConnect BBS

Use your modem to access Dell’s TechConnect Bulletin Board Service (BBS) 24 hours a day, seven days a week. The service is menu-driven and fully interactive. The modem settings for the BBS are 8 bit, no parity, 1 stop bit.

You can use the BBS to do the following:

- Send questions to a Dell technician
- Request a follow-up call or leave a message for a Dell technical support specialist
- Order parts
- Download basic input/output system (BIOS) and video driver upgrades
- Download updates

For the BBS telephone number, see “Dell Contact Numbers” found later in this chapter.

NOTE: The TechConnect BBS is not always available in all locations outside the continental U.S. Please call your local Dell representative for information on availability.

Automated Order-Status System

You can call this automated service to check on the status of any Dell products that you have ordered. A recording prompts you for the information needed to locate and report on your order. For the telephone number to call, see “Dell Contact Numbers” found later in this chapter.

NOTE: The Automated Order-Status System is not always available in all locations outside the continental U.S. Please call your local Dell representative for information on availability.

Technical Support Service

Dell’s industry-leading hardware technical support service is open 24 hours a day, seven days a week. At any hour of any day, a Dell technical expert is ready with the answers to your questions about Dell hardware.

Our technical support staff pride themselves on their track record: more than 90 percent of all problems and questions are taken care of in just one toll-free call, usually in less than ten minutes. When you call, our experts can refer to records we keep on your specific Dell system to better understand your particular question. Our technical support staff use computer-based diagnostics to provide fast, accurate answers to your questions.

To contact Dell’s technical support service, first refer to the section titled “Before You Call” and then call the number for your country as listed in “Dell Contact Numbers” found later in this chapter. (For information about receiving technical assistance in the U.K., refer to the *Placing a Service Call* card that came with your computer.)

NOTE: Technical support services may vary outside the continental U.S. Contact your local Dell representative for more information.

Problems With Your Order

If you have a problem with your order, such as missing parts, wrong parts, or incorrect billing, contact Dell Computer Corporation for customer assistance. Have your invoice or packing slip handy when you call. For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

Product Information

If you need information about additional products available from Dell Computer Corporation, or if you would like to place an order, a sales specialist will be glad to help. For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

Returning Items for Warranty Repair or Credit

Prepare all items being returned, whether for repair or credit, as follows:

1. **Call Dell to obtain an authorization number, and write it clearly and prominently on the outside of the box.**

   For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

2. **Include a copy of the invoice and a letter describing the reason for the return.**

3. **Include a copy of the Diagnostics Checklist indicating the tests you have run and any error messages reported by the Dell Diagnostics.**

4. **Include any accessories that belong with the item(s) being returned (power cables, software diskettes, guides, and so on) if the return is for credit.**

5. **Pack the equipment to be returned in the original (or equivalent) packing materials.**

   You are responsible for paying shipping expenses. You are also responsible for insuring any product returned, and you assume the risk of loss during shipment to Dell Computer Corporation. Collect on delivery (C.O.D.) packages are not accepted.

Returns that are missing any of the preceding requirements will be refused at our receiving dock and returned to you.

Before You Call

Keep a record of your diagnostic and troubleshooting activities by photocopying the Diagnostics Checklist in Figure 5-1 and filling it out whenever you experience a problem with the computer.

NOTE: Be sure to save the checklist in Figure 5-1 as a master, so you can use it to make copies as needed. The checklist can also be accessed in "Diagnostics Checklist" in the online System User's Guide.

If you need to call Dell Computer Corporation for assistance, you will be able to inform the support technician of the actions you have taken to resolve the problem. If you must return a piece of hardware to Dell, a technician will assign a Return Material Authorization Number. Record the number on the checklist, and include the completed checklist in the shipping box.

Dell's technical support staff uses computer-based diagnostics to provide fast, accurate answers to your questions. When you call, the technical support staff refers to records regarding your specific Dell computer to better understand your particular question.

NOTE: Have your express service code ready when you call. The code helps Dell's automated support telephone system direct your call more efficiently.

If possible, turn your system on before you call Dell for technical assistance and call from a telephone at or near the computer. You may be asked to type some commands at the keyboard, relay detailed information during operations, or try other troubleshooting steps possible only at the computer itself.

Make sure the computer's user documentation is available. You should also have a flat-blade screwdriver or a quarter-inch nut driver available.

Diagnostics Checklist

Name: _____ Date: _____

Address: _____ Phone number: _____

Service tag (bar code on the back of the computer): _____

Express service code: _____

Return Material Authorization Number (if provided by Dell support technician): _____

Operating system and version: _____

Peripherals: _____

_____

_____

PC Cards or expansion cards: _____

_____

_____

Are you connected to a network? ☐ yes ☐ no

Network, version, and network card: _____

Programs and versions: _____

_____

_____

_____

See your operating system documentation to determine the contents of the system's start-up files. If the computer is connected to a printer, print each file. Otherwise, record the contents of each file before calling Dell.

Error message or beep code: _____

Description of problem and troubleshooting procedures you performed: _____

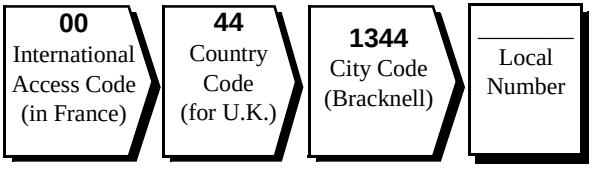
_____

_____

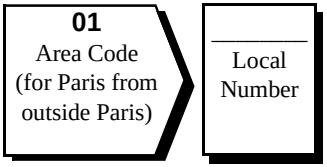
Figure 5-1. Diagnostics Checklist

Dell Contact Numbers

When you need to contact Dell, use the telephone numbers and codes provided in Tables 5-2 and 5-3. Table 5-2 provides the various codes required to make long-distance and international calls. Table 5-3 provides local telephone numbers, area codes, and toll-free numbers, if applicable, for each department or service available in various countries around the world. If you are making a direct-dialed call to a location outside of your local telephone service area, determine which codes to use (if any) in Table 5-2 in addition to the local numbers provided in Table 5-3. For example, to place an international call from Paris, France to Bracknell, England, dial the international access code for France followed by the country code for the U.K., the city code for Bracknell, and then the local number as shown in the following illustration.



To place a long-distance call within your own country, use area codes instead of international access codes, country codes, and city codes. For example, to call Paris, France from Montpellier, France, dial the area code plus the local number as shown in the following illustration.



The codes required depend on where you are calling from as well as the destination of your call; in addition, each country has a different dialing protocol. If you need assistance in determining which codes to use, contact a local or an international operator.

NOTE: Toll-free numbers are for use only within the country for which they are listed. Area codes are most often used to call long distance within your own country (not internationally)—in other words, when your call originates in the same country you are calling.

Table 5-2. International Dialing Codes

Country (City)	International Access Code	Country Code	City Code
Australia (Sydney)	0011	61	2
Austria (Vienna)	900	43	1
Belgium (Brussels)	00	32	2
Brunei	—	673	—
Canada (North York, Ontario)	011	—	Not required
Chile (Santiago)	—	56	2
China (Beijing)	—	86	10
Czech Republic (Prague)	00	420	2
Denmark (Horsholm)	009	45	Not required
Finland (Helsinki)	990	358	9
France (Paris) (Montpellier)	00	33	(1) (4)
Germany (Langen)	00	49	6103
Hong Kong	001	852	Not required
Ireland (Bray)	16	353	1
Italy (Milan)	00	39	2
Japan (Kawasaki)	001	81	44
Korea (Seoul)	001	82	2
Luxembourg	00	352	—
Macau	—	853	Not required
Malaysia (Penang)	00	60	4
Mexico (Colonia Granada)	95	52	5
Netherlands (Amsterdam)	00	31	20
New Zealand	00	64	—
Norway (Lysaker)	095	47	Not required
Poland (Warsaw)	011	48	22
Singapore (Singapore)	005	65	Not required
South Africa (Johannesburg)	09/091	27	11

Table 5-2. International Dialing Codes *(continued)*

Country (City)	International Access Code	Country Code	City Code
Spain (Madrid)	07	34	1
Sweden (Upplands Vasby)	009	46	8
Switzerland (Geneva)	00	41	22
Taiwan	002	886	—
Thailand	001	66	—
U.K. (Bracknell)	010	44	1344
U.S.A. (Austin, Texas)	011	1	Not required

Table 5-3. Dell Contact Numbers

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Australia (Sydney)	Customer Technical Support (Dell Dimension® systems only)		1-300-65-55-33
	Customer Technical Support (Other systems)		toll free: 1-800-808-378
	Customer Care		toll free: 1-800-819-339
	Corporate Sales		toll free: 1-800-808-385
	Transaction Sales		toll free: 1-800-808-312
	Fax		toll free: 1-800-818-341
Austria* (Vienna)	Switchboard		491 04 0
	Technical Support		0660-8779
Belgium* (Brussels)	Customer Technical Support	02	4819288
	Sales		toll free: 0800 16884
	SalesFax	02	4819299
	Switchboard	02	4819100
	Fax	02	4819299
Brunei *NOTE: Customers in Brunei call Malaysia for sales, customer, and technical assistance.*	Customer Technical Support (Dell Dimension systems only) (Penang, Malaysia)		810 4946
	Customer Technical Support (Other systems) (Penang, Malaysia)		810 4966
	Customer Service (Penang, Malaysia)		810 4949
	Transaction Sales (Penang, Malaysia)		810 4955

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Canada (North York, Ontario) *NOTE: Customers in Canada call the U.S.A. for access to TechConnect BBS.*	Automated Order-Status System		toll free: 1-800-433-9014
	AutoTech (Automated technical support)		toll free: 1-800-247-9362
	Customer Care (From outside Toronto)		toll free: 1-800-387-5759
	Customer Care (From within Toronto)	416	758-2400
	Customer Technical Support		toll free: 1-800-847-4096
	Sales (Direct Sales—from outside Toronto)		toll free: 1-800-387-5752
	Sales (Direct Sales—from within Toronto)	416	758-2200
	Sales (Federal government, education, and medical)		toll free: 1-800-567-7542
	Sales (Major Accounts)		toll free: 1-800-387-5755
	TechConnect BBS (Austin, Texas, U.S.A.)	512	728-8528
	TechFax		toll free: 1-800-950-1329
Chile (Santiago) *NOTE: Customers in Chile call the U.S.A for sales, customer, and technical assistance.*	Sales, Customer Support, and Technical Support		toll free: 1230-020-4823
China (Beijing) *NOTE: Customers in China call Malaysia for customer assistance.*	Customer Service (Penang, Malaysia)		810 4949
	Sales		6846 1122 (extensions 8309 to 8314)
Czech Republic* (Prague)	Technical Support	02	8728 221
	Customer Service and Sales	02	879250
	TechConnect BBS	02	66710274
Denmark* (Horsholm)	Customer Care, Technical Support, and Sales		toll free: 800 171 62
Finland* (Helsinki)	Customer Support and Technical Support		toll free: 0800-534 55
	Sales		toll free: 0800-33 55

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
France* (Paris/Montpellier)	Technical Support (Paris)	01	47 62 68 90
	Technical Support (Montpellier)	04	67 06 62 86
	Customer Care (Major Accounts) (Paris)	01	47 62 69 39
	Customer Care (VAR Accounts) (Paris)	01	47 62 69 26
	Customer Care (Direct Sales) (Paris)	01	47 62 69 76
	TechFax (Montpellier)	04	67 22 53 11
	TechConnect BBS (Montpellier)	04	67 22 53 04
	Switchboard (Paris)	01	47 62 68 50
	Switchboard (Montpellier)	04	67 06 65 51
Germany* (Langen)	Customer Technical Support	06103	971-200
	Customer Care	06103	971-500
	TechConnect BBS	06103	971-666
	Sales	06103	971-460
Hong Kong *NOTE: Customers in Hong Kong call Malaysia for technical assistance for Dell Dimension systems and for customer assistance.*	Technical Support (Dell Dimension systems only) (Penang, Malaysia)		810 4948
	Technical Support (Other systems)		toll free: 800 96 4107
	Customer Service (Penang, Malaysia)		810 4949
	Transaction Sales		toll free: 800 96 4109
	Corporate Sales		toll free: 800 96 4108
Ireland* (Bray)	Customer Technical Support		1-850-543-543
	Sales		1-850-235-235
	SalesFax	01	286 2020
	Fax	01	286 6848
	TechConnect BBS	01	204 4761
	TechFax	01	204 4044
	Switchboard	01	286 0500

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Italy* (Milan)	Switchboard		264 21 820
	Fax		264 13 420
Japan (Kawasaki)	Technical Support		toll free: 0088-22-7890
	Customer Care	044	556-4240
	Direct Sales	044	556-3344
	Commercial Sales	044	556-3430 556-3440
	Switchboard	044	556-4300
Korea (Seoul) *NOTE: Customers in Korea call Malaysia for customer assistance.*	Technical Support		toll free: 080-200-3800
	Transaction Sales		toll free: 080-200-3600
	Corporate Sales		toll free: 080-200-3900
	Customer Service (Penang, Malaysia)		810 4949
	Fax		394 3122
	Switchboard		287 5600
Latin America *NOTE: Customers in Latin America call the U.S.A. for sales, customer, and technical assistance.*	Customer Technical Support (Austin, Texas, U.S.A.)	512	728-4093
	Customer Service (Austin, Texas, U.S.A.)	512	728-3619
	Fax (Technical Support and Customer Service) (Austin, Texas, U.S.A.)	512	728-3883
	Sales (Austin, Texas, U.S.A.)	512	728-4397
	SalesFax (Austin, Texas, U.S.A.)	512	728-4600 728-3772
Luxembourg* *NOTE: Customers in Luxembourg may call Belgium for sales, customer, and technical assistance as well as the SalesFax service, and they call the Netherlands for the TechFax and TechConnect BBS services.*	Customer Technical Support (Brussels, Belgium)		toll free: 0800 2109
	Customer Service (Luxembourg)		295151
	Customer Service (Brussels, Belgium)	02	481 92 99
	Sales (Brussels, Belgium)		toll free: 0800 16884
	SalesFax (Brussels, Belgium)	02	481 92 44
	TechFax (Amsterdam, Netherlands)		682 91 06
	TechConnect BBS (Amsterdam, Netherlands)		686 65 04

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Macau *NOTE: Customers in Macau call Malaysia for technical assistance for Dell Dimension systems and for customer assistance.*	Technical Support (Dell Dimension systems only) (Penang, Malaysia)		810 4948
	Technical Support (Other systems)		toll free: 0800 582
	Customer Service (Penang, Malaysia)		810 4949
	Transaction Sales		toll free: 0800 581
Malaysia (Penang)	Technical Support (Dell Dimension systems only)	04	810 4946
	Technical Support (Other systems)		toll free: 1 800 888 298
	Customer Service	04	810 4949
	Transaction Sales		toll free: 1 800 888 202
	Corporate Sales		toll free: 1 800 888 213
Mexico (Colonia Granada) *NOTE: Customers in Mexico call the U.S.A. for access to the Automated Order-Status System and AutoTech.*	Automated Order-Status System (Austin, Texas, U.S.A.)	512	728-0685
	AutoTech (Automated technical support) (Austin, Texas, U.S.A.)	512	728-0686
	Customer Technical Support	525	228-7870
	Sales	525	228-7811
			toll free: 91-800-900-37
			toll free: 91-800-904-49
	Customer Service	525	228-7878
	Main	525	228-7800
Netherlands* (Amsterdam)	Customer Technical Support	020	5818838
	Direct Sales		toll free: 0800-0663
	Direct SalesFax	020	682 7171
	Corporate Sales	020	581 8818
	Corporate SalesFax	020	686 8003
	TechConnect BBS	020	686 6504

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
New Zealand	Technical Support (Dell Dimension systems only) ($2.50 + GST per call)		0900 51010
	Technical Support (Other systems)		0800 446 255
	Customer Service		0800 444 617
	Sales		0800 441 567
	Fax		0800 441 566
Norway* (Lysaker)	Customer Technical Support and Customer Service		22-67 50 00
	Sales		67-125 711
Poland* (Warsaw)	Switchboard		620-7898
	Fax		620-4584
Singapore (Singapore) *NOTE: Customers in Singapore call Malaysia for technical assistance for Dell Dimension systems and for customer assistance.*	Technical Support (Dell Dimension systems only) (Penang, Malaysia)	04	810 4947
	Technical Support (Other systems)		toll free: 800 6011 051
	Customer Service (Penang, Malaysia)	04	810 4949
	Transaction Sales		toll free: 800 6011 054
	Corporate Sales		toll free: 800 6011 053
South Africa (Johannesburg)	Switchboard	011	709 7700
	Technical Support	011	709 7710
	Fax	011	706 0495

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Southeast Asian/ Pacific Countries (excluding Australia, Brunei, China, Hong Kong, Japan, Korea, Macau, Malaysia, New Zealand, Singapore, Taiwan, and Thailand—see individual listings for these countries)	Customer Technical Support, Customer Service, and Sales (Penang, Malaysia)		60 4 810-4810
Spain* (Madrid)	Technical Support	91	902 100 130
	Customer Service	91	329 10 80
	TechConnect BBS	91	329 33 53
	Sales	91	902 100 185
	Switchboard	91	329 10 80
Sweden* (Upplands Vasby)	Technical Support	08	590 05 199
	Customer Care	08	590 05 169
	TechConnect BBS	08	590 05 591
	Sales	08	590 05 185
Switzerland* (Geneva)	Technical Support (Swiss French)	022	979 01 50
	Technical Support (Swiss German)	022	979 01 55
	TechConnect BBS	022	979 01 88
			979 01 89
	Customer Service	022	979 01 50

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Taiwan *NOTE: Customers in Taiwan call Malaysia for customer assistance.*	Technical Support	toll free:	0080 651 226/0800 33 557
	Customer Service (Penang, Malaysia)		810 4949
	Transaction Sales	toll free:	0080 651 228/0800 33 556
	Corporate Sales	toll free:	0080 651 227/0800 33 555
Thailand *NOTE: Customers in Thailand call Malaysia for customer assistance.*	Technical Support	toll free:	0880 060 07
	Customer Service (Penang, Malaysia)		810 4949
	Sales	toll free:	0880 060 06
U.K.* (Bracknell)	Customer Technical Support (Dell Dimension systems)	01344	720109
	Customer Technical Support (Other systems)	01344	723723
	Customer Care	01344	720110
	TechFax	01344	723178
	TechConnect BBS	01344	723858
	Sales	01344	720000

* *For technical assistance in this country after normal working hours, use one of the following numbers: (353-1) 204 4008 or (353-1) 286 5908 (English only—the call is rerouted to the U.S.A.).*

Table 5-3. Dell Contact Numbers *(continued)*

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
U.S.A. (Austin, Texas)	Automated Order-Status System		toll free: 1-800-433-9014
	AutoTech (Automated technical support)		toll free: 1-800-247-9362
	Customer Technical Support (Return Material Authorization Numbers—warranty repairs):		
	Dell Direct[1]		toll free: 1-800-247-9252
	Major Accounts[2]		toll free: 1-800-247-9256
	Dell Customer Service (Credit Return Authorization Numbers)		toll free: 1-800-624-9897
	Dell Sales		toll free: 1-800-247-4618
	DellWare®		toll free: 1-800-753-7201
	DellWare FaxBack Service	512	728-1681
	Fee-Based Technical Support		toll free: 1-800-433-9005
	Sales (Catalogs)		toll free: 1-800-426-5150
	Spare Parts Sales:		
	Dell Direct[1]		toll free: 1-800-274-1490
	Major Accounts[2]		toll free: 1-800-357-3355
	Fax		toll free: 1-800-727-8320
	TechFax		toll free: 1-800-950-1329
	TechConnect BBS	512	728-8528
	Switchboard	512	338-4400

[1] *Use this telephone number if your call is about a system purchased for home, personal, or small-business use.*

[2] *Use this telephone number if you are calling for an established Dell national account (have your account number handy), if you work for a governmental agency (local, state, or federal), or if you work for an educational or medical institution.*

Appendix A
Technical Specifications

Table A-1. Technical Specifications

Microprocessor	
Microprocessor type	Intel Pentium microprocessor with MMX technology running at 133, 166, or 233 MHz
Bus architecture	PCI
Internal cache memory	32 KB
External cache memory:	
Dell Latitude CP M133ST and M166ST	256-KB pipelined-burst SRAM
Dell Latitude CP M233ST and M233XT	512-KB pipelined-burst SRAM
Math coprocessor	internal to the microprocessor
Chip Set and Bus	
System chip set	Intel Mobile 430TX PCIset
Microprocessor data bus width	64 bits
DRAM bus width	64 bits
Address bus width	32 bits
Flash EPROM	2 Mbits
Local bus	66 MHz
PCI bus	33 MHz

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

Table A-1. Technical Specifications *(continued)*

PC Cards	
PC Card controller	Texas Instruments PCI 1131 CardBus controller
PC Card connectors	two (supports type I and type II cards in any combination; type III cards can be used only in the lower connector; the upper connector supports zoom video cards on systems using Windows 95)
Cards supported	3.3-V and 5-V
PC Card connector size	68 pins
Data width (maximum):	
PCMCIA	16 bits
CardBus	32 bits
Memory	
Architecture	EDO memory
Memory module sockets	two
Memory module capacities and type	16-, 32-, and 64-MB 3.3-V EDO SODIMMs [1]
Standard RAM	one 16-MB memory module or one 32-MB memory module
Maximum RAM	128 MB
Memory access time:	
tRAC	60 ns
tCAC	15 ns
BIOS address	F000:0000–F000:FFFF
Connectors	
Serial (DTE)	one 16,550-compatible, 16-byte buffer connector
Parallel	one unidirectional, bidirectional, or ECP connector
Video	one connector

[1] *The Dell Latitude CP does not support memory modules from older models of Dell portable computers, such as the Latitude XP, XPi CD, or LM.*

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

***Table A-1. Technical Specifications** (continued)*

Connectors *(continued)*	
PS/2	one mini-DIN connector
Infrared	one port compatible with both IrDA Standard 1.1 (Fast IR) and IrDA Standard 1.0 (Slow IR)
Audio	one microphone-in jack; one line-in/audio-in jack; one headphones/speakers jack
USB	one USB-compliant connector
Docking	one connector for the C/Port Advanced Port Replicator or C/Dock Expansion Station
Audio	
Audio type	Sound Blaster Pro-compatible voice and music functions
Audio controller	Crystal 4237B
Stereo conversion	16 bit (analog-to-digital and digital-to-analog)
FM music synthesizer	20-voice, 72-operator
Interfaces:	
Internal	ISA bus
External	stereo line-in minijack; microphone-in minijack; headphones/speakers-out minijack
Speakers	two 8-ohm speakers
Internal speaker amplifier	1 W into 8 ohms stereo
Controls	volume can be controlled through key combinations, software application menus, or the Speaker window in the Dell Control Center

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

Table A-1. Technical Specifications *(continued)*

Video	
Video type	128-bit hardware-accelerated
Data bus	PCI
Video controller	NeoMagic 2160
Video memory	2 MB
Display (Dell Latitude CP M133ST, M166ST, and M233ST)	
Type	active-matrix color (TFT)
Dimensions (active area):	
Height	184.5 mm (7.26 inches)
Width	246.0 mm (9.68 inches)
Diagonal	307.5 mm (12.1 inches)
Maximum resolution/colors	800 x 600 pixels; 16 million colors
Response time (typical)	50 ms
Operating angle	0° (closed) to 180°
Dot pitch	0.31 mm
Power consumption:	
Panel (typical)	0.6 W
Backlight	2.4 W
Controls	brightness can be controlled through a key combination, the Display window in the Dell Control Center, or the System Setup program

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

Table A-1. Technical Specifications *(continued)*

Display (Dell Latitude CP M233XT)	
Type	active-matrix color (TFT)
Dimensions (active area):	
Height	202.8 mm (7.98 inches)
Width	270.3 mm (10.64 inches)
Diagonal	337.8 mm (13.3 inches)
Maximum resolution/colors	1024 x 768 pixels; 65,536 colors
Response time (typical)	50 ms
Operating angle	0° (closed) to 180°
Dot pitch	0.26 mm
Power consumption:	
Panel (typical)	1.7 W
Backlight	2.6 W
Controls	brightness can be controlled through a key combination, the Display window in the Dell Control Center, or the System Setup program
Keyboard	
Number of keys	87 (U.S., Canada, Korea, Thailand, and locations that use traditional Chinese); 88 (Europe); 90 (Japan)
Key travel	3.0 mm + 0.5 mm/-0.2 mm (0.12 inch + 0.02 inch/-0.0008 inch)
Key spacing	19.05 mm ± 0.3 mm (0.75 inch ± 0.012 inch)

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

***Table A-1. Technical Specifications** (continued)*

Battery	
Type	lithium ion
Dimensions:	
Height	21.5 mm (0.83 inch)
Depth	88.5 mm (3.48 inches)
Width	139.0 mm (5.47 inches)
Weight	0.39 kg (0.87 lb)
Voltage	16.8 VDC
Capacity	39 WH
Charge time (approximate):[2]	
Computer on	2.5 hours
Computer off	1 hours
Life span (approximate)[2]	500 discharge/charge cycles
Temperature range:	
Charge	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)

[2] *Battery performance features such as charge time and life span can vary according to the conditions under which the computer and battery are used.*

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

***Table A-1. Technical Specifications** (continued)*

AC Adapter	
Input voltage	90 to 135 VAC and 164 to 264 VAC
Input current (maximum)	3.5 A
Input frequency	47 to 63 Hz
Output current	4.5 A (maximum at 4-second pulse); 3.51 A (continuous)
Rated output voltage	20.0 VDC
Height	27.94 mm (1.1 inches)
Width	58.42 mm (2.3 inches)
Depth	133.35 mm (5.25 inches)
Weight (with cables)	0.4 kg (0.9 lb)
Temperature range:	
Operating	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)

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

Table A-1. Technical Specifications *(continued)*

Physical (Dell Latitude CP M133ST, M166ST, and M233ST)	
Height	38.6 mm (1.52 inches)
Width	306.0 mm (12.05 inches)
Depth	241.0 mm (9.49 inches)
Weight [3]	2.5 kg (5.6 lb)
Physical (Dell Latitude CP M233XT)	
Height	44.1 mm (1.74 inches)
Width	306.8 mm (12.08 inches)
Depth	241 mm (9.49 inches)
Weight [4]	2.7 kg (6.1 lb)

[3] *Weight shown is with a hard-disk drive, a battery in the battery bay, a diskette drive in the modular bay, and one memory module. Your computer might weigh more or less, depending on its configuration. The maximum weight of the Dell Latitude CP M133ST, M166ST, or M233ST is 2.7 kg (6.0 lb), which includes a hard-disk drive, two batteries, and one memory module. The minimum weight is 2.3 kg (5.2 lb), which includes a hard-disk drive, a battery in the battery bay, the travel bay in the modular bay, and one memory module.*

[4] *Weight shown is with a hard-disk drive, a battery in the battery bay, a diskette drive in the modular bay, and one memory module. Your computer might weigh more or less, depending on its configuration. The maximum weight of the Dell Latitude CP M233XT is 2.9 kg (6.4 lb), which includes a hard-disk drive, two batteries, and one memory module. The minimum weight is 2.5 kg (5.6 lb), which includes a hard-disk drive, a battery in the battery bay, the travel bay in the modular bay, and one memory module.*

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

Table A-1. Technical Specifications *(continued)*

Environmental (Computer)	
Temperature:	
Operating	0° to 40°C (32° to 104°F)
Storage	-20° to 60°C (-4° to 140°F)
Relative humidity (maximum):	
Operating	10% to 90% (noncondensing)
Storage	5% to 95% (noncondensing)
Maximum vibration:	
Operating	0.51 GRMS using a random-vibration spectrum that simulates truck shipment
Storage	1.3 GRMS using a random-vibration spectrum that simulates air/truck shipment
Maximum shock: [5]	
Operating	152.4 cm/sec (60.0 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage	203.2 cm/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)
Altitude (maximum):	
Operating	-18 to 3048 m (-59 to 10,000 ft)
Storage	-18 to 10,600 m (-59 to 35,000 ft)

[5] *Measured with the hard-disk in head-parked position.*

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

***Table A-1. Technical Specifications** (continued)*

Touch Pad	
Interface	PS/2-compatible
X/Y position resolution (graphics table mode)	200 points/mm (500 points/inch)
Size:	
Thickness	2.50 mm (0.10 inch) at highest component
Width (sensor-active area)	61.8 mm (2.43 inch) at bottom 58.6 mm (2.31 inch) at top
Height	48.8-mm (1.92-inch) rectangle
Weight	8 g (0.28 oz) ± 0.5 g (0.02 oz)
Power:	
Supply voltage	5 V ± 10%
Supply current	2.75 mA (maximum operating)
ESD	12 kV applied to front surface

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
Diagnostic Video Tests

The Video test group of the Dell Diagnostics consists of the following eight tests, each of which verifies a particular video function or group of functions on your built-in display or on an external monitor:

- Video Memory Test — Checks the integrity of characters generated from data in the video memory
- Video Hardware Test — Checks the functions of the cursor register and the horizontal and vertical retrace bit registers
- Text Mode Character Test — Checks the video subsystem's ability to present text mode data
- Text Mode Color Test — Checks the video subsystem's ability to present color in text modes
- Text Mode Pages Test — Checks the video subsystem's ability to map and present all available video text pages on the display or monitor, one page at a time
- Graphics Mode Test — Checks the video subsystem's ability to present graphics mode data and colors
- Color Palettes Test — Checks the video subsystem's ability to display all available colors
- Solid Colors Test — Checks the video subsystem's ability to show screens full of solid colors and to display all pixels

All of these tests, except the Video Memory Test and the Video Hardware Test, are interactive. These interactive tests display images on the display or monitor and require you to respond with the following steps:

1. **Examine a displayed image for correctness.**
2. **If an image is correct, type** y**.**
3. **If an image is incorrect, type** n**.**

The following sections describe each of the tests in the Video test group.

Video Memory Test

The Video Memory Test verifies the integrity of the video memory on the system board. When a test is complete, a message indicates whether the video memory has passed or failed the test. This test does not require any interaction on your part.

Video Hardware Test

The Video Hardware Test verifies the operation of the cursor registers and the horizontal and vertical retrace bit registers. When a test is complete, a message indicates whether these registers have passed or failed the test. This test does not require any interaction on your part.

Text Mode Character Test

The Text Mode Character Test consists of a group of subtests that display printable characters and character attributes. The subtests check character quality and the ability of the display or monitor to show the characters correctly. A prompt at the bottom of each screen asks you to decide whether the display is satisfactory and to respond by typing y or n.

If you respond affirmatively to each subtest, the Text Mode Character Test passes. A negative response to any subtest causes the test to fail.

The following subsections describe the subtests of the Text Mode Character Test in the order in which they appear.

Character Attributes Subtest (80 x 25)

The 80-column x 25-line character attributes subtest displays four lines of text that demonstrate normal-intensity video, reverse video, intensified video, and blinking video.

Character Set Subtest (80 x 25)

The 80-column x 25-line character set subtest displays all 256 characters in the American Standard Code for Information Interchange (ASCII) character set in 80-column by 25-line text mode. Figure B-1 shows part of the character set subtest screen.

Figure B-1. 80-Column x 25-Line Character Set Subtest Screen

Character Attributes Subtest (40 x 25)

The 40-column x 25-line character attributes subtest displays four lines of text, in 40-column by 25-line (double-wide) text mode, that demonstrate normal-intensity video, reverse video, intensified video, and blinking video.

Character Set Subtest (40 x 25)

The 40-column x 25-line character set subtest displays all 256 characters in the ASCII character set in 40-column by 25-line (double-wide) text mode. Figure B-2 shows part of the 40-column x 25-line character set subtest screen.

Figure B-2. 40-Column x 25-Line Character Set Subtest Screen

Text Mode Color Test

The Text Mode Color Test contains three subtests that check the video subsystem's ability to present color in text modes. The following subsections describe these subtests.

Color Attributes Subtest (80 x 25)

The 80-column x 25-line color attributes subtest displays a pattern of 16 rows and 16 columns in 80-column by 25-line text mode. Each row has a hexadecimal number in a unique foreground color and each column has a unique background color. Where the same foreground

and background color intersect, the hexadecimal number is not visible. Type y if each character is displayed correctly; otherwise, type n. Table B-1 indicates the color in each of the rows and columns.

Table B-1. Color Attributes

Row or Column Number	Foreground Color	Background Color
0	black	black
1	blue	blue
2	green	green
3	cyan	cyan
4	red	red
5	magenta	magenta
6	brown	brown
7	white	white
8	dark gray*	black
9	light blue*	blue
A	light green*	green
B	light cyan*	cyan
C	light red*	red
D	light magenta*	magenta
E	yellow*	brown
F	intense white*	white

* *These colors blink during the test.*

Color Attributes Subtest (40 x 25)

The 40-column x 25-line color attributes subtest is the same as the previous subtest except that the characters are displayed in 40-column by 25-line (double-wide) text mode. Type y if each character is displayed correctly; otherwise, type n.

Color Bars Subtest

The color bars subtest displays 16 bars in different colors with background intensity enabled. Under each bar is the name of the color that should be displayed. Type y if each color bar is displayed correctly; otherwise, type n.

Text Mode Pages Test

The Text Mode Pages Test checks the video subsystem's ability to map and present all available video pages on the display or monitor, one page at a time. The test displays eight successive screens, the first of which contains 21 lines of 77 zeros. The remaining seven screens are identical to the first, except that each screen substitutes a different numeral (1 through 7) for the zeros.

Type y if all the rows of numbers on each screen are displayed correctly; otherwise, type n.

Graphics Mode Test

The Graphics Mode Test checks the video subsystem's ability to present graphics mode data and colors. This test displays a number of different screens, each of which allows you to check some aspect of graphics mode data and colors. The following subsections describe the Graphics Mode Test screens in the order in which they appear.

320 x 200 Graphics Mode Screens

The Graphics Mode Test displays two successive 320- x 200-pixel graphics mode screens. The first screen displays three pyramids in red, green, and yellow. The second screen displays three pyramids in magenta, cyan, and white. Type y if all the pyramids are the correct colors; otherwise, type n.

320 x 200 16-Color Graphics Mode Screen

The 320- x 200-pixel 16-color graphics mode screen displays a series of Xs in 16 different colors with the name of the color beneath each X. Type y if all the Xs are the correct colors; otherwise, type n.

640 x 200 16-Color Graphics Mode Screen

The 640- x 200-pixel 16-color graphics mode screen displays a series of hexagons in 16 different colors with the name of the color beneath each hexagon. Type y if all the hexagons are the correct colors; otherwise, type n.

640 x 350 16-Color Graphics Mode Screen

The 640- x 350-pixel 16-color graphics mode screen displays a series of octagons in 16 different colors with the name of the color displayed beneath each octagon. Type y if all the octagons are the correct colors; otherwise, type n.

640 x 480 2-Color Graphics Mode Screen

The 640- x 480-pixel 2-color graphics mode screen displays three chess pieces. Type y if all the chess pieces are identical and displayed correctly; otherwise, type n. Figure B-3 shows part of this screen.

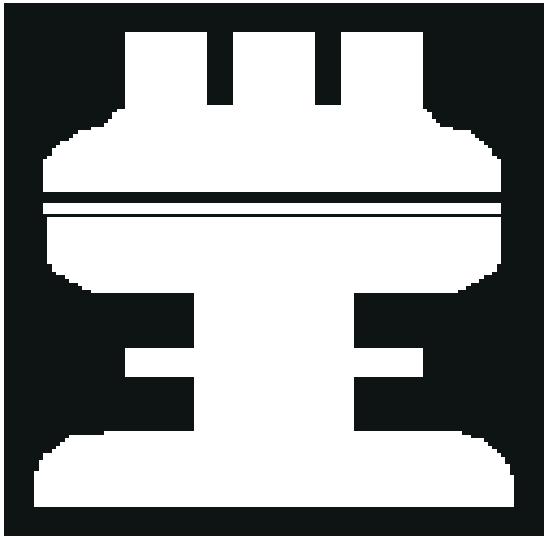


Figure B-3. 640 x 480 2-Color Graphics Mode Screen

640 x 480 16-Color Graphics Mode Screen

The 640- x 480-pixel 16-color graphics mode screen displays a series of stars in 16 different colors with the name of the color beneath each star. Type y if all the stars are the correct colors; otherwise, type n.

320 x 200 256-Color Graphics Mode Screen

The 320- x 200-pixel 256-color graphics mode screen displays a series of squares in 256 different color hues and intensities. Type y if all the squares are the correct colors; otherwise, type n.

640 x 480 256-Color Graphics Mode Screen

The 640- x 480-pixel 256-color graphics mode screen displays a series of squares with two colors in each square. Type y if all the squares appear to be correct; otherwise, type n.

800 x 600 16-Color Graphics Mode Screen

The 800- x 600-pixel 16-color graphics mode screen displays a series of pyramids in 16 different colors with the name of the color beneath each pyramid. Type y if all the pyramids appear to be correct; otherwise, type n.

800 x 600 256-Color Graphics Mode Screen

The 800- x 600-pixel 256-color graphics mode screen displays a series of squares with four colors in each square. Type y if all the squares appear to be correct; otherwise, type n.

1024 x 768 16-Color Graphics Mode Screen (External Monitor)

The 1024- x 768-pixel 16-color graphics mode screen displays a series of hourglasses in 16 different colors with the name of the color beneath each hourglass. Type y if all the hourglasses appear to be correct; otherwise, type n.

1024 x 768 256-Color Graphics Mode Screen (External Monitor)

The 1024- x 768-pixel 256-color graphics mode screen displays a series of asterisks with four colors in each asterisk. Type y if all the asterisks appear to be correct; otherwise, type n.

Color Palettes Test

The Color Palettes Test checks the video subsystem's ability to display all available colors. The test displays two screens that allow you to check the quality of different shades of the basic colors and to test the ability of the display or monitor to vary the intensity of these colors.

The first screen contains four sets of 64 squares, one for gray and one for each of the three basic colors (red, green, and blue). Each square contains a different shade of its associated color, ranging from very light to very dark. Type y if all the squares are the correct colors; otherwise, type n.

The second screen is the red/green/blue (RGB) color combination screen. This screen allows you to test the ability of the display or monitor to increase or decrease the intensity of the three basic colors.

The RGB color combination screen displays an RGB box in the top center of the screen with individual red, green, and blue boxes beneath it. Underneath the individual color boxes are three lines that show the intensity of each color. Type r, g, or b to adjust the intensity of the corresponding color; then press the right-arrow key to increase the color intensity, or press the left-arrow key to decrease the intensity. Type y if all the squares are the correct colors; otherwise, type n.

Solid Colors Test

The Solid Colors Test checks whether the video subsystem is displaying the correct colors. This test also lets you check for missing pixels. When this test is running, four screens appear sequentially—a red screen, a green screen, a blue screen, and a white screen. Check each screen for missing pixels, and verify that the correct color is being displayed.

When the test is complete, a message asks if you are satisfied with the quality of the colors. Type y if all the pixels were present and if the correct colors were displayed; otherwise, type n.

Appendix C
Regulatory Notices

All regulatory notices for the computer are located on the bottom of the computer.

FCC Class B Notice (U.S. Only)

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 Federal Communications Commission (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.

Note that FCC regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment Furthermore, shielded cables must be used when you connect peripherals to any Dell device.

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 about the device or devices covered by this document in compliance with FCC regulations:

- Product name: Dell Latitude CP
- Model number: PPL
- Company name: Dell Computer Corporation
  Regulatory Department
  One Dell Way
  Round Rock, Texas 78682 USA
  512-338-4400

Modem Requirements

This equipment operates in compliance with Part 68 of the FCC rules. In accordance with this regulation, the following requirements should be observed.

Type of Service

Your Dell notebook modem is designed to be used on standard device telephone lines. The modem connects to the telephone line by means of a standard jack called the USOC RJ-11C. Connection to a telephone-company-

provided coin service (central-office-implemented systems) is prohibited. Connection to party-line service is subject to state tariffs.

Telephone Company Procedures

The goal of the telephone company is to provide you with the best service it can. To this end, the company may need to occasionally make changes in its equipment, operations, or procedures. If these changes might affect your service or the operation of your equipment, the telephone company will give you notice, in writing, to allow you to make any changes necessary to maintain uninterrupted service.

If you have any questions about your telephone line, such as how many pieces of equipment you can connect to it, the telephone company will provide this information on request.

In certain circumstances, it may be necessary for the telephone company to request information from you concerning the equipment that you have connected to your telephone line. On request of the telephone company, provide the FCC registration number and the ringer equivalence number (REN) of the equipment that is connected to your line; both of these items are listed on the equipment label. The sum of all the RENs on your telephone line should be less than five to ensure proper service from the telephone company. In some cases, a sum of five may not be usable on a given line.

If Problems Arise

If your telephone equipment is not operating properly, immediately disconnect the modem from the telephone line, as it may harm the telephone network. If the telephone company notes a problem, it may temporarily discontinue service. When practical, it will notify you in advance of this disconnection. If advance notice is not feasible, you will be notified as soon as possible. When you are notified, you will be given the opportunity to correct the problem and informed of your right to file a complaint with the FCC.

If repairs are needed on your Dell notebook modem, they should be performed by Dell Computer Corporation or an authorized representative of Dell Computer Corporation. To return products, you must call Dell customer service at the toll-free number shown in Chapter 5, “Getting Help,” to receive a Credit Return Authorization Number. For more information on returning equipment, see the “Total Satisfaction” Return Policy in Appendix D, “Warranties and Return Policy.”

Installation and Labeling

Your Dell notebook modem provides all the connections necessary for proper operation. Connection to the telephone network should be made with standard modular cords that connect to the jacks or the modem.

Load Number

The load number (LN) assigned to each terminal device denotes the percentage of the total load to be connected to a telephone loop which is used by the device to prevent overloading. The termination on a loop may consist of any combination of devices subject only to the requirement that the total of the LNs of all the devices does not exceed 100. An alphabetic suffix is also specified in the LN for the appropriate ringing type (A or B), if applicable. For example, LN = 20 A designates an LN of 20 and an “A” type ringer.

IC Notice (Canada Only)

Most Dell portable computers (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 (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'enregistration) respecte toutes les exigences du Reglement sur le Materiel Brouilleur du Canada.

Canadian Modem Requirements

The ICES label identifies certified equipment. This certification means the equipment meets certain telecommunications network protective, operational, and safety requirements. The Industry Canada regulations do not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single-line individual service may be extended by means of a certified connector assembly (telephone extension cord). Be aware that compliance with these conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier (in this case, Dell Computer Corporation). Any repairs or alterations made to this equipment, or equipment malfunctions, may give the telecommunications company cause to request that you disconnect the equipment.

For your own protection, ensure that the electrical ground connections of the power utility, telephone lines, and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

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.

CE Notice

Marking by the symbol CE indicates compliance of this Dell portable computer to the EMC (Electromagnetic Compatibility) directive of the European Community. Such marking is indicative that this Dell portable computer 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 portable computer.

  WARNING: 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.

VCCI Notices (Japan Only)

Most Dell computer systems are classified by the Voluntary Control Council for Interference (VCCI) as Class B information technology equipment (ITE). 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 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 A ITE. If *all* labels carry either an FCC Class B identification number or the FCC logo (FC), your system is considered to be VCCI Class B 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 A ITE

This is a Class A product based on the standard of the Voluntary Control Council for Interference for information technology equipment. If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

Class B ITE

This is a Class B product based on the standard of the Voluntary Control Council for Interference for information technology equipment. If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Korean Regulatory Notice

To determine which classification (Class A or B) applies to your portable computers (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 computer is considered to be a Class A digital device. If all labels carry the Class B rating, your computer 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 nonbusiness purposes and may be used in any environment, including residential areas.

Polish Center for Testing and Certification Notice

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).

To completely switch off the equipment, the power supply cable must be 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

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).

W celu całkowitego wyłączenia urządzenia z sieci zasilania, należy wyjąć wtyczkę kabla zasilającego z gniazdka, które powinno znajdować się 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 bezpieczeństwa

- 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.

NOM 024 Information (Mexico Only)

The following information is provided on the device(s) described in this document in compliance with the requirements of the official Mexican standards (NOM 024):

Exporter:	Dell Computer Corporation One Dell Way Round Rock, TX 78682
Importer:	Dell Computer de México, S.A. de C.V. Rio Lerma No. 302 - 4° Piso Col. Cuauhtemoc 16500 México, D.F.
Ship to:	Dell Computer de México, S.A. de C.V. al Cuidado de Kuehne & Nagel de México S. de R.I. Avenida Soles No. 55 Col. Peñon de los Baños 15520 México, D.F.
Supply voltage:	100/250 VAC ±10%
Frequency:	50/60 Hz
Current consumption:	0.8/0.4 A

Información para NOM 024 (únicamente para México)

La información siguiente se proporciona en el dispositivo o en los dispositivos descritos en este documento, en cumplimiento con los requisitos de la Norma Oficial Mexicana (NOM 024):

Exportador:	Dell Computer Corporation One Dell Way Round Rock, TX 78682
Importador:	Dell Computer de México, S.A. de C.V. Rio Lerma No. 302 - 4° Piso Col. Cuauhtemoc 16500 México, D.F.
Embarcar a:	Dell Computer de México, S.A. de C.V. al Cuidado de Kuehne & Nagel de México S. de R.I. Avenida Soles No. 55 Col. Peñon de los Baños 15520 México, D.F.
Tensión alimentación:	100/250 V.C.A. ±10%
Frecuencia:	50/60 Hz
Consumo de corriente:	0.8/0.4 A

Appendix D
Warranties and Return Policy

Limited Three-Year Warranty (U.S. and 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.

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; 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 Chapter 5, "Getting Help," or to the section titled "Contacting Dell" in your online *System User's 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. or Canada, where applicable. 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 and subject to Dell's Exchange Policy in effect on the date of the exchange, 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 and prepay the shipping costs if you

use an address in the continental U.S. or Canada, where applicable. 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. The process for returning replaced parts, and your obligation to pay for replacement parts if you do not return the replaced parts to Dell, will be in accordance with Dell's Exchange Policy in effect on the date of the exchange.

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 (OR 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 WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE (OR JURISDICTION).

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 (OR JURISDICTIONS) 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 limited three-year warranty only. For provisions of any service contract covering your system, refer to the separate service contract that you will receive.

If Dell elects to exchange a system or component, the exchange will be made in accordance with Dell's Exchange Policy in effect on the date of the exchange.

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 you are an organization who 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 Chapter 5, "Getting Help," or to the section titled "Contacting Dell" in your online *System User's Guide*) to receive a Credit Return Authorization Number. You must ship the products to Dell in their original packaging, 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 then-current return policy.

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