Dell™ PowerVault™ 735N Systems Installation and Troubleshooting Guide

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Notes, Notices, Cautions, and Warnings

Throughout this guide, blocks of text may be accompanied by an icon and printed in bold type or in italic type. These blocks are notes, notices, cautions, and warnings, and they are used as follows:

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

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

CAUTION: A CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

WARNING: A WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious bodily injury.

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Preface

About This Guide

This guide is intended for anyone who wants to install or troubleshoot a Dell PowerVault 735N Network Attached Storage (NAS) appliance. Before calling Dell for technical assistance, follow the recommended procedure(s) in this guide to solve most hardware problems yourself. For software problems, see the *Dell PowerVault 735N NAS Appliance System Administrator's Guide.*

Other Documentation You May Need

In addition to this *Installation and Troubleshooting Guide*, the following documentation is included with your system:

- The *Dell PowerVault 735N Systems User's Guide*, which describes system features, technical specifications, and device drivers.

- The *Dell PowerVault 735N NAS Appliance System Administrator's Guide* provides instructions for configuring and managing your NAS Appliance and includes software-specific troubleshooting information.

- Supporting system documentation on the *Dell PowerVault 735N NAS Appliance Resource* CD, that includes information about all the option cards and software installed.

- The *Dell OpenManage Server Agent User's Guide* explains the features of, and provides installation instructions for the Dell OpenManage Server Agent.

- The *Dell OpenManage Array Manager User's Guide* provides instructions for using the Array Manager common interface for configuring and managing local and remote storage.

- The *Dell OpenManage Remote Assistant Card Version 2.3 (DRAC 2) User's Guide* provides instructions for using the Dell OpenManage Remote Assistant Card (DRAC) to manage and use a server through a modem or network connection, even when the server itself is down.

- The *Dell OpenManage Server Agent Messages Reference Guide* describes the event messages logged by the Dell OpenManage Server Agent 4.0 or later.

- The *Dell PowerEdge 2x50, PowerApp 2xx, and PowerVault 735N Systems Rack Installation Guide* provides detailed instructions for installing the system in a rack.

- The *Dell PowerVault 735N Systems Service Manual*, which contains detailed information on servicing your system. This is available only at **http://support.dell.com**.

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

- Documentation that is included with options you purchase separately from the system. This documentation includes information that you need to configure and install these options in your Dell system.

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

- Documentation updates that are sometimes included with the system to describe changes to the system or software. Always read these updates before consulting any other documentation. These updates often contain information that supersedes the information in the other documents.

Typographical Conventions

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

- *Interface components* are window titles, button and icon names, menu names and selections, and other options that appear on the monitor screen or display. They are presented in bold.

  Example: Click **OK**.

- *Keycaps* are labels that appear on the keys on a keyboard. They are enclosed in angle brackets.

  Example: <Enter>

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

  Example: <Ctrl><Alt><Enter>

- *Commands* presented in lowercase bold are for reference purposes only and are not intended to be typed when referenced.

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

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

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

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

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

- *Syntax lines* consist of a command and all its possible parameters. Commands are presented in lowercase bold; variable parameters (those for which you substitute a value) are presented in lowercase italics; constant parameters are presented 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 a message or 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.
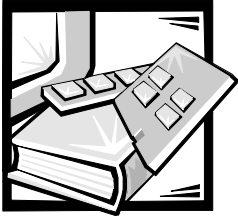
  Example: The following message appears on your screen:

  No boot device available

  Example: "Type md c:\programs and press <Enter>."

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

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

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CHAPTER 1
Introduction

The Dell™ PowerVault™ 735N system is an ultra-slimline, rack-mounted Network Attached Storage (NAS) Appliance that supports up to two Intel® Pentium® III microprocessors, has a large storage capacity, and is accessible by Microsoft® Windows®, UNIX®, Novell® NetWare®, and Apple clients through support of multiple network protocols and file systems.

These systems include the following service features to make troubleshooting and repair easy and effective:

- Dell PowerVault 735N NAS Manager, which is used through a browser to monitor and manage the system

- Dell Diagnostics, which checks for hardware problems

- Embedded server management hardware, which monitors temperatures and voltages throughout the system and notifies you if the system overheats, if a system cooling fan malfunctions, or a power supply fails

The system chassis simplifies removing and replacing components. The Dell-designed small computer system interface (SCSI) backplane board and hard-disk drive carriers eliminate the extensive cabling and drive configuration usually required for a SCSI subsystem.

The following options are offered for PowerVault 735N systems:

- An integrated redundant arrays of independent disks (RAID) controller

- A SCSI backplane extender board to support a fifth SCSI hard-disk drive in the peripheral bay

- A variety of expansion-card options

- An optional Dell OpenManage™ Remote Assistant Card 2 (DRAC 2) for advanced server management

Safety, Regulatory, and Warranty Information

See your *System Information* document for important safety, regulatory, and warranty information for your system.

Getting Help

If at any time you do not understand a procedure described in this guide, or if your system does not perform as expected, Dell provides a number of tools to help you. For more information on these help tools, see Chapter 9, "Getting Help." For software problems, see the *Dell PowerVault 735N NAS Appliance System Administrator's Guide.*

C H A P T E R   2
Checking the Basics

NOTE: To perform these troubleshooting tasks, you must connect a keyboard, mouse, and monitor to your system.

If your Dell PowerVault 735N Network Attached Storage (NAS) appliance is not working as expected, begin troubleshooting using the procedures in this chapter. This chapter guides you through some initial checks and procedures that can solve basic problems with your system. It can also direct you to the appropriate chapter for detailed troubleshooting information and procedures to solve more complex problems.

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

Backing Up Files

If the system is behaving erratically, back up the files on the hard-disk drives immediately. See the *Dell PowerVault 735N NAS Appliance System Administrator's Guide* or the documentation for your backup software for more information on backing up your data.

Basic Checks

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

1. Does the status indicator on the Dell PowerVault 735N NAS appliance NAS Manager indicate a status that is not normal?

    Yes. Check the event logs. See the *Dell PowerVault 735N NAS Appliance System Administrator's Guide* for more information.

    No. Go to step 2.

2. Is the system wet or damaged?

    Yes. Go to Chapter 5, "Checking the Equipment."

    No. Go to step 3.

3. Perform the steps in the next section, "Checking Connections and Switches."

   Is the problem resolved?

   Yes. The power to the system was faulty, or the connections to the system were loose. You have fixed the problem.

   No. Go to step 4.

4. Follow the procedures described in "Look and Listen," found later in this chapter.

   Did the system complete the boot routine?

   Yes. Go to step 5.

   No. A serious malfunction may have occurred. Go to Chapter 9, "Getting Help."

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

   Yes. Go to "System Messages" in Chapter 3, "Messages and Codes."

   No. Go to step 6.

6. Verify the settings in the System Setup program. See Chapter 3, "Using the System Setup Program," in your *User's Guide*.

   Is the problem resolved?

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

   No. Go to step 7.

7. Run the Dell Diagnostics. See Chapter 4, "Running the Dell Diagnostics."

Checking Connections and Switches

Improperly set switches and controls and loose or improperly connected cables are the most likely sources of problems for the system. A quick check of all the switches, controls, and cable connections can easily solve these problems.

Figure 2-1 shows the back-panel connections on the system. Figure 2-2 shows the front-panel indicators.

power supplies (2)

expansion slots (2)

keyboard connector*

mouse connector*

PERC 2/DC connector

video connector*

AC power receptacles (2)

network interface controller (NIC) connector

Universal Serial Bus (USB) connectors (2)*

serial port 2 connector (UPS port

serial port 1 connector (administration port

parallel port connector (not supported)

*   not used during normal operation
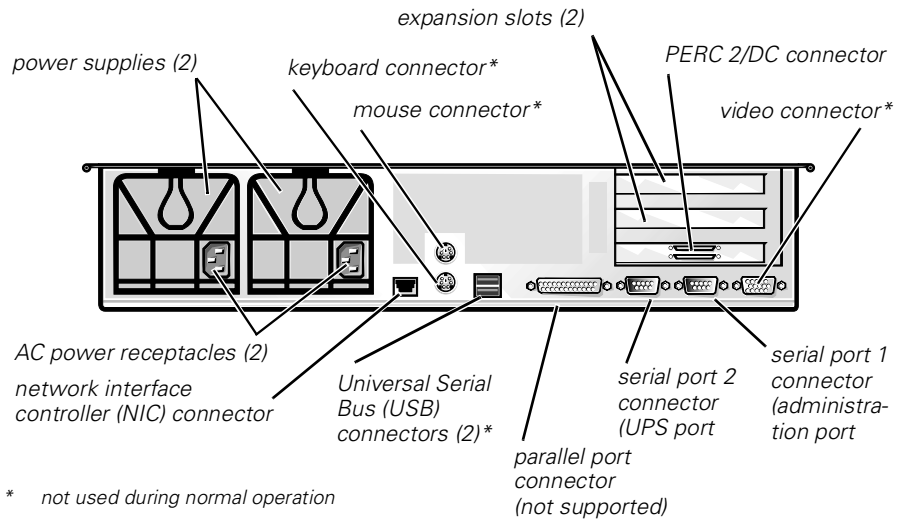
Figure 2-1. Back-Panel Features

hard-disk drive activity indicator

system status indicator

power button and power indicator
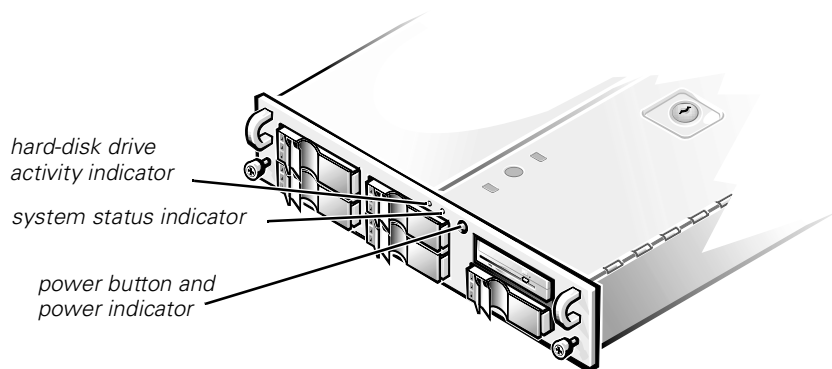
Figure 2-2. Front-Panel Indicators

To check all the connections and switches, perform the following steps:

1.   Shut down the system, including any attached peripherals (such as the monitor, keyboard, and external drives). Disconnect all the AC power cables from their electrical outlets.

2.   If the system is connected to a power strip (or power distribution unit), turn the power strip off and then on again.

Is the power strip receiving power?

Yes. Go to step 5.

No. Go to step 3.

3. Plug the power strip into another electrical outlet.

   Is the power strip receiving power?

   Yes. The original electrical outlet probably does not function. Use a different electrical outlet.

   No. Go to step 4.

4. Plug a different system into the electrical outlet.

   Does the system receive power?

   Yes. The power strip is probably not functioning properly. Use another power strip.

   No. Go to step 5.

5. Reconnect the system to the electrical outlet or power strip.

   Make sure that all connections fit tightly together.

6. Turn on the system.

   Is the problem resolved?

   Yes. The connections were loose. You have fixed the problem.

   No. Go to step 7.

7. Is the monitor operating properly (if connected)?

   Yes. Go to step 8.

   No. Go to "Troubleshooting the Monitor" in Chapter 5, "Checking the Equipment."

8. Is the keyboard operating properly (if connected)?

   Yes. Go to step 9.

   No. Go to "Troubleshooting the Keyboard" in Chapter 5, "Checking the Equipment."

9. Is the mouse operating properly (if connected)?

   Yes. Continue with "Look and Listen" found next in this chapter.

   No. Go to "Troubleshooting the Basic I/O Functions" in Chapter 5, "Checking the Equipment."

Look and Listen

Looking at and listening to the system is important in determining the source of a problem. Look and listen for the indications described in Table 2-1.

Table 2-1. Boot Routine Indications

Look/Listen for:	Action
An error message	See Chapter 3, "Messages and Codes."
The monitor's power indicator	Most monitors have a power indicator (usually on the front bezel). If the monitor's power indicator does not come on, see "Troubleshooting the Monitor" in Chapter 5, "Checking the Equipment."
The keyboard indicators	Most keyboards have one or more indicators (usually in the upper-right corner). Press the <Num Lock> key, the <Caps Lock> key, or the <Scroll Lock> key to toggle their respective keyboard indicators on and off. If the indicators do not light up, see "Troubleshooting the Keyboard" in Chapter 5, "Checking the Equipment."
The diskette drive access indicator	The diskette drive access indicator should quickly flash on and off when you access data on the diskette drive. If the diskette drive access indicator does not light up, see "Troubleshooting the Diskette Drive Subsystem" in Chapter 6, "Checking Inside the System."
The hard-disk drive activity indicators	The hard-disk drive activity indicators should quickly flash on and off when you access data on the hard-disk drives. On your system, you can test the drive by opening Windows Explorer through Terminal Services Client and clicking the icon for drive C. If the hard-disk drive access indicator does not come on, see Chapter 9, "Getting Help."
A series of beeps	See "System Beep Codes" and "PERC 2/DC Beep Codes" in Chapter 3, "Messages and Codes."

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

The System Setup Program

You can correct certain system problems by verifying the correct settings in the System Setup program. When you boot the system, the system checks the system configuration information and compares it with the current hardware configuration. If the system hardware configuration does not match the information recorded by the System Setup program, an error message may appear on the screen.

This problem can happen if you changed the system's hardware configuration and forgot to run the System Setup program. To correct this problem, enter the System Setup program, correct the corresponding System Setup setting, and reboot the system. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for detailed instructions on using the System Setup program.

C H A P T E R 3
Messages and Codes

NOTE: To view these messages, you must connect a keyboard, mouse, and monitor to your system.

Applications, operating systems, and the system itself are capable of identifying problems and alerting you to them. When a problem occurs, the Dell PowerVault 735N Network Attached Storage (NAS) Manager status indicator may change or a beep code may sound.

Several different types of messages can indicate when the system is not functioning properly:

- System messages
- PowerEdge™ Expandable RAID Controller 2/dual channel (PERC 2/DC) BIOS boot error messages
- System beep codes
- PERC 2/DC beep codes
- Warning messages
- Diagnostics messages
- Alert messages
- Small computer system interface (SCSI) hard-disk drive indicator codes

This chapter describes each type of message and lists the possible causes and actions you can take to resolve any problems indicated by a message. To determine what type of message you have received, read the following sections.

System Messages

System messages alert you to possible hardware problems. Table 3-1 lists the system error messages that can occur and the probable cause for each message.

Table 3-1. System Messages

Message	Cause	Corrective Action
Address mark not found	Faulty diskette subsystem or hard-disk drive subsystem (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Alert! Maximum memory size exceeded. Limiting memory size to 2 MB	System supports up to 2 MB of memory	Remove one or more DIMMs so that all DIMMS are the same type.
Alert! Single-bit memory error previously detected in *xxxx xxxx*h	Improperly seated or faulty DIMMs	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Alert! Unsupported memory in DIMM slot(s)	Unsupported DIMM(s) installed in specified slot(s)	Replace one or more DIMMs so that all DIMMs are the same type.
Alert! Uncorrectable memory error previously detected in *xxxx xxxx*h	Improperly seated or faulty DIMMs	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Attachment failed to respond	Diskette drive or hard-disk drive controller cannot send data to associated drive	Replace the drive. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Auxiliary device failure	Mouse cable connector loose or improperly connected, defective mouse	Check the mouse cable connection. If the problem persists, replace the mouse.
Bad error-correction code(ECC) on disk read Controller has failed	Faulty diskette subsystem or hard-disk drive subsystem (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
CD-ROM drive not found	Improperly connected or missing CD-ROM drive.	Check that the diskette drive/ CD-ROM drive unit is seated properly against the interposer board on the peripheral cage. Replace the drive. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. System Messages *(continued)*

Message	Cause	Corrective Action
`CPUs with different level 2 cache sizes detected`	Two different types of micropro-cessors are installed	Install a correct version of the microprocessor so both micro-processors have the same level 2 cache size.
`Data error`	Faulty diskette, diskette drive, or hard-disk drive	Replace the diskette, diskette drive, or hard-disk drive.
`Decreasing available memory`	One or more DIMMs improperly seated or faulty	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Get-ting Help," for instructions on obtaining technical assistance.

`Diskette drive 0 seek failure`
 	
 `Diskette drive 1 seek failure`
	Faulty or improperly inserted dis-kette, incorrect configuration settings in System Setup pro-gram, loose diskette interface cable, or loose power cable	Replace the diskette. Run the System Setup program to correct the diskette drive type. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions. Check that the diskette drive/CD-ROM drive unit is seated properly against the interposer board on the peripheral cage.

`Diskette read failure`	Faulty diskette, faulty or improp-erly connected diskette, or loose power cable	Check that the diskette drive/ CD-ROM drive unit is seated properly against the interposer board on the peripheral cage.
`Diskette subsystem reset failed`	Faulty diskette controller (defec-tive system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
`Diskette write protected`	Diskette write-protect feature activated	Move the write-protect tab on the diskette.
`Drive not ready`	Diskette missing from or improp-erly inserted in diskette drive	Reinsert or replace the diskette.

`Embedded server management error`
 	
 `Embedded server management is not present`
	Embedded server management memory may be temporarily corrupted	Shut down the system to clear the memory, and then restart the system. If the problem persists, see Chapter 9, "Getting Help," for instructions on obtaining tech-nical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. System Messages *(continued)*

Message	Cause	Corrective Action
`Gate A20 failure`	Faulty keyboard controller (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
`General failure`	Operating system corrupted or not installed properly	Reinstall the operating system.
`Hard disk controller failure`	Incorrect configuration settings in System Setup program, improperly connected hard-disk drive, faulty hard-disk drive controller subsystem (defective system board), or loose power cable	Check the hard-disk drive configuration settings in the System Setup program. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions. Reinstall the hard-disk drive. Check the interface cable and power cable connections to the backplane board. See Chapter 8, "Installing Hard-Disk Drives."
`Invalid configuration information – please run SETUP program`	Incorrect ISA_CLR jumper configuration, incorrect configuration settings in System Setup program, or faulty battery	Remove the plug from the ISA_CLR jumper. See Appendix A, "Jumpers, Switches, and Connectors" for instructions. Check the System Setup configuration settings. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions. Replace the battery. See Chapter 7, "Installing System Board Options."
`Invalid CPU speed detected`	Microprocessor not supported by system	Install a correct version of the microprocessor in the specified microprocessor connector.
`I/O parity interrupt at` *address*	Expansion card improperly installed or faulty	Reinstall the expansion cards (see Chapter 7, "Installing System Board Options"). If the problem persists, replace the expansion card.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. ***System Messages*** *(continued)*

Message	Cause	Corrective Action
`Keyboard failure`	Keyboard cable connector loose or improperly connected, defective keyboard, or defective keyboard/mouse controller (defective system board)	Check the keyboard cable connection. Replace the keyboard. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
`Keyboard controller failure`	Defective keyboard/mouse controller (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

`Keyboard data line failure`
 	
`Keyboard stuck key failure`
	Keyboard cable connector loose or improperly connected, defective keyboard, or defective keyboard/mouse controller (defective system board)	Check the keyboard cable connection. Replace the keyboard. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

`Memory address line failure at` *address*`, read` *value* `expecting` *value* `Memory double word logic failure at` *address*`, read` *value* `expecting` *value* `Memory odd/even logic failure at` *address*`, read` *value* `expecting` *value* `Memory write/read failure at` *address*`, read` *value* `expecting` *value*	Faulty or improperly seated DIMMs or defective system board	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
`Memory allocation error`	Faulty application	Restart the application.
`Memory parity interrupt at` *address*	Improperly seated or faulty DIMMs	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
`Memory tests terminated by keystroke`	POST memory test terminated by pressing the spacebar	No action is required.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. System Messages *(continued)*

Message	Cause	Corrective Action
No boot device available	Faulty diskette, diskette sub-system, hard-disk drive, hard-disk drive subsystem, or no boot disk in drive A	Replace the diskette or hard-disk drive. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
No boot sector on hard-disk drive	Incorrect configuration settings in System Setup program, or no operating system on hard-disk drive	Check the hard-disk drive configuration settings in the System Setup program. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions.
No timer tick interrupt	Defective system board	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Non-system disk or disk error	Faulty diskette, diskette sub-system, or hard-disk drive subsystem	Replace the diskette or hard-disk drive. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Not a boot diskette	No operating system on diskette	Use a bootable diskette.
Processor or terminator card not installed!	No microprocessor or terminator card installed in secondary micro-processor connector	Install a terminator card or micro-processor in the secondary microprocessor connector. See Chapter 7, "Installing System Board Options," for instructions.
Read fault Requested sector not found	Faulty diskette, diskette sub-system, or hard-disk drive subsystem (defective system board)	Replace the diskette or hard-disk drive. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. System Messages *(continued)*

Message	Cause	Corrective Action
Reset failed	Improperly connected diskette, hard-disk drive, or power cable	Check that the diskette drive/ CD-ROM drive unit is seated properly against the interposer board on the peripheral cage. Reinstall the hard-disk drive. Check the interface cable and power cable connections to the backplane board. See Chapter 8, "Installing Hard-Disk Drives."
ROM bad checksum = *address*	Expansion card improperly installed or faulty	Reinstall the expansion cards (see Chapter 7, "Installing System Board Options"). If the problem persists, replace the expansion card.
Sector not found	Defective sectors on diskette or hard-disk drive	Replace the diskette or hard-disk drive.
Seek error	Defective sectors on diskette or hard-disk drive	Replace the diskette or hard-disk drive.
Seek operation failed	Faulty diskette or hard-disk drive	Replace the diskette or hard-disk drive.
Shutdown failure	Defective system board	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
System backplane cable error	Improperly attached interface cables	Check the primary and secondary SCSI interface cable connections to the backplane board. See Chapter 8, "Installing Hard-Disk Drives."
System backplane error	Improperly attached or missing backplane	Check the interface cable connections to the backplane board. See Chapter 8, "Installing Hard-Disk Drives."
Time-of-day clock stopped	Defective battery or faulty chip (defective system board)	Replace the system battery. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-1. System Messages (continued)

Message	Cause	Corrective Action
Time-of-day not set - please run SETUP program	Incorrect **Time** or **Date** settings or defective system battery	Check the **Time** and **Date** settings. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions. If the problem persists, replace the system battery. If the problem still persists, replace the I/O board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Timer chip counter 2 failed	Defective system board	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Unexpected interrupt in protected mode	Improperly seated DIMMs or faulty keyboard/mouse controller chip (defective system board)	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. If the problem still persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
Unsupported CPU detected in SLOT *n* Unsupported CPU speed detected!	Microprocessor not supported by system	Install a correct version of the microprocessor in the specified microprocessor connector.
Unsupported CPU speed in CMOS	Microprocessor not supported by BIOS	Upgrade the BIOS. See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions.
Unsupported DIMM installed in the RAID DIMM slot!	RAID DIMM not supported by system	This DIMM slot is not supported. Remove the DIMM.
Write fault Write fault on selected drive	Faulty diskette or hard-disk drive	Replace the diskette or hard-disk drive.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

PERC 2/DC BIOS Error Messages

PERC 2/DC BIOS messages alert you to possible hardware problems. See the *Dell PowerEdge Expandable RAID Controller 2/DC User's Guide* on the *Dell PowerVault 735N Resource* CD for a list of these messages.

System Beep Codes

NOTE: If the system boots without a keyboard, mouse, or monitor attached, the system will not issue beep codes related to these peripherals.

When an error that cannot be reported on the monitor occurs during a boot routine, the system 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 system was unable to read the data in non-volatile random-access memory (NVRAM). This information is valuable to the Dell technical support representative if you need to call for technical assistance.

When a beep code is emitted, record it on a copy of the Diagnostics Checklist in Chapter 9, "Getting Help," and then look it up in Table 3-2. 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. If you are still unable to resolve the problem, see Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Table 3-2. System Beep Codes

Code	Cause	Corrective Action
1-1-3	CMOS write/read failure	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-1-4	BIOS checksum failure	This fatal error usually requires that you replace the BIOS firmware. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-2-1	Programmable interval-timer failure	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-2-2	DMA initialization failure	
1-2-3	DMA page register write/read failure	

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-2. System Beep Codes (continued)

Code	Cause	Corrective Action
1-3-1	Main-memory refresh verification failure	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. If the problem still persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-3-2	No memory installed	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. If the problem still persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-3-3	Chip or data line failure in the first 64 KB of main memory	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. If the problem still persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-3-4	Odd/even logic failure in the first 64 KB of main memory	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. If the problem still persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
1-4-1	Address line failure in the first 64 KB of main memory	
1-4-2	Parity failure in the first 64 KB of main memory	
2-1-1 through 2-4-4	Bit failure in the first 64 KB of main memory	

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-2. System Beep Codes *(continued)*

Code	Cause	Corrective Action
3-1-1	Slave DMA-register failure	Replace the system board. See Chapter 9, "Getting Help,"" for instructions on obtaining technical assistance.
3-1-2	Master DMA-register failure	
3-1-3	Master interrupt-mask register failure	
3-1-4	Slave interrupt-mask register failure	
3-2-4	Keyboard-controller test failure	Check the keyboard cable and connector for proper connection. If the problem persists, run the keyboard test in the Dell Diagnostics to determine whether the keyboard or keyboard controller is faulty. If the keyboard controller is faulty, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
3-3-1	CMOS failure	Run the system board test in the Dell Diagnostics to isolate the problem.
3-3-2	System configuration check failure	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
3-3-3	Keyboard controller not detected	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
3-3-4	Screen initialization failure	Run the video test in the Dell Diagnostics.
3-4-2	Screen-retrace test failure	
3-4-3	Search for video ROM failure	
4-2-1	No timer tick	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-2. System Beep Codes *(continued)*

Code	Cause	Corrective Action
4-2-2	Shutdown failure	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-2-3	Gate A20 failure	
4-2-4	Unexpected interrupt in protected mode	Ensure that all expansion cards are properly seated, and then reboot the system.
4-3-1	Improperly seated or faulty DIMMs	Remove and reseat the DIMMs. If the problem persists, replace the DIMMs. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-3-3	Defective system board	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-3-4	Time-of-day clock stopped	Replace the battery. If the problem persists, replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-4-1	Super I/O chip failure (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-4-2	Parallel-port test failure (defective system board)	Replace the system board. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
4-4-3	Math coprocessor failure (defective microprocessor)	Remove and reseat the specified microprocessor. If the problem still persists, replace the microprocessor. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table 3-2. System Beep Codes *(continued)*

Code	Cause	Corrective Action
4-4-4	Cache test failure (defective microprocessor)	Remove and reseat the specified microprocessor. If the problem still persists, replace the micro-processor. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

PERC 2/DC Beep Codes

The PERC 2/DC has an onboard tone generator that beeps to indicate events and errors. See the *Dell PowerEdge Expandable RAID Controller 2/DC User's Guide* for a list of these messages.

Diagnostics Messages

When you run a test group or subtest in the Dell Diagnostics, an error message may result. These particular error messages are not covered in this section. Record the message on a copy of the Diagnostics Checklist (see Chapter 9, "Getting Help"), and then follow the instructions in that section for obtaining technical assistance.

Dell PowerVault 735N NAS Manager Status Indicator and System Event Logs

The Dell OpenManage Server Assistant and Windows Powered operating system generate alert messages that appear in the System Status Indicator and the System Event Logs. The Status Indicator and System Event log messages consist of informa-tion, status, warning, and failure messages for drive, temperature, fan, power conditions, and the operating system. To view the messages, click on the system sta-tus indicator. You can also view the entire event log through the Dell PowerVault 735N NAS Manager. See the *Dell PowerVault 735N NAS Appliance System Administrator's Guide* for more information on the event logs.

SCSI Hard-Disk Drive Indicator Codes

Three light-emitting diode (LED) indicators on each of the hard-disk drive carriers pro-vide information about the status of the SCSI hard-disk drives (see Table 3-1). The SCSI backplane firmware controls the drive online and drive failure indicators.

hard-disk drive failure indicator

hard-disk drive activity indicator

hard-disk drive online indicator
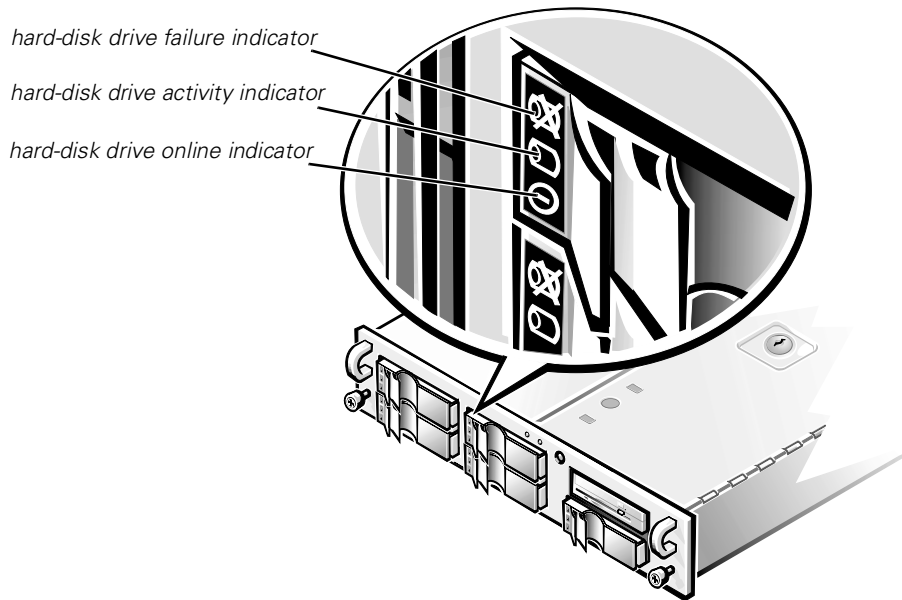
Figure 3-1. Hard-Disk Drive Indicators

Table 3-3 lists the hard-disk drive indicator patterns established by the SCSI backplane firmware. Different patterns are displayed as hard-disk drive events occur in the system. For example, in the event of a hard-disk drive failure, the "hard-disk drive failed" pattern appears. After the hard-disk drive is selected for removal, the "hard-disk drive being prepared for removal" pattern appears, followed by the "hard-disk drive ready for insertion or removal" pattern. After the replacement hard-disk drive is installed, the "hard-disk drive being prepared for operation" pattern appears, followed by the "hard-disk drive online" pattern.

Table 3-3. SCSI Hard-Disk Drive Indicator Patterns

Condition	Indicator Code
Identify hard-disk drive	All three hard-disk drive status indicators blink simultaneously.
Hard-disk drive being prepared for removal	The three hard-disk drive status indicators flash sequentially.
Hard-disk drive ready for insertion or removal	All three hard-disk drive status indicators are off.
Hard-disk drive being prepared for operation	The hard-disk drive online indicator is on. The drive activity light may flash briefly.
Hard-disk drive bay empty	All three hard-disk drive status indicators are off.

Table 3-3. SCSI Hard-Disk Drive Indicator Patterns *(continued)*

Condition	Indicator Code
Hard-disk drive predicted failure	The hard-disk drive online indicator is on. The hard-disk drive failure indicator blinks on briefly each second.
Hard-disk drive failed	The hard-disk drive online indicator turns off. The hard-disk drive failure indicator blinks off briefly each second.
Hard-disk drive rebuilding	The hard-disk drive online indicator blinks rapidly.
Hard-disk drive active	The hard-disk drive activity indicator is on.
Hard-disk drive online	The hard-disk drive online indicator is on.

C H A P T E R   4
Running the Dell Diagnostics

NOTE: To perform these procedures, you must connect a keyboard, mouse, and monitor to your system.

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

NOTICE: Use the Dell Diagnostics to test only Dell systems. If you use this program with other systems, incorrect system responses or error messages may result.

Features of the Dell Diagnostics

The Dell Diagnostics provides a series of menus and options from which you choose particular device groups or devices. You can also control the sequence in which the tests are run. The diagnostic menus 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 is repeated
- The ability to display or print test results or to save them in a file
- Options to temporarily suspend testing if an error is detected or to terminate testing when an adjustable error limit is reached
- Help messages that briefly describe each test and its parameters
- Status messages that inform you whether device group or device tests are 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 system does not function properly, you may have a component failure. As long as the microprocessor and the input and output components of the system (the monitor, keyboard, and diskette drive) are working, you can use the Dell Diagnostics. If you know what component(s) you need to test, simply select the appropriate diagnostic device group(s) or subtest(s). If you are unsure about the scope of the problem, read the rest of the information in this section.

Creating Diagnostic Diskettes

You must run the diagnostics from a set of diagnostic diskettes. To create a set of diagnostic diskettes, insert the *Dell PowerVault 735N Resource* CD and select **Create Diagnostics Diskettes** from the menu.

Starting the Dell Diagnostics

To run the Dell Diagnostics from the set of diagnostic diskettes you created using the *Dell PowerVault 735N Resource* CD, boot the system from the first diskette.

NOTE: To boot from the diskette, make sure there is not a CD in the CD-ROM drive.

If the system fails to boot, see Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

When you start the diagnostics, the Dell logo screen appears, followed by a message telling you that the diagnostics is loading. Before the diagnostics loads into memory, a program tests the random-access memory (RAM) that will be used by the diagnostics.

If no errors are found in the RAM, the diagnostics loads, and the **Diagnostics** menu appears. The menu allows you to run all or specific diagnostic tests or to exit the Dell Diagnostics.

NOTE: Before you read the rest of this section, you may want to start the Dell Diagnostics so that you can see it on your monitor screen.

For a quick check of the system, select **Quickly Test All Devices**. This option runs only the device tests 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 chance of tracing the source of the problem quickly. For a complete check of the system, select **Fully Test All Devices**. To check a particular area of the system, choose **Select Devices to Test**.

Selecting **Exit to MS-DOS** exits the diagnostics and returns you to your operating system environment.

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 you choose.

How to Use the Dell Diagnostics

When you select **Select Devices to Test** from the **Diagnostics** menu, the main screen of the diagnostics appears.

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

- Two lines at the top of the main screen identify the diagnostics and give its version number.

- On the left side of the screen, the **Device Groups** area lists the diagnostic device groups in the order they will run if you select **All** under the **Run Tests** submenu. Press the up- or down-arrow key to highlight a device group.

- On the right side of the screen, the **Devices for Highlighted Group** area lists the specific devices within a particular test group.

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

How to Use the Device Groups Menu

The **Device Groups** menu at the bottom of the screen provides options that enable you to select and run specific diagnostic tests from the diagnostics main screen. Press the left- and right-arrow keys to select the options on the menu. As you move from one menu option to another, a brief explanation of the highlighted option appears on the bottom line of the screen.

If you want more information about a device group or device, highlight the **About** option and press <Enter>. After you read the information, press <Esc> to return to the previous screen.

Device Groups Menu Options

Five options are listed at the bottom of the diagnostics main screen: **Run Tests**, **Devices**, **Select**, **Config**, and **Help**.

There are two ways to select a menu option:

- Look on the screen to see which letter in the option is capitalized, and type that letter (for example, type r to select the **Run** option).

- Move the highlight to the option you want to select by pressing the left- or right-arrow key, and then press <Enter>.

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

The following subsections explain the menu options as listed from left to right in the **Device Groups** menu.

Run Tests

Run Tests displays seven options: **One**, **All**, **Select**, **Options**, **Results**, **Errors**, and **Help**. If you select **One**, all the devices within the highlighted device group are run. If you select **All**, all of the tests in all of the device group tests are run. (The device group tests are run in the same order as they are listed.) If you choose **Select**, only the selected device groups or the devices that you selected within the device groups are run. Before you test any device groups or devices, consider setting global parameters within **Options**. Global parameters offer you greater control over how the device group tests or device tests are run and how results are reported. **Help** displays a series of help options, including **Menu**, **Keys**, **Device**, **Group**, and **Test**.

Devices

Most of the device groups consist of several devices. Use the **Devices** option to select individual devices within the device group(s).

When you select **Devices**, the following options are displayed: **Run Tests**, **Tests**, **Select**, **Parameters**, and **Help**. Table 4-1 lists all of the possible values for each option.

Table 4-1. Devices Options

Option	Functions
Run Tests	Displays five options: **Run Tests**, **Tests**, **Select**, **Parameters**, and **Help**.
Tests	Allows you to select individual devices to tailor the testing process to your particular needs. You can choose one or more devices from the list. When you choose **Tests**, four options are displayed: **Run Tests**, **Select**, **Parameters**, and **Help**.
Select	Allows you to choose one or more devices from a particular device group. Three options are displayed: **One**, **All**, and **Help**.
Parameters	Determines how a particular test will be run. Table 4-2 lists all of the possible values for each option. To change **Parameters** options, press the spacebar, the left- and right-arrow keys, or the plus (+) and minus (–) keys.
Help	Displays a list of help topics.

Table 4-2. Parameters Options

Option	Possible Values
Number of Times to Repeat Test(s)	**0001** through **9999** or **0000**, which loops indefinitely until you press <Ctrl><Break>. 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.
Message Logging	**None**, **Errors**, **All**
	Determines if any test results are saved to a file. The default is **None**.
Message Logging File Name	Specifies the name of the logging file if the **Message Logging** option is selected. The default is **A: RESULT**.

Select

The **Select** option in the **Device Groups** menu allows you to choose one or more devices from a particular device group. Three options are displayed: **One**, **All**, and **Help**.

Config

Choosing **Config** from the **Device Groups** menu displays information about the particular device that is highlighted.

Error Messages

When you run a test in the diagnostics, error messages may result. Record the messages on a copy of the Diagnostics Checklist; also see Chapter 9, "Getting Help," for instructions on obtaining technical assistance and informing the technical assistance representative of these messages.
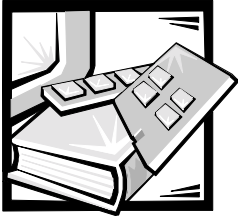
C H A P T E R 5
Checking the Equipment

NOTE: To perform these troubleshooting tasks, you must connect a keyboard, mouse, and monitor to your system.

This chapter provides troubleshooting procedures for equipment that connects directly to the input/output (I/O) panel of the system, such as the monitor, keyboard, or mouse. This equipment is not part of the PowerVault 735N system, but may be used for diagnostic purposes. Before you perform any of the procedures in this chapter, see "Checking Connections and Switches" in Chapter 2, "Checking the Basics." Then follow the troubleshooting procedures for the equipment that is malfunctioning.

You need the following items to perform the procedures in this chapter:

- The *Dell PowerVault 735N Resource* CD
- A blank, formatted diskette
- The system documentation

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

Troubleshooting the Monitor

Troubleshooting video problems involves determining which of the following items is the source of the problem:

- Monitor and monitor interface cable
- Video memory
- Video logic of the system or a video expansion card

If information on the monitor screen is displayed incorrectly or not at all, perform the following steps to solve the problem:

1. Adjust the switches and controls including the horizontal and vertical position and size, as specified in the monitor's documentation, to correct the video image.

   Is the problem resolved?

   Yes. You have fixed the problem.

   No. Go to step 2.

2. Run the video tests in the Dell Diagnostics.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

   Is the monitor displaying text properly?

   Yes. You have fixed the problem or the problem is software-related. See the *Dell PowerVault 735N NAS Appliance System Administrator's Guide* for more information on how to reinstall your system image.

   No. Go to step 3.

3. Turn off the system and disconnect it from the electrical outlet.

4. Swap the monitor with one of the same type that is working, and reconnect the system to the electrical outlet.

5. Run the video tests in the Dell Diagnostics again.

   Did the tests run successfully?

   Yes. The monitor must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

   No. The integrated video controller is faulty; see Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Keyboard

This procedure determines what kind of keyboard problem you may have. If a system error message indicates a keyboard problem when you start the system or while the Dell Diagnostics is running, perform the following steps:

1. Look at the keyboard and the keyboard cable for any signs of damage.

   Press and release each key on the keyboard.

Do the keyboard and its cable appear to be free of physical damage, and do the keys work?

Yes. Go to step 3.

No. Go to step 2.

2. Swap the faulty keyboard with a working keyboard. To swap a faulty keyboard, unplug the keyboard cable from the system's back panel and plug in a working keyboard.

Is the problem resolved?

Yes. The keyboard must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

No. Go to step 3.

3. Run the keyboard test in the Dell Diagnostics.

Can you use the keyboard to select the keyboard test?

Yes. Go to step 5.

No. Go to step 4.

4. Swap the faulty keyboard with a working keyboard.

5. Did the keyboard test run successfully?

Yes. The keyboard must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

No. The keyboard controller on the system board is faulty. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Basic I/O Functions

This procedure determines whether the system's basic I/O functions are operational. If a system error message indicates an I/O port problem or the device connected to the port does not function properly, perform the following steps:

1. Enter the System Setup program and check the **Serial Port 1** and **Serial Port 2** settings.

Are the communications ports set to **Enabled**?

Yes. Go to step 3.

No. Go to step 2.

2. Change the **Serial Port 1** and **Serial Port 2** settings to **Enabled**, then reboot the system.

   Is the problem resolved?

   Yes. You have fixed the problem.

   No. Go to step 3.

3. Reboot the system from the diagnostics diskette, and run the serial ports test in the Dell Diagnostics.

   Did the tests run successfully?

   Yes. Go to step 4.

   No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

4. If the problem persists, see "Troubleshooting a Serial I/O Device."

Troubleshooting a Serial I/O Device

If the procedure in "Troubleshooting the Basic I/O Functions" indicates that the problem is with a device connected to one of the serial ports, perform the following steps:

1. Turn off the system and any peripheral devices connected to the serial ports.

   Are two serial devices connected to the system?

   Yes. Go to step 2.

   No. Go to step 4.

2. Disconnect the devices from serial ports 1 and 2, and connect the malfunctioning serial device to the opposite port.

3. Turn on the system and the reconnected serial device.

   Is the problem resolved?

   Yes. The serial port may be defective. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

   No. Go to step 4.

4. Swap the interface cable that connects the device to the serial port with a known working cable.

   Is the problem resolved?

   Yes. The interface cable must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

   No. Go to step 5.

5. Turn off the system and the serial device, and swap the device with a comparable working device.

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

6. Turn on the system and the serial device.

    Is the problem resolved?

    Yes. The serial device must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

    No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Integrated NIC

If you encounter problems with the system's integrated network interface controller (NIC), the following actions may help you to diagnose the problem:

- Enter the System Setup program and confirm that the NIC is enabled.

    See Chapter 3, "Using the System Setup Program" in the *User's Guide* for instructions.

- Check the two light-emitting diodes (LEDs) on the corners of the NIC connector on the system's back panel.

    The green link LED (the LED closest to the serial ports) indicates that the adapter is connected to a valid link partner. The amber activity indicator lights if network data is being sent or received.

    — If the LINK light is not on, check all cable connections at the adapter and link partner.

    — Try changing the auto-negotiation setting on the link partner, if possible.

    — Try another port on the switch.

C H A P T E R   6
Checking Inside the System

NOTE: To perform these troubleshooting tasks, you must connect a keyboard, mouse, and monitor to your system.

This chapter provides troubleshooting procedures for components inside the system. Before you start any of the procedures in this chapter, perform the following steps:

- Perform the procedures described in "Checking Connections and Switches" and "The System Setup Program" in Chapter 2, "Checking the Basics."

- Read the safety instructions in "Safety First—For You and Your System."

You need the following items to perform the procedures in this chapter:

- The *Dell PowerVault 735N Resource* CD

- A blank, formatted 3.5-inch diskette

- The *Dell PowerVault 735N Systems User's Guide*

- The key to the system keylock

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

Safety First—For You and Your System

The procedures in this guide require that you open the system doors and work inside the system. While working inside the system, do not attempt to service the system except as explained in this guide and elsewhere in Dell documentation. Always follow the instructions closely.

WARNING FOR YOUR PERSONAL SAFETY AND PROTECTION OF THE EQUIPMENT

Before starting to work on the system, perform the following steps in the sequence listed:

1. **Turn off and disconnect your system and peripherals from their power sources (unless you are installing or removing a hard-disk drive). Also, disconnect any telephone or telecommunication lines from the system.**

2. Ground yourself by touching an unpainted metal surface on the chassis, such as the metal around the card-slot openings at the back of the system, before touching anything inside your system.

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

In addition, Dell recommends that you periodically review the safety instructions for this system.

Opening the System Doors

The system has two doors on the top of the system that provide access to the system board and expansion cards. The doors interlock so that the keylock on the right-side door secures both doors.

To open the system doors, perform the following steps:

1. Observe the precautions in "Safety First—For You and Your System." Also observe the safety instructions at the front of this guide.

2. Slide the system out of the rack.

3. Using the system key, turn the keylock on the top of the chassis to the unlocked position (see Figure 6-1).

4. Press the two latches to release the right door (see Figure 6-1).

5. Lift the right door.

6. Lift the left door

When closing the doors, be sure to close the left door first and then the right door so that the right door overlays the left door.

keylock

latches (2)
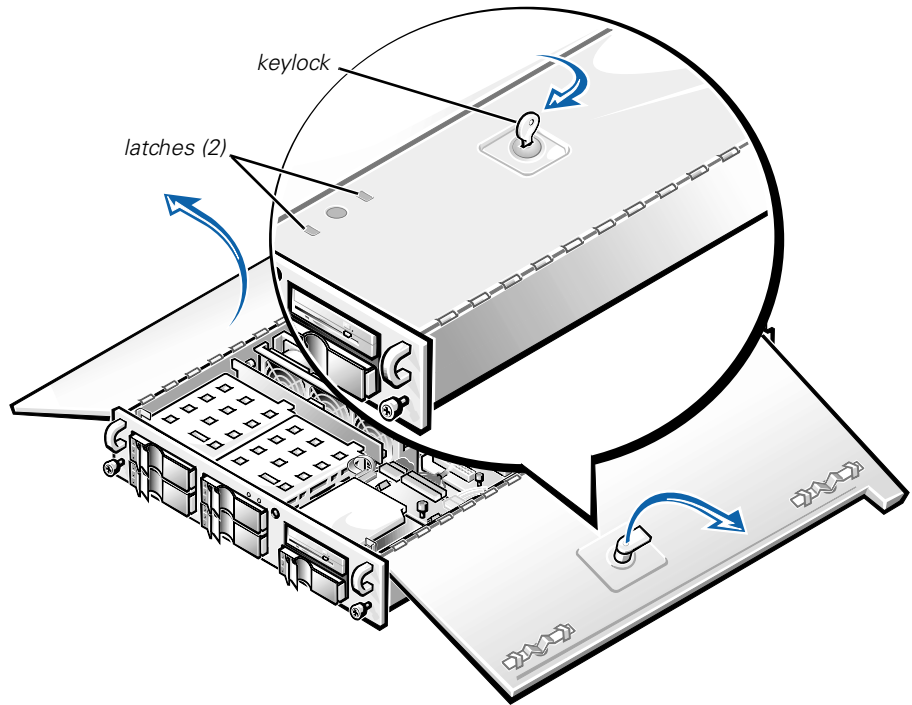
Figure 6-1. Opening the System Doors

Removing the Optional Front Bezel

You must remove the system's optional plastic front bezel before installing or removing a hard-disk drive, or using the diskette or CD-ROM drive.

To remove the front bezel, perform the following steps:

1. Unlock and open the system doors (see the previous section, "Opening the System Doors").

2. Pivot the two locking levers toward the back of the chassis (see Figure 6-2).

3. Press the tab on each end of the bezel and remove the bezel from the chassis (see Figure 6-2).

locking levers (2)

tabs (2)
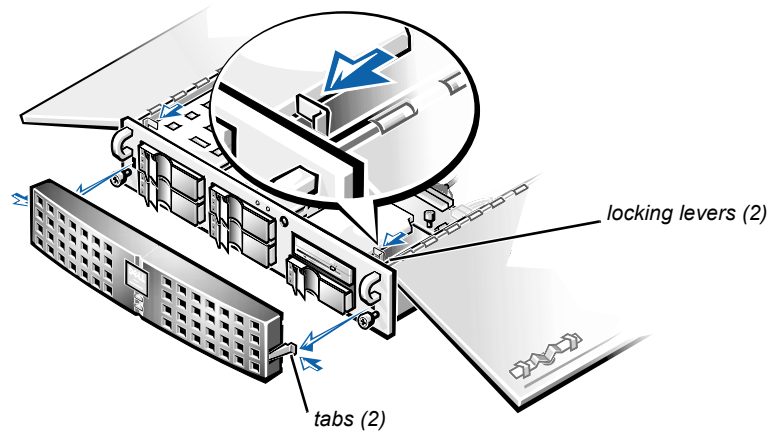
Figure 6-2. Removing the System Bezel

Removing and Replacing the Expansion-Card Cage

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

Removing the Expansion-Card Cage

To remove the expansion-card cage, perform the following steps:

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

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

NOTE: Verify that the power LED on the riser board (see Figure 6-3) is off before removing the card cage.

securing lever

power LED

expansion-card cage
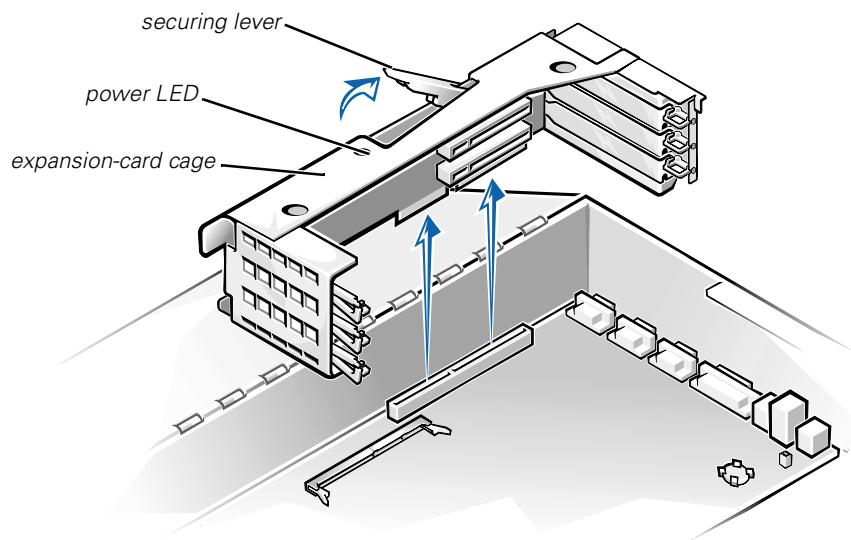
Figure 6-3. Removing the Expansion-Card Cage

4.   Locate the expansion-card cage securing lever (see Figure 6-3). Rotate the lever upward until it stops in an upright position.

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

Replacing the Expansion-Card Cage

To replace the expansion-card cage, perform the following steps:

1.   With the securing lever in the upright position, lower the expansion-card cage into place until it is aligned.

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

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

Inside the Chassis

In Figure 6-4, the system doors are opened to provide an interior view. Refer to this illustration to locate interior features and components discussed later in this guide.
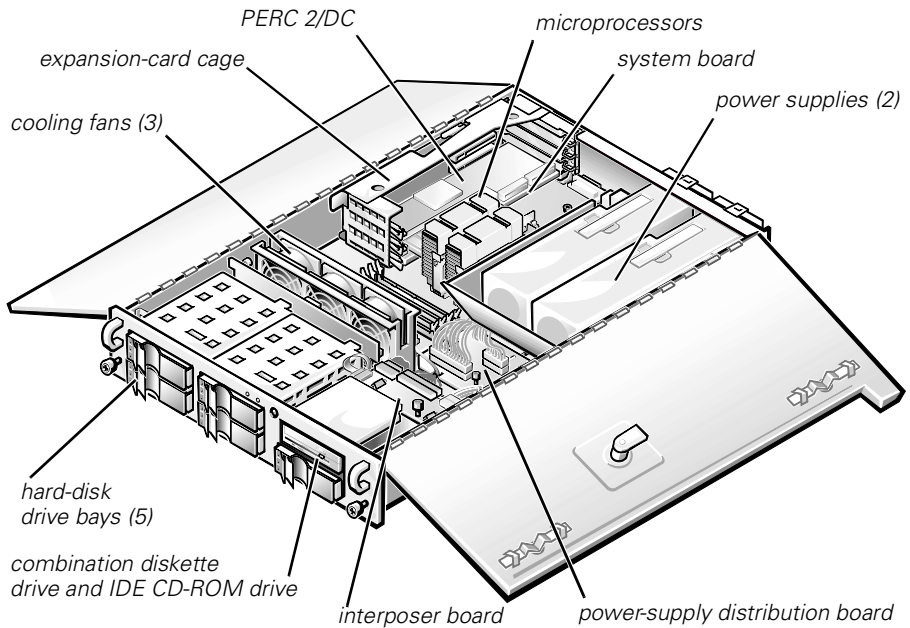
Figure 6-4. Inside the System

The system board holds the system control circuitry and other electronic components. Several hardware options such as the microprocessors and memory are installed directly on the system board. The expansion-card cage accommodates up to three full-length PCI expansion cards. Slot 1 has a PowerEdge Redundant Array of Independent Disks (RAID) Controller 2/dual channel (PERC 2/DC) card. The two peripheral bays provide space for a 3.5-inch diskette drive, CD-ROM drive, and a fifth small computer system interface (SCSI) hard drive.

The hard-disk drive bays provide space for up to five 1-inch SCSI hard-disk drives. These hard-disk drives are connected to a SCSI host adapter on the system board or on an expansion card, via the SCSI backplane board.

The power cables leading from the power supply, power-supply distribution board (PSDB), and interposer board provide power to the system board, SCSI backplane board, and drives in the peripheral bays.

For non-SCSI drives such as the diskette drive and CD-ROM drive, an interface cable connects each drive to the interposer board, or to an expansion card.

During an installation or troubleshooting procedure, you may be required to change a jumper or switch setting. For information on the system board jumpers, see Appendix A, "Jumpers, Switches, and Connectors."

Troubleshooting a Wet System

Liquid spills, splashes, and excessive humidity can cause damage to the system. If an external device (such as an external drive) gets wet, contact the device manufacturer for instructions. If the system gets wet, perform the following steps:

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

3. Let the system dry for at least 24 hours.

   Make sure that it is thoroughly dry before proceeding.

4. Remove all expansion cards installed in the system.

5. Close the system doors, reconnect the system to the electrical outlet, and turn on the system.

   Does the system have power?

   Yes. Go to step 6.

   No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

6. Turn off the system, disconnect it from the electrical outlet, open the system doors, and reinstall all expansion cards you removed in step 4.

7. Close the system doors and reconnect the system to the electrical outlet.

8. Run the Dell Diagnostics and test the system.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

   Did the tests run successfully?

   Yes. The system is operating properly.

   No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting a Damaged System

If the system was dropped or damaged while being moved, you should check the system to see if it functions properly. If an external device attached to the system is dropped or damaged, contact the manufacturer of the device for instructions or see Chapter 9, "Getting Help," for information on obtaining technical assistance from Dell.

To troubleshoot a damaged system, perform the following steps:

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

3. Check the following connections:

   - Expansion-card connections to the expansion-card cage
   - Drive carrier connections to the SCSI backplane board

4. Verify all internal cable and component connections.

   Make sure that all cables are properly connected and that all components are properly seated in their connectors and sockets. Pay particular attention to the interposer board and PSDB (if installed).

5. Close the system doors and reconnect the system to the electrical outlet.

6. Run the system board tests in the Dell Diagnostics.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

   Did the tests run successfully?

   Yes. The system is operating properly.

   No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Battery

If an error message indicates a problem with the battery, or if the System Setup program loses the system configuration information when the system is turned off, the battery may be defective.

To troubleshoot the battery, perform the following steps:

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

3. Check the connection of the coin cell battery to the system board.

   See "Replacing the Battery" in Chapter 7, "Installing System Board Options," for information on gaining access to the battery socket.

4. Is the battery firmly installed in the battery socket on the system board?

   Yes. Go to step 7.

   No. Go to step 6.

5. Reseat the battery in its socket.

6. Close the system doors and reconnect the system to the electrical outlet.

   Is the problem resolved?

   Yes. The battery was loose. You have fixed the problem.

   No. Continue with this procedure.

⚠ **WARNING: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**

7. Repeat steps 1 and 2.

8. Replace the battery.

   Is the problem resolved?

   Yes. The battery's charge was low. You have fixed the problem.

   No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Power Supplies

Your system contains two redundant power supplies. The two indicators on the back of each power supply (see Figure 6-5) signal the power supply's current status. If the red (forwardmost) failure indicator lights up, replace the power supply as described in the following subsection.
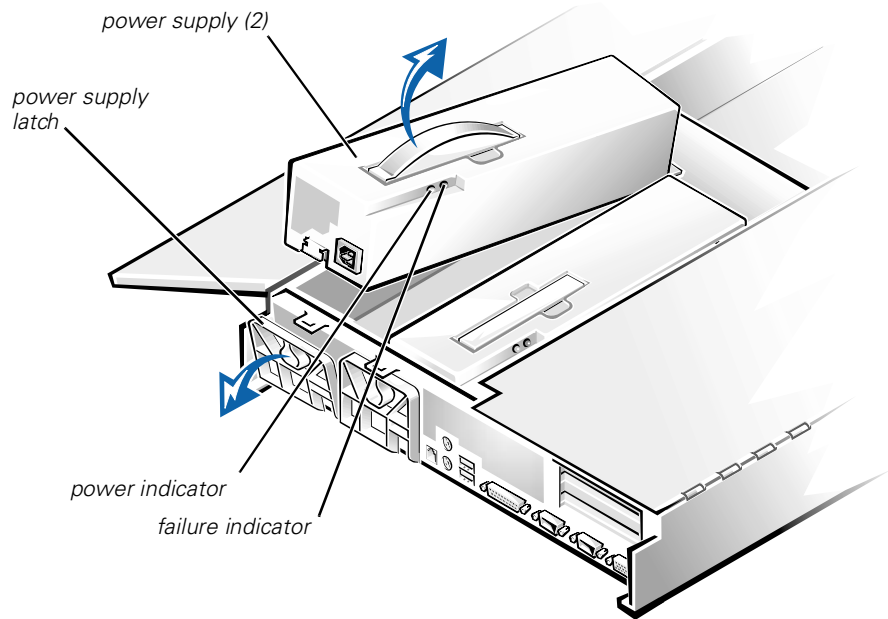
Figure 6-5. Power Supply Features and Removal

Removing and Replacing a Power Supply

To replace a power supply, perform the following steps.

NOTICE: The power supply is heavy. Support it with both hands when installing or removing it.

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2. Unplug the power cord from the faulty power supply.

3. Open the system doors.

4. Remove the power supply:

    a. The power supply is secured by a latch on the back panel of the system.

       Rotate the top of the power supply latch downward.

    b. Grasp the handle on the top of the power supply and lift the power supply straight up from the system.

5. Lower the new power supply into the chassis.

6. Close the power supply latch.

NOTE: The power supply will not function until the latch is engaged.

7. Close the system doors.

8. Connect the AC power cable to the new power supply and route the cable through the strain-relief clips on the power supply handle.

Troubleshooting a Cooling Fan

Three cooling fans are installed in the system chassis. (Fan 1 is the outermost fan in the fan assembly.) If you observe that one of the cooling fans is not operating or if clicking on the Dell PowerVault 735N NAS Manager Status Indicator shows a fan-related error message, perform the following steps to troubleshoot the problem:

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

2. Open the system doors.

See "Opening the System Doors" found earlier in this chapter.

3. Unplug the fan power wiring harness from the interposer board by pressing the release tab on the power cable connector.

4. Remove the retention pin from the chassis and lift the fan assembly out of the system (see Figure 6-6).
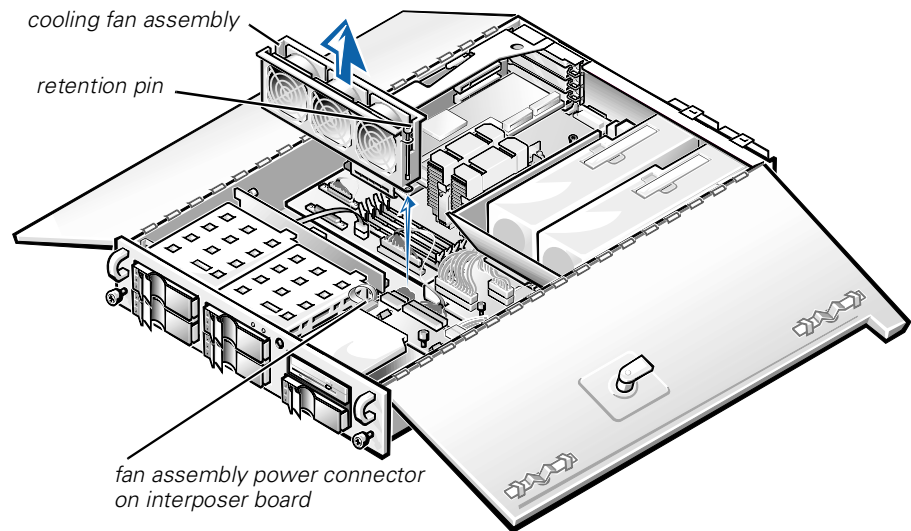
Figure 6-6. Removing the Cooling Fan Assembly

5. To replace an individual fan, perform the following steps:

    a. Separate the two halves of the fan assembly by pressing the locking tabs at each end of the assembly.

    b. Remove the faulty fan and disconnect it from the fan power wiring harness.

    c. Install a new fan in the assembly and connect it to the fan power wiring harness.

    d. Join the two halves of the fan assembly.

6. Slide the fan assembly back into the system and reinstall the retention pin.

    When reinstalling the fan, be careful to avoid pinching the system interface cables.

7. Connect the fan power wiring harness to the interposer board.

8. Close the system doors and reconnect the system to AC power.

9. Turn on the system.

    Do the fans operate properly?

    Yes. You have fixed the problem.

    No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting Expansion Cards

If an error message indicates an expansion-card problem or if an expansion card seems to perform incorrectly or not at all, the problem could be a faulty connection, a conflict with software or other hardware, or a faulty expansion card. To troubleshoot expansion cards, perform the following steps:

1. Turn off the system, including any attached peripherals and disconnect the AC power cable from its power source.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

3. Remove the expansion-card cage.

    See "Removing and Replacing the Expansion-Card Cage" found earlier in this chapter.

4. Reinstall the expansion-card cage.

    See "Removing and Replacing the Expansion-Card Cage" found earlier in this chapter.

5. Close the system doors, reconnect the system to AC power, and turn on the system.

    Is the problem resolved?

    Yes. The PCI riser board connection was loose. You have fixed the problem.

    No. Go to step 6.

6. Repeat steps 1 through 3 to remove the expansion-card cage.

7. Verify that each expansion card is firmly seated in its connector.

    Are the expansion cards properly seated in their connectors?

    Yes. Go to step 9.

    No. Go to step 8.

8. Reseat the expansion cards in their connectors, then repeat steps 4 and 5.

    Is the problem resolved?

    Yes. The connection was loose. You have fixed the problem.

    No. Go to step 9.

9. Verify that any appropriate cables are firmly connected to their corresponding connectors on the expansion cards.

    For instructions on which cables should be attached to specific connectors on an expansion card, see the expansion card's documentation.

    Are the appropriate cables firmly attached to their connectors?

    Yes. Go to step 10.

    No. Go to step 11.

10. Reconnect the cable connectors to the appropriate connectors on the expansion cards.

    Is the problem resolved?

    Yes. The cable connections were loose. You have fixed the problem.

    No. Go to step 11.

11. Remove all expansion cards from the system.

    See "Expansion Cards" in Chapter 7, "Running the Dell Diagnostics," for information on removing expansion cards.

12. Run the system memory test in the Dell Diagnostics.

    Did the test run successfully?

    Yes. Go to step 13.

    No. See Chapter 9, "Getting Help," for information on obtaining technical assistance.

13. Turn off the system, disconnect it from AC power, and open the system doors.

14. Reinstall one of the expansion cards you removed in step 11.

15. Run the system memory test in the Dell Diagnostics.

    See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics," for more information on Dell Diagnostics.

    Did the test run successfully?

    Yes. Go to step 16.

    No. See Chapter 9, "Getting Help," for information on obtaining technical assistance.

16. Repeat steps 14 and 15 for each of the remaining expansion cards that you removed in step 11.

    Have you reinstalled all of the expansion cards without encountering a test failure?

    Yes. You have fixed the problem.

    No. See Chapter 9, "Getting Help," for information on obtaining technical assistance.

Troubleshooting System Memory

A system memory problem can be a faulty dual in-line memory module (DIMM) or a faulty system board. If a random-access memory (RAM) error message appears, the system probably has a memory problem.

When you turn on or reboot the system, the Caps Lock and Scroll Lock indicators on the keyboard should flash momentarily and then turn off. If the **Num Lock** category in the System Setup program is set to **On**, the Num Lock indicator should flash momentarily and then remain on; otherwise, it should turn off. Abnormal operation of these indicators can result from a defective DIMM in socket DIMM_A.

To troubleshoot system memory, perform the following steps:

1. Turn on the system, including any attached peripherals.

   Is there an error message indicating invalid system configuration information after the memory count is completed?

   Yes. Go to step 2.

   No. Go to step 7.

2. Enter the System Setup program to check the **Total Memory** or **System Memory** setting.

   See "Using the System Setup Program," in the *User's Guide* for instructions.

   Does the amount of memory installed match the **Total Memory** or **System Memory** setting?

   Yes. Go to step 8.

   No. Go to step 3.

3. Turn off the system, including any attached peripherals, and disconnect the power cable from the electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

4. Open the system doors.

5. Reseat the DIMMs in their sockets.

6. Close the system doors, reconnect the system to AC power, and turn on the system.

7. Enter the System Setup program and check the **Total Memory** or **System Memory** setting again.

   Does the amount of memory installed match the **Total Memory** or **System Memory** setting?

   Yes. Go to step 8.

   No. Go to step 9.

8. Reboot the system, and observe the monitor screen and the Num Lock, Caps Lock, and Scroll Lock indicators on the keyboard.

   Does the monitor screen remain blank, and do the Num Lock, Caps Lock, and Scroll Lock indicators on the keyboard remain on?

   Yes. Go to step 9.

   No. Go to step 13.

9. Turn off the system and open the doors.

10. Swap the DIMM in socket DIMM_A with one of the same capacity.

11. Close the system doors and reconnect the system to an electrical outlet.Reboot the system, and observe the monitor screen and the indicators on the keyboard.

    Is the problem resolved?

    Yes. You have fixed the problem.

    No. Go to step 13.

12. Run the system memory test in the Dell Diagnostics.

    See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics," for more information on Dell Diagnostics.

    Did the test run successfully?

    Yes. You have fixed the problem.

    No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Video Subsystem

Troubleshooting video problems involves determining which of the following items is the source of the problem:

- Monitor and monitor interface cable
- Video memory
- Video logic of the system or a video expansion card

If information on the monitor screen is displayed incorrectly or not at all, perform the following steps to solve the problem:

1. Adjust the switches and controls including the horizontal and vertical position and size, as specified in the monitor's documentation, to correct the video image.

    Is the problem resolved?

    Yes. You have fixed the problem.

    No. Go to step 2.

2. Run the video tests in the Dell Diagnostics.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

   Is the monitor displaying text properly?

   Yes. You have fixed the problem or the problem is software-related. See the *Dell PowerVault 735N NAS Appliance System Administrator's Guide* for more information on how to reinstall your system image.

   No. Go to step 3.

3. Turn off the system and disconnect it from the electrical outlet.

4. Swap the monitor with one of the same type that is working, and reconnect the system to the electrical outlet.

5. Run the video tests in the Dell Diagnostics again.

   Did the tests run successfully?

   Yes. The monitor must be replaced. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

   No. The integrated video controller is faulty; see Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the System Board

A system board problem can result from a defective system board component, a faulty power supply, or a defective component connected to the system board. If an error message indicates a system board problem, perform the following steps to troubleshoot the problem:

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

2. Open the system doors.

3. Remove all expansion cards except the SCSI host adapter card and the video expansion card (if they are installed).

4. Close the system doors, reconnect the system to AC power, and turn on the system.

5. Run the system board tests in the Dell Diagnostics.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

Did the tests run successfully?

Yes. Go to step 10.

No. Go to step 11.

6. Turn off the system, disconnect it from AC power, and open the system doors.

7. Reinstall one of the expansion cards that you removed in step 3, repeat step 4, and continue with step 8.

8. Run the system board tests again.

Did the tests run successfully?

Yes. Go to step 8.

No. Go to step 10.

9. Repeat steps 6 through 8 for each of the remaining expansion cards that you removed in step 3.

Have you reinstalled all of the expansion cards without a test failure?

Yes. Go to step 10.

No. One of the expansion cards is faulty. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

10. Disconnect the keyboard and reboot the system.

Does the system boot successfully to the operating system?

Yes. Go to step 11.

No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

11. Swap the keyboard with a comparable working keyboard and run the system board tests again.

Did the tests run successfully?

Yes. You have fixed the problem.

No. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the Diskette Drive Subsystem

If the monitor displays a system error message indicating a diskette drive problem during execution of either the boot routine or the Dell Diagnostics, the problem may be caused by any of the following conditions:

- The system configuration settings do not match the physical diskette subsystem configuration.

- An expansion card is interfering with proper drive operations.

- The diskette drive/CD-ROM drive unit is improperly seated against the interposer board.

- The diskette drive is faulty.

- The interposer board is faulty.

- The system's power supply is not providing sufficient power for the drives.

- The system's diskette drive logic is faulty.

To troubleshoot the diskette drive subsystem, perform the following steps:

1. Enter the System Setup program, and verify that the diskette drive setting is configured correctly.

   See "Using the System Setup Program" in the *User's Guide* for instructions.

2. If the system configuration settings are incorrect, make the necessary corrections in the System Setup program, and then reboot the system.

3. Run the diskette drives test in the Dell Diagnostics to determine whether the diskette drive subsystem now works correctly.

   See "Starting the Dell Diagnostics" in Chapter 4, "Running the Dell Diagnostics" for more information on Dell Diagnostics.

   Do the tests complete successfully?

   Yes. You have fixed the problem.

   No. Go to step 4.

4. Turn off the system, including any attached peripherals, and disconnect the AC power cable from its power source.

5. Open the system doors.

   NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

6. Remove all expansion cards from the system.

7. Close the system doors, reconnect the system to AC power, and turn on the system.

8. Run the diskette drives test in the Dell Diagnostics to determine whether the diskette drive subsystem now works correctly.

   Do the tests complete successfully?

   Yes. An expansion card may be conflicting with the diskette drive logic, or you may have a faulty expansion card. Go to step 9.

   No. The diskette drive subsystem is faulty. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

9. Repeat steps 4 and 5, and reinstall one of the expansion cards that you removed in step 6.

10. Close the system doors, reconnect the system to AC power, and turn on the system.

11. Run the diskette drive tests in the Dell Diagnostics to determine whether the diskette drive subsystem now works correctly.
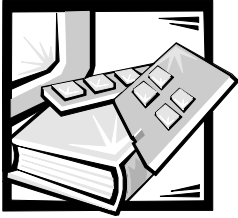
12. Repeat steps 9 through 11 until all expansion cards have been reinstalled or until one of the expansion cards prevents the system from booting from the diagnostics diskette.

13. Has an expansion card prevented the system from booting from the diagnostics diskette?

   Yes. An expansion card is faulty. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

   No. The diskette drive subsystem is faulty. See Chapter 9, "Getting Help," for instructions on obtaining technical assistance.

Troubleshooting the PERC 2/DC

Your system contains a Dell PERC 2/DC host adapter card. See the *Dell PERC 2/DC User's Guide* on the *Dell PowerVault 735N Resource* CD for information about troubleshooting this card.

C H A P T E R 7
Installing System Board Options

This section describes how to install expansion cards. This section also includes instructions for replacing the system battery, if necessary.

Use Figure 7-1 to locate the system board features.

WARNING: Before you perform the procedures in this section, you must turn off the system and disconnect it from its AC power source. For more information, see "Safety First—For You and Your System" in Chapter 6.

serial port connector (COM2) (UPS port)

parallel port connector (PARALLEL)**

Universal Serial Bus (USB) connectors (2)*

keyboard and mouse connectors (KYBD/ MOUSE)*

serial port connector (COM1) (administration port)

video connector (VGA)*

network interface connector (ENET)

chassis intrusion switch connector (INTRUS1)

battery connector (BATTERY)

hardware key connector for optional RAID controller (RAID_KEY)**

power input connector (POWER3)

PCI riser board connector (RISER)

configuration jumpers

power input connector (POWER1)

DIMM socket for optional RAID controller (DIMM_RAID)**

secondary microprocessor (PROC_2)

U160/m SCSI connector (SCSI1 [Channel A])**

primary microprocessor (PROC_1)

DIMM sockets (DIMM_A–DIMM_D)

U160/m SCSI connector (SCSI2 [Channel B])**

SCSI backplane board interface cable connector (BACKPLANE)

interposer board interface cable connector (I/O CONN)

* not used during normal operation

** not supported

Figure 7-1. System Board Features

Expansion Cards

Expansion cards are installed on the system's riser board (see Figure 7-2). The riser board plugs into the RISER connector on the system board (see Figure 7-1) and is considered an extension of the system board.

The riser board contains three full-length 32-bit, 33-megahertz (MHz), Peripheral Component Interconnect (PCI) expansion-card connectors. All three expansion card

connectors support both 3.3-volt (V) and 5 V cards. Connector PCI2 supports an optional Dell Remote Assistant Card version 2 (DRAC 2).

power LED

PCI3

PCI2

PCI1

DRAC 2 connector (SVR_MGT)
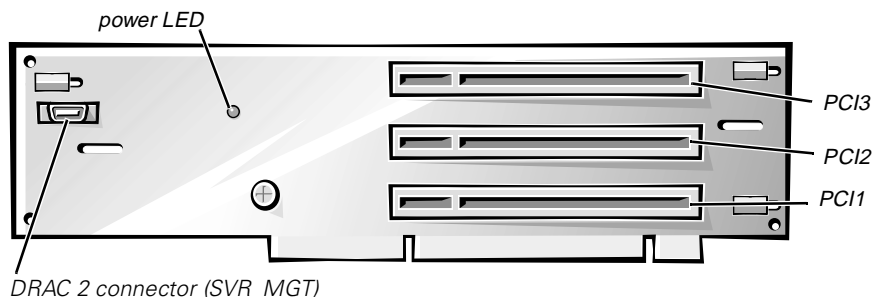
Figure 7-2. Riser-Board Expansion-Card Connectors

Installing an Expansion Card

To install an expansion card, perform the following steps.

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its AC power source. For more information, see "Safety First—For You and Your System" in Chapter 6.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2. Prepare the expansion card for installation, and open the system doors according to the instructions in "Opening the System Doors" in Chapter 6.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

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

3. Remove the expansion-card cage as instructed in "Removing the Expansion-Card Cage" in Chapter 6.

NOTE: Verify that the power LED on the riser board (see Figure 7-2) is off before removing the card cage.

4. Open the expansion-card latch (see Figure 7-3) and remove the filler bracket from the expansion slot.
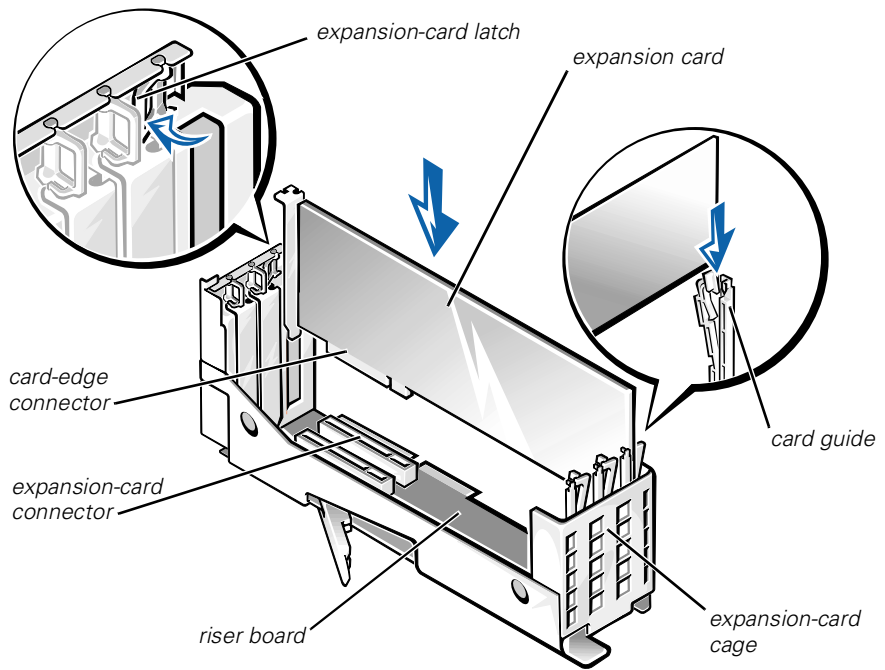
Figure 7-3. Installing an Expansion Card

5. Install the new expansion card (see Figure 7-3).

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

   Insert the card-edge connector firmly into the expansion-card connector on the riser board, until the card is fully seated.

6. When the card is seated in the connector and the card-mounting bracket is aligned with the brackets on either side of it, close the expansion-card latch.

7. If the expansion card is a full-length card, secure the inner end of the card by closing the latch on the card guide over the top edge of the card (see Figure 7-3).

8. Replace the expansion-card cage in the chassis as instructed in "Replacing the Expansion-Card Cage" in Chapter 6.

9. Connect any cables that should be attached to the card.

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

11. Close the system doors, and then reconnect the system and peripherals to their AC power sources and turn them on.

Removing an Expansion Card

To remove an expansion card, perform the following steps.

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its AC power source. For more information, see "Safety First—For You and Your System" in Chapter 6.

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.

2. Open the system doors.

3. Disconnect any cables connected to the card.

4. Remove the expansion-card cage as instructed in "Removing the Expansion-Card Cage" in Chapter 6.

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

6. To release the expansion card from the card cage, rotate the latch away from the expansion-card bracket.

7. If the expansion card is a full-length card, release the card's inner end by opening the tab on the card guide (see Figure 7-3).

8. Grasp the expansion card by its top corners, and carefully remove it from the expansion-card connector.

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

   NOTE: Installing a filler bracket over an empty expansion slot is necessary to maintain Federal Communications Commission (FCC) certification of the system. The brackets also keep dust and dirt out of the system and aid in proper cooling and airflow inside the system.

10. Replace the expansion-card cage in the chassis as instructed in "Replacing the Expansion-Card Cage" in Chapter 6.

11. Close the system doors, and then reconnect the system and peripherals to their AC power sources and turn them on.

Replacing the Battery

The system battery maintains system configuration, date, and time information in a special section of memory when you turn off the system. The operating life of the battery ranges from 2 to 5 years, depending on how you use the system (for example, if you keep the system on most of the time, the battery gets little use and thus lasts

longer). You may need to replace the battery if an incorrect time or date is displayed during the boot routine along with the following or similar message:

```
Time-of-day not set -- please run SETUP program
Strike the F1 key to continue, F2 to run the setup utility
```

or

```
System CMOS checksum bad -- Run SETUP
Strike the F1 key to continue, F2 to run the setup utility
```

or

```
Invalid configuration information -- please run SETUP program
Strike the F1 key to continue, F2 to run the setup utility
```

To determine if the battery needs replacing, reenter the time and date through the System Setup program. Turn off and disconnect the system from the electrical outlet for a few hours, and then reconnect and turn the system on again. Enter the System Setup program. If the date and time are not correct in the System Setup program, replace the battery.

NOTES: Some software may cause the system time to speed up or slow down. If the system seems to operate normally except for the time kept in the System Setup program, the problem may be caused by software rather than by a defective battery.

If the system is turned off for long periods of time (for weeks or months), the NVRAM may lose its system configuration information. This situation is not caused by a defective battery.

You can operate the system without a battery; however, the system configuration information maintained by the battery in NVRAM is erased each time you shut down the system. Therefore, you must reenter the system configuration information and reset the options each time the system boots until you replace the battery.

The battery is a 3.0-volt (V), coin-cell CR2032-type battery. To remove the battery, perform the following steps.

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its AC power source. For more information, see "Safety First—For You and Your System" in Chapter 6.

CAUTION: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

1. Enter the System Setup program and, if possible, make a printed copy of the System Setup screens.

    See Chapter 3, "Using the System Setup Program," in the *User's Guide* for instructions.

2. Shut down the system, including any attached peripherals, and disconnect the system from the electrical outlet.

NOTICE: See "Protecting Against Electrostatic Discharge" in the safety instructions in the *System Information* document.

3. Open the system doors.

4. Remove the battery.

    Pry the battery out of its socket with your fingers or with a blunt, nonconductive object such as a plastic screwdriver.

5. Install the new battery with the side labeled "+" facing up (see Figure 7-4).
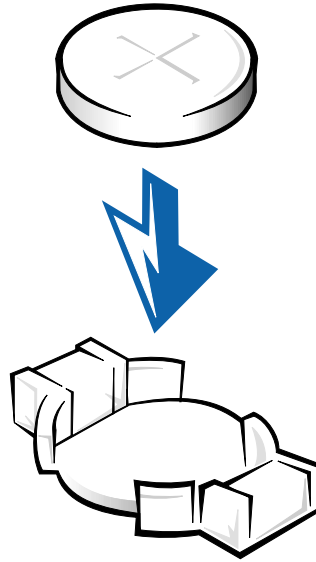
Figure 7-4. Installing the Battery

6. Close the system doors, and then reconnect the system and peripherals to their AC power sources and turn them on.

7. Enter the System Setup program to confirm that the battery is operating properly.

8. Enter the correct time and date through the System Setup program's **Time** and **Date** settings. Also reenter any system configuration information that is no longer displayed on the System Setup screens, and then exit the System Setup program.

9. To test the newly installed battery, turn off and disconnect the system from the electrical outlet for at least an hour.

10. After an hour, plug in and turn on the system and enter the System Setup program. If the time and date are still incorrect, see Chapter 9, "Getting Help," for instructions on obtaining technical assistance.
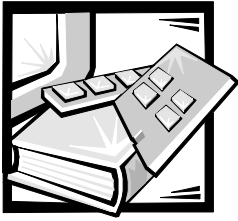
CHAPTER 8
Installing Hard-Disk Drives

This section describes how to install and configure small computer system interface (SCSI) hard-disk drives in the system's internal hard-disk drive bays. The hard-disk drive bays provide space for up to five 1-inch hard-disk drives. Standard Dell PowerVault 735N systems include SCSI hard-disk drives installed in slots 0, 1, 2, 3, and 4.

Figure 8-1 illustrates the system components associated with the SCSI hard-disk drives.

PERC 2/DC SCSI interface connector [Channel A]
SCSI peripheral bay interface cable
SCSI backplane board interface cable
SCSI backplane board
SCSI hard-disk drives (5)
SCSI ID 0
SCSI ID 1
SCSI ID 2
SCSI ID 3
SCSI ID 4
combination diskette drive and CD-ROM drive
interposer board
interposer board interface cable
SCSI backplane board data cable
system board
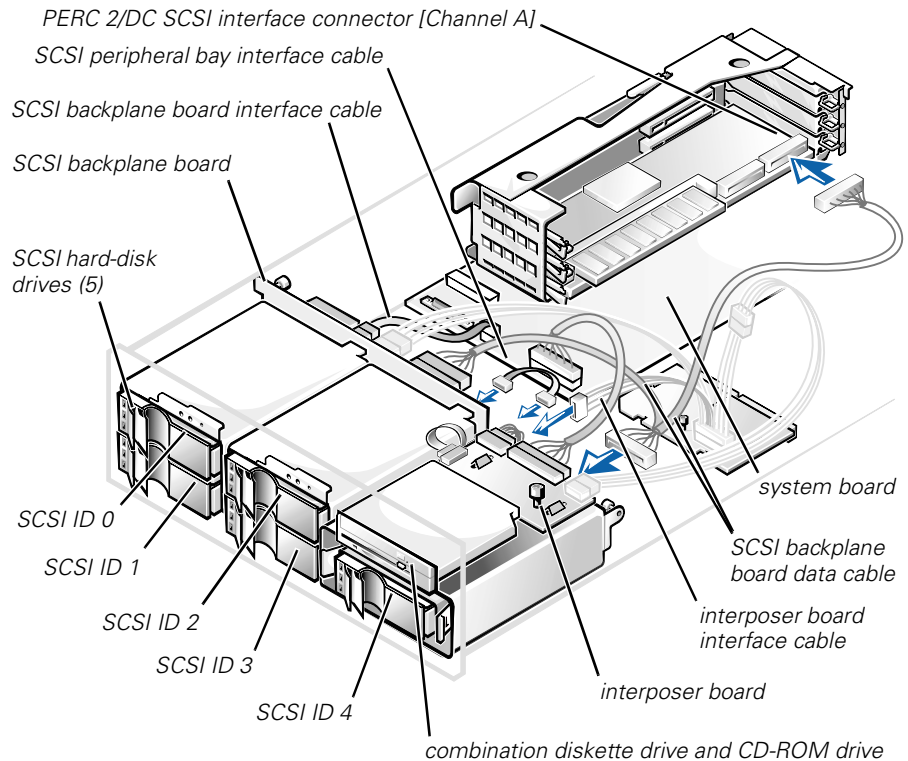
Figure 8-1. Hard-Disk Drive Hardware

Preparing SCSI Hard-Disk Drives for Installation

NOTE: Dell recommends that you use only drives that Dell has tested and approved for use with the SCSI backplane board.

SCSI Hard-Disk Drive Configuration

The SCSI drives must be configured as follows:

- Disable termination on the drives. The SCSI backplane board provides termination for the SCSI bus.

- Set the SCSI ID on all drives to 0. All SCSI ID numbers for the drives are set by the SCSI backplane board, as shown in Figure 8-1.

- Configure the drives so that the drive motor waits for a Start Unit command from the SCSI host adapter before spinning.

Partitioning and Formatting SCSI Hard-Disk Drives

Use Dell OpenManage Array Manager software to partition and format your hard-disk drives. See the Array Manager documentation on the *Dell PowerVault 735N Resource* CD for details.

General Information on Cabling

The four connectors on the SCSI backplane board are designated as SCSI ID 0 through SCSI ID 3 (see Figure 8-1). The connector on the SCSI peripheral bay backplane board is SCSI ID 4.

There is one cable that attaches from the SCSI backplane board to the peripheral bay backplane board, and then to Channel A of the PERC 2/DC (see Figure 8-1).

Installing SCSI Hard-Disk Drives

SCSI hard-disk drives are supplied by Dell in special drive carriers that fit in the hard-disk drive bays. To install a SCSI hard-disk drive, perform the following steps.

NOTICE: Hot-plug drive installation is not supported on the internal disk drives.

1. Shut down the system.

2. If the optional bezel is installed, remove it.

3. Open the drive carrier handle and slide the carrier toward you until it is free of the drive bay (see Figure 8-2).

hard-disk drive carrier

hard-disk drive carrier handle
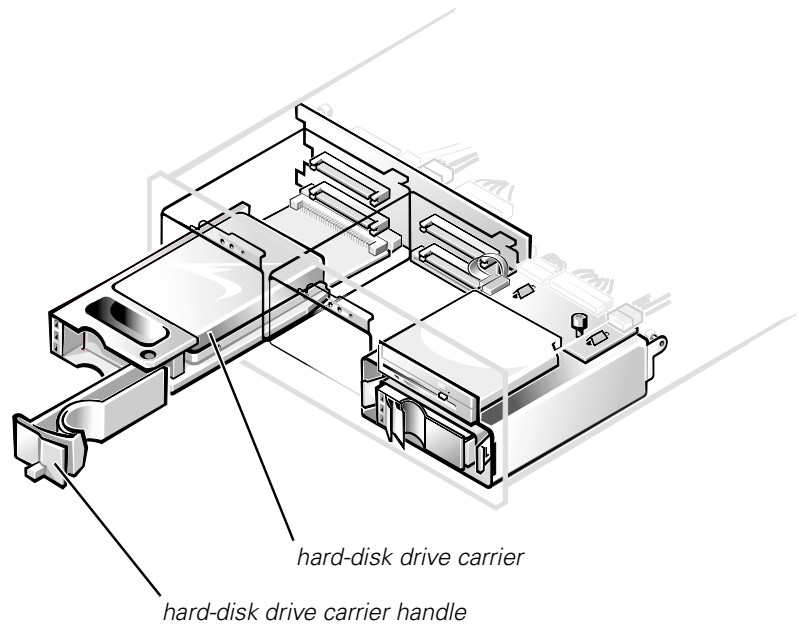
Figure 8-2. SCSI Hard-Disk Drive Carrier

4. Open the handle on the new hard-disk drive carrier.

5. Align the edge of the carrier with the notch in the system bezel and insert the carrier into the drive bay (see Figure 8-2).

6. Close the drive carrier handle to lock the new drive carrier in place.

7. Turn on the system.

8. If you removed the bezel in step 2, reinstall it now.
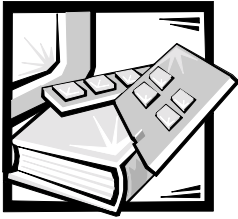
C H A P T E R   9
Getting Help

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

Technical Assistance

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

1. Complete the troubleshooting checks in Chapter 2, "Checking the Basics."

2. Run the Dell Diagnostics as described in Chapter 4, "Running the Dell Diagnostics."

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

4. Use Dell's extensive suite of online services available at Dell's World Wide Web site (**http://support.dell.com**) for help with installation and troubleshooting procedures.

    For more information, see "World Wide Web" found later in this chapter.

5. If the preceding steps have not resolved the problem, call Dell for technical assistance.

    When prompted by Dell's automated telephone system, enter your Express Service Code to route the call directly to the proper support personnel. If you do not have an Express Service Code, open the **Dell Accessories** folder, double-click the **Express Service Code** icon, and follow the directions.

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

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

Help Tools

Dell provides a number of tools to assist you. These tools are described in the following sections.

NOTE: Some of the following tools are not always available in all locations outside the continental U.S. Please call your local Dell representative for information on availability.

World Wide Web

The Internet is your most powerful tool for obtaining information about your computer and other Dell products. Through the Internet, you can access most of the services described in this section, including AutoTech, TechFax, order status, technical support, and product information.

You can access Dell's support Web site at **http://support.dell.com.** To select your country, click the map that appears. The **Welcome to support.dell.com** page opens. Enter your system information to access help tools and information.

Dell can be accessed electronically using the following addresses:

- World Wide Web

  http://www.dell.com/

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

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

  http://www.dell.com/la (for Latin American countries)

- Anonymous file transfer protocol (FTP)

  ftp.dell.com/

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

- Electronic Support Service

  support@us.dell.com

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

  support.euro.dell.com (for Europe only)

- Electronic Quote Service

  sales@dell.com

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

- Electronic Information Service

  info@dell.com

AutoTech Service

Dell's automated technical support service—AutoTech—provides recorded answers to the questions most frequently asked by Dell customers about their portable and desktop computers.

When you call AutoTech, you use your touch-tone telephone to select the subjects that correspond to your questions.

The AutoTech service is available 24 hours a day, seven days a week. You can also access this service through the technical support service. For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

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. For the TechFax telephone number to call, see "Dell Contact Numbers" found later in this chapter.

Automated Order-Status System

You can call this automated service to check on the status of any Dell products that you have ordered. A recording prompts you for the information needed to locate and report on your order. For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

Technical Support Service

Dell's industry-leading hardware technical-support service is available 24 hours a day, seven days a week, to answer your questions about Dell hardware.

Our technical support staff pride themselves on their track record: more than 90 percent of all problems and questions are taken care of in just one toll-free call, usually in less than 10 minutes. When you call, our experts can see records kept on your Dell system to better understand your particular question. Our technical support staff use computer-based diagnostics to provide fast, accurate answers to questions.

To contact Dell's technical support service, first see the section titled "Before You Call" and then call the number for your country as listed in "Dell Contact Numbers" found later in this chapter.

Problems With Your Order

If you have a problem with your order, such as missing parts, wrong parts, or incorrect billing, contact Dell for customer assistance. Have your invoice or packing slip handy

when you call. For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

Product Information

If you need information about additional products available from Dell, or if you would like to place an order, visit Dell's World Wide Web site at **http://www.dell.com/**. For the telephone number to call to speak to a sales specialist, see "Dell Contact Numbers" found later in this chapter.

Returning Items for Warranty Repair or Credit

Prepare all items being returned, whether for repair or credit, as follows:

1. Call Dell to obtain an authorization number, and write it clearly and prominently on the outside of the box.

    For the telephone number to call, see "Dell Contact Numbers" found later in this chapter.

2. Include a copy of the invoice and a letter describing the reason for the return.

3. Include a copy of the Diagnostics Checklist indicating the tests you have run and any error messages reported by the Dell Diagnostics.

4. Include any accessories that belong with the item(s) being returned (power cables, software diskettes, guides, and so on) if the return is for credit.

5. Pack the equipment to be returned in the original (or equivalent) packing materials.

    You are responsible for paying shipping expenses. You are also responsible for insuring any product returned, and you assume the risk of loss during shipment to Dell. Collect-on-delivery (C.O.D.) packages are not accepted.

Returns that are missing any of the preceding requirements will be refused at our receiving dock and returned to you.

Before You Call

NOTE: Have your Express Service Code ready when you call. The code helps Dell's automated-support telephone system direct your call more efficiently.

Remember to fill out the Diagnostics Checklist (Figure 9-1). If possible, turn on your system 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 system itself. Make sure that the system documentation is available.

WARNING: If you need to remove the computer covers, be sure to first disconnect the computer system's power and modem cables from all electrical outlets.

<div style="border:1px solid black; padding:1em;">

Diagnostics Checklist

Name: _____Date: _____

Address: _____Phone number: _____

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

Express Service Code: _____

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

Operating system and version: _____

Peripherals: _____

_____

_____

Expansion cards:_____

_____

_____

Network, version, and network card: _____

Programs and versions:_____

_____

_____

_____

Error message, beep code, or diagnostic code: _____

Description of problem and troubleshooting procedures you performed: _____

_____

_____

</div>

Figure 9-1. Diagnostics Checklist

Dell Contact Numbers

When you need to contact Dell, use the telephone numbers, codes, and electronic addresses provided in Table 9-1 and Table 9-2. Table 9-1 provides the various codes required to make long-distance and international calls. Table 9-2 provides local telephone numbers, area codes, toll-free numbers, Web site and e-mail addresses, 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 9-1 in addition to the local numbers provided in Table 9-2. 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.

| **00** International Access Code (in France) | **44** Country Code (for U.K.) | **1344** City Code (Bracknell) | Local Number |
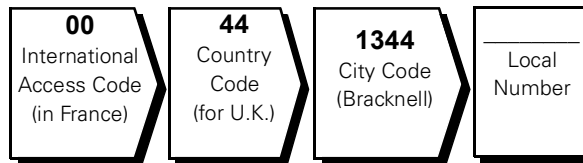
To place a long-distance call within your own country, use area codes instead of international access codes, country codes, and city codes. For example, to call Paris, France from Montpellier, France, dial the area code plus the local number as shown in the following illustration.

| **01** Area Code (for Paris from outside Paris) | Local Number |
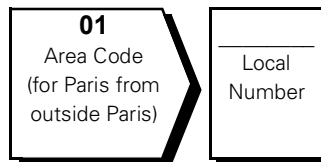
The codes required depend on where you are calling from as well as the destination of your call; in addition, each country has a different dialing protocol. If you need assistance in determining which codes to use, contact a local or an international operator.

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 9-1. 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
Brazil	0021	55	51
Brunei	—	673	—
Canada (North York, Ontario)	011	—	Not required
Chile (Santiago)	—	56	2
China (Xiamen)	—	86	592
Czech Republic (Prague)	00	420	2
Denmark (Horsholm)	009	45	Not required
Finland (Helsinki)	990	358	9
France (Paris) (Montpellier)	00	33	(1) (4)
Germany (Langen)	00	49	6103
Hong Kong	001	852	Not required
Ireland (Bray)	16	353	1
Italy (Milan)	00	39	02
Japan (Kawasaki)	001	81	44
Korea (Seoul)	001	82	2
Luxembourg	00	352	—
Macau	—	853	Not required
Malaysia (Penang)	00	60	4
Mexico (Colonia Granada)	95	52	5
Netherlands (Amsterdam)	00	31	20
New Zealand	00	64	—
Norway (Lysaker)	095	47	Not required
Poland (Warsaw)	011	48	22
Portugal	00	35	—
Singapore (Singapore)	005	65	Not required

Table 9-1. International Dialing Codes (continued)

Country (City)	International Access Code	Country Code	City Code
South Africa (Johannesburg)	09/091	27	11
Spain (Madrid)	00	34	91
Sweden (Upplands Vasby)	009	46	8
Switzerland (Geneva)	00	41	22
Taiwan	002	886	—
Thailand	001	66	—
U.K. (Bracknell)	010	44	1344
U.S.A. (Austin, Texas)	011	1	Not required

Table 9-2. Dell Contact Numbers

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Australia (Sydney)	Home and Small Business		1-300-65-55-33
	Government and Business		toll free: 1-800-633-559
	Preferred Accounts Division (PAD)		toll free: 1-800-060-889
	Customer Care		toll free: 1-800-819-339
	Corporate Sales		toll free: 1-800-808-385
	Transaction Sales		toll free: 1-800-808-312
	Fax		toll free: 1-800-818-341
Austria (Vienna) *NOTE: Customers in Austria call Germany for technical and customer assistance.*	Home/Small Business Sales	01	. . . . .795 567602
	Home/Small Business Fax	01	. . . . .795 67605
	Home/Small Business Customer Care.	01	. . . . .795 67603
	Preferred Accounts/Corporate Customer Care.		0660 8056
	Home/Small Business Technical Support	01	. . . . .795 67604
	Preferred Accounts/Corporate Technical Support.		0660 8779
	Switchboard	01	. . . . .491 04 0
	Web site: **http://support.euro.dell.com**		
	E-mail: tech_support_germany@dell.com		

Table 9-2. Dell Contact Numbers (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Belgium (Brussels)	Technical Support.	02	. . . . 481 92 88
	Customer Care.	02	. . . . 481 91 19
	Home/Small Business Sales . . . . .toll free: 0800 16884		
	Corporate Sales	02	. . . . 481 91 00
	Fax	02	. . . . 481 92 99
	Switchboard	02	. . . . 481 91 00
	Web site: **http://support.euro.dell.com**		
	E-mail: tech_be@dell.com		
Brazil	Customer Support, Technical Support 0800 90 3355		
	Sales 0800 90 3366		
	Web site: **http://www.dell.com/br**		
Brunei NOTE: Customers in Brunei call Malaysia for sales, customer, and technical assistance.	Customer Technical Support (Penang, Malaysia) .633 4966		
	Customer Service (Penang, Malaysia) 633 4949		
	Transaction Sales (Penang, Malaysia). 633 4955		
Canada (North York, Ontario)	Automated Order-Status System. .toll free: 1-800-433-9014		
	AutoTech (Automated technical support) . . . . .toll free: 1-800-247-9362		
	Customer Care (From outside Toronto) . . . . .toll free: 1-800-387-5759		
	Customer Care (From within Toronto)	416	758-2400
	Customer Technical Support . . . . .toll free: 1-800-847-4096		
	Sales (Direct Sales—from outside Toronto). . . . . .toll free: 1-800-387-5752		
	Sales (Direct Sales—from within Toronto)	416	758-2200
	Sales (Federal government, education, and medical). . . . . .toll free: 1-800-567-7542		
	Sales (Major Accounts) . . . . .toll free: 1-800-387-5755		
	TechFax . . . . .toll free: 1-800-950-1329		

*Table 9-2. **Dell Contact Numbers*** (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Chile (Santiago) *NOTE: Customers in Chile call the U.S.A for sales, customer, and technical assistance.*	Sales, Customer Support, and Technical Support . . . . toll free: 1230-020-4823		
China (Xiamen)	Technical Support . . . . toll free: 800 858 2437 Customer Experience. . . . . toll free: 800 858 2060 Home and Small Business . . . . toll free: 800 858 2222 Preferred Accounts Division. . . . . toll free: 800 858 2062 Large Corporate Accounts . . . . toll free: 800 858 2999		
Czech Republic (Prague)	Technical Support . . . . .02. . . . . 22 83 27 27 Customer Care. . . . . .02. . . . . 22 83 27 11 Fax . . . . .02. . . . . 22 83 27 14 TechFax . . . . .02. . . . . 22 83 27 28 Switchboard . . . . .02. . . . . .22 83 27 11 Web site: **http://support.euro.dell.com** E-mail: czech_dell@dell.com		
Denmark (Horsholm) *NOTE: Customers in Denmark call Sweden for fax technical support.*	Technical Support . . . . 45170182 Relational Customer Care . . . . 45170184 Home/Small Business Customer Care. . . . . 32875505 Switchboard . . . . 45170100 Fax Technical Support (Upplands Vasby, Sweden) . . . . 859005594 Fax Switchboard. . . . . .45170117 Web site: **http://support.euro.dell.com** E-mail: den_support@dell.com		

*Table 9-2. **Dell Contact Numbers*** (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Finland (Helsinki)	Technical Support	09	253 313 60
	Technical Support Fax	09	253 313 81
	Relational Customer Care	09	253 313 38
	Home/Small Business Customer Care	09	693 791 94
	Fax	09	253 313 99
	Switchboard	09	253 313 00
	Web site: **http://support.euro.dell.com**		
	E-mail: fin_support@dell.com		
France (Paris/Montpellier)	**Home and Small Business**		
	Technical Support	0825	387 270
	Customer Care	0825	823 833
	Switchboard	0825	004 700
	Switchboard (Alternative)	04	99 75 40 39
	Sales	0825	004 700
	Fax	0825	004 701
	Web site: **http://support.euro.dell.com**		
	E-mail: web_fr_tech@dell.com		
	Corporate		
	Technical Support	0825	004 719
	Customer Care	0825	338 339
	Switchboard	01	55 94 71 00
	Fax	01	55 94 71 99
	Web site: **http://support.euro.dell.com**		
	E-mail: web_fr_tech@dell.com		

Table 9-2. Dell Contact Numbers *(continued)*

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Germany (Langen)	Technical Support	06103	766-7200
	Technical Support Fax.	06103	766-9222
	Home/Small Business Customer Care.		. 0180-5-224400
	Global Segment Customer Care	06103	766-9570
	Preferred Accounts Customer Care	06103	766-9420
	Large Accounts Customer Care	06103	766-9560
	Public Accounts Customer Care.	06103	766-9555
	Switchboard	06103	 766-7000
	Web site: **http://support.euro.dell.com**		
	E-mail: tech_support_germany@dell.com		
Hong Kong *NOTE: Customers in Hong Kong call Malaysia for customer assistance.*	Technical Support		toll free: 800 96 4107
	Customer Service (Penang, Malaysia)		633 4949
	Transaction Sales		toll free: 800 96 4109
	Corporate Sales		toll free: 800 96 4108
Ireland (Bray)	Technical Support		. 0870 908 0800
	Customer Care.	01	. . . . 204 4026
	Sales.	01	. . . . 286 0500
	SalesFax	01	. . . . .204 0144
	Fax		. 0870 907 5590
	Switchboard	01	. . . . 286 0500
	Web site: **http://support.euro.dell.com**		
	E-mail: dell_direct_support@dell.com		

Table 9-2. Dell Contact Numbers *(continued)*

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Italy (Milan)	**Home and Small Business**		
	Technical Support.	02	577 826 90
	Customer Care.	02	696 821 14
	Fax	02	696 824 13
	Switchboard.	02	696 821 12
	Web site: **http://support.euro.dell.com**		
	E-mail: web_it_tech@dell.com		
	Corporate		
	Technical Support.	02	577 826 90
	Customer Care.	02	577 825 55
	Fax	02	575 035 30
	Switchboard	02	577 821
	Web site: **http://support.euro.dell.com**		
	E-mail: web_it_tech@dell.com		
Japan (Kawasaki)	Technical Support (Server) . . . . toll free: 0120-1984-35		
	Technical Support (Dimension™ and Inspiron™) . . . . toll free: 0120-1982-56 or 0088-25-3355		
	Technical Support (WorkStation, OptiPlex™, and Latitude™) . . . . toll free: 0120-1984-39 or 0088-22-7890		
	Customer Care.	044	556-4240
	24-Hour Automated Order Status Service.	044	556-3801
	Home and Small Business Group Sales	044	556-3344
	Preferred Accounts Division Sales.	044	556-3433
	Large Corporate Accounts.	044	556-3430
	Faxbox Service.	044	556-3490
	Switchboard.	044	556-4300
	Web site: **http://support.jp.dell.com**		

Table 9-2. ***Dell Contact Numbers*** (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Korea (Seoul)	Technical Support		toll free: 080-200-3800
	Sales.		toll free: 080-200-3777
	Customer Service (Seoul, Korea)		2194-6220
	Customer Service (Penang, Malaysia)		604-633-4949
	Fax		2194-6202
	Switchboard		2194-6000
Latin America *NOTE: Customers in Latin America call the U.S.A. for sales, customer, and technical assistance.*	Customer Technical Support (Austin, Texas, U.S.A.)	512	728-4093
	Customer Service (Austin, Texas, U.S.A.)	512	728-3619
	Fax (Technical Support and Customer Service) (Austin, Texas, U.S.A.)	512	728-3883
	Sales (Austin, Texas, U.S.A.).	512	728-4397
	SalesFax (Austin, Texas, U.S.A.)	512	728-4600
			728-3772
Luxembourg *NOTE: Customers in Luxembourg call Belgium for sales, customer, and technical assistance.*	Technical Support (Brussels, Belgium)	02	481 92 88
	Home/Small Business Sales (Brussels, Belgium).		toll free: 080016884
	Corporate Sales (Brussels, Belgium)	02	481 91 00
	Customer Care (Brussels, Belgium)	02	481 91 19
	Fax (Brussels, Belgium)	02	481 92 99
	Switchboard (Brussels, Belgium)	02	481 91 00
	Web site: **http://support.euro.dell.com**		
	E-mail: tech_be@dell.com		
Macau *NOTE: Customers in Macau call Malaysia for customer assistance.*	Technical Support		toll free: 0800 582
	Customer Service (Penang, Malaysia)		633 4949
	Transaction Sales		toll free: 0800 581
Malaysia (Penang)	Technical Support		toll free: 1 800 888 298
	Customer Service	04	633 4949
	Transaction Sales		toll free: 1 800 888 202
	Corporate Sales		toll free: 1 800 888 213

Table 9-2. Dell Contact Numbers (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Mexico *NOTE: Customers in Mexico call the U.S.A. for access to the Automated Order-Status System and AutoTech.*	Automated Order-Status System (Austin, Texas, U.S.A.)	512	728-0685
	AutoTech (Automated technical support) (Austin, Texas, U.S.A.)	512	728-0686
	Customer Technical Support	525	228-7870
	Sales	525	228-7811
			toll free: 91-800-900-37
			toll free: 91-800-904-49
	Customer Service	525	228-7878
	Main.	525	228-7800
Netherlands (Amsterdam)	Technical Support.	020	. . . . .581 8838
	Customer Care.	020	. . . . .581 8740
	Home/Small Business Sales		toll free: 0800-0663
	Home/Small Business Sales Fax	020	. . . . .682 7171
	Corporate Sales	020	. . . . .581 8818
	Corporate Sales Fax.	020	. . . . .686 8003
	Fax	020	. . . . .686 8003
	Switchboard.	020	. . . . .581 8818
	Web site: **http://support.euro.dell.com**		
	E-mail: tech_nl@dell.com		
New Zealand	Home and Small Business.		. 0800 446 255
	Government and Business.		. 0800 444 617
	Sales		. 0800 441 567
	Fax		. 0800 441 566
Norway (Lysaker) *NOTE: Customers in Norway call Sweden for fax technical support.*	Technical Support.		. . . . . . .671 16882
	Relational Customer Care		. . . . . . .671 17514
	Home/Small Business Customer Care		. 23162298
	Switchboard.		. . . . . . .671 16800
	Fax Technical Support (Upplands Vasby, Sweden)		. 590 05 594
	Fax Switchboard.		. . . . . . .671 16865
	Web site: **http://support.euro.dell.com**		
	E-mail: nor_support@dell.com		

*Table 9-2. **Dell Contact Numbers** (continued)*

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Poland (Warsaw)	Technical Support	22	57 95 700
	Customer Care	22	57 95 999
	Sales	22	57 95 999
	Fax	22	57 95 998
	Switchboard	22	57 95 999
	Web site: **http://support.euro.dell.com**		
	E-mail: pl_support@dell.com		
Portugal	Technical Support	35	800 834 077
	Customer Care	34	902 118 540 or
	. . . .	35	800 834 075
	Sales	35	800 834 075
	Fax	35	121 424 01 12
	Switchboard	34	917 229 200
	E-mail: es_support@dell.com		
Singapore (Singapore) *NOTE: Customers in Singapore call Malaysia for customer assistance.*	Technical Support		toll free: 800 6011 051
	Customer Service (Penang, Malaysia)	04	633 4949
	Transaction Sales		toll free: 800 6011 054
	Corporate Sales		toll free: 800 6011 053
South Africa (Johannesburg)	Technical Support	011	709 7710
	Customer Care	011	709 7707
	Sales	011	709 7700
	Fax	011	709 0495
	Switchboard	011	709 7700
	Web site: **http://support.euro.dell.com**		
	E-mail: dell_za_support@dell.com		

*Table 9-2. **Dell Contact Numbers*** (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Southeast Asian/ Pacific Countries (excluding Austra- lia, Brunei, China, Hong Kong, Japan, Korea, Macau, Malaysia, New Zealand, Singapore, Taiwan, and Thailand—see individual listings for these countries)	Customer Technical Support, Customer Service, and Sales (Penang, Malaysia). 60 4 633 4810		
Spain (Madrid)	**Home and Small Business**		
	Technical Support.		902 100 130
	Customer Care.		902 118 540
	Sales		902 118 541
	Switchboard.		902 118 541
	Fax		902 118 539
	Web site: **http://support.euro.dell.com**		
	E-mail: web_esp_tech@dell.com		
	Corporate		
	Technical Support.		902 100 130
	Customer Care.		902 118 546
	Switchboard.	91	. . . . 722 92 00
	Fax	91	. . . . 722 95 83
	Web site: **http://support.euro.dell.com**		
	E-mail: web_esp_tech@dell.com		
Sweden (Upplands Vasby)	Technical Support.	08	. . . . 590 05 199
	Relational Customer Care	08	. . . . 590 05 642
	Home/Small Business Customer Care	08	. . . . 587 70 527
	Fax Technical Support	08	. . . . 590 05 594
	Sales	08	. . . . 590 05 185
	Web site: **http://support.euro.dell.com**		
	E-mail: swe_support@dell.com		

Table 9-2. Dell Contact Numbers *(continued)*

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
Switzerland (Geneva)	Technical Support (Home and Small Business)		0844 811 411
	Technical Support (Corporate)		0844 822 844
	Customer Care.		0848 802 802
	Fax	022	799 01 90
	Switchboard	022	799 01 01
	Web site: **http://support.euro.dell.com**		
	E-mail: swisstech@dell.com		
Taiwan	Technical Support		toll free: 0080 60 1255
	Technical Support (servers)		toll free: 0080 60 1256
	Transaction Sales		toll free: 0080 651 228/0800 33 556
	Corporate Sales		toll free: 0080 651 227/0800 33 555
Thailand *NOTE: Customers in Thailand call Malaysia for customer assistance.*	Technical Support		toll free: 0880 060 07
	Customer Service (Penang, Malaysia)		633 4949
	Sales.		toll free: 0880 060 09
U.K. (Bracknell)	Technical Support . . . . (Corporate/Preferred Accounts/PAD [1000+ employees])		0870 908 0500
	Technical Support . . . . (Direct/PAD and General)		0870 908 0800
	Global Accounts Customer Care	01344	723186
	Corporate Customer Care	01344	723185
	Preferred Accounts (500-5000 employees) Customer Care	01344	723196
	Central Government Customer Care	01344	723193
	Local Government Customer Care.	01344	723194
	Home/Small Business Sales		0870-907-4000
	Corporate/Public Sector Sales	01344	860456
	Web site: **http://support.euro.dell.com**		
	E-mail: dell_direct_support@dell.com		

Table 9-2. Dell Contact Numbers (continued)

Country (City)	Department Name or Service	Area Code	Local Number or Toll-Free Number
U.S.A. (Austin, Texas)	Automated Order-Status System		toll free: 1-800-433-9014
	AutoTech (for portable and desktop computers)		toll free: 1-800-247-9362
	Home and Small Business Group (for portable and desktop computers)**:**		
	Customer Technical Support (Return Material Authorization Numbers)		toll free: 1-800-624-9896
	Customer Technical Support (Home sales purchased via **http://www.dell.com**)		toll free: 1-877-576-3355
	Customer Service (Credit Return Authorization Numbers)		toll free: 1-800-624-9897
	National Accounts (computers purchased by established Dell national accounts [have your account number handy], medical institutions, or value-added resellers [VARs]):		
	Customer Service and Technical Support (Return Material Authorization Numbers)		toll free: 1-800-822-8965
	Public Americas International (computers purchased by governmental agencies [local, state, or federal] or educational institutions):		
	Customer Service and Technical Support (Return Material Authorization Numbers)		toll free: 1-800-234-1490
	Dell Sales		toll free: 1-800-289-3355
			toll free: 1-800-879-3355
	Spare Parts Sales		toll free: 1-800-357-3355
	DellWare™		toll free: 1-800-753-7201
	Desktop and Portable Fee-Based Technical Support		toll free: 1-800-433-9005
	Server Fee-Based Technical Support		toll free: 1-800-967-0765
	Sales (Catalogs)		toll free: 1-800-426-5150
	Fax		toll free: 1-800-727-8320
	TechFax		toll free: 1-800-950-1329
	Dell Services for the Deaf, Hard-of- Hearing, or Speech-Impaired		toll free: 1-877-DELLTTY (1-877-335-5889)
	Switchboard	512	338-4400

A P P E N D I X   A
Jumpers, Switches, and Connectors

This section provides specific information about the jumpers on the system board. It also provides some basic information on jumpers and switches and describes the connectors and sockets on the various boards in the system.

Jumpers and Switches—A General Explanation

Jumpers and switches provide a convenient and reversible way of reconfiguring the circuitry on a printed circuit board. When reconfiguring the system, you may need to change jumper settings on the system board. You may also need to change jumper and/or switch settings on expansion cards or drives.

Jumpers

Jumpers are small blocks on a circuit board with two or more pins emerging from them. Plastic plugs containing a wire fit down over the pins. The wire connects the pins and creates a circuit. To change a jumper setting, pull the plug off its pin(s) and carefully fit it down onto the pin(s) indicated.
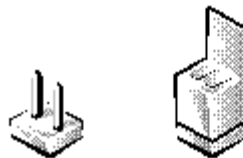
NOTICE: Make sure the system is turned off before you change a jumper setting. Otherwise, damage to the system or unpredictable results may occur.

A jumper is referred to as open or unjumpered when the plug is pushed down over only one pin or if there is no plug at all. When the plug is pushed down over two pins,

the jumper is referred to as jumpered. The jumper setting is often shown in text as two numbers, such as 1-2. The number 1 is printed on the circuit board so that you can identify each pin number based on the location of pin 1.

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

Switches

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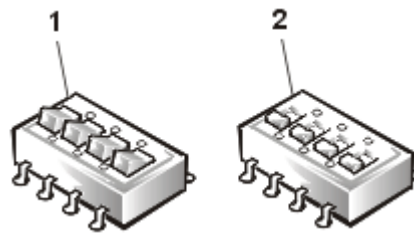
1	Rocker switch
2	Slide switch

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

System Board Jumpers

Figure A-1 shows the location of the configuration jumpers on the system board. Table A-1 lists the function of these jumpers.
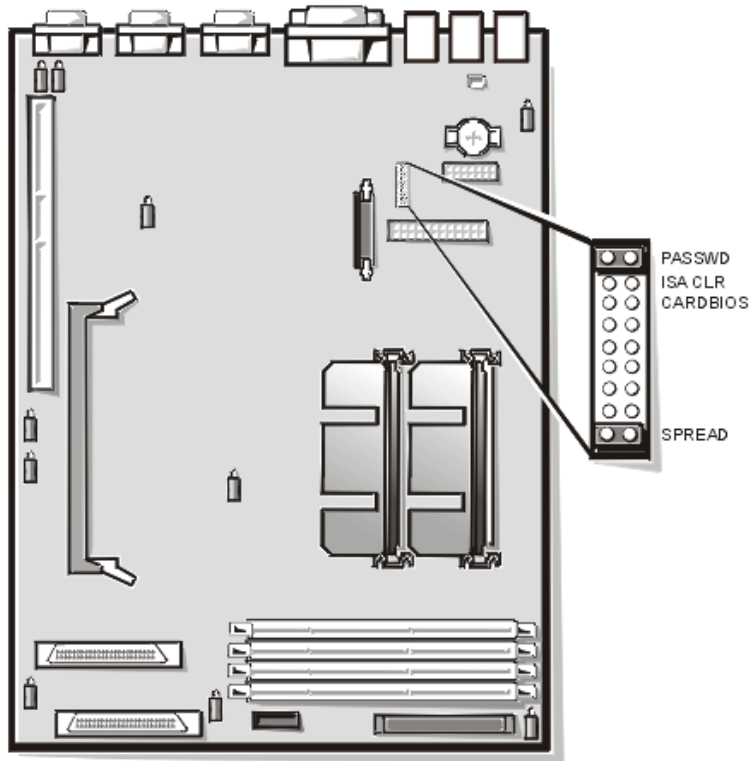
Figure A-1. System Board Jumpers

Table A-1.   System-Board Jumper Settings

Jumper	Setting		Description
PASSWD		(default)	The password feature is enabled.
			The password feature is disabled.
ISA_CLR		(default)	The configuration settings are retained at system boot.
			The configuration settings are cleared at next system boot. (If the configuration settings become corrupted to the point where the system will not boot, install the jumper plug and boot the system. Remove the jumper before restoring the configuration information.)

Table A-1. System-Board Jumper Settings (continued)

Jumper	Setting	Description
CARDBIOS	⬚⬚	Reserved (do not change).
SPREAD	▪▪	Reserved (do not change).

jumpered ▪▪   unjumpered ⬚⬚

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

System Board Connectors

Table A-2 lists the connectors and sockets located on the system board.

Table A-2. System Board Connectors and Sockets

Connector or Socket	Description
BACKPLANE	Hot-pluggable SCSI backplane board interface cable connector
BATTERY	Battery connector
COM*n*	Serial port connectors; sometimes referred to as COM1 (administrative port) and COM2 (UPS port)
DIMM_*x*	DIMM sockets
DIMM_RAID**	DIMM socket for integrated RAID controller
ENET	Ethernet connector
INTRUS1	Intrusion-alarm switch connectors
KYBD*	Keyboard connector
MOUSE*	Mouse connector
PANEL	System control panel connector
PARALLEL**	Parallel port connector; sometimes referred to as LPT1
POWER*n*	Power connector

*not used during normal operation

**not supported

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

Table A-2.   System Board Connectors and Sockets *(continued)*

Connector or Socket	Description
PROC_*n*	Microprocessor guide bracket assembly and connectors
RAID_KEY**	Socket for integrated RAID controller hardware key
SCSI1, SCSI2**	Ultra160/m SCSI host adapter connectors
USB*n**	USB connector
VGA*	Video connector

*not used during normal operation

**not supported

NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."

SCSI Backplane Board Connectors

Figure A-2 shows the location of the connectors on the back of the SCSI backplane board.

power connector (POWER2)

system-board data cable connector (PLANAR)

Ultra160/m SCSI cable connector (SCSIA)

Ultra160/m SCSI cable connector (SCSIB)

data cable connector to optional fifth drive board (DRIVE5)
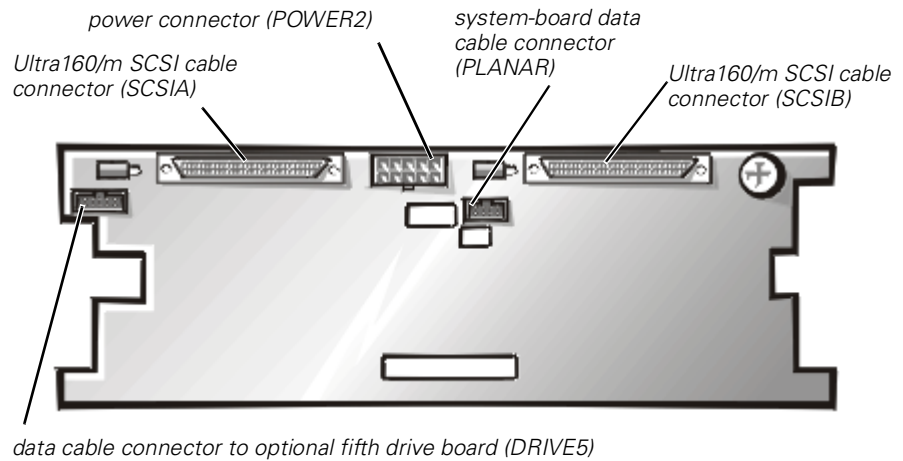
Figure A-2.   Connectors on the SCSI Backplane Board

Interposer Board Connectors

Figure A-3 shows the connectors and sockets located on the interposer board.
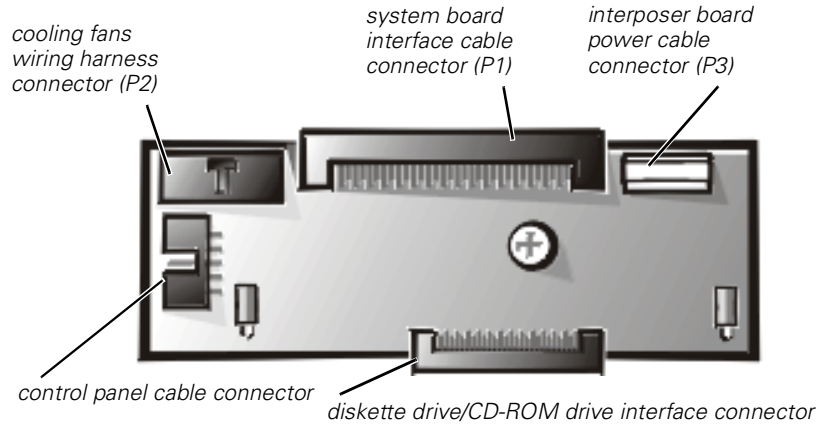
Figure A-3. Connectors on the Interposer Board

Disabling a Forgotten Password

NOTE: To perform this procedure, you must connect a keyboard, mouse, and monitor to your system.

The system's software security features include a system password and a setup password, which are discussed in detail in Chapter 3, "Using the System Setup Program," in the *User's Guide*. A password jumper on the system board enables these password features or disables them and clears any password(s) currently in use.

NOTICE: Dell recommends that the system password be left in the Not Enabled (default) setting. When operating your system in the headless configuration, you will not be able to input a system password in order to reboot the system.

To disable a forgotten system password or setup password, perform the following steps.

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

1. Remove the right-side system cover.

2. Refer to Figure A-1 for the location of the password jumper (labeled "PASSWD") on the system board.

3. Remove the jumper plug from the PASSWD jumper.

4. Replace the right-side system cover, and then reconnect the system to an electrical outlet and turn it on.

    The existing passwords are not disabled (erased) until the system boots with the PASSWD jumper plug removed. However, before you assign a new system and/or setup password, you must install the jumper plug.

    NOTE: If you assign a new system and/or setup password with the jumper plug still removed, the system disables the new password(s) the next time it boots.

5. Repeat step 1.

6. Install the jumper plug on the PASSWD jumper.

7. Replace the right-side system cover, and then reconnect the system and peripherals to their electrical outlets and turn them on.

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

    To assign a new system password using the System Setup program, see "Assigning a System Password" in Chapter 3 of the *User's Guide*. To assign a new setup password using the System Setup program, see "Assigning a Setup Password" in Chapter 3 of the *User's Guide*.

Abbreviations and Acronyms

The following list defines or identifies technical terms, abbreviations, and acronyms used in Dell user documentation.

A
ampere(s)

AC
alternating current

ACPI
Advanced Configuration and Power Interface

ADC
analog-to-digital converter

ADI
Autodesk Device Interface

AI
artificial intelligence

ANSI
American National Standards Institute

APIC
Advanced Peripheral Interrupt Controller

ASCII
American Standard Code for Information Interchange

ASIC
application-specific integrated circuit

B
BASIC

Beginner's All-Purpose Symbolic Instruction Code

BBS
bulletin board service

BIOS
basic input/output system

bpi
bits per inch

bps
bits per second

BTU
British thermal unit

C
Celsius

CCFT
cold cathode fluorescent tube

CD
compact disc

CD-ROM
compact disc read-only memory

CGA
color graphics adapter

cm
centimeter(s)

CMOS
complementary metal-oxide semiconductor

C.O.D.
collect on delivery

cpi
characters per inch

cpl
characters per line

CPU
central processing unit

DAC
digital-to-analog converter

DASH
Dell Advanced SCSI Host

DAT
digital audio tape

dB
decibel(s)

dBA
adjusted decibel(s)

DC
direct current

DIMM
dual in-line memory module

DIN
Deutsche Industrie Norm

DIP
dual in-line package

DMA
direct memory access

DOC
Department of Communications (in Canada)

dpi
dots per inch

DRAC
Dell OpenManage Remote Assistant Card

DRAM
dynamic random-access memory

DS/DD
double-sided double-density

DS/HD
double-sided high-density

DSA
Dell SCSI Array

ECC
error checking and correction

EDO
extended-data out

EGA
enhanced graphics adapter

EIDE
enhanced integrated drive electronics

EMI
electromagnetic interference

EMM
expanded memory manager

EMS
Expanded Memory Specification

EPP
Enhanced Parallel Port

EPROM
erasable programmable read-only memory

ESD
electrostatic discharge

ESDI
enhanced small-device interface

ESM
embedded server management

F
Fahrenheit

FAT
file allocation table

FCC
Federal Communications Commission

FIFO
first-in first-out

ft
feet

g
gram(s)

G
gravities

GB
gigabyte(s)

GUI
graphical user interface

h
hexadecimal

HIP
Hardware Instrumentation Package

HMA
high memory area

HPFS
High Performance File System

Hz
hertz

I/O
input/output

ICBM
inter-chassis management bus

ID
identification

IDE
integrated drive electronics

IRQ
interrupt request

ISA
Industry-Standard Architecture

JEIDA
Japanese Electronic Industry Development Association

K
kilo- (1024)

KB
kilobyte(s)

KB/sec
kilobyte(s) per second

Kb
kilobit(s)

Kbps
kilobit(s) per second

kg
kilogram(s)

kHz
kilohertz

LAN
local area network

lb
pound(s)

LCD
liquid crystal display

LED
light-emitting diode

LIF
low insertion force

LN
load number

lpi
lines per inch

LVD
low voltage differential

m
meter(s)

mA
milliampere(s)

mAh
milliampere-hour(s)

MB
megabyte(s)

Mb
megabit(s)

Mbps
megabit(s) per second

MBR
master boot record

MDA
monochrome display adapter

MGA
monochrome graphics adapter

MHz
megahertz

MMX™
MultiMedia eXtensions

mm
millimeter(s)

ms
millisecond(s)

MS-DOS®
Microsoft Disk Operating System

MTBF
mean time between failures

mV
millivolt(s)

NIC
network interface controller

NiCad
nickel cadmium

NiMH
nickel-metal hydride

NMI
nonmaskable interrupt

NNM
Network Node Manager

ns
nanosecond(s)

NTFS
NT File System

NVRAM
nonvolatile random-access memory

OS/2®
Operating System/2

OTP
one-time programmable

PAL
programmable array logic

PCI
Peripheral Component Interconnect

PCMCIA
Personal Computer Memory Card International Association

PGA
pin grid array

POST
power-on self-test

ppm
pages per minute

PQFP
plastic quad flat pack

PSDB
power-supply distribution board

PS/2
Personal System/2

PVC
polyvinyl chloride

QIC
quarter-inch cartridge

RAID
redundant arrays of independent disks

RAM
random-access memory

RAMDAC
random-access memory digital-to-analog
converter

RCU
Resource Configuration Utility

REN
ringer equivalence number

RFI
radio frequency interference

RGB
red/green/blue

ROM
read-only memory

rpm
revolutions per minute

RTC
real-time clock

SCA
Single Controller Architecture

SCSI
small computer system interface

SDS
Scalable Disk System

sec
second(s)

SEC
single-edge contact

SDRAM
synchronous dynamic random-access
memory

SIMM
single in-line memory module

SMB
server management bus

SNMP
Simple Network Management Protocol

SRAM
static random-access memory

SSU
system setup utility

SVGA
super video graphics array

TFT
thin film transistor

tpi
tracks per inch

TSR
terminate-and-stay-resident

UMB
upper memory block

UPS
uninterruptible power supply

USOC
Universal Service Ordering Code

V
volt(s)

VAC
volt(s) alternating current

VDC
volt(s) direct current

VESA®
Video Electronics Standards Association

VGA
video graphics array

VLSI
very-large-scale integration

VRAM
video random-access memory

W
watt(s)

WH
watt-hour(s)

X
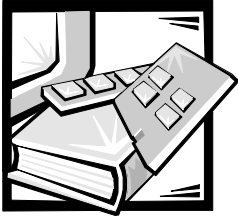
XMM
extended memory manager

XMS
eXtended Memory Specification

Z

ZIF
zero insertion force

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