

Dell® Latitude® LM Reference and Troubleshooting Guide



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Safety Instructions

When Using Your Computer

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

- When traveling with your computer, do not check the computer as baggage. You can put your computer through an X-ray security machine, but *never* put the 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 with the hard-disk drive removed from the computer, wrap the drive in a nonconducting material, such as cloth or paper. If you have the drive checked by hand, be ready to install the drive in the computer. You can put the hard-disk drive through an X-ray security machine, but *never* put the drive through a metal detector.
- 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.
- When setting up the computer for work, place it on a level surface.
- Protect your computer, battery, and hard-disk drive from environmental hazards such as temperature extremes, dirt, dust, food, liquids, and overexposure to sunlight.
- When moving 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. 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 using it.

CAUTION: If your computer gets very cold, allow it to warm gradually to room temperature before turning on the power.

- If using alternating current (AC) power, be sure nothing rests on your adapter's power cable and that the cable is not located where it can be tripped over or stepped on.
- When unplugging a power cable, grasp its plug, not the cable itself.
- Before you clean your computer, turn it off, unplug it from its power source, and remove the battery. Clean your computer with a soft cloth dampened with water rather than with liquid or aerosol cleaners.
- Clean the display with a soft, clean cloth and commercial window cleaner that does not contain wax or abrasives. Apply the cleaner to the cloth; then stroke the cloth across the display in one direction, moving from the top of the display to the bottom. If the display contains grease or some other contaminant, use isopropyl alcohol instead of commercial window cleaner.
- 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

For maximum 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 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 [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, touch pad, or external mouse.
- Always use the palmrest with the keyboard or touch pad. 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 more than a minute or so at a time 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.

NOTE: The only time you should ever access the inside of your computer is when you are installing memory modules.

- 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.**
- 3. Remove the main battery from the main-battery compartment. If necessary, remove the optional second battery from the options bay.**
- 4. Open the input/output (I/O) panel door on the back of your computer, and ground yourself by touching an I/O connector.**

While you work, periodically touch an I/O connector to dissipate any static electricity that might harm internal components.

Additional Safety Guidelines

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

- Do not attempt to service the computer yourself. Always follow installation instructions closely.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, make sure both connectors are correctly oriented and aligned.
- Handle components with care. Hold a component such as a memory module by its edges, not by its pins.

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 one of the unpainted metal connectors 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 appears throughout this document to remind you of these precautions:

CAUTION: See “Protecting Against Electrostatic Discharge” in the safety instructions at the front of this guide.

Preface

About This Guide

This guide is intended for anyone who uses the Dell Latitude LM 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 diskette-based diagnostics to test your computer and its components.

Summaries of the chapters and appendixes of this guide follow:

- Read Chapter 1, “Introduction,” for an overview of the computer features and a list of available upgrades.
- Read Chapter 2, “Customizing System Features,” to learn how to access the Setup program, which allows you to change system settings, such as your computer’s power conservation features.
- Read Chapter 3, “Troubleshooting Your Computer,” for some initial checks and procedures that can be used to solve basic computer problems and for some general guidelines on analyzing software problems. This chapter also discusses messages and beep codes.
- Read Chapter 4, “Running the Dell Diagnostics,” for hardware-related problems. The Dell diagnostics checks your computer’s hardware and isolates 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 diskette-based diagnostics is run. These screens help you check a particular video function or group of functions on the built-in display or on an external monitor.
- Appendix C, “Regulatory Notices,” is for users who are interested in which regulatory agencies have tested and approved the Dell Latitude LM portable computer.
- Appendix D, “Warranties and Return Policy,” describes the warranty and return policy for your 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 Group.



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 group.



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



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

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 presented in uppercase and enclosed in angle brackets.
Example: <ENTER>
- *Key combinations* are series of keys to be pressed simultaneously (unless otherwise indicated) to perform a single function.
Example: <CTRL><ALT><ENTER>
- All items on a menu screen are presented in the **ARIAL** font and in uppercase bold.
- *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 **setup** command to . . .”

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

Example: “Type `setup` 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® LM is an expandable, multi-media portable computer designed around the Intel® Pentium® microprocessor and Peripheral Component Interconnect (PCI) technology. This chapter describes the

major hardware and software features of your computer, provides information about accessing the online documentation, and tells you where to find help when needed.

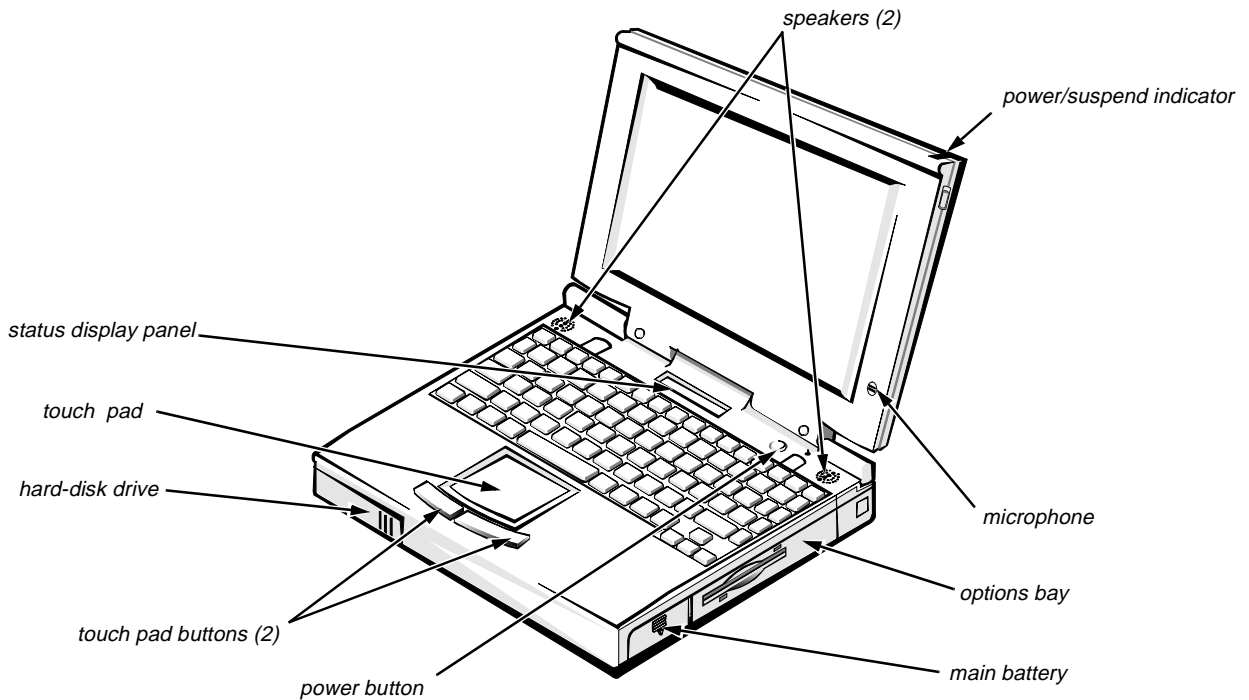


Figure 1-1. Front View of the Portable Computer

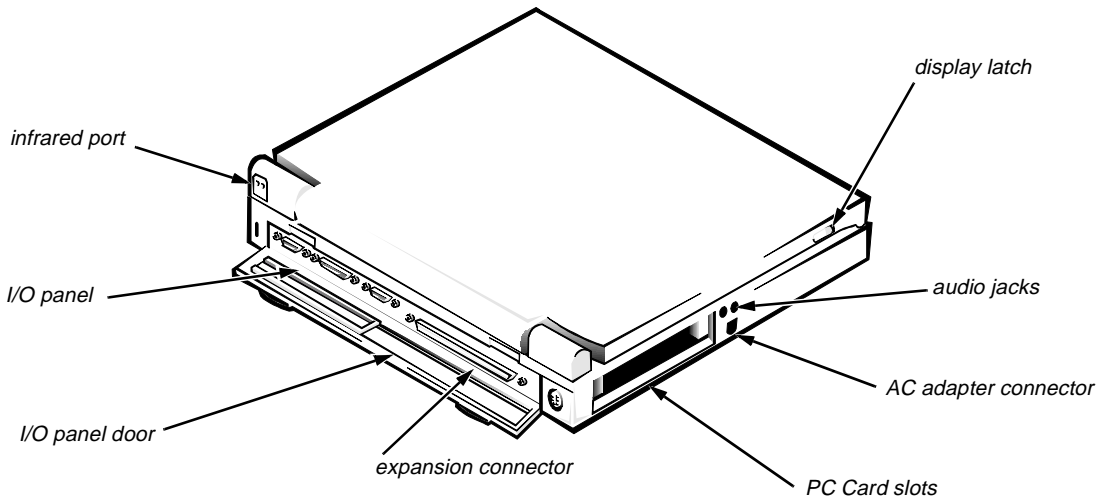


Figure 1-2. Back View of the Portable Computer

Hardware Features

Your Dell computer has the following features:

- An Intel Pentium microprocessor running at 100 or 133 megahertz (MHz).
- Full multimedia capability through the following standard features:
 - A CD-ROM drive that can be used in the options bay. When you unpack your computer, look for the CD-ROM drive in the accessories box of the shipping carton.
 - Built-in microphone and stereo speakers.
 - Jacks for connecting external speakers, headphones, or a microphone to your computer.
 - Software Motion Picture Experts Group (MPEG) software that lets you view MPEG-1 video clips on your monitor and provide synchronized audio playback through the computer's sound system.

NOTE: Your computer was shipped with a diskette drive in the options bay. When you want to use the CD-ROM drive, turn off the computer, remove the diskette drive, and install the CD-ROM drive. For instructions and more information, see the topic titled "Options Bay" in the online System User's Guide.

- An 11.3-inch dual-scan super video graphics array (SVGA) color display or a 12.1-inch active-matrix SVGA color display.
- Extended battery power with a lithium ion main battery, and an optional secondary battery that can be used in the options bay to double battery life.

The battery charges in approximately three hours using an alternating current (AC) power source if the computer is off; the battery charges in approximately four hours if the computer is on. You can expect three to five hours of battery life with a single battery, and six to ten hours of battery life with two batteries.

NOTE: The battery is designed to work only with Dell Latitude LM computers. Do not attempt to use the battery with other computers.

WARNING: Do not puncture or incinerate the battery or dispose of it in a landfill. Instead, return the battery to Dell for proper disposal or recycling.

- Cache memory that enhances the speed of many microprocessor operations by storing the most recently accessed contents of system memory. Your computer has 16 kilobytes (KB) of internal cache on the microprocessor and 256 KB of static random-access memory (SRAM) level 2 (L2) cache.
- Eight megabytes (MB) of nonremovable memory on the system board. Memory can be increased to a maximum of 40 MB by installing matched pairs of 4-, 8-, or 16-MB memory modules.
- Three power conservation modes—*standby mode*, *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.
- A special options bay that extends the functionality of your computer by letting you use a CD-ROM drive, a diskette drive, or an optional secondary battery.
- Support for up to two 3.3-volt (V) or 5-V PC Cards that adhere to the standards of the Personal Computer Memory Card International Association (PCMCIA). The computer supports up to two type I or type II cards (in any combination) or one type III card. Dell-installed device drivers on the hard-disk drive support the operation of many standard PC Cards. The Card Manager utility automatically recognizes most installed PC Cards and lets you reconfigure them as needed.
- A basic input/output system (BIOS) that resides in flash memory and can be upgraded by diskette. A BIOS upgrade, if required, can be obtained on diskette from Dell or can be downloaded from Dell's TechConnect BBS.

- High-performance parallel and serial ports, and a multipurpose Personal System (PS)/2 connector for attaching external devices. There is also a monitor connector for attaching an external monitor to your computer.
- A PS/2-compatible touch pad that gives your computer full mouse functionality.
- An infrared port for use with compatible external devices. The infrared port permits file transfers without using cable connections.

Software Features

Dell has installed the Microsoft® Windows® 95 operating system or the Microsoft Windows 3.x/MS-DOS® 6.x operating system on your hard-disk drive. The following software is also included with your Dell computer:

- A Setup program and system utilities that let you customize the operation of your computer. For more information, see Chapter 2, “Customizing System Features,” and the “Software Features” section of the online *System User's Guide*.

NOTE: The system utilities are available separately on diskettes from Dell for customers who installed their own version of Windows 95 or Windows 3.x. See Chapter 5, “Getting Help,” for the appropriate telephone number in your location.

- The Dell diagnostics for evaluating your computer's components and devices. For more information, see Chapter 4, “Running the Dell Diagnostics.”

After you turn on your computer the first time, accept the software licenses agreement. Then complete the installation of your operating system.

Next, use the Dell DiskMaker in the Dell Accessories folder or group to create program diskette sets and back up your software support (system) utilities. A program diskette set contains the complete software package on diskettes. These diskettes can be used to reinstall or reconfigure the software if necessary. The online instructions in the Dell DiskMaker tell you how many blank diskettes are needed.

Accessing Online Documentation

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

- System features
- Traveling with the computer
- Customizing system configuration
- Powering the computer and extending battery life
- Connecting 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 or program group.

To print any screen from the online *System User's Guide*, display the screen you want, and select **PRINT TOPIC** from the File menu.

Available Options

Dell offers the following devices and upgrade options:

- External devices, such as pointing devices, printers, external monitors, external keyboards, and numeric keypads, that connect to ports on the back of the computer

- AC adapters
- Batteries
- Hard-disk drives
- Modem PC Cards
- Memory modules (4-, 8-, and 16-MB capacities; must be installed in matched pairs)
- Carrying case
- Auto adapter
- Microphone
- External speakers
- Headphones

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.

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

Customizing System Features



As your computing environment changes, you may want to customize the configuration of your computer. The system utilities and the Setup program let you control various hardware and software features of your computer and allow you to monitor and reduce power consumption when your computer is running on battery power. This chapter explains how to access and use the system utilities and the Setup program.

System Utilities

If Dell installed your operating system, the system utilities are on the hard-disk drive that came with the computer.

Dell highly recommends that you use the Dell DiskMaker in the Dell Accessories folder or group to back up the system utilities. If your hard-disk drive becomes corrupted, you can use the program diskettes to reinstall the utilities.

NOTE: The system utilities are available separately on diskettes for those who installed their own version of the Microsoft Windows 95 or Microsoft Windows 3.x operating system. To order these diskettes from Dell, see Chapter 5, “Getting Help,” for the appropriate telephone number in your location.

Use system utilities to:

- Configure PC Cards



If you are using Windows 95, use the PC Card configuration utility that comes with the operating system.

In Windows 3.x, click the PC Card Manager icon in the Phoenix Card Manager program group. For more information about this utility, see the topic titled “Configuring PC Cards” in the online *System User’s Guide*. The utility contains help files.

- Change video resolution



In Windows 95, click the Start button, point to Settings, and click Control Panel. Double-click the Display icon and click the Settings tab.

In Windows 3.x, double-click this icon in the Control Panel in the Main group. For more information about this utility, see the topic titled “Changing Video Resolution” in the online *System User’s Guide*. The utility contains help files.

- Customize touch pad and cursor features



In Windows 95, click the Start button, point to Settings, and then click Control Panel. Then double-click this icon.

In Windows 3.x, double-click the Control Panel icon in the Main program group. Then double-click this icon again. For more information about this utility, see the topic titled “Customizing Touch Pad and Cursor Features” in the online *System User’s Guide*. The utility contains help files.

- Check battery status



In Windows 95, see the operating system documentation for instructions on using the battery status utility that comes with the operating system.

In Windows 3.x, this minimized icon appears at the bottom of the display. Click the icon to access the help files for more information, including instructions on moving the icon to a more convenient location on the display. For more information about this utility, see the topic titled “Battery Status Icon” in the online *System User’s Guide*.

- Manage power consumption when using a battery



The PowerPanel lets you adjust the computer's power management options to suit your working environment. The PowerPanel toolbar appears minimized on your desktop when you turn on the computer. The PowerPanel folder or group contains help files. For more information about saving battery power, see the topic titled "Conserving Battery Power" in the online *System User's Guide*.

- Manage the suspend-to-disk file on the hard-disk drive

The MS-DOS PHDISK utility in the `c:\dell\util` directory lets you remove the suspend-to-disk file from the hard-disk drive or create the file on a new hard-disk drive. For more information, see the topic titled "Suspend-to-Disk File" in the online *System User's Guide*.

CAUTION: The PHDISK utility erases all data on the hard-disk drive. If you want to retain the data, back up the hard-disk drive before using the PHDISK utility.

You can use the Setup program as follows:

- To set or change user-selectable features—for example, power management or security features
- To verify information about your computer's current configuration, such as the amount of system memory
- To change your system configuration information after you add, change, or remove hardware connected to or installed inside your computer

The first time you turn on your computer, run through the Setup program to become familiar with its options and to verify that their settings are correct. Record the option settings for reference in case you need to reestablish them.

Accessing the Setup Program

To access the Setup program, press <F2> when prompted during start-up. The computer reboots automatically when you exit the Setup program.

CAUTION: To avoid data loss, exit any application programs before rebooting the computer to enter the Setup program.

The Main menu of the Setup program shows how the computer is configured. From the Main menu (see Figure 2-1), you can access the Peripherals menu, Security menu, Power menu, and Exit menu.

NOTE: When you press <F9>, the computer displays the default values for each option in that menu. When you press <F10>, the computer restores the previous values for each option in that menu.

Main Menu Options

The following subsections explain each option in the Main menu of the Setup program. The same information is also available in the topic titled "Main Menu" in the online *System User's Guide*.

Setup Program

Your computer retains system configuration information in nonvolatile random-access memory (NVRAM) maintained by your computer's backup battery. Each time you turn on your computer, the system compares the installed hardware with the system configuration information stored in NVRAM. If the system detects a discrepancy, it generates an error message that identifies the incorrect configuration setting. The system then prompts you to enter the setup program to correct the setting.

Diskette A

DISKETTE A identifies the type of diskette drive being used by the computer. This option has no user-selectable settings.

1.44 MB, 3.5 means there is a diskette drive in the options bay.

EXTERNAL FDD means the diskette drive is being used as an external device.

Total Memory

TOTAL MEMORY displays the amount of dynamic random-access memory (DRAM) installed in the computer. Each computer comes standard with 8 MB of this system memory. This option has no user-selectable settings. The amount of memory displayed changes if you install or remove memory configurations.

Video Memory

VIDEO MEMORY displays the amount of video memory installed in the computer. This option has no user-selectable settings.

Peripherals Menu Options

The following subsections explain each option in the Peripherals menu of the Setup program (Figure 2-2). The

same information is also available in the topic titled “Peripherals Menu” in the online *System User’s Guide*.

Integrated Peripherals

Press <ENTER> when this option is highlighted to call up the Integrated Peripherals submenu.

Serial Port

SERIAL PORT lets you map the address of the serial port to avoid address conflicts with other devices or disable the port for security. The default setting is **COM1**. Other possible settings are **DISABLED**, **COM2**, **COM3**, **COM4**, and **AUTO**.

If you are using Windows 95 and this option is set to **AUTO**, the operating system can remap the port automatically to avoid address conflicts with other devices. If any other setting is used, this automatic mapping does not occur.

If you are using Windows 3.x and this option is set to **AUTO**, the serial port is automatically set to the default, **COM1**.

When mapping the serial port, be careful not to create a conflict with the infrared port. Table 2-1 shows the available serial port mappings.

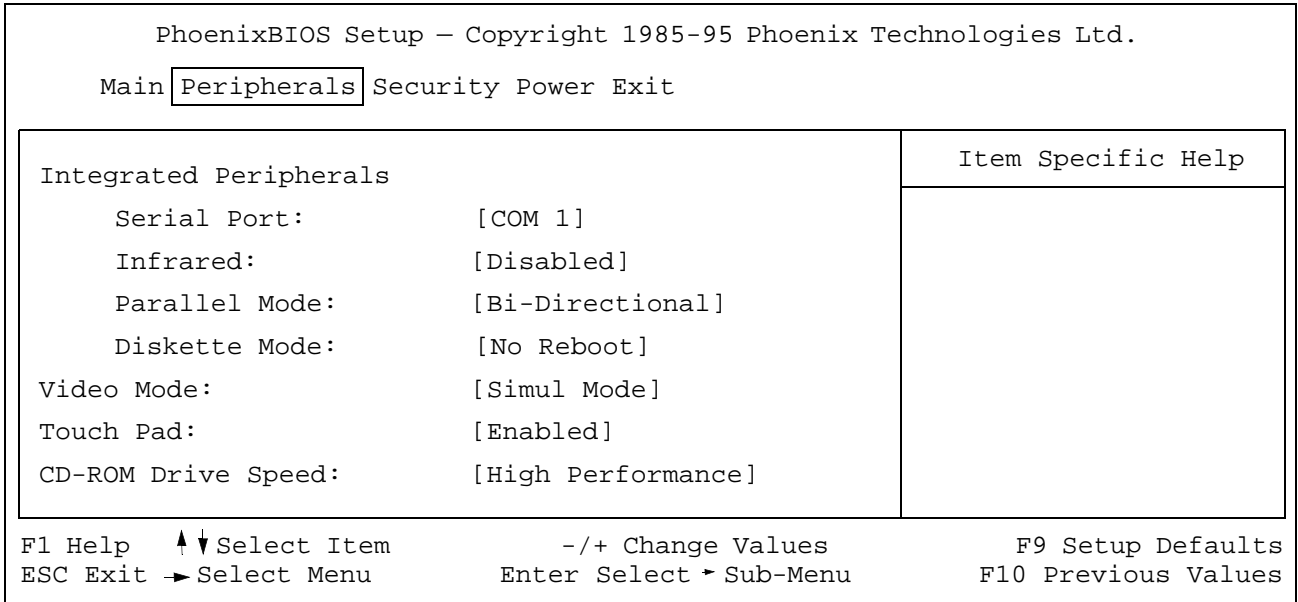


Figure 2-2. Peripherals Menu of Setup Program

Table 2-1. Serial Port Mappings

If serial port is set to:	Infrared port can be set to:
COM1	COM2 or COM4 (COM1 and COM3 are illegal configurations.)
COM2	COM1 or COM3 (COM2 and COM4 are illegal configurations.)
COM3	COM2 or COM4 (COM1 and COM3 are illegal configurations.)
COM4	COM1 or COM3 (COM2 and COM4 are illegal configurations.)

Infrared

INFRARED lets you map the address of the infrared port to avoid address conflicts with other devices. The default setting is **DISABLED**. Other possible settings are **COM1**, **COM2**, **COM3**, **COM4**, and **AUTO**.

If you are using Windows 95 and this option is set to **AUTO**, the operating system can remap the port automatically to avoid address conflicts with other devices. If any other setting is used, this automatic mapping does not occur.

If you are using Windows 3.x set this option to **COM3**, and set the **SERIAL PORT** option to **DISABLED**, **COM2**, or **COM4**.

When mapping the infrared port, be careful not to create a conflict with the serial port. Table 2-2 shows the available infrared port mappings.

Table 2-2. Infrared Port Mappings

If infrared port is set to:	Serial port can be set to:
COM1	COM2 or COM4 (COM1 and COM3 are illegal configurations.)
COM2	COM1 or COM3 (COM2 and COM4 are illegal configurations.)
COM3	COM2 or COM4 (COM1 and COM3 are illegal configurations.)
COM4	COM1 or COM3 (COM2 and COM4 are illegal configurations.)

Parallel Mode

PARALLEL MODE controls whether the computer's parallel port acts as an AT-compatible (unidirectional), PS/2-compatible (bidirectional), EPP-compatible, or ECP-compatible port. You can also disable the port and free its assigned LPT address for another device. The default setting for this option is **BI-DIRECTIONAL**. Other possible settings are **DISABLED**, **NORMAL**, **EPP**, and **ECP**.

Diskette Mode

When **DISKETTE MODE** is set to **NO REBOOT** (the default), you do not have to reboot after installing a diskette drive in the options 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. When **DISKETTE MODE** is set to **REBOOT**, such application programs run at normal speed, but you must reboot after installing or attaching a diskette drive.

Video Mode

VIDEO MODE sends the video signal to the display only (**LCD MODE**), an external monitor only (**CRT MODE**), or to both (**SIMUL MODE**).

NOTE: When an external monitor is attached to the monitor connector, the computer does not enter suspend

mode when the display is closed. Instead, the computer sends its video signal to the external monitor.

Touch Pad

TOUCH PAD lets you enable or disable the touch pad in Windows 3.x. If you are using Windows 95, the operating system determines if an external mouse is attached to the computer and automatically configures this option. The default setting is **ENABLED**. Select **DISABLED** when you want to attach a serial mouse to the computer.

If you attach a PS/2 mouse, the computer automatically detects the mouse and disables this option (but does not change the setting).

CD-ROM Drive Speed

CD-ROM DRIVE SPEED lets you compensate for imbalanced 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 the imbalanced CD.

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

For a change in the **CD-ROM DRIVE SPEED** option to take effect, select **SAVE CHANGES & EXIT** from the Exit menu. (For more information, see “Exit Menu Options” found later in this chapter.)

Security Menu Options

The following subsections explain each option in the Security menu of the Setup program (Figure 2-3). The same information is also available in the topic titled “Security Menu” in the online System User's Guide.

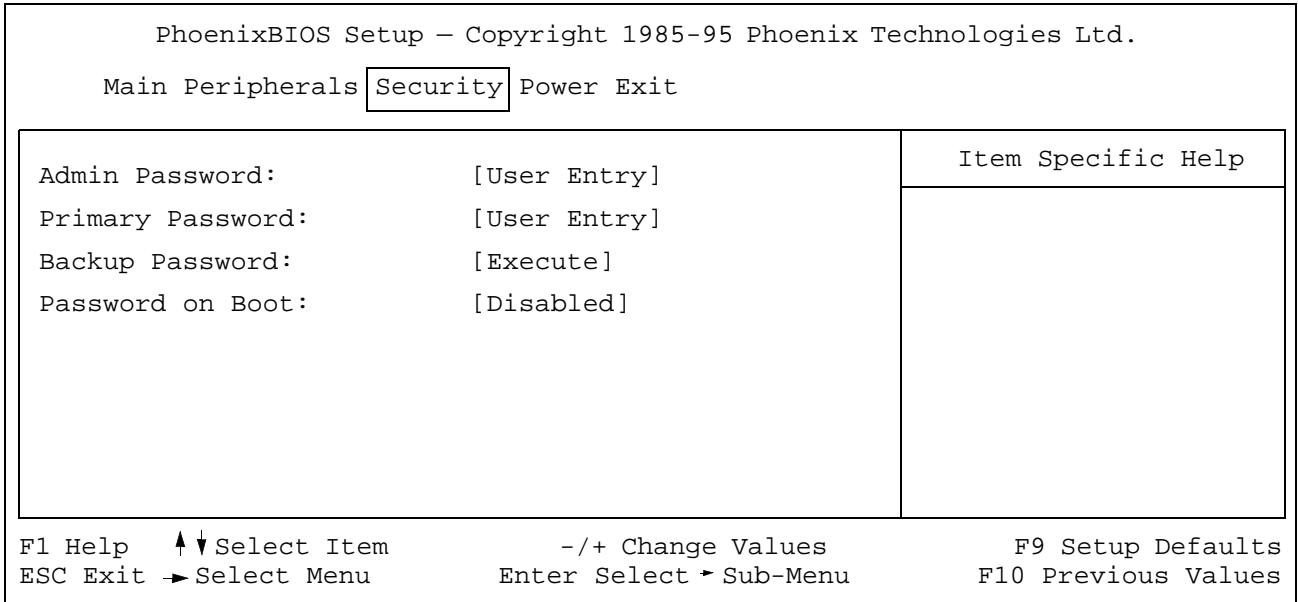


Figure 2-3. Security Menu of Setup Program

Admin Password

ADMIN PASSWORD displays the current status of your administrator password and lets you assign or change this password. Settings for this option are **DISABLED** (the default) and **ENABLED**.

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.

*NOTE: If you type the primary password to enter the Setup program, the **ADMIN PASSWORD** option does not appear on the Security menu.*

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) and **ENABLED**.

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

*NOTE: If you type the primary password to enter the Setup program, the **ADMIN PASSWORD** option does not appear on the Security menu.*

Backup Password

Use the **BACKUP PASSWORD** option to back up a password onto a diskette. Use the diskette to access the computer if you forget the password.

NOTE: This option appears on the Security Menu only when the administrator password has been used to enter the Setup program.

When you set this option to **ENABLED**, insert a formatted diskette into the diskette drive and press <ENTER> to save the password to the diskette. If you forget the password, insert the diskette into the diskette drive when prompted for the password. Then type `f l o p p y` and press <ENTER>.

Password on Boot

When the **PASSWORD ON BOOT** option is enabled, you must enter a password before the computer loads the operating system into memory. To enable this option, the **ADMIN PASSWORD** option must be enabled and an administrator password assigned.

Settings for this option are **DISABLED** (the **PRIMARY PASSWORD** option default) and **ENABLED**.

*NOTE: If the **ADMIN PASSWORD** option is enabled and the **PASSWORD ON BOOT** option is disabled, the computer assumes the user is booting the computer.*

CAUTION: Dell *strongly* recommends that you back up your password onto a diskette. If you forget the password and do not have it on diskette, you cannot access the computer. In that case, you must return the computer to Dell at your expense. Technicians will disable the password feature and send the computer back to you at your expense.

Power Menu Options

The following subsections explain each option in the Power menu of the Setup program (Figure 2-4). The same information is also available in the topic titled “Power Menu” in the online *System User’s Guide*

NOTE: You can also use the Windows-based PowerPanel to control some of the computer’s power management features. Power settings override corresponding settings in the Power menu of the Setup program. For more information about the PowerPanel, see the topic “Using the PowerPanel” in the online System User’s Guide.

PhoenixBIOS Setup – Copyright 1985-95 Phoenix Technologies Ltd.

Main Peripherals Security **Power** Exit

Power Savings:	[Customize]	Item Specific Help	
AC Power Save:	[On]		
Standby Time-Out:	[3 min.]		
Suspend Time-Out:	[3 min.]		
Suspend-to-Disk Time-Out::	[10 min.]		
Hard-Disk Drive Time-Out:	[2 min.]		
DIM Mode Time-Out:	[30 sec.]		
Smart CPU Mode:	[Enabled]		
Alarm Resume:	[OFF]		
F1 Help	↑↓ Select Item	-/+ Change Values	F9 Setup Defaults
ESC Exit	→ Select Menu	Enter Select ▶ Sub-Menu	F10 Previous Values

Figure 2-4. Power Menu of Setup Program

Power Savings

Select **OFF** if you want to disable all power savings, regardless of how the time-out options are set.

Select **CUSTOMIZE** (the default) to control the power saving time-outs individually.

Select **MAXIMUM PERFORMANCE** to configure power saving time-outs as a group to increase the performance of the computer. When this setting is selected, the **STANDBY TIME-OUT**, **SUSPEND TIME-OUT**, and **SUSPEND-TO-DISK TIMEOUT** options are set automatically to 30 minutes.

Select **MAXIMUM BATTERY LIFE** to configure the power saving time-outs as a group to save the most battery power. When this setting is selected, the **STANDBY TIME-OUT**, **SUSPEND TIME-OUT**, and **SUSPEND-TO-DISK TIMEOUT** options are set automatically to 1 minute.

AC Power Save

AC POWER SAVE lets you enable or disable power saving time-outs when the computer is connected to an AC power source. The default setting for this option is **ON**.

Enable this option to keep all power saving time-outs in effect whether you operate the computer on battery power or from the AC adapter. Disable this option to override all time-out settings when the computer is being powered by the AC adapter.

Standby Time-Out

STANDBY TIME-OUT lets you determine how long the computer remains idle (no I/O activity) before activating standby mode to conserve battery power. Settings for this option are **DISABLED**, **1 MIN.**, **2 MIN.**, **3 MIN.** (the default), **5 MIN.**, **10 MIN.**, **15 MIN.**, and **30 MIN.**

To increase battery operating time, set this option to a lower number of minutes. Press any key on the built-in keyboard to resume normal computer operation.

If the time delay you set for standby mode is greater than the delay set for suspend mode or suspend to disk mode, the computer enters standby mode first. For instance, if **STANDBY TIME-OUT** is set for 10 minutes and **SUSPEND-TO-DISK TIME-OUT** is set for 5 minutes, the computer enters standby mode after 10 minutes of no I/O activity and then enters suspend-to-disk mode 5 minutes later.

*NOTE: Set this option to **DISABLED** if it causes compatibility problems with your software.*

Suspend Time-Out

SUSPEND TIME-OUT lets you determine how long the computer remains idle (no I/O activity) before activating suspend mode to conserve battery power. Settings for this option are **DISABLED**, **1 MIN.**, **2 MIN.**, **3 MIN.** (the default), **5 MIN.**, **10 MIN.**, **15 MIN.**, and **30 MIN.**

To increase battery operating time, set this option to a lower number of minutes.

If the time delay you set for suspend mode is greater than the delay set for standby mode or suspend to disk mode, the computer enters suspend mode first. For instance, if **SUSPEND TIME-OUT** is set for 10 minutes and **SUSPEND-TO-DISK TIME-OUT** is set for 5 minutes, the computer enters suspend mode after 10 minutes of no I/O activity and then enters suspend-to-disk mode 5 minutes later.

*NOTE: Set this option to **DISABLED** if it causes compatibility problems with your software.*

If you are not in the Setup program, you can activate suspend mode at any time by pressing <FN><ESC>. Press any key on the built-in keyboard to resume normal computer operation.

Suspend-to-Disk Time-Out

SUSPEND-TO-DISK TIME-OUT lets you determine how long the computer remains idle (no I/O activity) before activating suspend-to-disk mode to conserve battery power. Settings for this option are **DISABLED**, **1 MIN.**, **2 MIN.**, **3 MIN.**, **5 MIN.**, **10 MIN.** (the default), **15 MIN.**, and **30 MIN.**

If you are not in the Setup program, you can activate suspend-to-disk mode at any time by pressing <FN><a>. Press the power button and hold it down for a second or two to turn on the computer and resume normal operation.

Hard-Disk Drive Time-Out

HARD-DISK DRIVE TIME-OUT lets you determine how long the computer remains idle (no I/O activity) before the hard-disk drive turns off to conserve battery power. Settings for this option are **1 MIN.**, **2 MIN.** (the default), **3 MIN.**, **5 MIN.**, **10 MIN.**, **15 MIN.**, **20 MIN.**, and **DISABLED**.

Use this feature when the computer is engaged in an activity, such as calculations, that rarely accesses the hard-disk drive.

NOTE: To lengthen the life of the hard-disk drive, Dell recommends setting this option to the lowest possible setting that works for you.

DIM Mode Time-Out

DIM MODE TIME-OUT lets you determine how long the computer remains idle (no I/O activity) before the display begins dimming slowly to conserve battery power. Settings for this option are **DISABLED**, **15 SEC.**, **30 SEC.** (the default), and **60 SEC.** The display begins to brighten again when you press any key on the built-in keyboard.

Use this option to conserve battery power when you are working with the computer intermittently or when the computer is performing a task that does not require your input.

NOTE: To save battery power, Dell recommends that you always set this option to the lowest setting that affords comfortable viewing when the computer is being powered by a battery. You can conserve up to 5 percent of battery power by using the minimum brightness.

Smart CPU Mode

SMART CPU MODE allows the computer to slow down the microprocessor automatically if it is not being used. Settings for this option are:

- **ENABLED** (the default) 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.

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).

Alarm Resume

ALARM RESUME tells the computer to resume normal operation when it is in suspend mode and detects an alarm from the system clock. Such alarms can be set through various application programs. In order for the alarms in these programs to work, this option must be set to **ON**. If this option is set to **OFF** (the default), the computer remains in suspend mode when it detects an alarm.

Exit Menu Options

The following subsections explain each option in the Exit menu of the Setup program (Figure 2-5). The same information is also available in the topic titled “Exit Menu” in the online *System User’s Guide*.

Chapter 3

Troubleshooting Your Computer



If your Dell Latitude LM 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 beep codes, their possible causes, and actions you can take to resolve any problems indicated by a message or code. This chapter also offers some general guidelines for analyzing software problems.

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

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. Go 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. The problem is resolved.

No. Go to step 3.

3. Perform the steps found 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.

Yes. Go to step 4.

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

4. Did you receive a system message or beep code?

A single beep always sounds during the boot routine when the speaker is tested.

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

No. Go to step 5.

5. Verify the system setup settings as explained in Chapter 2, “Customizing System Features.”

Is the problem resolved?

Yes. The system configuration information was incorrect. The problem is resolved.

No. Go 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 the connector has two small screws, make sure the screws are tight. In addition, check for damaged or frayed cables, and for bent pins on connectors.

Be sure the following items are properly connected or installed:

- The AC adapter and the AC power cable

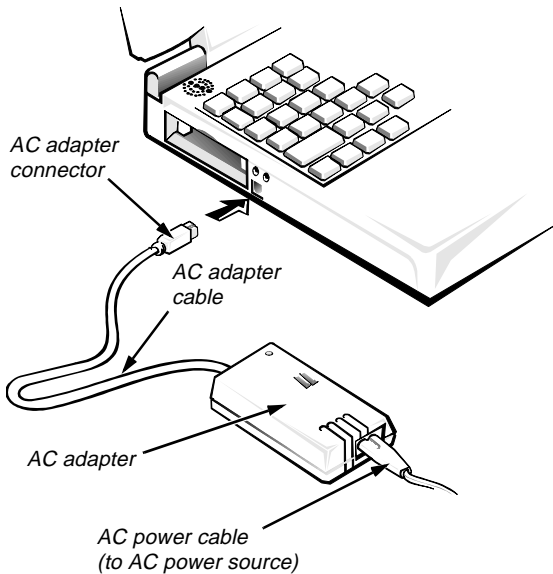


Figure 3-1. AC Adapter and Power Cable

- The main battery

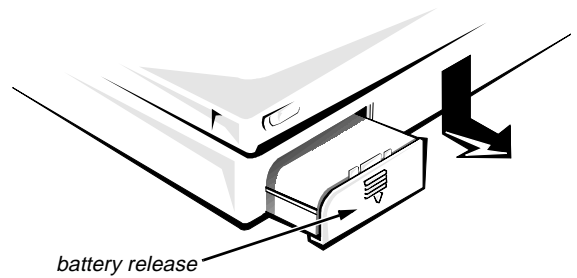


Figure 3-2. Checking the Battery

- The secondary battery, if one is installed in the options bay

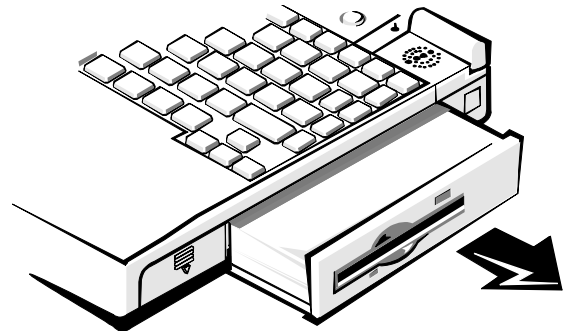


Figure 3-3. Checking the Optional Battery

- All cables to external devices

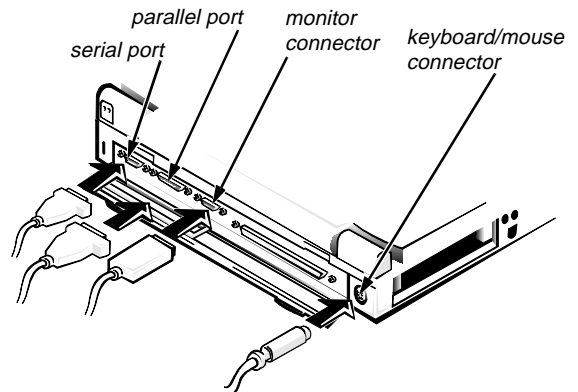


Figure 3-4. External Cables

Look and Listen

If the problem is not resolved by looking and listening to the computer, see the next subsection, “Setup Options.”

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.

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	Press the <NUM LOCK> key, the <CAPS LOCK> key, and the <SCROLL LOCK> key to toggle their respective indicators on and off in the status display panel. If the indicators do not appear, run the Keyboard Test Group in the Dell diagnostics (for instructions, see Chapter 4, “Running the Dell Diagnostics”).
The diskette-drive access indicator	The diskette-drive access indicator should appear in the status display when data is accessed on the diskette drive. You can test this indicator by inserting a diskette into the drive, typing <code>dir a:</code> at an MS-DOS prompt, and pressing <ENTER>. If the diskette-drive access indicator does not appear, see “Troubleshooting the Diskette Drive” found later in this chapter.
The CD-ROM/hard-disk drive access indicator	The CD-ROM/hard-disk drive access indicator should appear when data is accessed on the CD-ROM drive or the hard-disk drive. You can test this indicator by typing <code>dir c:</code> at an MS-DOS prompt and pressing <ENTER>. If the CD-ROM/hard-disk drive access indicator does not appear, see “Troubleshooting the Hard-Disk Drive” or “Troubleshooting the CD-ROM Drive” found later in this chapter.
Listen for:	Action
A series of beeps	See “Messages and Codes” found later in this chapter.
An unfamiliar constant scraping or grinding sound when a drive is accessed	Make sure the sound is not caused by the application program that is running. The sound could 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 the computer, you can hear the hard-disk drive spin up, and the computer tries to access the boot files from the hard-disk drive or the diskette drive. 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.

Setup Options

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

To fix this problem, correct the appropriate options in the Setup program. See Chapter 2, "Customizing System Features," for information on accessing the Setup program. See the topic titled "Setup Program" in the online *System User's Guide* for detailed information about the Setup program and its options.

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

Messages and Codes

The 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 beep 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 system messages are listed alphabetically.

NOTE: If the message is not listed in Table 3-2, check the documentation for the application programs that were 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
Diskette drive A error	A connector may be loose or the diskette may be faulty.	If the diskette-drive access indicator appears in the status display panel, try a different diskette. If the problem persists, see "Troubleshooting the Diskette Drive" found later in this chapter.
Extended RAM failed at off-set: <i>nnnn</i>	Extended memory is not configured properly or has failed at the memory address <i>nnnn</i> .	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
Failing bits: <i>nnnn</i>	Memory failed at RAM address <i>nnnn</i> .	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
Fixed disk 0 failure	The hard-disk drive failed to initialize.	See "Troubleshooting the Hard-Disk Drive" found later in this chapter.
Fixed disk controller failure	The hard-disk drive controller may be faulty.	Call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")
Incorrect drive A type—run Setup	The diskette drive is not identified properly in the Setup program.	Reboot the computer and press <F2> to enter the Setup program. Write down the setting for DISKETTE A in the Main menu. Then call Dell for technical assistance. (For instructions, see Chapter 5, "Getting Help.")

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 controller error	The keyboard controller is faulty.	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
Keyboard error	If an external keyboard is being used, a cable or connector may be loose or the keyboard may be faulty. If using the built-in keyboard, the keyboard may be faulty. A key on the built-in 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.”)
Operating system not found	The operating system may be corrupted. Or the operating system cannot be found on the hard-disk drive or on the diskette in the diskette drive.	Reinstall the operating system. See the documentation that came with the operating system. If that fails to solve the problem, call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
Parity check 1 <i>nnnn</i>	A parity error was found in the system bus at address <i>nnnn</i> .	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
Parity check 2 <i>nnnn</i>	A parity error was found in the I/O bus at address <i>nnnn</i> .	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
Real time clock error	The CMOS battery that supports data stored in NVRAM may be dead.	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
Shadow RAM failed at off-set: <i>nnnn</i>	Shadow RAM failed at address <i>nnnn</i> .	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
CMOS battery is dead— Replace and run Setup	The CMOS battery does not have enough charge to power the computer.	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
System cache error—cache disabled	The primary cache internal to the microprocessor has failed.	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)

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
System CMOS checksum bad—run Setup	The BIOS has been updated. CMOS has been corrupted or modified, possibly by an application program that changes data stored in CMOS.	Reboot the computer and press <F2> to enter the Setup program and reconfigure the system. If the problem persists, call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
System RAM failed at off-set: <i>nnnn</i>	System RAM failed at address <i>nnnn</i> in the 64-KB block at which the error was detected.	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)
System timer error	A chip on the system board may be malfunctioning.	Run the System Set Test Group and 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.

System Beep Codes

When errors occur during the boot routine that cannot be reported on the built-in display or on an external monitor (if attached), the computer may emit a series of beeps that identify the problem. The *beep code* is a pattern of sounds: for example, one beep, followed by a second beep, and then a burst of three beeps (code 1-1-3) means that the computer was unable to read the data in non-volatile random-access memory (NVRAM). This information is invaluable to the Dell support staff if you need to call for technical assistance.

When a beep 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 beep 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. Beep Codes

Message	Cause	Action
1-2	Memory module not being properly identified or used	See “Troubleshooting Memory” found later in this chapter
1-2-2-3	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.”)
1-3-1-1	DRAM refresh 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.”)
1-3-1-3	Keyboard controller test failure	Run the Keyboard Controller Test in the Dell diagnostics. (For instructions, see Chapter 4, “Running the Dell Diagnostics.”)
1-3-4-1	RAM failure on address line <i>nnnn</i>	Run the RAM 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.”)
1-3-4-3	RAM failure on data bits <i>nnnn</i> of the high byte on the memory bus	Run the RAM 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.”)
1-4-1-1	RAM failure on data bits <i>nnnn</i> of the low byte on the memory bus	Run the RAM 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.”)
2-1-2-3	Check ROM copyright notice 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.”)
2-2-3-1	Interrupt mask register failure	Call Dell for technical assistance. (For instructions, see Chapter 5, “Getting Help.”)

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 first 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 online 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 the 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 documenta-

tion and a software installation routine on its program diskettes.

The software installation routine assists you in transferring the appropriate program files to the computer’s hard-disk drive. Installation instructions may provide details about how to configure the operating system to successfully run the program. Always read the installation instructions before running a program’s installation routine. If you are instructed to modify the start-up files, see the documentation that accompanied the operating system for instructions.

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

Start-Up Files

Whenever you start or reboot the computer, the operating system executes commands from its start-up 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 start-up files of the operating system. (For information on start-up files, see the documentation that came with the operating system). If a program or peripheral does not work correctly, check the product’s documentation to see if you need to modify these files.

Expanded and Extended Memory

System memory can be expanded by installing matched pairs of memory modules or by exchanging an installed pair of memory modules for a pair of different capacity. If you operate the computer with MS-DOS, the operating system makes only 640 kilobytes (KB) (called *conventional memory*) of the first 1 megabyte (MB) of system memory available for use by programs. Some programs require more than 640 KB of memory and, therefore, cannot be run with conventional memory alone. Other programs run much faster when they have more than 1 MB of memory to use.

When you boot the computer, MS-DOS recognizes memory in excess of 1 MB as *extended memory*. Some, but not all, programs are able to use extended memory. For example, the Windows operating system and Lotus® 1-2-3 take advantage of extended memory.

Other programs are able to use extended memory only if it is first converted into *expanded memory* by an expanded memory manager (EMM).

Under the following conditions, expanded memory can greatly enhance the computer's ability to use application programs that require more memory than is available in the conventional memory area:

- The application program is written for use with expanded memory.
- The EMM driver is installed and properly initialized.

Improper use of an EMM can lead to conflicts between the expanded-memory operation and any installed PC Cards, which may be assigned memory areas that overlap memory areas that the EMM is using.

Using Software

The following subsections discuss errors that can occur while using 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 generated by the computer. If you receive an error message not listed in "Messages and Codes," check the 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 the application program to make sure the values or characters you are entering do not conflict with the application program you are using.

Make sure the operating environment is compatible with 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 the programs. Sometimes, after modifying 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, the operating system's start-up files contain commands to start TSR programs when you boot the 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 the 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 the 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.

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

Table 3-4. IRQ Line Assignments

IRQ Line	Used/Available
IRQ0	Generated by the system timer
IRQ1	Generated by the keyboard controller to signal that the keyboard output buffer is full
IRQ2	Cascade to second interrupt controller
IRQ3	Used by the infrared port (COM2)
IRQ4	Used by the serial port (COM1)
IRQ5	Used by the audio controller
IRQ6	Generated by the diskette drive controller to indicate that the diskette drive requires the attention of the microprocessor
IRQ7	Used by the parallel port
IRQ8	Generated by the system RTC
IRQ9	Software redirect to INT0A
IRQ10	Reserved
IRQ11	Reserved
IRQ12	Generated by the keyboard controller to indicate that the output buffer of the integrated touch pad or external PS/2 mouse is full
IRQ13	Used by the math coprocessor on the microprocessor
IRQ14	Generated by the hard-disk drive to indicate that the drive requires the attention of the microprocessor
IRQ15	Reserved

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 built-in components (such as the display) and for external devices that connect to the computer (such as an external monitor). Before performing any of the procedures in this section, see “Basic Checks” found earlier in 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.

Troubleshooting a Wet Computer

Liquids, spills and splashes, rain, and excessive humidity can cause moisture damage to the computer. If the 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 the 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. Turn off the 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. Remove any installed batteries.**
Wipe off each battery, and store it in a safe place to dry.
- 3. If the options bay slot is wet, remove the device from the bay. If the PC Card slot is wet, remove the PC Cards. Put the device and cards in a safe place to dry.**

4. **Open the input/output (I/O) cover on the back of the computer, and ground yourself by touching one of the metal connectors.**

5. **Use a small screwdriver to remove the memory cover from the bottom of the computer. Remove any installed 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. **Remove the hard-disk drive.**

To remove the hard-disk drive, use a small screwdriver to remove the two screws below the hard-disk door. With the computer facing you, slide the drive cover to the left until it is free of the computer. Then slide the hard-disk drive out the bay.

7. **Open the display, and place the computer across two books or similar props to let air circulate all around it. Leave the I/O cover open to expose the I/O panel and its connectors to the air. 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.

<p>WARNING: Before continuing with the remainder of this procedure, verify that the computer is thoroughly dry.</p>
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8. **Ground yourself by touching one of the metal connectors on the I/O panel, and close the I/O panel.**
9. **If you removed memory modules in step 5, reinstall them. Replace the memory cover.**

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 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 must be installed in matched pairs. That is, memory modules of the same capacity must be installed in both memory module sockets.

10. **Reinstall the options-bay device or PC Cards that you removed in step 3.**

11. **Replace any batteries that you removed in step 1.**

12. **Replace the hard-disk drive that you removed in step 6.**

Slide the drive firmly into the drive bay. There may be some resistance as the drive connects to its interface connector at the back of the bay. Slide the drive cover to the right, and replace the screws below the hard-disk drive door.

13. **Reconnect the computer and peripherals to AC power, and turn them on.**

14. **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. 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. (See Chapter 5, “Getting Help,” for instructions.)

Troubleshooting a Damaged Computer

If the computer is dropped or damaged, use the following procedure:

1. **Save all your work, exit any open application programs, and remove any installed batteries.**
2. **Turn off the 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.**
3. **Open the I/O cover on the back of the computer, and ground yourself by touching one of the metal connectors.**

- 4. Using a small screwdriver, remove the memory cover from the bottom of the computer. Remove and reinstall any memory modules, and then replace the memory 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 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 must be installed in matched pairs. That is, memory modules of the same capacity must be installed in both memory module sockets.

- 5. Install the diskette drive in the options bay.**
- 6. Verify that any installed PC Cards are properly seated in the PC Card connectors.**
- 7. Replace any batteries that you removed in step 2.**
- 8. Reconnect the computer and peripherals to AC power, and turn them on.**
- 9. Run the Dell diagnostics to verify that the computer is operating properly. (See Chapter 4, "Running the Dell Diagnostics," for instructions.)**
- 10. 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. (See Chapter 5, "Getting Help," for instructions.)**

Troubleshooting a Power Failure

Occasionally, you may experience a power failure in all or part of the computer. A total power failure is indicated by the absence of electrical activity (such as status indicators 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 and fill it out as you complete the following procedure:

- 1. Turn off the computer. Do the power indicator and battery indicator(s) appear on the status display panel?**
Yes. Go to step 2.
No. Go to step 3.
- 2. Remove any installed batteries, and disconnect the AC adapter. Then reinstall the batteries, reconnect the AC adapter, and turn on the computer. Do the power indicator and battery indicator(s) appear on the status display panel?**
Yes. Go to step 4.
No. Go to step 3.
- 3. Turn off the computer, wait a few seconds, and then turn on the computer again. Do the indicators appear on the status display panel?**
Yes. Your computer is receiving power. Go 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 5.
- 5. Reseat (remove and reinstall) any installed batteries, and check the AC adapter connection. Do the indicators appear in the status display panel?**
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 using battery power, see "Total Power Failure When Using a 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 and fill it out as you complete the following procedure:

- 1. Turn off the computer and peripherals, and disconnect them from AC power. If you are using a surge protector, remove it.**
- 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. Does the light-emitting diode (LED) on top of the AC adapter turn on?**

Yes. Go to step 4.
No. The AC adapter may be defective. Go to step 5.
- 4. Turn on the computer. Does the power indicator appear in the status display panel?**

Yes. The problem is resolved.
No. Go to step 5.
- 5. 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 its battery. If the battery status indicator does not appear in the status display panel when you turn on the computer, the battery’s charge may be depleted. If the battery status indicator is empty, the battery may be nearly out of charge or defective. 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. Disconnect the peripherals from AC power.**
- 2. Reseat (remove and reinstall) each installed battery by first removing and then replacing the battery in its compartment.**

- 3. Turn on the computer. Does the battery status indicator appear in the status display panel?**

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

Yes. Go 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. Is the battery status indicator blinking?**

Yes. Go to step 7.

No. Go to step 5.

- 5. Is a battery status indicator solid, and does the AC power indicator appear in the status display panel?**

Yes. Go to step 6.

No. The battery is defective. Call Dell for technical assistance. (See Chapter 5, “Getting Help,” for instructions.)

- 6. Is there a single bar on the far left of the battery status indicator?**

Yes. The battery is too hot. Remove the battery, and let it cool to room temperature. Then reinstall the battery, reboot the computer, and go back to step 3. (If you return to step 6 the second time you perform this procedure, 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.)

- 7. Use the AC adapter to fully charge the battery.**

For instructions, see the topic titled “Charging the Battery” in the online *System User’s Guide*. The battery charges in 3 hours using an AC power source if the computer is off; the battery charges in 4 hours if the computer is on.

8. Does the battery status indicator in the status display panel indicate that the battery is fully charged?

Yes. The problem is resolved. Turn on the computer.

No. You may have a defective battery. Go to step 9.

9. If a fully charged spare battery is available, install it in the computer.

10. Turn on the computer. Does the battery status indicator appear in the status display panel?

Yes. Your original battery 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.)

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 and contrast of the display. If the display still does not show an image, call Dell for technical assistance. (See Chapter 5, “Getting Help,” for instructions.)

NOTE: Contrast cannot be adjusted on an active-matrix color display.

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 appears in the status display panel as the computer performs this check on a diskette drive in the options bay. If the diskette drive is being used as an external device, the activity indicator lights up on the front of the drive during POST.)

If the drive fails POST or if the access indicators do not appear, 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 by pressing <CTRL><ALT>. Does the diskette-drive access indicator appear in the status display panel 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 diskette-drive access indicator appear in the status display panel 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 diskette-drive access indicator appear in the status display panel (or on the front of the drive if it is being used externally) 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 CD-ROM/hard-disk 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. **Install the CD-ROM drive in the options bay. Reboot the computer by pressing the <CTRL><ALT> key combination. Does the CD-ROM/harddisk drive access indicator appear in the status display panel 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 CD-ROM/hard-disk drive access indicator appear in the status display panel 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 CD-ROM/hard-disk drive access indicator appear in the status display panel?**

Yes. Go to step 4.

No. Go to step 7.

4. **Reinstall the hard-disk drive. Then check the config.sys file (in the Microsoft Windows 95 operating system, 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. **Insert a bootable diskette into drive A, and reboot the computer.**

6. **Type d: and press <ENTER>. Then type dir and press <ENTER>. Does MS-DOS display the root directory contents for drive D?**

Yes. The problem is resolved.

No. Go to step 7.

7. **Insert your Dell diagnostics diskette into drive A, 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 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 by pressing <CTRL><ALT>. Does the CD-ROM/hard-disk drive access indicator appear in the status display panel 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. Go to step 2.

2. **Insert a bootable diskette into drive A, and reboot the computer.**

3. **Type `c:` and press <ENTER>. Then type `dir` and press <ENTER>. Does MS-DOS display the root directory contents for drive C?**

Yes. Go to step 5.

No. Go to step 4.

4. **If your hard-disk drive has more than one logical drive, type `d:` and press <ENTER>. Then type `dir` and press <ENTER>. Does MS-DOS display the root directory contents for drive D?**

Yes. You may have a corrupted boot sector or file allocation table (FAT) on drive C. Go to step 8.

No. 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 accompanied your operating system.

No. Go to step 6.

6. **Insert your diagnostics diskette into drive A, and reboot the computer. Then run the Hard-Disk Drives (Non-SCSI) Test Group. Does your drive pass all the tests?**

Yes. Go 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, go to step 8.

No. Go to step 8.

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

See Chapter 5, “Getting Help,” for instructions.

Troubleshooting an External Keyboard

When you attach an external keyboard, the built-in keyboard is fully functional except for the embedded numeric keypad. During POST, the computer checks whether an external keyboard is connected; if it is, the computer recognizes both the built-in keyboard and the external keyboard. If an attached external keyboard 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:

1. **Make sure the cable from the external keyboard is firmly connected to the keyboard/mouse connector on the back of the computer.** (See “Checking Connections” found earlier in this chapter.)
2. **If you are using a keyboard that can be configured 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. **Turn off the computer, wait one minute, and then turn it on again. During the boot routine, do the Num Lock, Caps Lock, and Scroll Lock indicators on the external keyboard blink momentarily?**

Yes. Go to step 4.

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

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

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

Yes. The problem is resolved.

No. Go to step 5.

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

6. **Turn on the computer. Does the computer recognize 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. If you cannot isolate the problem after running the diagnostics, call Dell for technical assistance.

No. Go to step 7.

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

See Chapter 5, “Getting Help,” for instructions.

Troubleshooting Memory

During POST, the computer checks the computer’s memory, and then writes to and reads from the number of available bytes to ensure proper operation. If the memory count displayed 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:

1. **Reboot the computer. Does the random-access memory (RAM) count displayed correctly match the actual amount of memory installed in the computer?**

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

No. Go to step 2.

2. **Reseat (remove and reinstall) any installed memory modules in your computer.**

A loose or disconnected memory module may cause intermittent memory problems. Removing and reinstalling, or *reseating*, a memory module often corrects the problem.

To remove a memory module, *carefully* spread apart the *inner* metal tabs of 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 module down until it clicks into place. If you do not hear a sharp click, remove the memory module and reinstall it.

3. **Reboot the computer. Does the RAM count complete?**

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

No. Go to step 4.

4. **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.

NOTE: The highest video resolution supported by your built-in display is 800 x 600 pixels. If your application program uses a higher resolution, you must attach an external video graphics array (VGA) monitor to your computer.

1. **If the computer is running, press any key on the built-in keyboard. Is the full display readable?**

Yes. The computer was in standby or suspend mode. The problem is resolved.

No. Go to step 2.

2. **Is an external monitor connected to the computer?**

Yes. Go to step 3.

No. Go to step 4.

3. **Press the <FN><F8> key combination. Is the full display readable?**

Yes. The Video Mode option in the Setup program was set to **CRT MODE**.

No. Go 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. Go to step 7.

No. Go to step 9.

7. Use the <FN><↓> or <FN><↑> key combination to adjust the brightness. Use the <FN><←> or <FN><→> key combination to adjust the contrast. Is the full display readable?

NOTE: Contrast cannot be adjusted on an active-matrix color display.

Yes. Go to step 8.

No. Go to step 9.

8. Has an error message appeared on the display, or has a beep code sounded?

Yes. Refer to Table 3-2 or Table 3-3 to find the message or beep 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. Then call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

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

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

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

No. The computer's video controller on the system board may be defective. Call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

Troubleshooting an External Monitor

During POST, the computer checks to see if an external monitor is attached to the computer. If no image appears on the external monitor 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. Is the VIDEO MODE option in the Setup program set to LCD MODE?

Yes. If the VIDEO MODE option is set to LCD MODE, the computer ignores the presence of an external monitor at start-up. Go to step 2.

No. Go to step 2.

2. Press the <FN><F8> key combination on the built-in keyboard several times. Does an image appear on the external monitor?

Yes. The problem is resolved.

No. Go to step 3.

3. Make sure the external monitor's video cable is firmly connected to the computer's external-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.

4. Turn off the computer, wait a minute, and then turn the computer back on. Adjust the monitor's brightness and contrast controls. Is the monitor readable?

Allow one minute for the computer to initialize its components.

Yes. The problem is resolved.

No. Go to step 5.

5. Raise the display into viewing position, if necessary, and press <FN><F8> to switch the video image from the external monitor to the display.

6. Use the <FN><↓> or <FN><↑> key combination to adjust the brightness. Use the <FN><←> or <FN><→> key combination to adjust the contrast. Is the full display readable?

NOTE: Contrast cannot be adjusted on an active-matrix color display.

Yes. The external monitor may be defective. Go to step 7.

No. The video controller on the system board may be defective. Call Dell for technical assistance. (See Chapter 5, "Getting Help," for instructions.)

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

If you do not have another external monitor, call Dell for technical assistance. (See Chapter 5, “Getting Help,” for instructions.)

8. **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 the Serial and Parallel Ports

This section provides a procedure for troubleshooting the computer’s serial and parallel ports (shown in Figure 3-4) and any attached peripheral devices.

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 options in the Peripherals menu of the Setup program.**

For information on the Setup program, see the topic titled “Setup Program” in the online *System User’s Guide*. Are the communication port options set correctly for the peripheral devices connected to the computer?

Yes. Go to step 3.

No. Go to step 2.

2. **Change the SERIAL PORT and PARALLEL MODE options to the appropriate settings, and then reboot the system.**

Is the problem resolved?

Yes. The problem is resolved.

No. Go to step 3.

3. **Check the contents of your 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. Go 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. The problem is resolved.

No. Go to step 5.

- 5. Insert your diagnostics diskette into drive A, reboot the computer, and run the Serial/Infrared Ports Test Group and/or the Parallel Ports Test Group in the Dell diagnostics. (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. Go to step 6.

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

- 6. If the problem persists, go to “Troubleshooting a Parallel Printer” or “Troubleshooting a Serial I/O Device” found later in this chapter.**

Troubleshooting a Parallel Printer

If the preceding procedure, “Troubleshooting the Basic I/O Functions,” indicates that the problem is with a parallel printer, use the following procedure:

- 1. Turn off the parallel printer and computer.**
- 2. Swap the parallel printer’s interface cable with a known working cable.**
- 3. Turn on the parallel printer and computer.**
- 4. Attempt a print operation on the parallel printer.**

Does the print operation complete successfully?

Yes. You probably need a new interface cable. Call Dell for technical assistance. (See Chapter 5, “Getting Help,” for instructions.)

No. Go to step 5.

- 5. Run the parallel printer’s self-test.**

Does the self-test complete successfully?

Yes. Go to step 6.

No. The printer is probably defective. If you bought the printer from Dell, call Dell for technical assistance. (See Chapter 5, “Getting Help,” for

instructions.) If you purchased the printer elsewhere, take it to one of the manufacturer’s authorized service centers for repair.

- 6. Attempt another print operation on the parallel printer.**

Does the print operation complete successfully?

Yes. The problem is resolved.

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

Troubleshooting a Serial I/O Device

If the procedure titled “Troubleshooting the Basic I/O Functions” found earlier in this section indicates that the problem is with a device connected to one of the serial ports, use the following procedure:

- 1. Save any open application programs, and then turn off the computer and the serial device.**
- 2. Swap the device’s interface cable with a known working cable.**
- 3. Turn on the computer and the serial device.**

Is the problem resolved?

Yes. You probably need a new interface cable. Call Dell for technical assistance. (See Chapter 5, “Getting Help,” for instructions.)

No. Go to step 4.

- 4. Turn off the computer and the serial device, and swap the device with a comparable working device.**

For example, if your serial mouse has a problem, swap it with a serial mouse you know is working properly.

- 5. Turn on the computer and the serial device.**

Is the problem resolved?

Yes. You probably need a new device. 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 the Infrared Port

This section provides a procedure for troubleshooting the computer's infrared (IR) port.

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

1. Check the setting for the INFRARED option in the Peripherals menu of the Setup program.

For information on the Setup program, see the topic titled "Setup Program" in the online *System User's Guide*. Is the **INFRARED** option set correctly for the external device with which you are communicating?

Yes. Go to step 3.

No. Go to step 2.

2. Change the INFRARED option to the appropriate settings, and then reboot the system.

Is the problem resolved?

Yes. The problem is resolved.

No. Go to step 3.

3. Insert your diagnostics diskette into drive A, reboot the computer, and run the Serial/IR 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 port is 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 with the external device.

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

Troubleshooting the Touch Pad

This section provides a procedure for troubleshooting the computer's built-in touch pad.

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

1. Check the setting for the TOUCH PAD option in the Peripherals menu of the Setup program.

For information on the Setup program, see the topic titled "Setup Program" in the online *System User's Guide*. Is the **TOUCH PAD** option set to **ENABLED**?

Yes. Go to step 3.

No. Go to step 2.

2. Change the TOUCH PAD option to ENABLED, and then reboot the system. Does the touch pad work properly?

Yes. The problem is resolved.

No. Go to step 3.

3. Insert your diagnostics diskette into drive A, reboot the computer, and run the Mouse Test in the Dell diagnostics. (See Chapter 4, "Running the Dell Diagnostics.") Do the tests complete successfully?

The Mouse Test checks the functionality of the mouse controller (which affects the ability to move the pointer around the screen) and the operation of the touch pad buttons.

Yes. The controller is functioning properly. If the problem persists, 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 Audio Functions

This section provides a procedure for troubleshooting the computer's sound functions.

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

1. Press <FN><END>. Does the built-in speaker emit a beep?

Yes. All sound functions had been muted. Pressing <FN><END> turns the sound on. The problem is resolved.

No. Go to step 2.

2. Press <FN><END> again. Then press <FN><PAGE UP> several times. Can you hear sound coming from the built-in speaker?

Yes. The volume was too low. Pressing the <FN><PAGE UP> key combination increased the volume. The problem is resolved.

No. Go to step 3.

3. Insert your diagnostics diskette into drive A, reboot the computer, and run the Audio Tests in the Dell diagnostics. (See Chapter 4, "Running the Dell Diagnostics.") Do the tests complete successfully?

The Audio Tests check the functionality of the audio controller.

Yes. The controller is functioning properly. If the problem persists, 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.)

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 Dell 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 what 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 on line.**
- 3. Confirm the computer's system configuration information, and enable all its components and devices, such as ports.**
For instructions, see the topic titled "Setup Program" in the online *System User's Guide*.
- 4. Disable all system setup options for power management.**
For instructions, see the topics titled "Using the PowerPanel" and "Setup Program" in the online *System User's 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:

- 1. Install a CD-ROM drive in the options bay.**
For instructions, see the topic titled "Options Bay" 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 "Parallel Devices" 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.

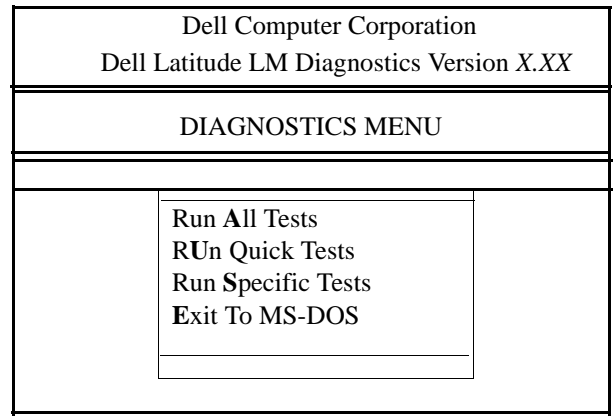


Figure 4-1. Diagnostics Menu

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.

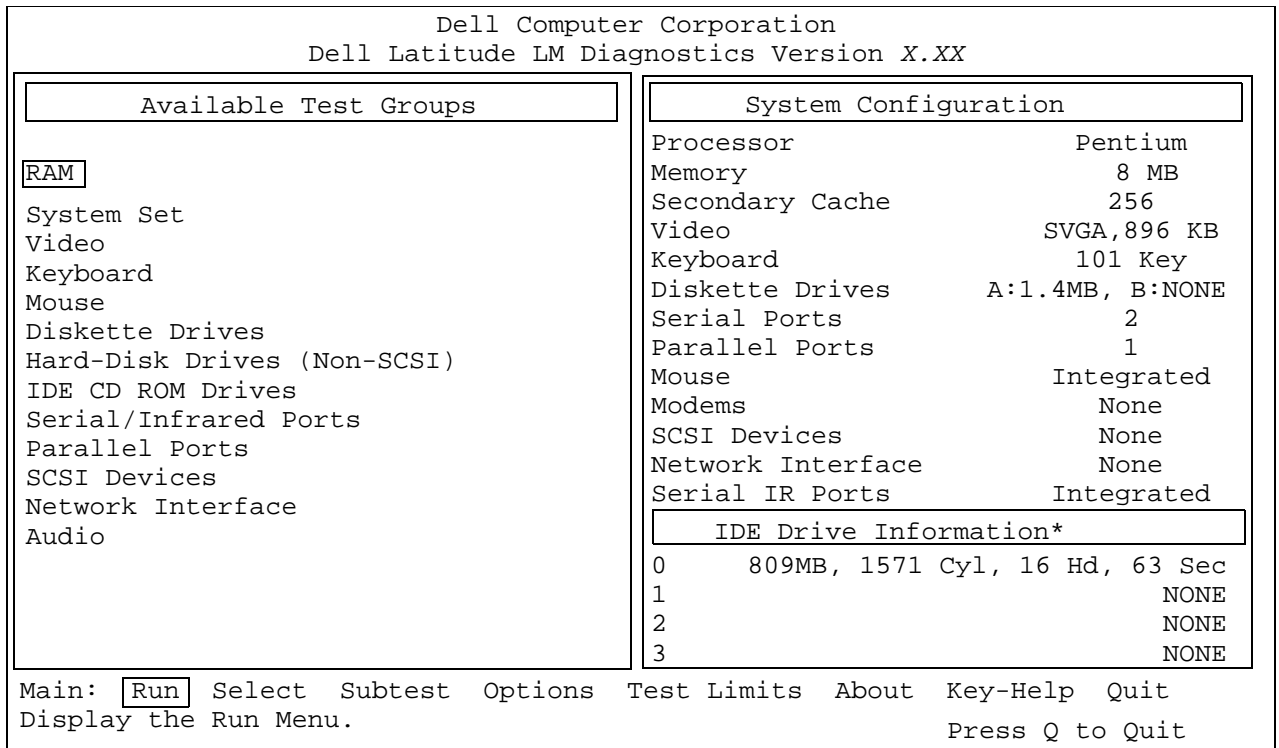
To select an option from the Diagnostics Menu, highlight the option and press <ENTER>, or press the key that corresponds to the highlighted letter in the option.

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 the **RUN** menu option and then the **ALL** menu option. 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.
- Two lines at the bottom of the screen make up the menu area. 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 (or plug one in if you are running the tests from battery power), and do not reboot the computer. Interrupting the tests in any of these ways could lead to the loss of system data.



* On the Dell Latitude LM, a CD-ROM drive installed in the options bay is recognized as IDE Drive 1.

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 subtests selected within

the test groups that you selected. (Select test groups or subtests within test groups with the **SELECT** or **SUBTEST** options, 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 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 are run. (The subtests are sun 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 then 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 this 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 this 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 of the 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 <i>status</i> 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 <i>error</i> 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. 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:

- Your interaction is needed to verify the Video Test Group screens, the Keyboard Test Group key functions, or other types of interaction such as inserting a diskette.
- The maximum error limit is reached.

To continue testing, press any key.

If the **PAUSE** 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 the **PAUSE** 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. **Use the <CTRL><ALT> key combination to 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 highlighted test group (from the Main menu) or a 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, return to the main screen of the diagnostics by pressing the <ESC> key. 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 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 by pressing <CTRL><ALT>.

CAUTION: It is important that you quit the diagnostic 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	Tests the RAM.
System Set	CMOS Confidence Test DMA Controller Test Real-Time Clock Test System Speaker Test Secondary Cache Test System Timers Test Interrupt Controller Test Coprocessor Calculation Test Coprocessor Duty Cycle Test Coprocessor Error Exception Test PC Card 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. Tests the math coprocessor that is internal to the microprocessor. Tests the PC Card controller on the system board.
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 monitor 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 <i>stick</i> or respond incorrectly.
Mouse	Mouse Test	Tests the electronic pointing device (integrated touch pad, external serial or 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.
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.

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
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 ports, such as communications devices, send and receive data.
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 Dell Latitude XP/XPi Advanced Port Replicator and all the SCSI devices attached to it. This test group does not apply to the Dell Latitude LM.
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 XP/XPi Advanced Port Replicator. This test group does not apply to the Dell Latitude LM.
Audio	Software Reset Test Compatibility ID Test Interrupt Test DMA Test FIFO RAM Test Initial Reset Status Test Internal Register Test Dual Channel 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.

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 so that you can 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 <i>number</i>	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 <i>number</i>	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 <i>hexadecimal memory address</i>	Starts the test at this hexadecimal address. Valid hexadecimal values are 0 to the highest memory address. The default value is 0.
-e <i>hexadecimal memory address</i>	Stops the test at this hexadecimal address. Valid hexadecimal values are 0 to the highest memory address. The default is the highest memory address.
-o [<i>f filename.p</i>]	Outputs the test report to a file (f) or a printer (p). If you output to a file, append the <i>filename</i> 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 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

Two subtests are available for RAM: the Quick Test and the Comprehensive 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 one time. This subtest checks all available RAM. 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 subtests that constitute the System Set Test Group and the computer functions they confirm follow:

- **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.
- **Secondary Cache Test**
Confirms the functionality of the secondary (external) cache on the system board.
- **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 Duty Cycle Test**

Tests the math coprocessor's ability to perform complex mathematical operations.

- **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.

- **Thermal Control Test**

Checks the functionality of the thermal-monitoring and microprocessor speed-switching device on the system board. This test does not apply to the Dell Latitude LM.

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 the 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, the Color Palettes Test, and the 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 the 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 default 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 keyboard subtests 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 Group.

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 options 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—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 diskette drive 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 when it is installed in the options bay. Before conducting an IDE CD ROM test, insert into the CD-ROM drive a CD with audio and data tracks (such as a multimedia CD).

NOTES: Before running the IDE CD ROM Drives Test Group, install the CD-ROM drive in the options bay and attach the diskette drive to the parallel connector on the back of the computer. If you do not have a CD-ROM drive in the options bay and the diskette drive attached to the parallel port, the subtests fail.

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 the 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 Port 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** options in the Peripherals Menu of the Setup program to see if the port has been disabled. For instructions, see the topic titled "Peripherals Menu" in the online *System User's Guide*. 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.

If the external device is not properly installed through software, the device also 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/IR Baud Rate Test**
Checks the baud rate generator in each serial communications chip against the computer's clock
- **Serial/IR Interrupt Test**
Checks the serial port's ability to send IRQs to the microprocessor
- **Serial/IR 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 paral-

lel 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** system setup option to see if the port has been disabled. For instructions, see the topic titled "Peripherals Menu" in the online *System User's Guide*. 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. If the external device is not properly installed through software, it also 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 Dell Latitude Advanced Port Replicator and the SCSI devices attached to it.

NOTE: The SCSI Devices Test Group does not apply to the Dell Latitude LM.

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 Advanced Port Replicator. They test the controller's internal functions, including read and write access to its registers and internal transmit and receive (loopback) capability.

NOTE: The Network Interface Test Group does not apply to the Dell Latitude LM.

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 than 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, make sure to enable the built-in speaker(s), and make sure that the speaker volume has not been muted.

Subtests

The 11 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
- **Compatibility ID Test**
Determines if the correct sound controller is installed for your system
- **Interrupt Test**
Checks to see if 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

- **FIFO RAM Test**

Checks the read/write capabilities and status of the audio controller

- **Initial Reset Status Test**

Verifies the reset values of the extended registers on the audio controller

- **Internal Register Test**

Writes test patterns to the internal registers of the audio controller, then reads other registers to confirm that the patterns are correctly interpreted

- **Dual Channel Test**

Confirms the presence of a second DMA channel on the system chip set and determines if the DMA controller and audio controller can exchange signals on that second DMA channel

NOTE: The Dual Channel Test is performed only on Dell Latitude XPi systems.

- **FM Sound Playback Test**

Tests whether the system can synthesize sounds and play them through the built-in speaker(s)

- **Analog Sound Playback Test**

Tests whether the system can play sampled sounds through the built-in speaker(s)

- **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*.

Chapter 5

Getting Help



This chapter describes the tools Dell provides to help you when there is a problem with the 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.

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 or group in the Windows 95 or Windows 3.x operating system, respectively.

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 4, “Running the Dell Diagnostics,” for instructions on using the diagnostics.

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 Diagnostics Checklist, document any error messages or beep codes as they occur so you can inform the Dell technician of them. Describe what was happening when the error occurred. Note the steps you took to solve the problem.

5. Call the Dell for help with installation and troubleshooting procedures.

For instructions, see “Dell Contact Numbers” found later in this chapter. When you call, you can ask to speak to a technician, or you can use the AutoTech service. For instructions on using AutoTech, see “AutoTech Service” 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	<i>Dell Q&A</i> , Customer Technical Support
Information about Dell, its products, and its services	TechFax SM service, World Wide Web on the Internet
Installation instructions	Online <i>System User's Guide, Reference and Troubleshooting Guide</i> , Customer Technical Support, AutoTech service
Interrupt maps	TechFax service
Ordering parts	Customer Technical Support, TechConnect BBS
Software update information	TechFax service
Technical notes on system compatibility and revisions	TechFax service
Technical training class information	TechFax service
Technical specifications	TechFax service, online <i>System User's Guide, Reference and Troubleshooting Guide</i>
Troubleshooting, step-by-step instructions	<i>Reference and Troubleshooting Guide</i> , Dell diagnostics, Customer Technical Support, AutoTech service
Unresolved problems requiring assistance from a Dell technician	Customer Technical Support, 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

Dell anticipates your questions by providing the *Dell Q&A*, a Windows-based online file that answers questions that are often asked by Dell computer users. Look for the Dell Q&A icon in the Dell Accessories folder or group.

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/>
- 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
- Electronic Quote Service
sales@dell.com
- Electronic Information Service
info@dell.com

Commercial Online Services

Dell can also be accessed electronically via commercial online services, such as CompuServe®, PRODIGY®, America Online, and the Microsoft Network, by using the following addresses:

- CompuServe
Type GO DELL.
- PRODIGY
Select **MANUFACTURER'S CORNER**; then select **DELL**.
- America Online
Use the keyword DELL.
- Microsoft Network
From the Edit menu, select **GO TO**, select **OTHER PLACES**, and then type DELL.

Dell Diagnostics Program

Every Dell computer comes with Dell diagnostics that can help you determine what is wrong with the computer when it does not operate correctly. This program provides valuable information that can help you fix the problem, or can help 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 it 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 Windows 95 and Windows 3.x
- 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 Customer Technical Support. For the telephone number to call, see Table 5-3.

NOTE: AutoTech is not always available in all locations outside the continental United States. 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 Table 5-3.

NOTE: TechFax is not always available in all locations outside the continental United States. Please call your local Dell representative for information on availability.

TechConnect BBS

Use your modem to access Dell's TechConnect 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 to the *Dell Directory*

For the BBS telephone number, see Table 5-3.

NOTE: The Dell TechConnect BBS is not always available in all locations outside the continental United States. 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 Table 5-3.

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 Table 5-3.

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 Table 5-3.

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 Table 5-3.
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.

Include return shipping expenses. You are responsible for insuring any product returned, and you assume the risk of loss during shipment to Dell Computer Corporation. Cash-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 filled-out 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.

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.

Diagnostics Checklist

Name: _____ Date: _____

Address: _____ Phone no.: _____

Service tag (bar code on the back of the computer): _____

Return Material Authorization Number (if provided by support technician): _____

Operating system and version: _____

Peripherals: _____

PC Cards: _____

Are you connected to a network? yes no

Network, version, and network card: _____

Programs and versions: _____

Error message or beep code: _____

Description of problem and troubleshooting procedures you performed: _____

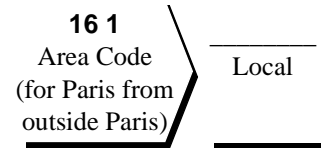
Figure 5-1. Diagnostics Checklist

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
Canada (North York, Ontario)	011	—	Not required
Czech Republic (Prague)	00	42	2
Denmark (Horsholm)	009	45	Not required
Finland (Helsinki)	990	358	0
France (Paris) (Montpellier)	19	33	(1) (67)
Germany (Langen)	00	49	6103
Hong Kong	001	852	Not required
Ireland (Bray)	16	353	1
Italy (Milan)	00	39	2
Japan (Tokyo)	001	81	3
Korea (Seoul)	001	82	2
Luxembourg	00	—	—
Malaysia (Penang)	007	60	—
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
Spain (Madrid)	07	34	1
Sweden (Upplands Vasby)	009	46	8
Switzerland (Geneva)	00	41	22
U.K. (Bracknell)	010	44	1344
U.S. (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		toll free: 1-800-808-378
	Customer Care		toll free: 1-800-819-339
	Sales		toll free: 1-800-808-312
	Fax		toll free: 1-800-818-341
Austria* (Vienna)	Switchboard		0224334100-0
	Technical Support		0660-8779
Belgium* (Brussels)	Customer Technical Support		toll free: 0800 14856
	Customer Service	02 . . . . .	.466 91 99
	Sales		toll free: 0800 16884
	SalesFax	02 . . . . .	.466 47 89
	TechFax (International call to the Netherlands) . . . . .		.00 31 206829106
	TechConnect BBS (International call to the Netherlands). . . . .		.00 31 206866504

* 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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Canada (North York, Ontario) <i>NOTE: Customers in Canada call the U.S. for access to TechConnect BBS.</i>	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: 1-800-247-9349
	Customer Account Services (Credit Return Authorization Numbers)		toll free: 1-800-387-5759
	Sales (Direct sales—from outside Toronto).		toll free: 1-800-387-5752
	Sales (Direct sales—from within Toronto)	416	758-2200
	Sales (Software and peripherals)		toll free: 1-800-667-7345
	Sales (Federal government, education, and medical)		toll free: 1-800-567-7542
	Sales (Major accounts)		toll free: 1-800-387-5755
	TechConnect BBS	512	728-8528
	TechFax		toll free: 1-800-950-1329
Czech Republic* (Prague)	Technical Support	02	8728 221
	Customer Service and Sales.	02	879250
	TechConnect BBS	02	66710274

* 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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
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
France* (Paris/Montpellier)	Technical Support (Paris)	16 1	47 62 68 90
	. . . . .		67 06 62 86
	Technical Support (Other systems)		05 00 96 88
	Customer Care (Paris)	16 1	47 62 69 39
	Customer Care (Fax) (Paris)	16 1	47 62 60 03
	Customer Care (Fax) (Montpellier)	16	06 60 03
	TechFax (Montpellier)	16	22 53 11
	TechConnect BBS (Montpellier)	16	22 53 04
	Sales (Major accounts) (Paris)	16 1	47 62 69 00
	Direct Sales (Paris)	16 1	47 62 68 50
			47 62 68 68
	Corporate Sales (Paris)	16 1	47 62 69 00
Germany* (Langen)	Customer Technical Support	06103	971-200
	Customer Care	06103	971-500
	TechConnect BBS	06103	971-666
	Sales	06103	971-460
Hong Kong	Customer Technical Support		toll free: 800 4107
	Sales		toll free: 800 4109

* 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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
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
Italy* (Milan)	Customer Technical Support		toll free: 1678-74413
	Customer Care		toll free: 1678-74482
	Sales		toll free: 1678-74492
Japan (Tokyo)	Technical Support	03	5466-3386 toll free: 0120-1984-39
	Customer Service		toll free: 0120-1984-99
	Sales		toll free: 0120-1984-86
Korea (Seoul)	Technical Support		toll free: 080-200-3800
	Customer Service and Sales		toll free: 080-200-3600
	Fax		394 3122
	Switchboard		287 5600
Latin America <i>NOTE: Customers in Latin America call the U.S. for sales and technical assistance.</i>	Customer Technical Support	512	728-4093
	Customer Service	512	728-3619
	Fax (Technical Support and Customer Service)	512	728-3883
	Sales	512	728-4397
	SalesFax	512	728-4600
			728-3772

* 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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Luxembourg* <i>NOTE: Customers in Luxembourg call Belgium for sales, customer assistance, and technical assistance, and they call the Netherlands for the SalesFax, TechFax, and TechConnect BBS services.</i>	Customer Technical Support (Brussels, Belgium)		toll free: 0800 2109
	Customer Service (Brussels, Belgium)	02 . . . . .	.466 91 99
	Sales (Brussels, Belgium)		toll free: 0800 16884
	SalesFax (Brussels, Belgium)	02 . . . . .	.466 47 89
	TechFax (Amsterdam, Netherlands) . . . . .		.682 91 06
	TechConnect BBS (Amsterdam, Netherlands) . . . . .		.686 65 04
Malaysia (Penang)	Customer Technical Support		toll free: 800 8298
	Sales		toll free: 800 8202
Mexico (Colonia Granada) <i>NOTE: Customers in Mexico call the U.S. for access to the Automated Order-Status System and AutoTech.</i>	Automated Order-Status System (U.S.)	512	728-0685
	AutoTech (U.S.) (Automated technical support)	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		toll free: 06-0996663
	Direct Sales		toll free: 06-0663
	Direct SalesFax	020	682 7171
	Corporate Sales	020	581 8818
	Corporate SalesFax	020	686 8003
	TechFax	020	682 9106
	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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
New Zealand	Technical Support . . . . .		.0800 446 255
	Sales . . . . .		.0800 441 567
	Fax		0 800 441 566
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)	Customer Technical Support		toll free: 800 6011 051
	Sales		toll free: 800 6011 054
South Africa (Johannesburg)	Switchboard . . . . .		.011 447-7567
	Fax . . . . .		.011 447 7549
Southeast Asian/ Pacific Countries (excluding Australia, Hong Kong, Japan, Malaysia, New Zealand, and Singapore—see individual listings for these countries)	Customer Technical Support		60 4 810-4977
	Sales		60 4 810-4988
Spain* (Madrid)	Technical Support . . . . .		.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

* 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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
Sweden* (Upplands Vasby)	Technical Support	08	5900 5199
	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
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.).

Table 5-3. Dell Contact Numbers (Continued)

Country	Department Name or Service	Area Code	Local Number or Toll-Free Number
U.S. (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:		
	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
	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
	Dell Sales		toll free: 1-800-247-4618
	Spare Parts Sales:		
	Dell Direct		toll free: 1-800-274-1490
	Major Accounts		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	

* 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.).

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
Microprocessor speed	100 or 133 MHz
Internal cache memory	16 KB
External cache memory	256-KB write-back SRAM
Math coprocessor	internal to the microprocessor
Chip Set and Bus	
System chip set	Intel 430MX PCIset
Data bus width	64 bits
DRAM bus width	64 bits
Address bus width.	32 bits
Flash EPROM.	2 Mbits
PC Card	
PCI controller	Cirrus Logic CL-PD6730, 2.01-compatible
PC Card connectors	two (supports two type I or type II cards or one type III card)
Cards supported	3.3-V and 5-V
PC Card connector size.	68 pins
Data width (maximum).	32 bits

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)

Memory	
Architecture	fast-page mode, two-way interleaved
Memory module capacities	4, 8, and 16 MB; must be installed in matched pairs (two 4-MB modules, two 8-MB modules, or two 16-MB modules)
Standard RAM	8 MB on system board
Maximum RAM	40 MB
Memory access time:	
tRAC	70 ns
tCAC	20 ns
BIOS address	F000:0000

Connectors	
Serial (DTE)	one 9-pin connector; 16,550-compatible, 16-byte buffer
Parallel	one 25-hole connector; unidirectional, bidirectional, EPP 1.9, or ECP
Monitor	one 15-hole connector
PS/2 keyboard/mouse	one 6-pin mini-DIN connector
Infrared	one infrared port
Expansion connector	240 pins
Audio	microphone headphones/speakers

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)

Audio	
Audio type.	SoundBlasterPro-compatible voice and music functions
Audio controller	ESS 1688
Conversion	16 bit (stereo analog-to-digital and digital-to-analog)
FM music synthesizer	20-voice, 72-operator
Interfaces:	
Internal.	ISA bus
External	microphone (minijack; mono) headphones/speakers out (minijack)
Internal speaker amplifier	0.5 W stereo
Controls.	volume can be controlled through key combinations and software application menus

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	64-bit (128-bit hardware-accelerated) PCI
Video controller	NeoMagic 2070
Video memory	896 KB

Active-Matrix Display	
Type	active-matrix color (TFT)
Dimensions:	
Height	184.5 mm (7.3 inches)
Width	246.0 mm (9.7 inches)
Diagonal	307.5 mm (12.1 inches)
Maximum resolution	800 x 600 pixels; 256 colors
Response time (typical)	60 ms
Operating angle	0° (closed) to 135°
Dot pitch	0.31 mm
Power consumption	2.35 W
Controls	brightness can be controlled through key combinations

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)

Dual-Scan Display	
Type.....	dual-scan color (STN)
Dimensions:	
Height	172.8 mm (6.8 inches)
Width	230.4 mm (9.1 inches)
Diagonal.....	287.0 mm (11.3 inches)
Maximum resolution.....	800 x 600 pixels; 256 colors
Response time (typical)	300 ms
Operating angle.....	0° (closed) to 135°
Dot pitch	0.29 mm
Power consumption.....	3.4 W
Controls.....	brightness and contrast can be controlled through key combinations
Keyboard	
Number of keys.....	87 (U.S. and Canada); 88 (Europe); 89 (Japan)
Key travel	3.0 ± 0.5 mm (0.12 ± 0.02 inch)
Key spacing.....	19.1 mm (0.75 inch)
Layout.....	QWERTY/AZERTY/Kanji

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)	20 points/mm (500 points/inch)
Size:	
Thickness	4.65 mm (0.18 inch) at highest component
Width	62.1-mm (2.4-inch) sensor-active area
Height	49.0-mm (1.9-inch) rectangle with 0.5-mm (0.02-inch) tabs
Weight	15 g (0.52 ounce) ± 0.5 g (0.001 ounce)
Power:	
Supply voltage	5 V ± 10%
Supply current	4 mA (maximum operating current)

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)

Main Battery	
Type	lithium ion
Dimensions:	
Height	22.0 mm (0.86 inch)
Depth	219.0 mm (8.62 inches)
Width	57.8 mm (2.27 inches)
Weight	0.44 kg (0.97 lb)
Voltage	10.8 VDC
Capacity	42 WH
Charge time (approximate): ¹	
Computer on	4 hours
Computer off	3 hours
Operating time ¹ (approximate, with no power management features enabled)	
	3 to 5 hours with one battery; 6 to 10 hours with two batteries
Life span (approximate) ¹	500 discharge/charge cycles
Temperature range:	
Charge	0° to 40°C (32° to 104°F)
Discharge	0° to 60°C (32° to 140°F)
Storage	-20° to 50°C (-4° to 122°F)

¹ *Battery performance features such as charge time, operating 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 264 VAC
Input current (maximum)	1.0 A at 100 VAC, full load
Input frequency	47 to 63 Hz
Output current	2.6 A (continuous)
Output power	34 W
Rated output voltage	16.2 VDC
Height	27.0 mm (1.06 inches)
Width	60.0 mm (2.36 inches)
Depth	107.5 mm (4.23 inches)
Weight (with cables)	0.3 kg (0.66 lb)
Temperature range:	
Operating	5° to 35°C (41° to 95°F)
Storage	-20° to 50°C (-4° to 122°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 (Computer)	
Height	49.5 mm (1.95 inches)
Width.	299.9 mm (11.8 inches)
Depth.	226.7 mm (8.93 inches)
Weight (with hard-disk drive, diskette drive, battery, and two PC Card blanks):	
Dell Latitude LM P-100SD	3.1 kg (6.9 lbs)
Dell Latitude LM P-133ST	3.1 kg (6.9 lbs)

Environmental (Computer)	
Temperature:	
Operating	5° to 35°C (41° to 95°F)
Storage	-20° to 50°C (-4° to 122°F)
Relative humidity	10% to 90% (noncondensing)
Maximum vibration:	
Operating	0.51 GRMS using a random-vibration spectrum that simulates air shipment
Storage	1.1 GRMS using a random-vibration spectrum that simulates truck shipment

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) (Continued)

Maximum shock:²

Operating 1.52 m/sec (4.98 feet/sec)
(less than or equal to a pulse width of 2 ms)

Storage 2.03 m/sec (6.66 feet/sec)
(less than or equal to a pulse width of 2 ms)

Altitude:

Operating 0 to 2438 m (0 to 8,000 ft)

Storage 0 m to 12,192 m (0 ft to 40,000 ft)

² Measured with the hard-disk drive 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.

Appendix B

Diagnostic Video Tests



The Video Test Group of the diskette-based 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.

***V*ideo 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.

***V*ideo 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.

***T*ext 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.

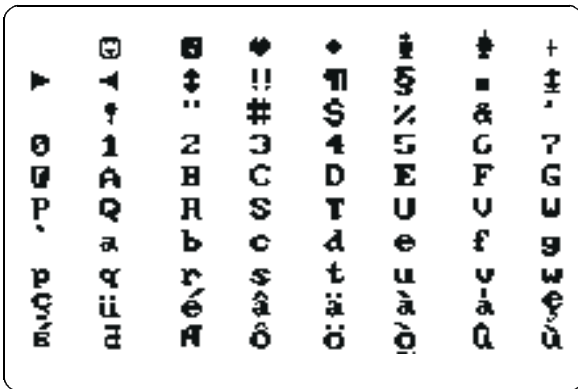


Figure B-1. 80-Column x 25-Line Character Set Subtest Screen

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.

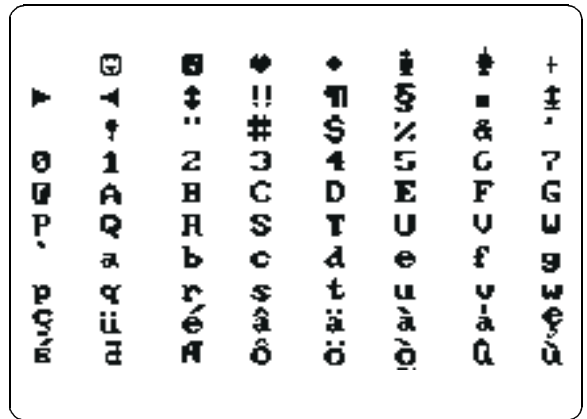


Figure B-2. 40-Column x 25-Line Character Set Subtest Screen

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

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

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)

NOTE: This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. This equipment has been tested and found to comply with the limits for a Class B digital device pursuant to Part 15 of the 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.

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.

Note that FCC regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

A Notice About Shielded Cables: Use only shielded cables for connecting peripherals to any Dell device to reduce the possibility of interference with radio and television reception. Using shielded cables ensures that you maintain the appropriate FCC certification for a Class B device of this product. For parallel printers, a cable is available from Dell Computer Corporation.

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 computer systems (and other Dell digital apparatus) are classified by the Industry Canada (IC) Interference-Causing Equipment Standard #3 (ICES-003) as Class B digital devices. To determine which classification (Class A or B) applies to your computer (or other Dell digital apparatus), examine all registration labels located on the bottom or the back panel of your computer (or other digital apparatus). A statement in the form of “IC Class A ICES-3” or “IC Class B ICES-3” will be located on one of these labels.

Note that Industry Canada regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

This Class B (or Class A, if so indicated on the registration label) digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe B (ou Classe A, si ainsi indiqué sur l'étiquette d'enregistrement) respecte toutes les exigences du Règlement sur le Matériel 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 štítku počítače uvedeno, že spadá do třídy A podle EN 55022, spadá automaticky do třídy B podle EN 55022. Pro zařízení zarazená do třídy A (ochranné pásmo 30m) podle EN 55022 platí následující. Dojde-li k rusení telekomunikačních nebo jiných zařízení, je uživatel povinen provést taková opatření, aby rusení odstranil.

CE Notice

Marking by the symbol  indicates compliance of this Dell system to the EMC (Electromagnetic Compatibility) directive of the European Community. Such marking is indicative that this Dell system meets or exceeds the following technical standards:

- EN 55022 — “Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment.”

NOTE: EN 55022 emissions requirements provide for two classifications—Class A and Class B. If any one of the registration labels (located on the bottom or back panel of your computer, on card-mounting brackets, or on the cards themselves) carries an FCC Class A rating, the following warning applies to your system.

CAUTION: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

- EN 50082-1 — “Electromagnetic compatibility— Generic immunity standard Part 1: Residential, commercial, and light industry.”
- IEC 801-2 — “Electromagnetic compatibility for industrial-process measurement and control equipment Part 2: Electrostatic discharge requirements.” — Severity level 3.
- IEC 801-3 — “Electromagnetic compatibility for industrial-process measurement and control equipment Part 3: Radiated electromagnetic field requirements.” — Severity level 2.
- IEC 801-4 — “Electromagnetic compatibility for industrial-process measurement and control equipment Part 4: Electrical fast transient/burst requirements.” — Severity level 2.
- EN60950:1992 + Amd.1:1993 + Amd.2:1993 — Safety of Information Technology Equipment including Electrical Business Equipment.

A “Declaration of Conformity” in accordance with the above standards has been made and is on file at Dell Products Europe BV, Limerick, Ireland.

VCCI Notices (Japan only)

Most Dell computer systems are classified by the Voluntary Control Council for Interference (VCCI) as Class 2 information technology equipment (ITE). However, the inclusion of certain options changes the rating of some configurations to Class 1. To determine which classification applies to your computer system, examine the FCC classification on the registration labels located on the bottom or the back panel of your compute. If any one of the labels carries an FCC Class A designation, your entire system is considered to be VCCI Class 1 ITE. If all labels carry an FCC Class B identification number, your system is considered to be VCCI Class 2 ITE.

Once you have determined your system's VCCI classification, read the appropriate VCCI notice. Note that VCCI regulations provide that changes or modifications not expressly approved by Dell Computer Corporation could void your authority to operate this equipment.

Class 1 Notice

This equipment complies with the limits for a Class 1 digital device (devices used in commercial and/or industrial environments) and conforms to the standards for information technology equipment that are set by the Voluntary Control Council for Interference for preventing radio frequency interference in commercial and/or industrial areas.

Consequently, when used in a residential area or in an area adjacent to a residential area, this equipment may cause radio interference with radio and television receivers or other communications equipment.

To ensure that such radio interference does not occur, it is important to install and use this equipment in accordance with the manufacturer's instruction manual.

Class 2 Notice

This equipment complies with the limits for a Class 2 digital device (devices used in or adjacent to a residential environment) and conforms to the standards for information technology equipment that are set by the Voluntary Control Council for Interference for preventing radio frequency interference in residential areas.

However, this equipment does generate, use, and can radiate radio frequency energy and, if not installed and used in accordance with the manufacturer's instruction manual, may cause interference with radio and television reception. Therefore, it is important to adhere to the manufacturer's instructions for installing and using this equipment.

Korean Regulatory Notice

To determine which classification (Class A or B) applies to your computer system (or other Dell digital apparatus), examine all registration labels located on the bottom or the back panel of your computer (or other digital apparatus), on card-mounting brackets, and on the cards themselves. If any one of the labels carries a Class A rating, your entire system is considered to be a Class A digital device. If all labels carry the Class B rating, your system is considered to be a Class B digital device.

NOTE: Class A devices are for business purposes. Class B devices are for nonbusiness purposes.

Class A Device

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you may exchange it for a device that has been approved for use in residential as well as business environments.

Class B Device

Please note that this device has been approved for non-business purposes and may be used in any environment, including residential areas.

Appendix D

Warranties and Return Policy



Your Dell portable computer is covered by either a three-year limited warranty or a one-year limited warranty. Please refer to your invoice to determine which warranty applies to your system. The terms of the warranties (both for the U.S. and Canada) are provided in the following sections.

Limited Three-Year Warranty (U.S. Only)

Dell Computer Corporation (“Dell”) manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is three years beginning on the date of invoice, as described in the following text.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell’s system integration department; accessories or parts that are not installed in the Dell factory; or DellWare products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell’s

standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those sold through the DellWare program) are not covered. Batteries for portable computers are covered only during the initial one-year period of this warranty.

Coverage During Year One

During the one-year period beginning on the invoice date, Dell will repair or replace products covered under this limited warranty that are returned to Dell’s facility. To request warranty service, you must call Dell within the warranty period. Refer to Chapter 5, “Getting Help,” to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in the continental U.S. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards. Dell does not accept liability for lost data or software.

Dell owns all parts removed from repaired products. Dell uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Dell repairs or replaces a product, its warranty term is not extended.

Coverage During Years Two and Three

During the second and third years of this limited warranty, Dell will provide, on an exchange basis, replacement parts for the Dell hardware product(s) covered under this limited

warranty when a part requires replacement. You must report each instance of hardware failure to Dell Technical Support in advance to obtain Dell's concurrence that a part should be replaced and to have Dell ship the replacement part. Dell will ship parts using next-business-day delivery, shipping prepaid if you use an address in the continental U.S. Shipments to other locations will be made freight collect. Dell will include a prepaid shipping container with each replacement part for your use in returning the replaced part to Dell. Replacement parts are new or reconditioned. Dell may provide replacement parts made by various manufacturers when supplying parts to you. The warranty term for a replacement part is the remainder of the limited warranty term.

You will pay Dell for replacement parts if the replaced part is not returned to Dell within 30 days after the date the replacement part was shipped by Dell and for parts used to repair systems not covered by this limited warranty. In these events, replacement parts will be priced at Dell's then-current standard prices. Payment for these parts is due within 30 days from the date of invoice.

NOTE: You accept full responsibility for your software and data. Dell is not required to advise or remind you of appropriate backup and other procedures.

General

DELL MAKES NO EXPRESS WARRANTIES BEYOND THOSE STATED IN THIS WARRANTY STATEMENT. DELL DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. SOME STATES DO NOT ALLOW LIMITATIONS ON IMPLIED WARRANTIES, SO THIS LIMITATION MAY NOT APPLY TO YOU.

DELL'S RESPONSIBILITY FOR MALFUNCTIONS AND DEFECTS IN HARDWARE IS LIMITED TO REPAIR AND REPLACEMENT AS SET FORTH IN THIS WARRANTY STATEMENT. THESE WARRANTIES GIVE YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS, WHICH VARY FROM STATE TO STATE.

DELL DOES NOT ACCEPT LIABILITY BEYOND THE REMEDIES SET FORTH IN THIS WARRANTY STATEMENT OR LIABILITY FOR INCIDENTAL OR

CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION ANY LIABILITY FOR PRODUCTS NOT BEING AVAILABLE FOR USE OR FOR LOST DATA OR SOFTWARE.

SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE PRECEDING EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

These provisions apply to Dell's U.S. limited three-year warranty only. For provisions of any on-site service contract covering your system, refer to the separate on-site service contract that you will receive.

Limited Three-Year Warranty (Canada Only)

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is three years beginning on the date of invoice, as described in the following text. This warranty is transferrable with the warranted products.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell's system integration department; accessories or parts that are not installed in the Dell factory; or DellWare products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell's standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those

sold through the DellWare program) are not covered. Batteries for portable computers are covered only during the initial one-year period of this warranty.

Coverage During Year One

During the one-year period beginning on the invoice date, Dell will repair or replace products covered under this limited warranty that are returned to Dell's facility. To request warranty service, you must call Dell within the warranty period. Refer to Chapter 5, "Getting Help," to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in Canada. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards. Dell does not accept liability for lost data or software.

Dell owns all parts removed from repaired products. Dell uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Dell repairs or replaces a product, its warranty term is not extended, except as may be required by law.

Coverage During Years Two and Three

During the second and third years of this limited warranty, Dell will provide, on an exchange basis, replacement parts for the Dell hardware product(s) covered under this limited warranty when a part requires replacement. You must report each instance of hardware failure to Dell Technical Support in advance to obtain Dell's concurrence that a part should be replaced and to have Dell ship the replacement part. Dell will ship parts using next-business-day delivery, shipping prepaid if you use an address in Canada. Shipments to other locations will be made freight collect. Dell will include a prepaid shipping container with each replacement part for your use in returning the replaced part to Dell. Replacement

parts are new or reconditioned. Dell may provide replacement parts made by various manufacturers when supplying parts to you. The warranty term for a replacement part is the remainder of the limited warranty term.

You will pay Dell for replacement parts if the replaced part is not returned to Dell within 30 days after the date the replacement part was shipped by Dell and for parts used to repair systems not covered by this limited warranty. In these events, replacement parts will be priced at Dell's then-current standard prices. Payment for these parts is due within 30 days from the date of invoice.

NOTE: You accept full responsibility for your software and data. Dell is not required to advise or remind you of appropriate backup and other procedures.

General

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SOME 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 Canadian limited three-year warranty only. For provisions of any on-site service contract covering your system, refer to the separate on-site service contract that you will receive.

Limited One-Year Warranty (U.S. Only)

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is one year beginning on the date of invoice, as described in the following text.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell's system integration department; accessories or parts that are not installed in the Dell factory; or DellWare products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell's standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those sold through the DellWare program) are not covered.

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 within the warranty period. Refer to Chapter 5, "Getting Help," to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or

equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in the continental U.S. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards.

Dell 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.

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SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE PRECEDING EXCLUSION OR LIMITATION MAY NOT APPLY TO YOU.

These provisions apply to Dell's U.S. limited one-year warranty only. For provisions of any on-site service contract covering your system, refer to the separate on-site service contract that you will receive.

Limited One-Year Warranty (Canada Only)

Dell Computer Corporation ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Dell warrants that the hardware products it manufactures will be free from defects in materials and workmanship. The warranty term is one year beginning on the date of invoice, as described in the following text. This warranty is transferrable with the warranted products.

Damage due to shipping the products to you is covered under this warranty. Otherwise, this warranty does not cover damage due to external causes, including accident, abuse, misuse, problems with electrical power, servicing not authorized by Dell, usage not in accordance with product instructions, failure to perform required preventive maintenance, and problems caused by use of parts and components not supplied by Dell.

This warranty does not cover any items that are in one or more of the following categories: software; sound cards; speakers; external devices (except as specifically noted); accessories or parts added to a Dell system after the system is shipped from Dell; accessories or parts added to a Dell system through Dell's system integration department; accessories or parts that are not installed in the Dell factory; or DellWare products. Monitors, keyboards, and mice that are Dell-branded or that are included on Dell's standard price list are covered under this warranty; all other monitors, keyboards, and mice (including those sold through the DellWare program) are not covered.

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 within the warranty period. Refer to Chapter 5, "Getting Help," to find the appropriate telephone number for obtaining customer assistance. If warranty service is required, Dell will issue a Return Material Authorization Number. You must ship the products back to Dell in their original or

equivalent packaging, prepay shipping charges, and insure the shipment or accept the risk of loss or damage during shipment. Dell will ship the repaired or replacement products to you freight prepaid if you use an address in Canada. Shipments to other locations will be made freight collect.

NOTE: Before you ship the product(s) to Dell, back up the data on the hard-disk drive(s) and any other storage device(s) in the product(s). Remove any removable media, such as diskettes, CDs, or PC Cards.

Dell owns all parts removed from repaired products. Dell uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Dell repairs or replaces a product, its warranty term is not extended, except as may be required by law.

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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 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 Canadian limited one-year warranty only. For provisions of any on-site service contract covering your system, refer to the separate on-site service contract that you will receive.

“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 that 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 services 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 diskettes is unopened. Returned products must be in as-new condition, and all of the manuals, diskettes, 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 returns policy.

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