

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

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Notes, Notices, Cautions, and Warnings

-  **NOTE:** A NOTE indicates important information that helps you make better use of your computer.
 -  **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, may result in severe injury.
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August 2001

Jumpers and Connectors

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Jumpers—A General Explanation](#)
- [System Board Jumpers](#)
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- [SCSI Backplane Board Connectors](#)
- [Disabling a Forgotten Password](#)

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.

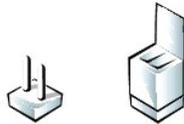
Jumpers—A General Explanation

Jumpers 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 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. [Figure A-1](#) shows an example of a jumper.

Figure A-1. Example Jumpers



WARNING: Make sure the system is turned off before you change a jumper setting. Otherwise, damage to the system or unpredictable results may occur.

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

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

A jumper is referred to as open or unjumped 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 jumped. 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-2](#) 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.

System Board Jumpers

[Figure A-2](#) shows the location of the configuration jumpers on the system board. [Table A-1](#) lists the function of these jumpers.

Figure A-2. System Board Jumpers

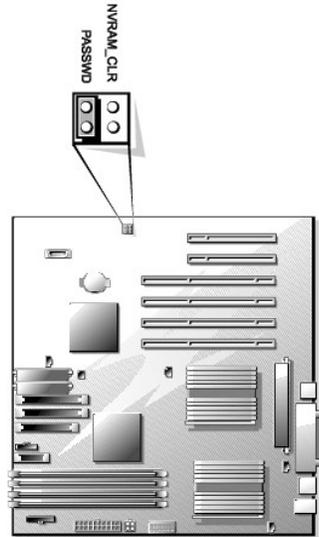


Table A-1. System-Board Jumper Settings

Jumper	Setting	Description
PASSWD	(default) 	The password feature is enabled. The password feature is disabled.
NVRAM_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.)
jumpered unjumpered		
NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms."		

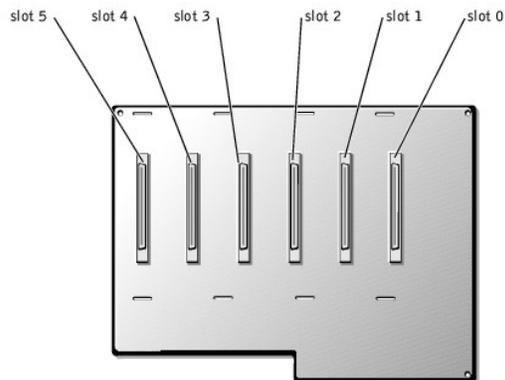
System-Board Connectors

See [Figure 6-1](#) and [Table 6-1](#) for the location and description of system board connectors.

SCSI Backplane Board Connectors

[Figure A-3](#) shows the location of the connectors on the back of the SCSI backplane board.

Figure A-3. Connectors on the SCSI Backplane Board



Disabling a Forgotten Password

The system's software security features include a system password and a setup password, which are discussed in detail in "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.

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

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

1. Remove the system cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
2. See [Figure A-2](#) 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 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 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 the *User's Guide*.

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Introduction

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Other Documents You May Need](#)
- [Obtaining Technical Assistance](#)

Your system is a high-speed server that offers significant service and upgrade features. The system includes the following service features:

- 1 Redundant, hot-pluggable power supplies
- 1 System diagnostics, which checks for hardware problems (if the system can boot)

The following system upgrade options are offered:

- 1 Additional microprocessors
 - 1 Additional memory
 - 1 A variety of PCI expansion-card options (including RAID controller host adapter cards)
-

Other Documents You May Need

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

- 1 The *Setting Up Your System* sheet provides general instructions for setting up your system.
- 1 The *User's Guide*, which describes system features and technical specifications, video and SCSI device drivers, the system setup program, and software support utilities.
- 1 The system management software documentation, which describes the features, requirements, installation, and basic operation of the server management software. See the software's online help for information about the alert messages issued by the software.
- 1 The *System Information* document provides important safety, regulatory, and warranty information.

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



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

- 1 Operating system documentation is included with the system. This documentation describes how to install (if necessary), configure, and use the operating system software.
 - 1 Documentation is included with any options you purchase separately from the system. This documentation includes information that you need to configure and install these options in your system.
 - 1 Technical information files—sometimes called "readme" files—may 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.
-

Obtaining Technical Assistance

If at any time you do not understand a procedure described in this guide, or if your system does not perform as expected, a number of tools are provided to help you. For more information on these help tools, see "[Getting Help](#)."

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Indicators, Messages, and Codes

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Bezel Indicators](#)
- [Front-Panel Indicators and Features](#)
- [Back-Panel Features](#)
- [SCSI Hard Drive Indicator Codes](#)
- [Power Supply Indicators](#)
- [System Messages](#)
- [System Beep Codes](#)
- [Warning Messages](#)
- [Diagnostics Messages](#)
- [Alert Log Messages From the System Management Software](#)

Applications, operating systems, and the system itself are capable of identifying problems and alerting you to them. When a problem occurs, a message might appear on the monitor screen or a beep code may sound.

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

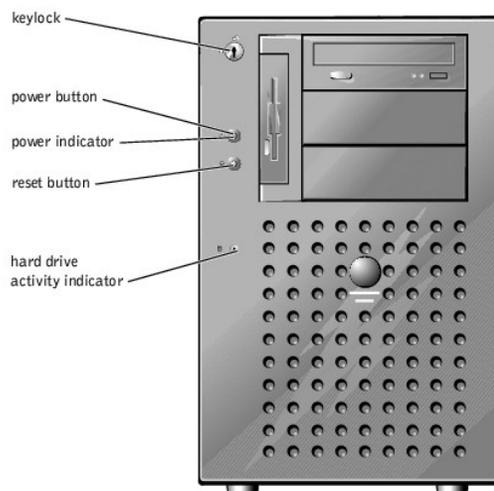
- 1 System messages
- 1 System beep codes
- 1 Warning messages
- 1 Diagnostics messages
- 1 Alert messages
- 1 SCSI hard drive indicator codes
- 1 Power supply indicator codes

The system indicators and the front and back panel features are illustrated in this section. This section also 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.

Bezel Indicators

When the bezel is in place on the system, it has two indicators (see [Figure 2-1](#)). The power indicator lights green when the system is operating correctly. The system alert indicator lights amber when the system needs attention.

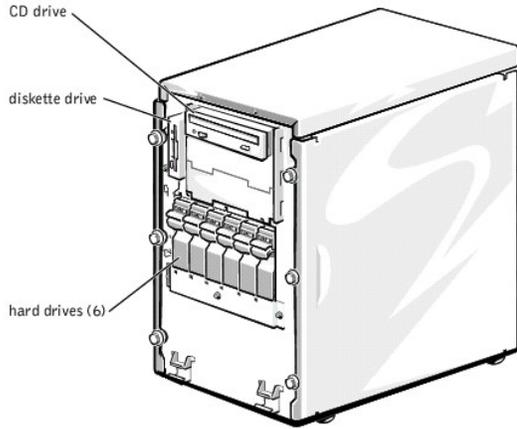
Figure 2-1. Bezel Indicators



Front-Panel Indicators and Features

Indicators on the front of the system are located on the power supplies, hard drives, and the control panel. The CD and diskette drives have green activity indicators.

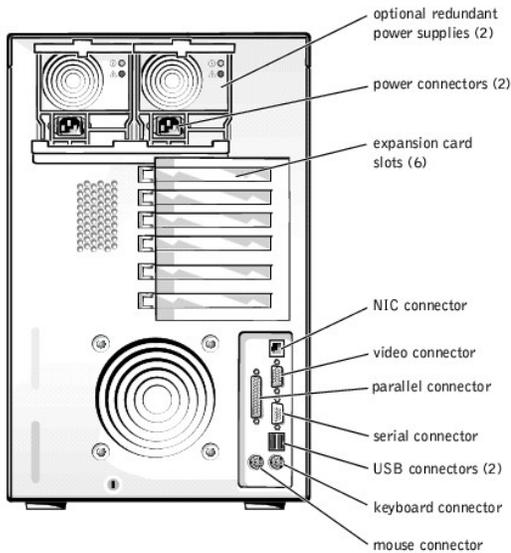
Figure 2-2. Front-Panel Features



Back-Panel Features

[Figure 2-3](#) shows the back-panel features of the system.

Figure 2-3. Back-Panel Features



SCSI Hard Drive Indicator Codes

If you have an optional RAID controller installed, three indicators on each of the hard drive carriers provide information on the status of the SCSI hard drives (see [Table 2-1](#)). The SCSI backplane firmware controls the drive online and drive failure indicators.

Figure 2-4. Hard-Drive Indicators

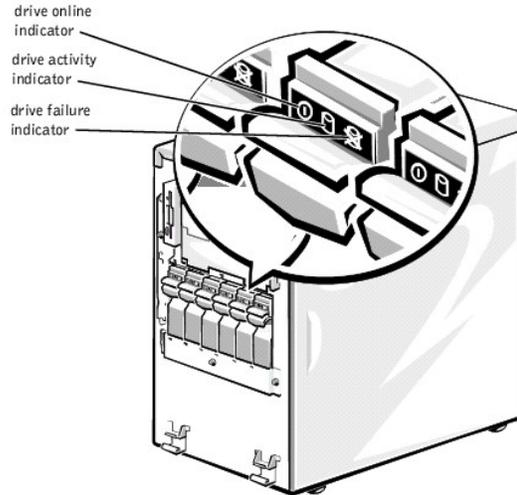


Table 2-1 lists the drive indicator patterns established by the SCSI backplane firmware. Different patterns are displayed as drive events occur in the system. For example, in the event of a hard drive failure, the "drive failed" pattern appears. After the drive is selected for removal, the "drive being prepared for removal" pattern appears, followed by the "drive ready for insertion or removal" pattern. After the replacement drive is installed, the "drive being prepared for operation" pattern appears, followed by the "drive online" pattern.

NOTE: If you do not have an optional RAID controller installed, you will see only the "drive online" and "drive bay empty" indicator patterns.

Table 2-1. SCSI Hard Drive Indicator Patterns

Condition	Indicator Code
Identify drive	All three drive status indicators blink simultaneously.
Drive being prepared for removal	The three drive status indicators flash sequentially.
Drive ready for insertion or removal	All three drive status indicators are off.
Drive being prepared for operation	The drive online indicator is on. The drive activity light might flash briefly.
Drive bay empty	All three drive status indicators are off.
Drive predicted failure	The drive online indicator is on. The drive failure indicator blinks on briefly each second.
Drive failed	The drive online indicator turns off. The drive failure indicator blinks off briefly each second.
Drive rebuilding	The drive online indicator blinks rapidly.
Drive online	The drive online indicator is on.

Power Supply Indicators

Your system has two power supply options. A single nonredundant power supply or up to two hot-pluggable redundant power supplies. The single nonredundant power supply does not have indicators. The hot-pluggable redundant power supply indicators are shown in Figure 2-5.

Figure 2-5. Redundant Power-Supply Indicators

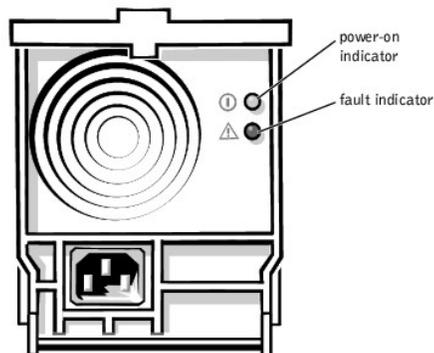


Table 2-2. Power-Supply Indicator Patterns

Indicator	Indicator Code
Power-on	Green indicator indicates that the power supply is operational.
Fault	Red indicator indicates a problem with the power supply such as fan failure, voltage error, and others.

System Messages

System messages alert you to a possible operating system problem or to a conflict between the software and hardware. [Table 2-3](#) lists the system error messages that can occur and the probable cause for each message.

 **NOTE:** If you receive a system message that is not listed in [Table 2-3](#), check the documentation for the application that is running when the message appears and/or the operating system documentation for an explanation of the message and recommended action.

Table 2-3. System Messages

Message	Cause	Corrective Action
Address mark not found	Faulty diskette, CD drive, or hard drive subsystem (defective system board).	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
Alert! One or more of the memory DIMMs are out of rev.	Unsupported memory module(s) installed.	Replace one or more memory modules so that the memory module pairs are identical. See " Adding Memory " in "Installing System Board Options."
Alert! Processor thermal probe failure detected	Defective microprocessor.	Replace the microprocessor. See " Adding or Replacing a Microprocessor ."
Alert! Secondary system fan was not detected	Loose PCI fan cable connection, defective fan.	Check the PCI fan cable. If the problem persists, replace the PCI fan shroud. See " Cooling Shrouds " in "Installing System Board Options."
Alert! System fan was not detected	Loose fan cable connection, defective fan.	Check the fan cable. If the problem persists, replace the fan. See " Removing the Fan " in "Installing System Board Options."
Alert! Unsupported memory in DIMM slot(s) A, B, C, or D	Unsupported memory module(s) installed in specified slot(s).	Replace one or more memory modules so that the memory module pairs are identical. See " Adding Memory " in "Installing System Board Options."
Attachment failed to respond	Diskette drive or hard drive controller cannot send data to associated drive.	Replace the defective drive. See " Installing Drives ." If the problem persists, see " 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. See " Getting Help ," for instructions on obtaining technical assistance.
Bad error-correction code(ECC) on disk read	Faulty diskette/tape drive, CD drive, or hard drive subsystem (defective system board).	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
Controller has failed		
CD-ROM drive 0 not found	Improperly connected or missing CD drive.	Check that the interface cable is seated on the system board. Replace the drive. See " Installing Drives ." If the problem persists, see " Getting Help ."
Data error	Faulty diskette, diskette drive, or hard drive.	Replace the diskette, diskette drive, or hard drive. See " Installing Drives ."
Decreasing available memory	One or more memory modules improperly seated or faulty.	Remove and reseat the memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " Getting Help ," for instructions on obtaining technical assistance.
Diskette drive 0 seek failure	Faulty or improperly inserted diskette, incorrect configuration settings in System Setup program, loose diskette/tape drive interface cable, or loose power cable.	Replace the diskette. Run the System Setup program to correct the diskette drive type. See "Using the System Setup Program," in the <i>User's Guide</i> for instructions. Check the interface cable and power cable connections to the system board. See " Installing Drives ."
Diskette drive 1 seek failure		
Diskette read failure	Faulty diskette, faulty or improperly connected diskette drive, loose diskette/tape drive interface cable, or loose power cable.	Check the interface cable and power cable connections to the system board. See " Installing Drives ."
Diskette subsystem reset failed	Faulty diskette/tape drive controller (defective system board).	Replace the system board. See " 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 improperly inserted in diskette drive.	Reinsert or replace the diskette.
Gate A20 failure	Faulty keyboard controller (defective system board).	Replace the system board. See " 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 drive, faulty hard drive controller subsystem (defective system board), or loose power cable.	Check the hard drive configuration settings in the System Setup program. See "Using the System Setup Program," in the <i>User's Guide</i> for instructions. Reinstall the hard drive. See " Installing Drives ." Check the interface cable and power cable connections to the system board. See " Installing Drives ."
Keyboard failure	Keyboard cable connector loose or improperly	Check the keyboard cable connection. Replace the keyboard. If the problem

Keyboard data line failure	connected, defective keyboard, or defective keyboard/mouse controller (defective system board).	persists, replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Keyboard stuck key failure		
Keyboard controller failure	Defective keyboard/mouse controller (defective system board).	Replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Keyboard fuse has failed	Defective keyboard.	Replace the keyboard.
Memory address line failure at address, read value expecting value	Faulty or improperly seated memory modules or defective system board.	Remove and reseat the memory modules. See "Adding Memory" in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.
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		
Memory allocation error	Faulty application program.	Restart the application program.
Memory parity interrupt at address	Improperly seated or faulty memory modules.	Remove and reseat the memory modules. See "Adding Memory" in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see "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.
No boot device available	Faulty diskette, diskette/tape drive subsystem, hard drive, hard drive subsystem, or no boot disk in drive A.	Replace the diskette or hard drive. See "Installing Drives." If the problem persists, replace the system board. See "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 drive.	Check the hard drive configuration settings in the System Setup program. See "Using the System Setup Program," in the <i>User's Guide</i> for instructions.
No timer tick interrupt	Defective system board.	Replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Non-system disk or disk error	Faulty diskette, diskette/tape drive subsystem, or hard drive subsystem.	Replace the diskette or hard drive. See "Installing Drives." If the problem persists, replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Not a boot diskette	No operating system on diskette.	Use a bootable diskette
Processors with different speeds detected. System halted!	Two different types of microprocessors are installed.	Replace one of the microprocessors so that both are the same type. See "Adding or Replacing a Microprocessor."
Read fault Requested sector not found	Faulty diskette, diskette/tape drive subsystem, or hard drive subsystem.	Replace the diskette or hard drive. See "Installing Drives." If the problem persists, replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Reset failed	Improperly connected diskette/tape drive, hard drive, or power cable.	Check that cables are securely connected. If the problem persists, replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
ROM bad checksum = address	Expansion card improperly installed or faulty.	Check that the expansion cards are fully seated. If problem persists, replace the expansion card. See "Expansion Cards" in "Installing System Board Options." If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.
Sector not found Seek error	Defective sectors on diskette or hard drive.	Replace the diskette. If the problem persists, replace the hard drive. See "Installing Drives." If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.
Seek operation failed	Faulty diskette or hard drive.	Replace the diskette. If the problem persists, replace the hard drive. See "Installing Drives." If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.
Shutdown failure	Defective system board.	Replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Time-of-day clock stopped	Defective battery or faulty chip.	Replace the system battery. See "Replacing the System Battery" in "Installing System Board Options."
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 "Using the System Setup Program," in the <i>User's Guide</i> for instructions. If the problem persists, replace the battery. See "Replacing the System Battery" in "Installing System Board Options." If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.
Timer chip counter 2 failed	Defective system board.	Replace the system board. See "Getting Help." for instructions on obtaining technical assistance.
Unexpected interrupt in protected mode	Improperly seated memory modules or faulty keyboard/mouse controller chip.	Remove and reseat the memory modules. See "Adding Memory" in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see "Getting Help." for instructions on obtaining technical assistance.

Write fault Write fault on selected drive	Faulty diskette or hard drive.	Replace the diskette. If the problem persists, replace the hard drive. See " Installing Drives ." If the problem persists, see " Getting Help ," for instructions on obtaining technical assistance.
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System Beep Codes

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.

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

When a beep code is emitted, record it on a copy of the Diagnostics Checklist in "[Getting Help](#)," and then look it up in [Table 2-4](#). If you are unable to resolve the problem by looking up the meaning of the beep code, use system diagnostics to identify a more serious cause. If you are still unable to resolve the problem, see "[Getting Help](#)."

Table 2-4. System Beep Codes

Code	Cause	Corrective Action
1-1-3	CMOS write/read failure	Replace the system board. See " 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 " Getting Help ," for instructions on obtaining technical assistance.
1-2-1	Programmable interval-timer failure	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
1-2-2	DMA initialization failure	Remove and reseat the memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " Getting Help ," for instructions on obtaining technical assistance.
1-2-3	DMA page register write/read failure	
1-3-1	Main-memory refresh verification failure	Remove and reseat the memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " Getting Help ," for instructions on obtaining technical assistance.
1-3-2	No memory installed	Remove and reseat the memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " 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 memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " Getting Help ," for instructions on obtaining technical assistance.
1-3-4	Odd/even logic failure in the first 64 KB of main memory	
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	
3-1-1	Slave DMA-register failure	Replace the system board. See " 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 system diagnostics to determine whether the keyboard or keyboard controller is faulty. See " Running System Diagnostics ." If the keyboard controller is faulty, replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
3-3-1	CMOS failure	Run the system board test in the system diagnostics to isolate the problem. See " Running System Diagnostics ."
3-3-2	System configuration check failure	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
3-3-3	Keyboard controller not detected	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
3-3-4	Screen initialization failure	Run the video test in the system diagnostics. See " Running System 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. " Getting Help ," for instructions on obtaining technical assistance.
4-2-2	Shutdown failure	
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 memory modules	Remove and reseat the memory modules. See " Adding Memory " in "Installing System Board Options." If the problem persists, replace the memory modules. If the problem persists, see " Getting Help ," for instructions on obtaining

		technical assistance.
4-3-3	Defective system board	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
4-3-4	Time-of-day clock stopped	Replace the battery. See " Replacing the System Battery " in "Installing System Board Options." If the problem persists, replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
4-4-1	I/O chip set failure (defective system board)	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
4-4-2	Parallel-port test failure (defective system board)	Replace the system board. See " Getting Help ," for instructions on obtaining technical assistance.
4-4-3	Math coprocessor failure (defective microprocessor)	Remove and reseat the specified microprocessor. See " Microprocessor Upgrades " in "Installing System Board Options." If the problem persists, replace the microprocessor. If the problem persists, see " 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 ."		

Warning Messages

A warning message alerts you to a possible problem and asks you to take corrective action before the system continues a task. For example, before you format a diskette, a message might warn you that you might lose all data on the diskette, as a way to protect against inadvertently erasing or writing over the data. These warning messages usually interrupt the procedure and require you to respond by typing y (yes) or n (no).

 **NOTE:** Warning messages are generated by either the application program or the operating system. See "[Finding Software Solutions](#)," and the documentation that accompanied the operating system and application program for more information on warning messages.

Diagnostics Messages

When you run a test group or subtest in system 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 "[Getting Help](#)"), and then follow the instructions in that section for obtaining technical assistance.

Alert Log Messages From the System Management Software

The optional system management software generates alert messages for your system. For example, the server agent generates messages that appear in the SNMP trap log file. Alert messages consist of information, status, warning, and failure messages for drive, temperature, fan, and power conditions. More information about alert messages is provided in the system management software documentation found on the documentation CD that shipped with your system.

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Finding Software Solutions

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Installing and Configuring Software](#)
- [Using Software](#)

Because most systems have several application programs installed in addition to the operating system, isolating a software problem can be confusing. Software errors can also appear to be hardware malfunctions at first.

Software problems can result from the following circumstances:

- 1 Improper installation or configuration of a program
- 1 Input errors
- 1 Device drivers that may conflict with certain application programs
- 1 Interrupt conflicts between devices

You can confirm that a system problem is caused by software by running system diagnostics. If all tests in the test group are completed successfully, the problem is most likely caused by software.

This section provides some general guidelines for analyzing software problems. For detailed troubleshooting information on a particular program, see the documentation that accompanied the software or consult the support service for the software.

Installing and Configuring Software

Use virus-scanning software to check newly acquired programs and files for viruses before installing the programs on the system's hard drive. Viruses can quickly use all available system memory, damage and/or destroy data stored on the hard drive, and permanently affect the performance of the programs they infect. Several commercial virus-scanning programs are available for purchase.

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

The software installation routine assists users in transferring the appropriate program files to the system's hard drive. Installation instructions may provide details about how to configure the operating system to successfully run the program. Always read the installation instructions before running a program's installation routine.

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

Using Software

The following subsections discuss errors that can occur as a result of software operation or configuration.

Error Messages

Error messages can be produced by an application program, the operating system, or the system. "[Indicators, Messages, and Codes](#)" discusses the error messages that are generated by the system. If you receive an error message that is not listed in "[Indicators, Messages, and Codes](#)," check the operating system or application program documentation.

Input Errors

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

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

Program Conflicts

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

Device drivers, which are programs that use specialized subroutines, can cause problems with the system. For example, a variation in the way the data is sent to the monitor may require a special screen driver program that expects a certain kind of video mode or monitor. In such cases, you may have to develop an alternate method of running that particular program—by creating a start-up file made especially for that program, for example. Call the support service for the software you are using to help you with this problem.

Avoiding Interrupt Assignment Conflicts

Problems can arise if two devices attempt to use the same IRQ line. To avoid this type of conflict, check the documentation for the IRQ line's default for each installed expansion card. Then consult [Table 3-1](#) to configure the card for one of the available IRQ lines.

Table 3-1. IRQ Line Assignment Defaults

IRQ Line	Used By/Available
IRQ0	Used by the system timer
IRQ1	Used by the keyboard controller
IRQ2	Used by interrupt controller 1 to enable IRQ8 through IRQ15
IRQ3	Used by serial port 2 (COM2 and COM4)
IRQ4	Used by serial port 1 (COM1 and COM3)
IRQ5	Available unless used by a secondary parallel port
IRQ6	Used by the diskette drive controller
IRQ7	Used by the primary parallel port
IRQ8	Used by the real-time clock
IRQ9	Used for ACPI functions
IRQ10	Available
IRQ11	Available
IRQ12	Used by the PS/2 mouse port unless the mouse is disabled in the System Setup program
IRQ13	Used for floating-point error
IRQ14	Available
IRQ15	Embedded server management
NOTE: For the full name of an abbreviation or acronym used in this table, see " Abbreviations and Acronyms ."	

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Running System Diagnostics

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Features of the System Diagnostics](#)
- [When to Use System Diagnostics](#)
- [Starting System Diagnostics](#)
- [How to Use the System Diagnostics](#)
- [How to Use the Device Groups Menu](#)
- [Device Groups Menu Options](#)
- [Error Messages](#)

Unlike many diagnostic programs, system 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 a technical assistance representative.



NOTICE: Use system 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 System Diagnostics

System 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:

- 1 Options that let you run tests individually or collectively
- 1 An option that allows you to choose the number of times a test is repeated
- 1 The ability to display or print test results or to save them in a file
- 1 Options to temporarily suspend testing if an error is detected or to terminate testing when an adjustable error limit is reached
- 1 Help messages that briefly describe each test and its parameters
- 1 Status messages that inform you whether device group or device tests are completed successfully
- 1 Error messages that appear if any problems are detected

When to Use System 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 system 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.

Starting System Diagnostics

You can run system diagnostics from either the utility partition on your hard drive or from a set of diskettes that you create from the *Dell OpenManage Server Assistant* CD.

To run the diagnostics from the utility partition, perform the following steps:

1. Start the utility partition by pressing <F10> during POST.
2. From the utility partition's main menu, select the **Run System Diagnostics** option from **Run System Utilities**.

See "Utility Partition" in "Using the *Dell OpenManage Server Assistant* CD," in the *User's Guide* for additional information about the utility partition.

To run the system diagnostics from the diskettes, perform the following steps:

1. Create a set of diagnostics diskettes using the *Dell OpenManage Server Assistant* CD.

See "Using the *Dell OpenManage Server Assistant* CD," in the *User's Guide* for information on creating diskettes.

2. Boot the system from the first diagnostics diskette.

If the system fails to boot, see "[Getting Help](#)."

When you start the diagnostics a message is displayed telling you that the diagnostics is loading. The **Diagnostics** menu appears. The menu allows you to run all or specific diagnostic tests or to exit system diagnostics.



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

For a quick check of the system, select **Test All Devices** and then select **Quick Tests**. 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. To test a particular device, select **Test One Device**. For a complete check of the system, select **Test All Devices** and then select **Extended Tests**.

To check a particular area of the system, choose **Advanced Testing**. When you select **Advanced Testing**, the main screen of the diagnostics appears. This screen includes a listing of the various device groups in the system, and the system's service tag.

To view data on test results, select **Information and Results**. Select **Program Options** to view the program options screen, which allows you to set various test parameters.

By selecting the **Device Configuration** option, you can see overview of the devices in the system.

Selecting **Exit to MS-DOS** exits the diagnostics and returns you to the MS-DOS@ 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 System Diagnostics

When you select **Advanced Testing** 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:

- 1 Two lines at the top of the main screen identify the diagnostics, the version number, and the system service tag.
- 1 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.
- 1 On the right side of the screen, the **Devices for Highlighted Group** area lists the specific devices within a particular test group.
- 1 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 **Help** 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:

- 1 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).
- 1 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**, **Device**, **Test** and **Versions**.

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 seven options: One , All , Select , Options , Results , Errors , 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.
Help	Displays a list of help topics.

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 "[Getting Help](#)," for instructions on obtaining technical assistance and informing the technical assistance representative of these messages.

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Troubleshooting Your System

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Safety First—For You and Your System](#)
- [External Connections](#)
- [Checking Specific System Problems](#)
- [Start-Up Routine](#)
- [System Orientation](#)
- [Removing and Replacing the Front Bezel](#)
- [Removing and Replacing the System Covers](#)
- [Checking the Equipment](#)
- [Inside the System](#)
- [Responding to a System Management Alert Message](#)
- [Troubleshooting a Wet System](#)
- [Troubleshooting a Damaged System](#)
- [Troubleshooting the System Battery](#)
- [Troubleshooting Power Supplies](#)
- [Troubleshooting Expansion Cards](#)
- [Troubleshooting System Memory](#)
- [Troubleshooting the Video Subsystem](#)
- [Troubleshooting the System Board](#)
- [Troubleshooting the Diskette Drive](#)
- [Troubleshooting a CD Drive](#)
- [Troubleshooting an Internal SCSI Tape Drive](#)
- [Troubleshooting Hard Drives](#)
- [Troubleshooting a RAID Controller Card](#)

If your system is not working as expected, begin troubleshooting using the procedures in this section. This section guides you through some initial checks and procedures that can solve basic system problems and provides troubleshooting procedures for components inside the system. Before you start any of the procedures in this section, take the following steps:

1. Get the key to the system keylock.
1. Remove the front bezel.
1. Lay the system on its left-side.
1. Read the "Safety Instructions" in your *System Information* document.
1. Read "[Running System Diagnostics](#)" for information about running diagnostics.

Safety First—For You and Your System

The procedures in this guide require that you remove the cover 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 your system documentation. Always follow the instructions closely. Review all of the procedures in the safety instructions in your *System Information* document.

Observe the following precautions when working inside your system.

-  **WARNING:** The power supplies in this system produce high voltages and energy hazards, which can cause bodily harm. Only trained service technicians are authorized to remove the system cover and access any of the components inside the system.
-  **CAUTION:** See "Protecting Against Electrostatic Discharge" in the safety instructions in your *System Information* document before performing any procedure which requires you to open the cover.

External Connections

Improperly set switches, controls, and loose or improperly connected cables are the most likely source of problems for the system, monitor, or other peripherals (such as a printer, keyboard, mouse, or other external equipment). A quick check of all the switches, controls, and cable connections can easily solve these problems. See [Figure 2-3](#) for the back-panel features and connectors.

Checking Specific System Problems

1. Turn off the system, including any attached peripherals. Disconnect all the power cables from their electrical outlets.
2. If the system is connected to a PDU, turn the PDU off and then on again.

If it is not receiving power, plug it into another electrical outlet. If it still is not receiving power, try another PDU.
3. Reconnect the system to the electrical outlet or PDU.

4. Is the monitor working properly?
See "[Troubleshooting the Video Subsystem.](#)"
5. Is the keyboard working properly?
See "[Troubleshooting the Keyboard.](#)"
6. Are the mouse and printer working properly?
See "[Troubleshooting the Basic I/O Functions.](#)"

Start-Up Routine

Looking at and listening to the system is important in determining the source of a problem. Look and listen during the system's start-up routine for the indication described in [Table 5-1](#).

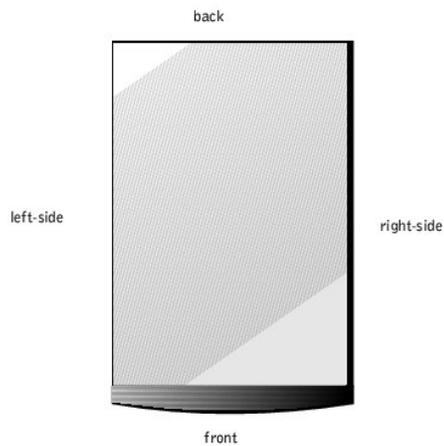
Table 5-1. Start-Up Routine Indications

Look/Listen for:	Action
An error message	See " Indicators, Messages, and Codes. "
Alert messages from the Dell OpenManage™ Server Agent software	See " Alert Log Messages From the System Management Software " in "Indicators, Messages, and Codes."
The monitor's power indicator	See " Troubleshooting the Video Subsystem. "
The keyboard indicators	See " Troubleshooting the Keyboard. "
The diskette-drive access indicator	See " Troubleshooting the Diskette Drive. "
The hard drive activity indicators	See " Troubleshooting Hard Drives. "
A series of beeps	See, " Indicators, Messages, and Codes. "
An unfamiliar constant scraping or grinding sound when you access a drive	See " Getting Help. " for instructions on obtaining technical assistance.

System Orientation

[Figure 5-1](#) shows the system orientation. The illustrations in this document are based on the system laying on its left-side.

Figure 5-1. System Orientation



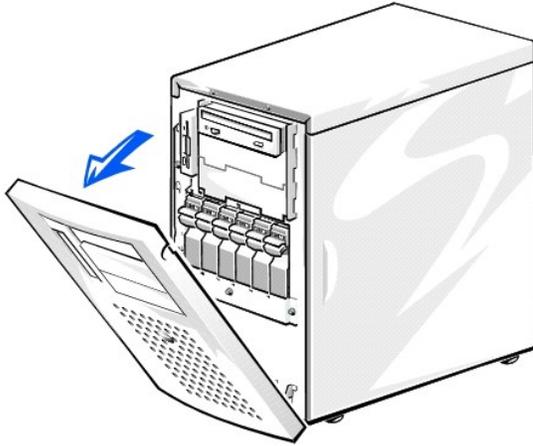
Removing and Replacing the Front Bezel

The front bezel has status and attention indicators. Removing the front bezel provides access to the hard drive(s). You must remove the front bezel and remove the system's right-side cover to gain access to internal components.

Removing the Front Bezel

1. Using the system key, unlock the front bezel.
2. Grasp the bezel by the indentations on each side and pull it slightly away from the chassis to release the two detents on the back of the bezel (see [Figure 5-2](#)).

Figure 5-2. Removing the Front Bezel



3. Pivot the bezel downward until it is at right angles to the chassis.
4. Grasp the bezel along the edge adjacent to the chassis and unsnap the bezel to remove it from the chassis.

Replacing the Front Bezel

1. Snap the two tabs near the lower inside edge of the bezel into the corresponding metal clips on the chassis, and pivot the bezel upwards into its closed position until the bezel snaps into place.
2. Using the system key, lock the bezel.

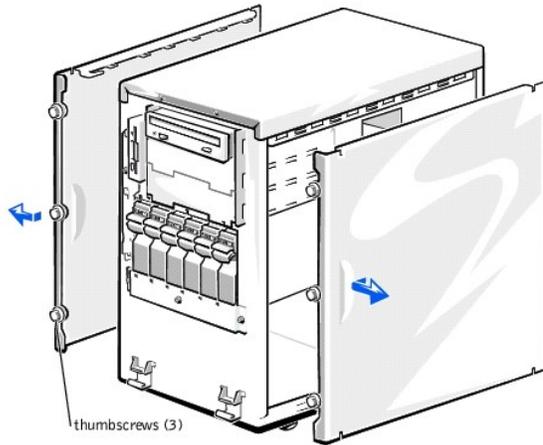
Removing and Replacing the System Covers

The system is enclosed by a front bezel, left and right-side covers, and a top cover. Removal of the right-side cover allows access to the system board, SCSI backplane board, memory, microprocessors, and expansion cards. Removal of the left-side cover allows access to the diskette drive interface cable, and removal of the top cover allows access to the external drive bay devices interface cables. To upgrade or troubleshoot the system, remove the appropriate cover to gain access.

Removing the Side Covers

1. Remove the front bezel (see "[Removing the Front Bezel](#)").
2. Observe the precautions in "[Safety First—For You and Your System](#)."
3. Loosen the three thumbscrews on the front of the system (see [Figure 5-3](#)).
4. Slide the system cover forward and grasp the cover at both ends.
5. Carefully lift the cover away from the system.

Figure 5-3. Removing the Side Covers



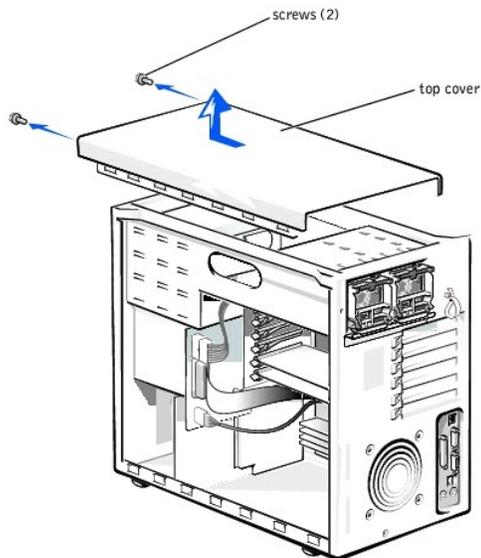
Replacing the Side Cover

1. Check that no tools or parts are left inside the system.
2. Fit the cover over the sides of the chassis, and slide the cover backward.
3. Secure the cover with the three thumbscrews.
4. Replace the front bezel.

Removing the Top Cover

1. Remove both side covers (see ["Removing the Side Covers"](#)).
2. Using a #2 Phillips screwdriver, remove the two screws securing the top cover to the chassis (see [Figure 5-4](#)).

Figure 5-4. Removing the Top Cover



3. Slide the top cover forward and grasp the cover at both ends.
4. Carefully lift the cover away from the system.

Replacing the Top Cover

1. Fit the cover over the sides of the chassis, and slide the cover backward.
2. Using a #2 Phillips screwdriver, secure the cover with the two screws.
3. Replace both side covers (see ["Replacing the Side Cover"](#)).

4. Replace the front bezel.
-

Checking the Equipment

This section provides troubleshooting procedures for equipment that connects directly to the I/O (back) panel of the system, such as the monitor, keyboard, or mouse. Before you perform any of the procedures, see "[External Connections](#)."

Troubleshooting the Video Subsystem

Problem

- 1 Monitor
- 1 Monitor interface cable
- 1 Video memory
- 1 Video logic

Action

1. Check the system and power connections to the monitor.
2. Run the video tests in system diagnostics.

If the tests run successfully, the problem is not related to video hardware. Go to "[Finding Software Solutions](#)."

If the tests did not run successfully see "[Getting Help](#)" for instructions on obtaining technical assistance.

Troubleshooting the Keyboard

Problem

- 1 A system error message indicates a keyboard problem

Action

1. Look at the keyboard and the keyboard cable for any signs of damage.
2. Press and release each key on the keyboard.

If the keyboard and its cable appear to be free of physical damage, and the keys work, go to step 4.

If the keyboard or its cable are damaged, continue to step 3.

3. Swap the faulty keyboard with a working keyboard.

If the problem is resolved, the keyboard must be replaced. See "[Getting Help](#)," for instructions on obtaining technical assistance.

4. Run the keyboard test in system diagnostics.

If you can use the keyboard to select the keyboard test, go to step 6.

If you cannot use the keyboard to select the keyboard test, continue to step 5.

5. Swap the faulty keyboard with a working keyboard.
6. Did the keyboard test run successfully?

If the problem is resolved, the keyboard must be replaced. If the problem is not resolved, the keyboard controller on the system board is faulty. See "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the Basic I/O Functions

Problem

- 1 A system error message indicates an I/O port problem
- 1 A device connected to the port does not function properly

Action

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

If the communications ports are set to **Enabled**, go to step 3.

If the communications ports are not set to **Enabled**, continue to step 2.

2. Change the **Serial Port 1**, and **Parallel Port** settings to **Enabled**; then reboot the system.
3. Check the system setup. See "Using the System Setup Program" in the *User's Guide* for instructions.

If the system setup is correct, go to step 5.

4. Change the necessary statements in the system setup. If the port problem is confined to a particular application program, see the application program's documentation for specific port configuration requirements.
5. Reboot the system from the diagnostics diskette, and run the serial ports test and/or the parallel ports test in system diagnostics.

If the tests did not run successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

6. If the problem persists, see one of the following procedures, "[Troubleshooting a Parallel Printer](#)" or "[Troubleshooting a Serial I/O Device](#)," depending on the malfunctioning device.

Troubleshooting a Serial I/O Device

Problem

1. Device connected to the serial port is not working

Action

1. Turn off the system and any peripheral devices connected to the serial port.
2. Swap the interface cable with a known working cable.

If the problem is resolved, the interface cable must be replaced. See "[Getting Help](#)," for instructions on obtaining technical assistance.

3. Turn off the system and the serial device, and swap the device with a comparable device.
4. Turn on the power to the system and the serial device.

If the problem is resolved, the serial device must be replaced. If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting a Parallel Printer

Problem

1. Parallel printer is not working

Action

1. Turn off the power from the printer and the system.
2. Swap the parallel printer interface cable with a known working cable.
3. Turn on the power to the printer and the system.
4. Attempt a print operation.

If the print operation is successful, the interface cable must be replaced. See "[Getting Help](#)," for instructions on obtaining technical assistance.

5. Run the printer's self-test.

If the self-test is not successful, the printer is probably defective. See "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting a USB Device

Problem

1. A system error message indicates a problem
1. Device connected to the port is not working

Action

1. Enter the System Setup program, and check that the USB ports are enabled. See "Using the System Setup Program" in the *User's Guide* for instructions.
2. Turn off the system and any USB devices.

If there is only one USB device connected to the system, go to step 5.

3. Disconnect the USB devices, and connect the malfunctioning device to the other port.
4. Apply power to the system and the reconnected device.

If the problem is resolved, the USB port might be defective. See "[Getting Help](#)," for instructions on obtaining technical assistance.

5. If possible, swap the interface cable with a known working cable.

If the problem is resolved, the interface cable must be replaced. See "[Getting Help](#)," for instructions on obtaining technical assistance.

6. Turn off the system and the USB device, and swap the device with a comparable device.
7. Turn on the power to the system and the USB device.

If the problem is resolved, the USB device must be replaced. If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the Integrated NIC

Problem

- 1 NIC cannot communicate with network

Action

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

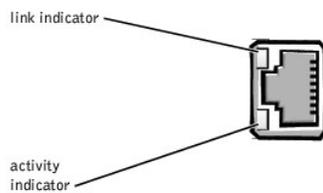
See "Using the System Setup Program" in the *User's Guide* for instructions.

2. Check the two indicators on the left and right corners of the NIC connector on the system's back-panel (see [Figure 5-5](#)).

The green link indicator shows that the adapter is connected to a valid link partner. The amber activity indicator lights if network data is being sent or received.

- 1 If the link indicator is not on, check all cable connections.
 - 1 Try changing the auto negotiation setting, if possible.
 - 1 Try another port on the switch or hub.
3. If the activity indicator does not light, the network driver files might be damaged or deleted.
 4. Reinstall the drivers.
 5. Ensure the appropriate drivers are installed and the protocols are bound.

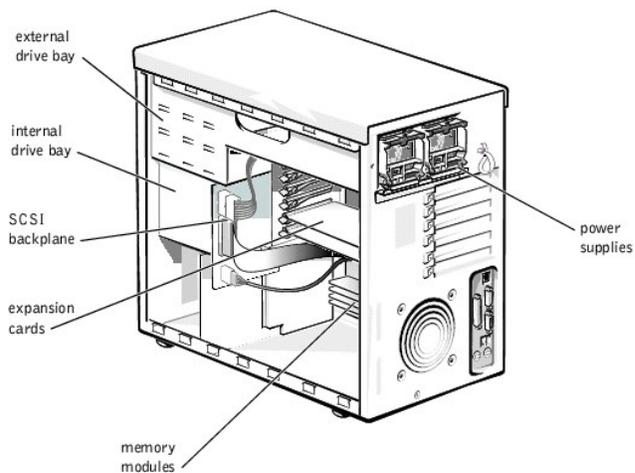
Figure 5-5. NIC Indicators



Inside the System

In [Figure 5-6](#), the system cover and front bezel are removed to provide an interior view of the system.

Figure 5-6. Inside the System



The system board can accommodate up to six PCI expansion cards (four cards at 64-bit/66 MHz and two cards at 32-bit/33 MHz). The system memory is contained in four memory module slots that must be populated with at least two memory modules. The peripheral bay provides space for a 3.5-inch diskette drive and a CD drive and one other device.

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

In a single nonredundant power supply system, the power supply will connect directly to and provide power to the system board, SCSI backplane, and internal peripherals. In a redundant hot-pluggable power-supply system, the dual hot-pluggable power supplies connect directly to the power-supply distribution board (PSDB) which then provides power to the system board, SCSI backplane, and internal peripherals.

For non-SCSI drives such as the diskette drive and CD drive, an interface cable connects the devices to the system board. For SCSI devices, interface cables connect externally accessible SCSI devices and the SCSI backplane board to a SCSI host adapter either on the system board or on an expansion card. (For more information, see "[Installing Drives](#).")

During an installation or troubleshooting procedure, you may be required to change a jumper. For information on the system board jumpers, see "[Jumpers and Connectors](#)."

Responding to a System Management Alert Message

The optional system management applications monitor critical system voltages and temperatures, the system cooling fans, and the status of the SCSI hard drives in the system. Alert messages appear in the alert log window. For information about the alert log window and options, see your system management software documentation.

Troubleshooting a Wet System

Problem

- 1 Liquid spills
- 1 Splashes
- 1 Excessive humidity

Action

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system covers (see "[Removing the Side Covers](#)").
3. Remove all expansion cards installed in the system.

See "[Removing an Expansion Card](#)" in "Installing System Board Options."

4. Let the system dry thoroughly for at least 24 hours.
5. Replace the system covers, reconnect the system to the electrical outlet, and turn on the system.

If the system does not start up properly, see "[Getting Help](#)," for instructions on obtaining technical assistance.

6. If the system starts up normally, shut down the system and reinstall all expansion cards you removed in step 3.

See "[Installing an Expansion Card](#)" in "Installing System Board Options."

7. Run the system board tests in system diagnostics to confirm that the system is working properly.

If the tests did not complete successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting a Damaged System

Problem

- 1 System dropped or damaged

Action

1. Check the following connections:
 - 1 Expansion-card connections to the system board
 - 1 Drive carrier connections to the SCSI backplane board
2. Ensure that all cables are properly connected and that all components are properly seated in their connectors and sockets.
3. Run the system board tests in system diagnostics.

If the tests did not complete successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the System Battery

Problem

- 1 Error message shows problem with the battery
- 1 System setup program loses the system configuration information
- 1 System date and time will not stay current

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 lasts longer).

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.

Action

1. Reenter the time and date through the System Setup program.
2. Turn off and disconnect the system from the electrical outlet for a few hours.
3. Reconnect the system to the electrical outlet and turn the system on again.
4. Enter the System Setup program.

If the date and time are not correct in the System Setup program, replace the battery (see "[Replacing the System Battery](#)").

If the problem is not resolved by replacing the battery, see "[Getting Help](#)," for instructions on obtaining technical assistance.



NOTE: Some software might 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 might be caused by software rather than by a defective battery.



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

Troubleshooting Power Supplies

Problem

- 1 Amber *fault indicator* on the system front panel lights up (redundant only)
- 1 Red *fault indicator* blinks on the power supply or lights up continuously (redundant only)
- 1 No power

Action

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. For nonredundant system's, remove the system's right-side cover and check that the power connectors are properly connected or if they are loose.

For redundant system's, check that the power supplies are properly installed.

3. Slide the new power supply into the chassis.
4. If you removed the system cover, replace the system cover and connect the system to its electrical outlet.
5. Turn on the system including any attached peripherals.

If the problem persists, see "[Getting Help](#)," for information on obtaining technical assistance.

Troubleshooting Expansion Cards

Problem

- 1 Error message indicates an expansion-card problem
- 1 Expansion card seems to perform incorrectly or not at all

Action

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the right-side cover (see "[Removing the Side Covers](#)").
3. Remove the PCI fan shroud (see "[Removing the PCI Cooling Shroud](#)" in "Installing System Board Options").
4. Verify that each expansion card is firmly seated in its connector.
5. Verify that any appropriate cables are firmly connected to their corresponding connectors on the expansion cards.
6. Replace the PCI fan shroud (see "[Installing the PCI Cooling Shroud](#)" in "Installing System Board Options").
7. Replace the right-side cover (see "[Replacing the Side Cover](#)").

8. Turn on the system including any attached peripherals.
9. Run the **Quick Tests** in system diagnostics. If the problem still exists, go to step 10.
10. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
11. Remove the right-side cover (see "[Removing the Side Covers](#)").
12. Remove all expansion cards installed in the system (see "[Removing an Expansion Card](#)" in "Installing System Board Options").
13. Replace the right-side cover (see "[Replacing the Side Cover](#)").
14. Turn on the system including any attached peripherals.
15. Run the **Quick Tests** in system diagnostics.

If the tests do not complete successfully, see "[Getting Help](#)," for information on obtaining technical assistance.

16. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
17. Remove the right-side cover (see "[Removing the Side Covers](#)").
18. Reinstall one of the expansion cards you removed in step 12 (see "[Installing an Expansion Card](#)" in "Installing System Board Options").
19. Repeat steps 13 through 18 for each of the remaining expansion cards.

If you have reinstalled all of the expansion cards and the **Quick Tests** are still failing, see "[Getting Help](#)," for information on obtaining technical assistance.

Troubleshooting System Memory

Problem

- 1 Faulty memory module
- 1 Faulty system board

Action

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

If there are no error messages, go to step 17.

2. Enter the System Setup program to check the system memory setting.

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

3. If the amount of memory does match the system memory setting, go to step 17.
4. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.

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

5. Remove the system's right-side cover (see "[Removing the Side Covers](#)").
6. Remove the memory module cooling shroud (see "[Cooling Shrouds](#)" in "Installing System Board Options").
7. Reseat the memory modules in their sockets.
8. Install the memory modules cooling shroud (see "[Cooling Shrouds](#)" in "Installing System Board Options").
9. Replace the system's right-side cover, reconnect the system to power, and turn on the system.
10. Enter the System Setup program and check the system memory again.

If the amount of memory installed does not match the system memory setting, then perform the following steps:

- a. Turn off the system.
 - b. Remove the right-side cover.
 - c. Remove the memory modules cooling shroud.
 - d. Go to step 12.
11. Reboot the system, and observe the monitor screen and the Num Lock, Caps Lock, and Scroll Lock indicators on the keyboard.

If the monitor screen does remain blank, and the Num Lock, Caps Lock, and Scroll Lock indicators on the keyboard remain on:

- a. Turn off the system.
- b. Remove the right-side cover.
- c. Remove the memory modules cooling shroud.
- d. Go to step 12.

If the monitor screen does not remain blank, and the Num Lock, Caps Lock, and Scroll Lock indicators on the keyboard remain on, continue to step 18.

 **NOTE:** There are multiple configurations for the memory modules: see "[Memory Module Installation Guidelines](#)" in "Installing System Board Options." The following steps are an example of one configuration.

12. Swap the memory module pair in PAIR 1 with a pair of the same capacity.
13. Install the memory modules cooling shroud (see "[Cooling Shrouds](#)" in "Installing System Board Options").
14. Replace the system's right-side cover and reconnect the system to an electrical outlet.
15. Reboot the system, and observe the monitor screen and the indicators on the keyboard.
16. If the problem still exists:
 - a. Turn off the system.
 - b. Remove the right-side cover.
 - c. Remove the memory modules cooling shroud.
 - d. Repeat steps 12 through 15 for the pair of memory modules installed in PAIR2.

If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.

17. Run the system memory test in system diagnostics.

If the test does not complete successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the Video Subsystem

Problem

- 1 Monitor not operating
- 1 Monitor interface cable not connected correctly or is faulty
- 1 Video logic problems

Action

1. Check the system and power connections to the monitor.
2. Run the video tests in system diagnostics.

If the tests run successfully, the problem is not related to video hardware. See "[Finding Software Solutions](#)."

If the tests did not run successfully see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the System Board

Problem

- 1 Error message indicating a system board problem

Action

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the right-side cover (see "[Removing the Side Covers](#)").
3. Remove all expansion cards except the SCSI host adapter card for the boot drive (see "[Removing an Expansion Card](#)" in "Installing System Board Options").
4. Replace the right-side cover (see "[Replacing the Side Cover](#)").
5. Turn on the system including any attached peripherals.
6. Run the **Quick Tests** in system diagnostics.

If the tests does not run successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

7. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
8. Remove the right-side cover (see "[Removing the Side Covers](#)").
9. Reinstall one of the expansion cards that you removed in step 3 (see "[Installing an Expansion Card](#)" in "Installing System Board Options").
10. Replace the right-side cover (see "[Replacing the Side Cover](#)").
11. Turn on the system including any attached peripherals.
12. Run the **Quick Tests** again.

If the tests does not complete successfully, see "[Getting Help](#)," for instructions on obtaining technical assistance.

13. Repeat steps 7 through 12 for the remaining expansion cards that you removed in step 3.

If you have reinstalled all of the expansion cards and the problem still persists, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting the Diskette Drive

Problem

- 1 Error message indicating a diskette drive problem during execution of either the boot routine or system diagnostics

Action

1. Enter the system setup program, and verify that the system is configured correctly. See "Using the System Setup Program" in the *User's Guide* for instructions.
2. Run the diskette drive tests in system diagnostics to see whether the diskette drive now works correctly.
3. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
4. Remove the system covers (see "[Removing and Replacing the System Covers](#)").
5. Remove the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
6. Verify that the diskette drive's interface cable is securely connected between the diskette drive and the system board.
7. Replace the cooling shrouds (see "[Cooling Shrouds](#)").
8. Reinstall the system covers (see "[Removing and Replacing the System Covers](#)").
9. Connect the system to its electrical outlet and turn on the system, including any attached peripherals.
10. Run the diskette drive tests in system diagnostics to determine whether the diskette drive works correctly.
11. If the drive still does not work, remove all expansion cards (see "[Removing an Expansion Card](#)" in "Installing System Board Options").
12. Run the diskette drive tests in system diagnostics to determine whether the diskette drive now works correctly.

If the test ran successfully, an expansion card might be conflicting with the diskette drive logic, or you may have a faulty expansion card. Continue to step 13.

If the test failed, see "[Getting Help](#)," for instructions on obtaining technical assistance.

13. Reinstall one of the expansion cards you removed in step 11 (see "[Installing an Expansion Card](#)" in "Installing System Board Options").
 14. Retest and run the diskette drives test in system diagnostics to determine whether the diskette drive subsystem now works correctly.
 15. Repeat steps 13 and 14 until all expansion cards have been reinstalled or until one of the expansion cards prevents the system from booting from the diagnostics diskette.
- If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.
-

Troubleshooting a CD Drive

Problem

- 1 System cannot read data from the CD
- 1 CD indicator fails to flash during boot

Action

1. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
2. Remove the system's right-side cover (see "[Removing the Side Covers](#)").
3. Remove the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
4. Verify that the CD drive interface cable is securely connected between the CD drive and the system board.
5. Connect the system to its electrical outlet and turn on the system, including any attached peripherals.
6. Run the IDE devices tests in system diagnostics to determine whether the CD drive now works correctly.

If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting an Internal SCSI Tape Drive

Problem

- 1 Defective tape drive
- 1 Defective tape cartridge
- 1 Software or device driver

Action

1. Remove the tape that was in use when the problem occurred and replace it with a tape that you know is not defective.
 2. Verify that any required SCSI device drivers are installed on the hard drive and are configured correctly.
 3. See "Using the Dell OpenManage Server Assistant CD" in the *User's Guide* for instructions on installing and configuring device drivers for the system's integrated SCSI host adapter or an optional host adapter card.
 4. For any other type of SCSI host adapter card, see the documentation that accompanied the SCSI host adapter card.
 5. Reinstall the tape backup software as instructed in the tape-backup software documentation.
 6. Remove the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
 7. Replace the SCSI cable that connects the tape drive to the SCSI host adapter or system board.
 8. Replace the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
 9. Reconnect the system to the electrical outlet and apply power.
 10. If the problem is not resolved, replace the tape drive. If the problem persists, see "[Getting Help](#)," for instructions on obtaining technical assistance.
-

Troubleshooting Hard Drives

Problem

- 1 The drive itself
- 1 SCSI backplane board
- 1 SCSI cable connections to the system board
- 1 Systems using an optional host adapter card issue the following signals by using the drive indicator lights adjacent to each hard drive:
 - o Hard drive failure indicator on the control panel lights.
 - o If a drive shows signs of imminent failure, the drive online indicator stays on and the drive failure indicator blinks on briefly each second.
 - o If a drive has failed, the drive online indicator turns off and the drive failure indicator blinks on briefly each second.

Action

 **NOTICE:** This troubleshooting procedure can destroy data stored on the hard drive. Before you proceed, back up all the files on the hard drive.

1. If the integrated SCSI host adapter is being used to control the SCSI backplane board, reboot the system and press <Ctrl><a> to enter the SCSI configuration utility program.

 **NOTE:** If your system has an optional RAID controller installed, reboot the system and press <Ctrl><h>, <Ctrl><a>, or <Ctrl><m> depending on the utility. See the documentation supplied with the controller for information on the configuration utility.

2. Check that the primary SCSI channel is enabled, and reboot the system.
3. Verify that the device drivers are installed and configured correctly.

See the documentation for the system's operating system.

4. Remove the hard drive and install it in another drive bay.
5. If the problem is resolved, reinstall the drive carrier in the original bay.

If the hard drive functions properly in the original bay, the drive carrier could have intermittent problems. Replace the hard drive (see "[Installing SCSI Hard Drives](#)" in "Installing Drives").

If the hard drive still does not function properly in the original bay, the SCSI backplane board has a defective connector. See "[Getting Help](#)," for instructions on obtaining technical assistance.

6. Remove the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
7. Check the SCSI cable connections inside the system:
 - a. Turn off the system, including any attached peripherals, and disconnect the system from its electrical outlet.
 - b. Remove the system cover.
 - c. Check the SCSI cable connection to the SCSI host adapter.

The SCSI cable may be connected to the internal SCSI host adapter on the system board or a SCSI host adapter installed in an expansion slot.

8. Partition and logically format the hard drive. If possible, restore the files to the drive.

To partition and logically format the drive, see the documentation for the system's operating system.

9. If the problem is not resolved, see "[Getting Help](#)," for instructions on obtaining technical assistance.

Troubleshooting a RAID Controller Card

Your system may contain an optional RAID controller card. If you encounter problems with a controller, see the RAID controller's documentation for detailed information on troubleshooting.

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Installing System Board Options

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Removing the Fan](#)
- [Replacing the Fan](#)
- [Removing and Installing Power Supplies](#)
- [Expansion Cards](#)
- [Cooling Shrouds](#)
- [Adding Memory](#)
- [Microprocessor Upgrades](#)
- [Replacing the System Battery](#)

This section describes how to install the following options:

- 1 Expansion cards
- 1 Memory upgrades
- 1 Microprocessor upgrades

This section also includes instructions for replacing the fan, cooling shrouds, power supplies, and system battery, if necessary.

Use [Figure 6-1](#) to locate the system board features. [Table 6-1](#) describes the system board connectors and sockets.

▲ WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

Figure 6-1. System Board Connectors and Sockets

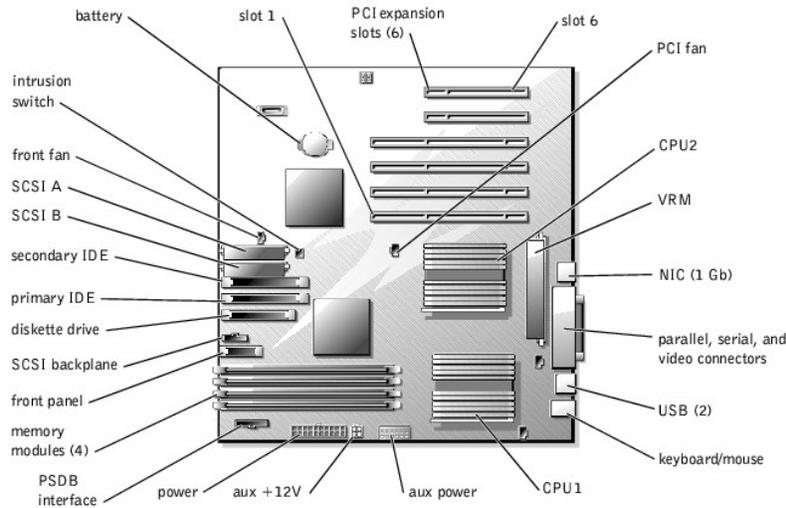


Table 6-1. System Board Connectors and Sockets

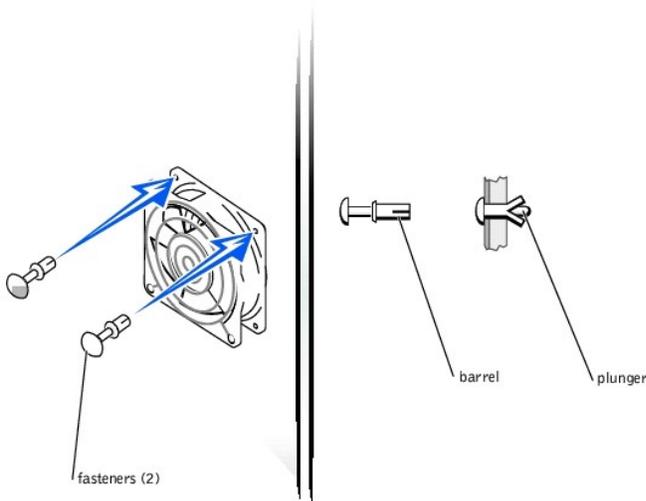
Connector or Socket	Description
SCSI BACKPLANE	Hot-pluggable SCSI backplane board interface cable connector
BATTERY	System battery connector
PARALLEL, COMn, VGA	Parallel port connector; sometimes referred to as LPT1, serial port connectors: sometimes referred to as COM1, video connector
DIMM_n	Memory riser card connectors (2)
ENET_1GB	Ethernet connector
FAN	Power for the front system fan
SCSI_n	Power and data to the diskette and CD drive from the system board
PRIMARY IDE	CD drive connector
SECONDARY IDE	Tape drive connector
DISKETTE	Diskette connector
KYBD	Keyboard connector
MOUSE	Mouse connector
PSDB I/F	Power supply distribution board interface connector
CNTL PNL	System control panel connector

POWER n	Power connector
PCI FAN	Power connector for the PCI fan
CPU_ n	Microprocessor sockets
VRM_ n	Voltage regulator module connector
SLOT_ n	Expansion card connectors (SLOT_1—SLOT_6)
INTRUSION SW	Intrusion switch connector
USB n	USB connector
NOTE: For the full name of an abbreviation or acronym used in this table, see "Abbreviations and Acronyms ."	

Removing the Fan

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system's right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").
3. Remove the cooling shrouds (see ["Cooling Shrouds"](#)).
4. Remove the two fasteners that secure the fan to the chassis (see [Figure 6-2](#)).
 - a. On the opposite side of the chassis from the fan, push the plunger of each fastener back into the fastener barrel, using the flat surface of a flat-tipped screwdriver, or other small flat object.
 - b. On the fan side, grasp the extended head of the fastener and pull the fastener completely out of the chassis wall.

Figure 6-2. Removing the Fan



5. Disconnect the fan power cable from the fan connector on the system board (see [Figure 6-1](#)).
6. Carefully pull the fan power cable through the hole in the chassis wall and lift the fan out of the chassis.

Replacing the Fan

1. Route the fan power cable through the hole in the chassis wall.
2. Connect the fan power cable to the fan connector on the system board (see [Figure 6-1](#)).
3. Place the fan in the hinge bracket and then swing it backward.
4. Secure the fan to the chassis using the two fasteners you removed in step 3 of ["Removing the Fan."](#)
5. Replace the cooling shrouds (see ["Cooling Shrouds"](#)).
6. Replace the system's right-side cover.

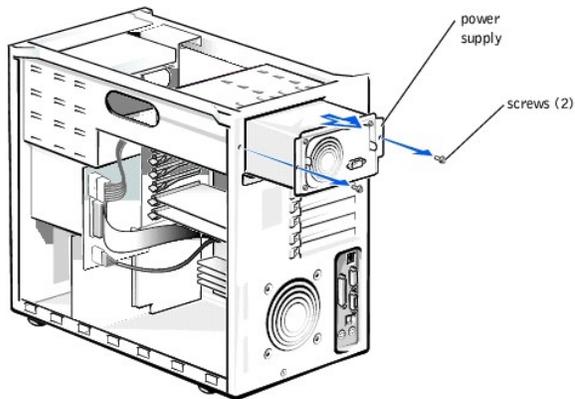
Removing and Installing Power Supplies

Your system might have the single nonredundant power supply or the hot-pluggable dual power supplies.

Removing and Installing the Single Nonredundant Power Supply

1. Remove the front bezel (see ["Removing the Front Bezel"](#) in "Troubleshooting Your System").
2. Remove the system covers (see ["Removing and Replacing the System Covers"](#) in "Troubleshooting Your System").
3. Remove the cooling shrouds (see ["Cooling Shrouds"](#)).
4. Disconnect the power cable harness from the SCSI backplane, system board, diskette drive, and any other devices in the peripheral drive bay.
5. Using a #2 Phillips screwdriver, remove the two screws securing the power supply to the chassis (see [Figure 6-3](#)).
6. Slide the power supply out of the chassis.

Figure 6-3. Removing and Installing the Nonredundant Power Supply

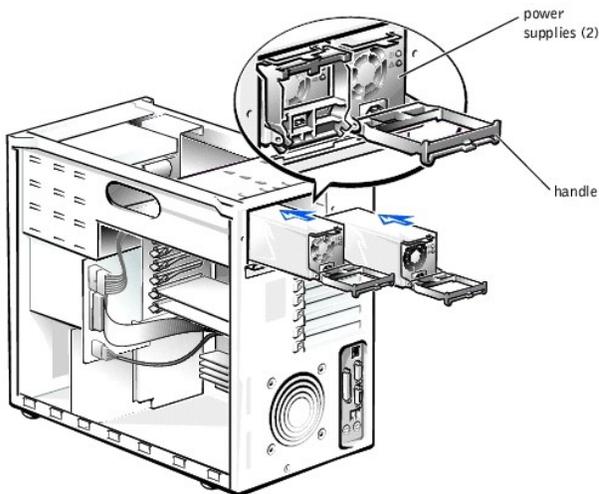


7. Slide the new power supply into the chassis.
8. Reconnect the power cable harness to the SCSI backplane, system board, diskette drive, and any other devices in the peripheral drive bay.
9. Replace the cooling shrouds (see ["Cooling Shrouds"](#)).
10. Secure the power supply to the chassis using the two screws you removed in step 5.

Removing and Installing the Redundant Power Supplies

1. Remove the power supply by squeezing the power supply handle, and pulling the power supply straight out to clear the chassis (see [Figure 6-4](#)).

Figure 6-4. Removing and Installing the Redundant Power Supplies



2. Install the power supply by sliding the new power supply into the chassis and swinging the handle closed until it snaps into place.
-

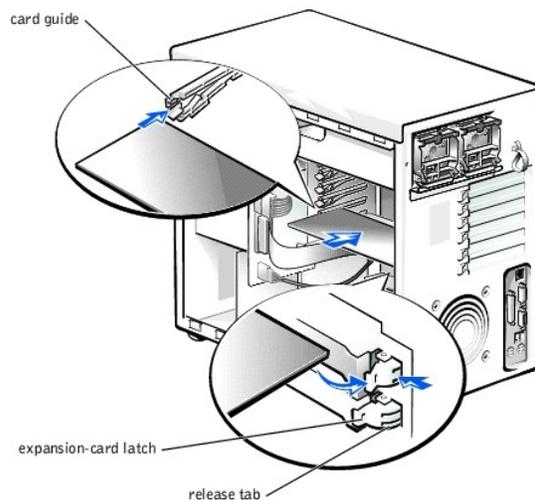
Expansion Cards

There are six expansion card slots available. Expansion card slots 1 and 2 reside on the secondary 64-bit/66 MHz bus, card slots 3 and 4, reside on the primary 64-bit/66 MHz bus, and card slots 5 and 6 reside on the 32-bit/33 MHz bus.

Installing an Expansion Card

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").
3. Remove the PCI cooling shroud (see ["Removing the PCI Cooling Shroud"](#)).
4. Open the plastic expansion-card latch and remove the expansion-card filler bracket (see [Figure 6-5](#)).
 - a. Press and hold the plastic tab on the back of the chassis.
 - b. Press the release tab on the latch inside the chassis.
 - c. Open the expansion-card latch and remove the filler bracket.
 - d. Ensure that the card guide latch is open if the expansion-card is a full-length card.
5. Install the new expansion card (see [Figure 6-5](#)).
 - a. Position the expansion-card so that the board-edge connector aligns with the expansion-card connector on the system board.
 - b. Insert the card-edge connector firmly into the expansion-card connector until the card is fully seated.
 - c. Close the expansion-card latch.
 - d. Close the card guide latch if the new expansion card is a full-length card.

Figure 6-5. Installing an Expansion Card



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

See the documentation that came with the card for information about its cable connections.
7. Replace the PCI cooling shroud (see ["Installing the PCI Cooling Shroud"](#)).
8. Replace the right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").

Removing an Expansion Card

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").
3. Remove the PCI cooling shroud (see ["Removing the PCI Cooling Shroud"](#)).
4. Disconnect any cables connected to the card.
5. To release the expansion card latch, press and hold the clip on the back of the chassis while you press the release tab on the latch inside the chassis, and then rotate the latch to the open position (see [Figure 6-5](#)).
6. Grasp the expansion card by its top corners, and carefully remove it from the expansion-card connector.
7. 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 card 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.

8. Replace the PCI cooling shroud (see "[Installing the PCI Cooling Shroud](#)").
9. Replace the right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").

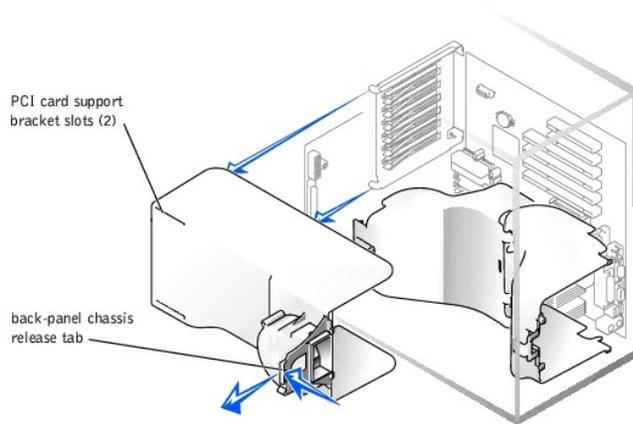
Cooling Shrouds

Your system contains two cooling shrouds. The PCI cooling shroud covers the expansion cards and the microprocessor/memory module cooling shroud covers the microprocessors and memory modules. This shroud is hinged in the middle to facilitate the removal and installation of the shroud.

Removing the PCI Cooling Shroud

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system's right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
3. Use your index finger to pull the back-panel release tab and swing the cooling shroud up and out of the chassis (see [Figure 6-6](#)).
4. Disconnect the PCI fan power cable from the system board (see [Figure 6-1](#)).

Figure 6-6. Removing and Installing the PCI Cooling Shroud



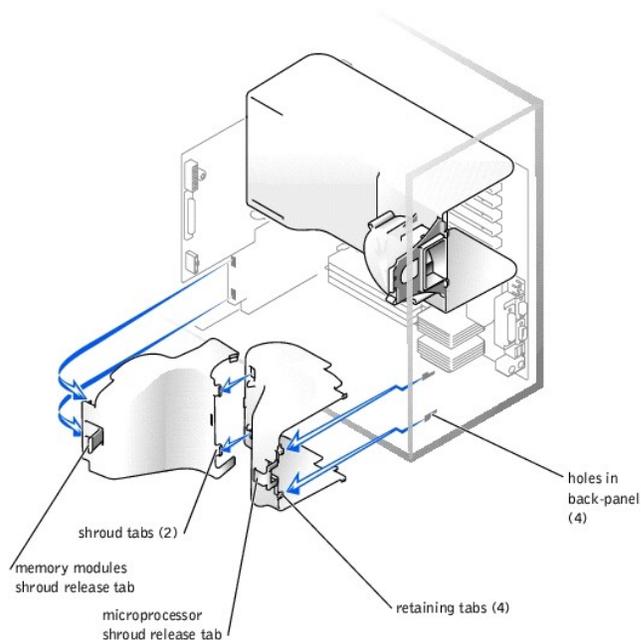
Installing the PCI Cooling Shroud

1. Connect the PCI fan power cable to the system board.
2. Lower the cooling shroud into the chassis ensuring that the shroud is aligned with the tabs on the PCI card support bracket (see [Figure 6-6](#)).
3. Swing the cooling shroud down until it snaps into place securing the shroud to the system (see [Figure 6-6](#)).
4. Replace the system's right-side cover.
5. Replace the front bezel.

Removing the Microprocessor and Memory Module Cooling Shrouds

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the system's right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
3. Press the release tab on the memory modules shroud and rotate the shroud until the tabs release from the slots in the microprocessor shroud (see [Figure 6-7](#)).
4. Lift the memory modules shroud from the system.
5. While pulling the release tab on the shroud that covers the microprocessors, lift the shroud upward so that the four retaining tabs that secure the shroud to the back of the chassis can be pulled through the back panel (see [Figure 6-7](#)).
6. Lift the microprocessor cooling shroud up and out of the chassis.

Figure 6-7. Removing and Installing the Microprocessor and Memory Module Cooling Shrouds



Installing the Microprocessor and Memory Module Cooling Shrouds

1. Lower the microprocessor cooling shroud into the chassis ensuring that the four securing tabs of the shroud is aligned with the holes in the back-panel (see [Figure 6-7](#)).
2. Press the cooling shroud down until it snaps into place securing the cooling shroud to the back-panel (see [Figure 6-7](#)).
3. Insert the two tabs on the memory module shroud into the two slots on the microprocessor shroud and swing the memory module shroud down until it snaps into place.
4. Replace the system's right-side cover.
5. Replace the front bezel.

Adding Memory

The memory modules are contained in four memory module sockets. The system can accommodate 128 MB to 4 GB of registered memory modules. The memory module sockets are arranged in two pairs. PAIR 1 consists of DIMMA and DIMMB and PAIR 2 consists of DIMMC and DIMMD. Memory modules must be installed in pairs and must be identical (type and vendor).

Memory Upgrade Kits

The system is upgradable to 4 GB by installing combinations of 128- 256-, 512-MB, and 1 GB registered memory modules. If you receive an error message stating that maximum memory has been exceeded, see "[Indicators, Messages, and Codes](#)," for detailed information. You can purchase memory upgrade kits from Dell as needed.

NOTE: The memory modules must be PC-133 compliant.

Memory Module Installation Guidelines

Starting with the socket nearest the power connector, the memory module sockets are labeled "PAIR1 DIMMA and DIMMB" and "PAIR2 DIMMC and DIMMD" (see [Figure 6-8](#)). When you install memory modules, follow these guidelines:

- 1 You must install memory modules in identical pairs.
- 1 Install a pair of memory modules in sockets PAIR1 DIMMA and DIMMB before installing the second pair in sockets PAIR2 DIMMC and DIMMD.
- 1 When memory modules are installed in both PAIR1 and PAIR2, install memory modules of the same size for optimum performance.

Figure 6-8. Memory Module Sockets

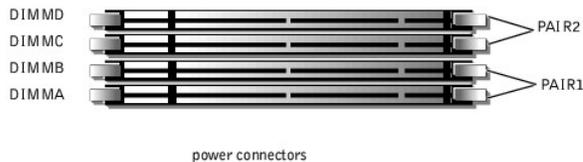


Table 6-2 illustrates several sample memory configurations based on these guidelines.

Table 6-2. Sample Memory Module Configurations

Total Desired Memory	PAIR1		PAIR2	
	DIMMA	DIMMB	DIMMC	DIMMD
128 MB	64 MB	64 MB	None	None
256 MB	64 MB	64 MB	64 MB	64 MB
256 MB	128 MB	128 MB	None	None
512 MB	128 MB	128 MB	128 MB	128 MB
1 GB	256 MB	256 MB	256 MB	256 MB
1 GB	512 MB	512 MB	None	None
2 GB	512 MB	512 MB	512 MB	512 MB
2 GB	1 GB	1 GB	None	None
4 GB	1 GB	1 GB	1 GB	1 GB

Performing a Memory Upgrade

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see ["Safety First— For You and Your System"](#) in "Troubleshooting Your System."

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

1. Turn off the system, including any attached peripherals, and disconnect the AC power from the electrical outlet.
2. Remove the system's right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").
3. Remove the memory module cooling shroud (see ["Removing the Microprocessor and Memory Module Cooling Shrouds"](#)).
4. Install or replace the memory module pairs as necessary to reach the desired memory total (see ["Installing Memory Modules"](#) or ["Removing Memory Modules"](#)).

See [Figure 6-8](#) for the memory module socket locations.

5. Reinstall the memory module cooling shroud (see ["Installing the Microprocessor and Memory Module Cooling Shrouds"](#)).
6. Reinstall the system's right-side cover, reconnect the system to the electrical outlet, and turn on system. After the system completes the POST routine, it runs a memory test.

The system detects that the new memory does not match the system configuration information, which is stored in NVRAM. The monitor displays an error message that ends with the following words:

Press <F1> to continue; <F2> to enter System Setup

7. Press <F2> to enter the System Setup program, and check the **System Memory** setting in the system data box on the System Setup screens. The system should have already changed the value in the **System Memory** setting to reflect the newly installed memory.
8. If the **System Memory** value is incorrect, one or more of the memory modules may not be installed properly. Repeat steps 1 through 4 ensuring that the memory modules are firmly seated in their sockets.
9. Run the system memory test in system diagnostics.
10. Replace the front bezel.

Installing Memory Modules

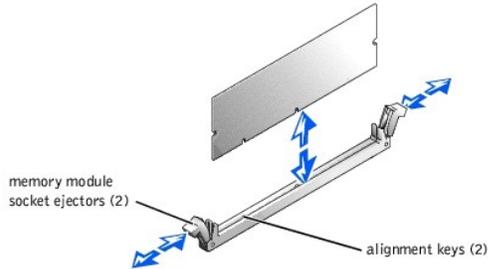
WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see ["Safety First— For You and Your System"](#) in "Troubleshooting Your System."

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

1. Turn off the system, including any attached peripherals, and disconnect the AC power from the electrical outlet.
2. Remove the system's right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").

3. Remove the memory module cooling shroud (see ["Removing the Microprocessor and Memory Module Cooling Shrouds"](#)).
4. Locate the memory module sockets in which you will install a memory module. [Figure 6-8](#) shows the order of the memory module sockets.
5. Press down and outward on the memory module socket ejectors, as shown in [Figure 6-9](#), to allow the memory module to be inserted into the socket.

Figure 6-9. Installing a Memory Module



6. Align the memory module's edge connector with the alignment keys, and insert the memory module in the socket (see [Figure 6-9](#)).
The memory module socket has two alignment keys that allow the memory module to be installed in the socket in only one way.
7. Press down on the memory module with your thumbs while pulling up on the ejectors with your index fingers to lock the memory module into the socket (see [Figure 6-9](#)).
When the memory module is properly seated in the socket, the memory module socket ejectors should align with the ejectors on the other sockets with memory modules installed.
8. Repeat steps 4 through 7 of this procedure to install the remaining memory modules.
9. Perform steps 5 through 10 of ["Performing a Memory Upgrade."](#)

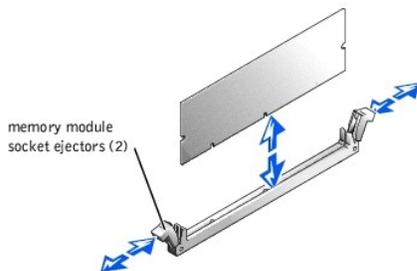
Removing Memory Modules

⚠ WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see ["Safety First— For You and Your System"](#) in ["Troubleshooting Your System."](#)

⚠ CAUTION: See ["Protecting Against Electrostatic Discharge"](#) in the safety instructions in your *System Information* document.

1. Turn off the system, including any attached peripherals, and disconnect the AC power from the electrical outlet.
2. Remove the system's right-side cover (see ["Removing the Side Covers"](#) in ["Troubleshooting Your System"](#)).
3. Remove the memory module cooling shroud (see ["Removing the Microprocessor and Memory Module Cooling Shrouds"](#)).
4. Locate the memory module sockets in which you will remove memory modules.
[Figure 6-8](#) shows the order of the memory module sockets.
5. Press down and outward on the memory module socket ejectors until the memory module pops out of the socket (see [Figure 6-10](#)).

Figure 6-10. Removing a Memory Module



Microprocessor Upgrades

To take advantage of future options in speed and functionality, you can add a second microprocessor or replace either the primary or secondary microprocessor.

🔗 NOTICE: The second microprocessor must be of the same type and speed as the first microprocessor.

Each microprocessor and its associated cache memory are contained in a PGA package that is installed in a ZIF socket on the system board. A second ZIF socket accommodates a secondary microprocessor. The secondary micro-processor must have the same operating frequency as the primary micro-processor. For example, if the system has a 1.13-GHz primary microprocessor, your secondary microprocessor must also be a 1.13-GHz microprocessor.

In a single microprocessor system, the microprocessor must be installed in the PROC_1 ZIF socket.

The following items are included in the microprocessor upgrade kit:

- 1 A microprocessor
- 1 A heat sink
- 1 A securing clip
- 1 A VRM, if adding a second microprocessor

Adding or Replacing a Microprocessor

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

1. Turn off the system, including any attached peripherals, and disconnect the AC power from the electrical outlet.
2. Remove the right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
3. Remove the microprocessor and memory module cooling shrouds (see "[Removing the Microprocessor and Memory Module Cooling Shrouds](#)").
4. Remove the VRM if adding or replacing a microprocessor in the CPU_2 socket.
5. Push on the heat-sink securing clip handle to release the clip from the retaining tabs on the ZIF socket (see [Figure 6-11](#)).

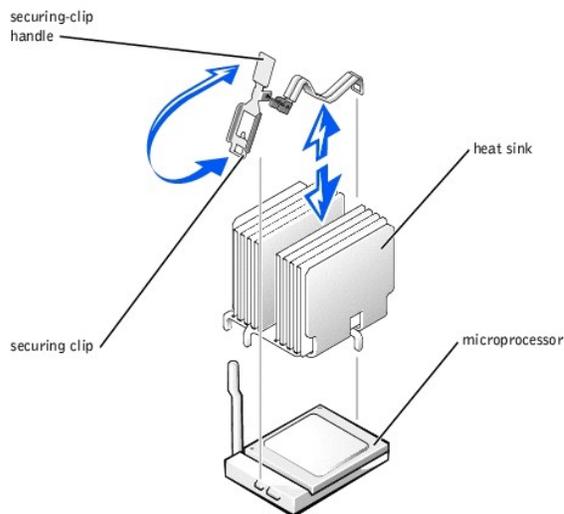
🔍 NOTE: The securing clip is spring-loaded and could quickly disengage when removing.

6. Remove the securing clip.

⚠ WARNING: The microprocessor and heat sink can become extremely hot. Ensure that the microprocessor has had sufficient time to cool before handling.

⚠ CAUTION: Never remove the heat sink from a microprocessor unless you intend to remove the microprocessor. The heat sink is necessary to maintain proper thermal conditions.

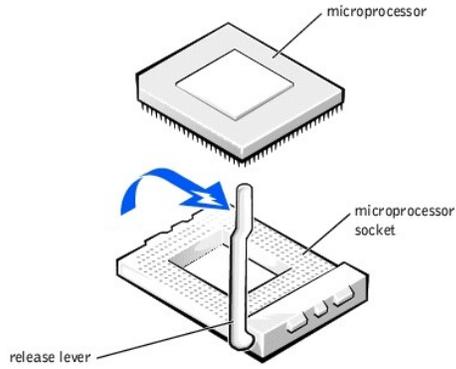
Figure 6-11. Heat-Sink Securing Clips



7. Remove the heat sink.
8. Pull the socket release lever straight up until the microprocessor is released (see [Figure 6-12](#)).
9. Lift the microprocessor out of the socket and leave the release lever up so that the socket is ready for the new microprocessor.

⚠ CAUTION: Be careful not to bend any of the pins when removing the microprocessor. Bending the pins can permanently damage the microprocessor.

Figure 6-12. Removing the Microprocessor



10. Unpack the new microprocessor.

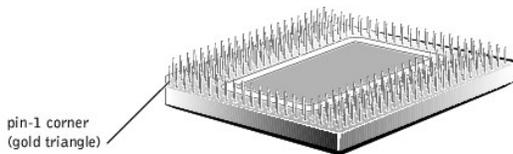
If any of the pins on the microprocessor appear bent, see ["Getting Help,"](#) for instructions on obtaining technical assistance.

11. Align the pin-1 corner of the microprocessor (see [Figure 6-13](#)) with the pin-1 corner of the microprocessor socket.

NOTE: Identifying the pin-1 corners is critical to positioning the microprocessor correctly.

Identify the pin-1 corner of the microprocessor by locating the tiny gold triangle that extends from one corner of the large central rectangular area. The gold triangle points toward pin 1, which is also uniquely identified by a square pad.

Figure 6-13. Pin-1 Identification

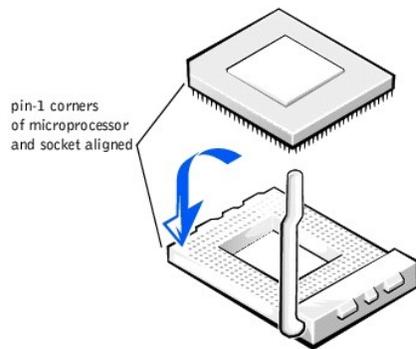


12. If the release lever on the microprocessor socket is not all the way up, move it to that position now.
13. Install the microprocessor in the socket (see [Figure 6-14](#)).

CAUTION: Positioning the microprocessor incorrectly can permanently damage the microprocessor and the system when you turn on the system. When placing the microprocessor in the socket, ensure that all of the pins on the microprocessor go into the corresponding holes. Be careful not to bend the pins.

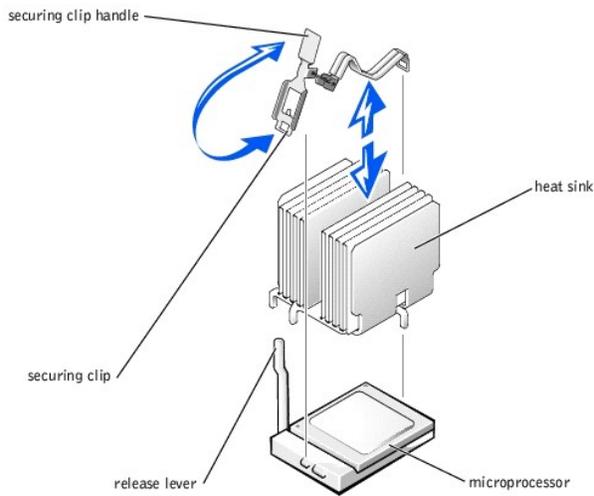
14. When the microprocessor is fully seated in the socket, rotate the socket release lever back down until it snaps into place, securing the microprocessor.

Figure 6-14. Installing the Microprocessor



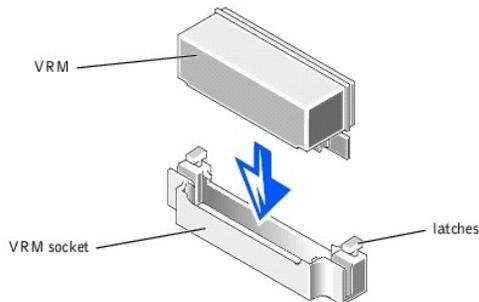
15. Place the new heat sink on top of the microprocessor (see [Figure 6-15](#)).
16. Orient the securing clip as shown in [Figure 6-15](#).

Figure 6-15. Installing the Heat-Sink



17. Hook the end of the clip without the heat-sink latch to the tab on the edge of the socket.
18. Align the hole in the heat-sink securing clip with the tab on the edge of the socket, and push the heat-sink securing clip handle until it snaps into place next to the heat-sink.
19. If you are adding a second microprocessor, install the VRM in the VRM_CONN socket making sure that the latches engage (see [Figure 6-16](#)).

Figure 6-16. Installing the VRM



20. Reinstall the microprocessor and memory module cooling shrouds (see "[Installing the Microprocessor and Memory Module Cooling Shrouds](#)").
21. Reinstall the system's right-side cover.
22. Replace the front bezel.
23. Reconnect your system and peripherals to their power sources, and turn on system.
24. Press <F2> to enter the System Setup program, and check that the **PROCESSOR 1** and **PROCESSOR 2** categories match the new system configuration.

See the system *User's Guide* for instructions.

25. As the system boots, it detects the presence of the new processor and automatically changes the system configuration information in the System Setup program. If you installed a second microprocessor, the following message is displayed:

Two 1.13 GHz Processors, Processor Bus: 133 MHz, L2 cache 512 KB Advanced

If only one processor is installed, the following message is displayed:

One 1.13 GHz Processor, Processor Bus: 133 MHz, L2 cache 512 KB Advanced

NOTE: After you remove and replace the front bezel, the chassis intrusion detector causes the following message to display at the next system start-up:

ALERT! Bezel was previously removed.

26. Enter the System Setup program, and confirm that the top line in the system data area correctly identifies the installed processor(s). See "Using the System Setup Program" in your *User's Guide*.
27. While in the System Setup program, reset the chassis intrusion detector.

 **NOTE:** If a setup password has been assigned by someone else, contact your network administrator for information on resetting the chassis intrusion detector.

28. Run the system diagnostics to verify that the new microprocessor is operating correctly. See "[Running System Diagnostics](#)," for information on running the diagnostics and troubleshooting any problems that might occur.

Replacing the System Battery

The battery is a 3.0-volt (V), coin-cell 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 power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

 **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.

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

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

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

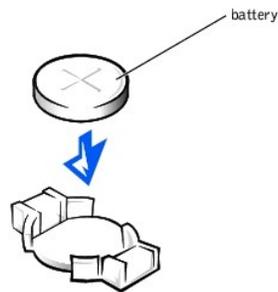
 **CAUTION:** See "Protecting Against Electrostatic Discharge" in the safety instructions in your *System Information* document.

3. Remove the system's right-side cover (see "[Removing and Replacing the System Covers](#)" in "Troubleshooting Your System").
4. Remove the cooling shrouds (see "[Cooling Shrouds](#)").
5. Remove the system battery (see [Figure 6-1](#), for the battery location).

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

6. Install the new system battery with the side labeled "+" facing up (see [Figure 6-17](#)).

Figure 6-17. Installing the System Battery



7. Replace the cooling shrouds (see "[Cooling Shrouds](#)").
8. Replace the system's right-side cover.
9. Reconnect the system to an electrical outlet and turn on the system, including any attached peripherals.
10. Enter the System Setup program to confirm that the battery is operating properly.
11. 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.

12. To test the newly installed battery, power down and disconnect the system from the electrical source for at least an hour.
13. Replace the front bezel.
14. After an hour, connect the system to an electrical source and turn on the power.
15. Enter the System Setup program and if the time and date are still incorrect, see "[Getting Help](#)," for instructions on obtaining technical assistance.

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Installing Drives

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

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- [Removing and Replacing Front-Panel Inserts](#)
- [Connecting the Drive](#)
- [SCSI Configuration Information](#)
- [Installing SCSI Hard Drives](#)
- [Installing a 5.25-Inch Device](#)
- [Installing a Tape Drive That Uses a Controller Card](#)
- [Removing a Diskette Drive](#)
- [Installing a Diskette Drive](#)
- [Installing a Host-Adapter Expansion Card](#)
- [Configuring the Boot Device](#)

The external drive bays of your system hold up to three user-accessible, half-height 5.25-inch devices (typically CD or tape drives). A CD drive is standard in the first external drive bay, while two additional devices of your choice can be installed in the next two external drive bays. A fourth drive bay accommodates a standard 3.5-inch diskette drive, which is controlled by the diskette drive controller on the system board.

The hard drive bays provide space for up to six 1-inch hard drives. These hard drives are hot-pluggable.

Installing Devices in the External Drive Bay

A CD drive is standard in the first external drive bay, while two additional devices of your choice can be installed in the next two external drive bays.

Before You Begin

This section describes how to install the following options:

1. Drives that use the computer's integrated diskette drive controller
1. Drives that use the computer's integrated Ultra/Narrow SCSI controller
1. Tape drives that use a controller card

To remove or install drives in the external bays, you must remove the system covers. See "[Removing and Replacing the System Covers](#)" in "Troubleshooting Your System."

Removing and Replacing Front-Panel Inserts

To protect the inside of the computer from foreign particles, a plastic insert covers each empty external drive bay. Additionally, each empty external drive bay is covered by a metal insert to maintain the necessary electromagnetic interference (EMI) shielding for the chassis. Before you install a drive in an empty bay, you must first remove the plastic and metal inserts. Whenever you remove a drive, be sure to replace the metal insert on the chassis and then replace the plastic insert in the front bezel to cover the empty bay.

Removing a Plastic Insert

1. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
2. Facing the inside of the front bezel, press against the center of the insert with your thumbs to loosen the tabs on the sides of the insert.
3. Pull the insert out of the bezel.

Removing a Metal Insert

1. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
 2. Use your thumb to press in the tab on the right edge of the metal insert to release the insert.
 3. Pivot the insert away from the chassis and disengage the tab on the insert's left edge.
-

Connecting the Drive

This section describes the interface cables and power cables used with the drives in your system.

Interface Cables

Most interface connectors are keyed for correct insertion; that is, a notch or a raised tab on one connector matches a tab or a notch on the other connector. Keying ensures that the pin-1 wire in the cable goes to the pin-1 ends of the connectors on both ends.

When you disconnect an interface cable, take care to grasp the cable connector, rather than the cable itself, to avoid stress on the cable.

DC Power Cables

Each drive in the external drive bays must connect to a 4-wire DC power cable from the system power supply. The connectors on these cables are labeled "P3," "P4," "P5," and "P6." Connectors P3, P4, and P5 are used for 5.25-inch devices; connector P6 is used for the 3.5-inch diskette drive.

SCSI Configuration Information

Although SCSI devices are installed essentially the same way as other devices, their configuration requirements are different. To configure SCSI devices installed in the external bays, follow the guidelines in the following subsections.

SCSI ID Numbers

Each device attached to the SCSI host adapter must have a unique SCSI ID number from 0 to 7.

When SCSI devices are shipped, the default SCSI ID numbers are assigned as follows:

- 1 The integrated SCSI host adapter is configured through the BIOS as SCSI ID 7.
- 1 A SCSI tape drive is configured as SCSI ID 6 (the default ID number for a tape drive).

 **NOTE:** There is no requirement that SCSI ID numbers be assigned sequentially or that devices be attached to the cable in order by ID number.

Device Termination

SCSI logic requires that the two devices at opposite ends of the SCSI chain be terminated and that all devices in between be unterminated. The SCSI cable included in your system has an active terminator installed at the end of the cable. Disable the termination on all SCSI devices you attach to this cable.

Installing SCSI Hard Drives

This subsection describes how to install and configure SCSI hard drives in the system's internal hard drive bays, and how to upgrade the system by installing a host adapter expansion card.

The internal hard drive bays provide space for up to six 1-inch hard drives. These drives connect to a SCSI backplane board. A SCSI cable connects the SCSI backplane board to the SCSI host adapter connector on the system board or to an optional SCSI host adapter card.

Before You Begin

Before attempting to remove or install a drive while the system is running, see the documentation for the host adapter card to ensure that the card is configured correctly to support hot-pluggable drive removal and insertion.

SCSI hard drives are supplied in special drive carriers that fit in the hard drive bays.

 **NOTE:** We recommend that you use only drives that has been tested and approved for use with the SCSI backplane board.

See the following guidelines when you configure the SCSI drive:

- 1 Disable termination on the drive. The SCSI backplane board provides termination for the SCSI bus.
- 1 Set the SCSI ID on all drives to 0. All SCSI ID numbers for the drives are set by the SCSI backplane board.
- 1 Configure the drive so that the drive motor waits for a **Start Unit** command from the SCSI host adapter before spinning.

 **NOTICE:** Do not turn off or reboot your system while the drive is being formatted. Doing so can cause a drive failure.

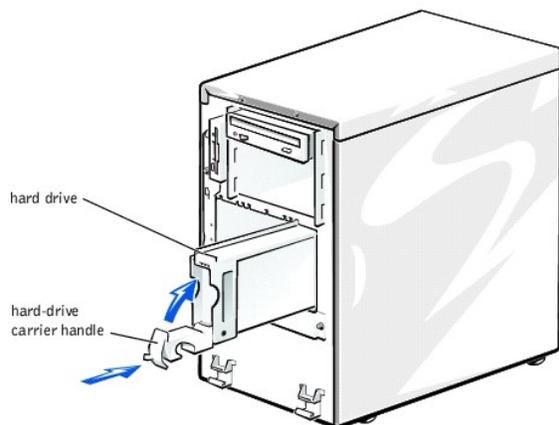
When you format a high-capacity SCSI hard drive, allow enough time for the formatting to be completed. Long format times for these drives are normal. A 9 GB hard drive, for example, can take up to 2.5 hours to format.

Installing a SCSI Hard Drive

 **NOTICE:** Hot-plug drive installation is not supported for systems without a host adapter expansion card.

1. If the system does not have a RAID controller installed, shut down the system.
2. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
3. Open the hard drive carrier handle (see [Figure 7-1](#)).

Figure 7-1. Installing a SCSI Hard Drive



4. Insert the hard drive into the drive bay (see [Figure 7-1](#)).
5. Close the hard drive carrier handle to lock the drive in place.
6. Replace the front bezel (see ["Replacing the Front Bezel"](#) in "Troubleshooting Your System").
7. Install any required SCSI device drivers (see "Installing and Configuring SCSI Drivers," in the *User's Guide* for information).
8. If the hard drive is a new drive, run the **SCSI Controllers** test in system diagnostics.

Removing a SCSI Hard Drive

NOTICE: Hot-plug drive installation is not supported for systems without a host adapter expansion card.

1. If the system does not have a RAID controller installed, shut down the system.
2. For systems with host adapter expansion cards, power down the hard drive bay and wait until the SCSI hard drive indicator codes on the drive carrier signal that the drive can be removed safely.

If the drive has been online, the drive status indicators will flash sequentially as the drive is powered down. When all indicators are turned off, the drive is ready for removal.

3. Remove the front bezel (see ["Removing the Front Bezel"](#) in "Troubleshooting Your System").
4. Open the hard drive carrier handle to release the carrier.
5. Slide the carrier toward you until it is free of the drive bay.
6. Replace the front bezel (see ["Replacing the Front Bezel"](#) in "Troubleshooting Your System").

Installing a 5.25-Inch Device

1. Prepare the drive for installation.

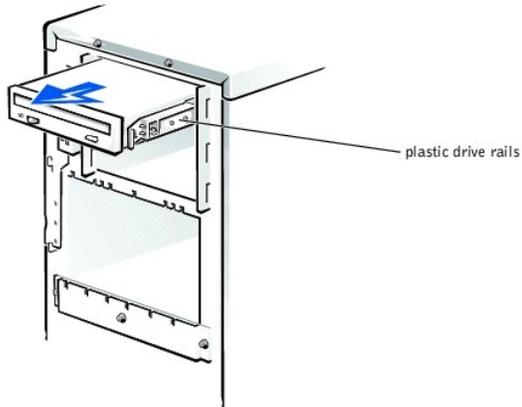
CAUTION: See "Protecting Against Electrostatic Discharge" in the safety instructions in your *System Information* document.

Ground yourself by touching an unpainted metal surface on the back of the computer, unpack the drive, and compare the jumper and switch settings with those in the drive documentation. (See ["SCSI Configuration Information,"](#) for information on setting the drive's SCSI ID number and enabling termination [if required].) Change any settings necessary for this system's configuration.

If the drive does not already have drive rails attached, attach a drive rail to each side of the drive and secure each drive rail to the drive with a screw in each of the lower slotted screw holes on the drive rail.

2. Remove the front bezel (see ["Removing the Front Bezel"](#) in "Troubleshooting Your System").
3. Remove the right-side cover (see ["Removing the Side Covers"](#) in "Troubleshooting Your System").
4. If other installed drives are in the way, temporarily move them out of the way.
5. Press in on the plastic drive rails at the front of the bay to disengage a drive, and then slide the drive slightly toward the front of the chassis (see [Figure 7-2](#)).

Figure 7-2. Installing and Removing a 5.25-Inch Device



6. Remove the metal insert from the drive bay.
7. Slide the new drive into its bay until it snaps securely into place.

If necessary, you can adjust drive alignment by repositioning one or both rails.

8. Plug the DC power cable connector into the 4-pin power input connector on the back of the drive.
9. Select the connector on the SCSI cable that most easily reaches the new device, and press the interface cable connector firmly onto the drive's interface connector.
10. If you moved other drives in step 4, snap them back into place.
11. Check all cable connections that may have been loosened during this procedure. Arrange cables so that they will not catch on the computer covers or block the airflow of the fans or cooling vents.
12. If a front-panel insert on the front-bezel blocks the bay in which you installed the drive, remove the insert.
13. Replace the front bezel and right-side cover.
14. Reconnect your system and peripherals to their power sources, and turn them on.
15. Test the devices.
16. To test a SCSI tape drive, refer to the documentation for the tape drive software to perform a tape drive backup and verification test.

Installing a Tape Drive That Uses a Controller Card

Tape drives that require their own separate controller cards are shipped with the controller card and an interface cable.

WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Prepare the controller card and drive for installation.

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

3. Ground yourself by touching an unpainted metal surface on the back of the system, unpack the drive and controller card, and compare the jumper and switch settings with those in the drive documentation.
4. Change any settings necessary for this system's configuration.
5. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
6. Remove the right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
7. Remove the PCI cooling shroud (see "[Removing the PCI Cooling Shroud](#)" in "Installing System Board Options").
8. If other installed drives are in the way, disengage them by pressing in on the plastic drive rails at the front of the bay, and slide them slightly toward the front of the chassis.
9. Remove the metal insert from the drive bay.
10. Slide the new drive into its bay until it snaps securely into place.

If necessary, you can adjust drive alignment by repositioning one or both rails.

11. Determine which DC power cable connector to use, and then plug the DC power cable connector into the 4-pin power input connector on the back of the drive.
12. Install the controller card in an expansion slot (see "[Installing an Expansion Card](#)").
13. Attach the interface cable that came with the drive kit to the interface connector on the back of the drive.

14. Connect the interface cable to the controller connector on the controller card.

See the controller card's documentation to identify the controller connector on the card.

15. If you moved other drives in step 8, snap them back into place.
16. Check all cable connections that might have been loosened during this procedure.

Arrange the cables so that they will not catch on the system covers or block the airflow of the fans or cooling vents.

17. Replace the PCI cooling shroud (see "[Installing the PCI Cooling Shroud](#)" in "Installing System Board Options").
18. If a front-panel insert on the front bezel blocks the bay in which you installed the drive, remove the insert.
19. Replace the front bezel and right-side cover.
20. Reconnect the system and peripherals to their power sources, and turn them on.
21. Perform a tape backup and verification test with the drive as instructed in the tape- drive software documentation that came with the drive.

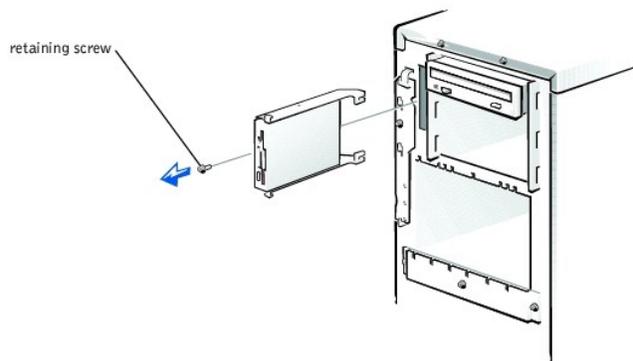
Removing a Diskette Drive

▲ WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

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

1. Turn off the system, including any attached peripherals, and disconnect the system from the electrical outlet.
2. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
3. Remove the top cover (see "[Removing the Top Cover](#)" in "Troubleshooting Your System").
4. Disconnect the power cable and the interface cable from the back of the diskette drive.
5. Remove the retaining screw that secures the diskette drive to the front of the chassis (see "[Figure 7-3](#)").

Figure 7-3. Removing and Installing a Diskette Drive



6. Slide the diskette drive forward to clear the chassis.

Installing a Diskette Drive

▲ WARNING: Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

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

1. Slide the diskette drive into the chassis.
2. Using a #2 Phillips screwdriver, tighten the retaining screw that secures the diskette drive to the front of the chassis (see "[Figure 7-3](#)").
3. Connect the power and interface cables to the back of the diskette drive.
4. Replace the top cover (see "[Replacing the Top Cover](#)").

Installing a Host-Adapter Expansion Card

Follow these general guidelines when installing a host-adapter expansion card. For specific instructions, see the documentation supplied with the host-adapter expansion card.

 **WARNING:** Before you perform this procedure, you must turn off the system and disconnect it from its power source. For more information, see "[Safety First— For You and Your System](#)" in "Troubleshooting Your System."

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

1. Unpack the host adapter expansion card, and prepare it for installation.

See the documentation accompanying the expansion card.

2. Remove the front bezel (see "[Removing the Front Bezel](#)" in "Troubleshooting Your System").
3. Remove the right-side cover (see "[Removing the Side Covers](#)" in "Troubleshooting Your System").
4. Remove the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
5. Remove the SCSI interface cable that connects the SCSI/Channel A host-adapter connector on the system board to the SCSI connector on the SCSI backplane board (see [Figure 6-1](#)).
6. Install the host-adapter expansion card in slot 1 through 4 for optimum performance.
7. Install the SCSI interface cable supplied with the host-adapter expansion card to the SCSI connector on the SCSI backplane board.

To identify the correct connector, see documentation for the host-adapter expansion card. Route the SCSI cable under the front fan assembly.

8. Connect the external SCSI devices to the SCSI host-adapter expansion card's external connector on the system's back-panel.

If you are attaching multiple external SCSI devices, daisy-chain the devices to each other by using the cables shipped with each device.

9. Replace the cooling shrouds (see "[Cooling Shrouds](#)" in "Installing System Board Options").
10. Replace the right-side cover (see "[Replacing the Side Cover](#)" in "Troubleshooting Your System").
11. Replace the front bezel (see "[Replacing the Front Bezel](#)" in "Troubleshooting Your System"). Reconnect the system to an electrical outlet.
12. Connect the external device(s) to electrical outlet(s).
13. Install any required SCSI device drivers (see "Installing and Configuring SCSI Drivers," in the *User's Guide* for information and instructions).
14. Test the SCSI devices.

Test a SCSI hard drive by running the **SCSI Controllers** test in system diagnostics. To test a SCSI tape drive, also see the documentation for the tape drive software to perform a tape drive backup and verification test.

Configuring the Boot Device

If you plan to boot the system from a hard drive, the drive must be attached to the primary (or boot) controller or SCSI host adapter card. The device that the system boots from is determined by the boot order specified in the System Setup program.

The system setup program provides options that the system uses to scan for installed boot devices. See your system's *User's Guide* for information about the System Setup program.

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Getting Help

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

- [Help Overview](#)
 - [Dell Contact Numbers](#)
-

Help Overview

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

Technical Assistance

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

1. Complete the procedures in "[Troubleshooting Your System](#)."
2. Run the system diagnostics.
3. Make a copy of the Diagnostics Checklist, and fill it out.
4. Use Dell's extensive suite of online services available at Dell's website (<http://www.dell.com>) for help with installation and troubleshooting procedures.

For more information, see "[World Wide Web](#)."

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](#)."

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 website 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:

- 1 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)

- 1 Anonymous file transfer protocol (FTP)

<ftp.dell.com/>

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

- 1 Electronic Support Service

support@us.dell.com

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

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

- 1 Electronic Quote Service

sales@dell.com

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

1 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 computer systems.

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."

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](#)."

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](#)."

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 refer to 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, see "[Before You Call](#)" and then call the number for your country as listed in "[Dell Contact Numbers](#)."

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](#)."

Product Information

If you need information about additional products available from Dell, or if you would like to place an order, visit Dell's website at <http://www.dell.com/>. For the telephone number to call to speak to a sales specialist, see "[Dell Contact Numbers](#)."

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](#)."
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 (such as power cables, software diskettes, and guides) 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. 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.

 **CAUTION:** Before servicing any components inside your computer, see "[Safety First—For You and Your System](#)."

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: _____

Are you connected to a network? yes no

Network, version, and network card: _____

Programs and versions: _____

See your operating system documentation to determine the contents of the system's startup files.
 Print each file if possible. Otherwise, record the contents of each file before calling Dell.

Error message, beep code, or diagnostic code: _____

Description of problem and troubleshooting procedures you performed: _____

Dell Contact Numbers

The following table provides country-specific access codes and telephone numbers, websites, and email addresses that you can use to contact Dell.

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.

Country (City) International Access Code Country Code City Code	Department Name or Service Area, Website and E-mail Address	Area Codes, Local Numbers, and Toll Free Numbers
Australia (Sydney) International Access Code: 0011 Country Code: 61 City Code: 2	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) International Access Code: 900 Country Code: 43 City Code: 1	Home/Small Business Sales	01 795 67602
	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

	Website: http://support.euro.dell.com	
	E-mail: tech_support_germany@dell.com	
Belgium (Brussels)	Technical Support	02 481 92 88
International Access Code: 00	Customer Care	02 481 91 19
Country Code: 32	Home/Small Business Sales	toll free: 0800 16884
City Code: 2	Corporate Sales	02 481 91 00
	Fax	02 481 92 99
	Switchboard	02 481 91 00
	Website: http://support.euro.dell.com	
	E-mail: tech_be@dell.com	
Brazil	Customer Support, Technical Support	0800 90 3355
International Access Code: 0021	Sales	0800 90 3366
Country Code: 55	Website: http://www.dell.com/br	
City Code: 51		
Brunei	Customer Technical Support (Penang, Malaysia)	604 633 4966
Country Code: 673	Customer Service (Penang, Malaysia)	604 633 4949
	Transaction Sales (Penang, Malaysia)	604 633 4955
Canada (North York, Ontario)	Automated Order-Status System	toll free: 1-800-433-9014
International Access Code: 011	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
Chile (Santiago)	Sales, Customer Support, and Technical Support	toll free: 1230-020-4823
Country Code: 56		
City Code: 2		
China (Xiamen)	Technical Support	toll free: 800 858 2437
Country Code: 86	Customer Experience	toll free: 800 858 2060
City Code: 592	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
International Access Code: 00	Customer Care	02 22 83 27 11
Country Code: 420	Fax	02 22 83 27 14
City Code: 2	TechFax	02 22 83 27 28
	Switchboard	02 22 83 27 11
	Website: http://support.euro.dell.com	
	E-mail: czech_dell@dell.com	
Denmark (Horsholm)	Technical Support	45170182
International Access Code: 009	Relational Customer Care	45170184
Country Code: 45	Home/Small Business Customer Care	32875505
	Switchboard	45170100
	Fax Technical Support (Upplands Vasby, Sweden)	859005594
	Fax Switchboard	45170117
	Website: http://support.euro.dell.com	
	E-mail: den_support@dell.com	
Finland (Helsinki)	Technical Support	09 253 313 60
International Access Code: 990	Technical Support Fax	09 253 313 81
Country Code: 358	Relational Customer Care	09 253 313 38
City Code: 9	Home/Small Business Customer Care	09 693 791 94
	Fax	09 253 313 99
	Switchboard	09 253 313 00
	Website: http://support.euro.dell.com	

	E-mail: fin_support@dell.com	
France (Paris/Montpellier)	Home and Small Business	
International Access Code: 00	Technical Support	0825 387 270
Country Code: 33	Customer Care	0825 823 833
City Code: (1) (4)	Switchboard	0825 004 700
	Switchboard (Alternative)	04 99 75 40 39
	Sales	0825 004 700
	Fax	0825 004 701
	Website: 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
	Sales	01 55 94 71 00
	Fax	01 55 94 71 99
	Website: http://support.euro.dell.com	
	E-mail: web_fr_tech@dell.com	
Germany (Langen)	Technical Support	06103 766-7200
International Access Code: 00	Technical Support Fax	06103 766-9222
Country Code: 49	Home/Small Business Customer Care	0180-5-224400
City Code: 6103	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
	Website: http://support.euro.dell.com	
	E-mail: tech_support_germany@dell.com	
Hong Kong	Technical Support	toll free: 800 96 4107
International Access Code: 001	Customer Service (Penang, Malaysia)	604 633 4949
Country Code: 852	Transaction Sales	toll free: 800 96 4109
	Corporate Sales	toll free: 800 96 4108
Ireland (Cherrywood)	Technical Support	0870 908 0800
International Access Code: 16	Customer Care	01 204 4026
Country Code: 353	Sales	01 286 0500
City Code: 1	SalesFax	01 204 0144
	Fax	0870 907 5590
	Switchboard	01 286 0500
	Website: http://support.euro.dell.com	
	E-mail: dell_direct_support@dell.com	
Italy (Milan)	Home and Small Business	
International Access Code: 00	Technical Support	02 577 826 90
Country Code: 39	Customer Care	02 696 821 14
City Code: 02	Fax	02 696 824 13
	Switchboard	02 696 821 12
	Website: 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
	Website: http://support.euro.dell.com	
	E-mail: web_it_tech@dell.com	
Japan (Kawasaki)	Technical Support (Server)	toll free: 0120-1984-35
International Access Code: 001	Technical Support (Dimension™ and Inspiron™)	toll free: 0120-1982-56 or 0088-25-3355
Country Code: 81		
City Code: 44	Technical Support (Workstation, OptiPlex™ and Latitude™)	toll free: 0120-1984-39

		or 0088-22-7890
	24-Hour Automated Order Service	044 556-3801
	Customer Care	044 556-4240
	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
	Website: http://support.jp.dell.com	
Korea (Seoul)	Technical Support	toll free: 080-200-3800
International Access Code: 001	Sales	toll free: 080-200-3777
Country Code: 82	Customer Service (Seoul, Korea)	2194-6220
City Code: 2	Customer Service (Penang, Malaysia)	604 633 4949
	Fax	2194-6202
	Switchboard	2194-6000
Latin America	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
		or 512 728-3772
Luxembourg	Technical Support (Brussels, Belgium)	02 481 92 88
International Access Code: 00	Home/Small Business Sales (Brussels, Belgium)	toll free: 080016884
Country Code: 352	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
	Website: http://support.euro.dell.com	
	E-mail: tech_be@dell.com	
Macau	Technical Support	toll free: 0800 582
Country Code: 853	Customer Service (Penang, Malaysia)	604 633 4949
	Transaction Sales	toll free: 0800 581
Malaysia (Penang)	Technical Support	toll free: 1 800 888 298
International Access Code: 00	Customer Service	04 633 4949
Country Code: 60	Transaction Sales	toll free: 1 800 888 202
City Code: 4	Corporate Sales	toll free: 1 800 888 213
Mexico	Automated Order-Status System (Austin, Texas, U.S.A.)	512 728-0685
International Access Code: 95	AutoTech (Automated technical support) (Austin, Texas, U.S.A.)	512 728-0686
Country Code: 52	Customer Technical Support	525 228-7870
City Code: 5	Sales	525 228-7811
		or toll free: 91-800-900-37
		or toll free: 91-800-904-49
	Customer Service	525 228-7878
	Main	525 228-7800
Netherlands (Amsterdam)	Technical Support	020 581 8838
International Access Code: 00	Customer Care	020 581 8740
Country Code: 31	Home/Small Business Sales	toll free: 0800-0663
City Code: 20	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
	Website: http://support.euro.dell.com	
	E-mail: tech_nl@dell.com	
New Zealand	Home and Small Business	0800 446 255
International Access Code: 00	Government and Business	0800 444 617
	Sales	0800 441 567

Country Code: 64	Fax	0800 441 566	
Norway (Lysaker) International Access Code: 095 Country Code: 47	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	
	Website: http://support.euro.dell.com E-mail: nor_support@dell.com		
Poland (Warsaw) International Access Code: 011 Country Code: 48 City Code: 22	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	
	Website: http://support.euro.dell.com E-mail: pl_support@dell.com		
Portugal International Access Code: 00 Country Code: 35	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	
	E-mail: es_support@dell.com		
Singapore (Singapore) International Access Code: 005 Country Code: 65	Technical Support	toll free: 800 6011 051	
	Customer Service (Penang, Malaysia)	604 633 4949	
	Transaction Sales	toll free: 800 6011 054	
	Corporate Sales	toll free: 800 6011 053	
South Africa (Johannesburg) International Access Code: 09/091 Country Code: 27 City Code: 11	Technical Support	011 709 7710	
	Customer Care	011 709 7707	
	Sales	011 709 7700	
	Fax	011 709 0495	
	Switchboard	011 709 7700	
	Website: http://support.euro.dell.com E-mail: dell_za_support@dell.com		
Southeast Asian and Pacific Countries	Customer Technical Support, Customer Service, and Sales (Penang, Malaysia)	604 633 4810	
Spain (Madrid) International Access Code: 00 Country Code: 34 City Code: 91	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	
	Website: 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	
	Website: http://support.euro.dell.com E-mail: web_esp_tech@dell.com		
	Sweden (Upplands Vasby) International Access Code: 009 Country Code: 46 City Code: 8	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	
Website: http://support.euro.dell.com E-mail: swe_support@dell.com			
Switzerland (Geneva) International Access Code: 00	Technical Support (Home and Small Business)	0844 811 411	
	Technical Support (Corporate)	0844 822 844	
	Customer Care	0848 802 802	

Country Code: 41 City Code: 22	Fax	022 799 01 90
	Switchboard	022 799 01 01
	Website: http://support.euro.dell.com	
	E-mail: swisstech@dell.com	
Taiwan International Access Code: 002 Country Code: 886	Technical Support	toll free: 0080 60 1255
	Technical Support (Servers)	toll free: 0080 60 1256
	Transaction Sales	toll free: 0080 651 228 or 0800 33 556
	Corporate Sales	toll free: 0080 651 227 or 0800 33 555
Thailand International Access Code: 001 Country Code: 66	Technical Support	toll free: 0880 060 07
	Customer Support (Penang, Malaysia)	604 633 4949
	Sales	toll free: 0880 060 09
U.K. (Bracknell) International Access Code: 010 Country Code: 44 City Code: 1344	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
	Website: http://support.euro.dell.com E-mail: dell_direct_support@dell.com	
U.S.A. (Austin, Texas) International Access Code: 011 Country Code: 1	Automated Order-Status System	toll free: 1-800-433-9014
	AutoTech (for portable and desktop computers)	toll free: 1-800-247-9362
	Dell 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 (systems 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 (systems 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 or 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
Dellnet Technical Support	toll free: 1-877-Dellnet (1-877-335-5638)	

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Abbreviations and Acronyms

Dell™ PowerEdge™ 1500SC Systems Installation and Troubleshooting Guide

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

A

ampere(s)

AC

alternating current

ADC

analog-to-digital converter

ANSI

American National Standards Institute

APIC

Advanced Peripheral Interrupt Controller

ASIC

application-specific integrated circuit

B

BIOS

basic input/output system

bpi

bits per inch

bps

bits per second

BTU

British thermal unit

C

Celsius

CD

compact disc

CD

compact disc

CGA

color graphics adapter

cm

centimeter(s)

cpi

characters per inch

cpl

characters per line

CPU

central processing unit

DAC

digital-to-analog converter

DAT

digital audio tape

dB

decibel(s)

dB(A)

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

DRAM

dynamic random-access memory

DRSC

Dell remote service card

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

ft

feet

g

gram(s)

G

gravities

GB

gigabyte(s)

GUI

graphical user interface

h

Hz

hertz

I/O

input/output

ID

identification

IDE

integrated drive electronics

IRQ

interrupt request

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

mm

millimeter(s)

ms

millisecond(s)

MTBF

mean time between failures

mV

millivolt(s)

NIC

network interface controller

NiCad

nickel cadmium

NiMH

nickel-metal hydride

NMI

nonmaskable interrupt

ns

nanosecond(s)

NTFS

NT File System

NVRAM

nonvolatile random-access memory

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

PXE

preboot execution environment

RAID

redundant arrays of independent disks

RAM

random-access memory

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

SCSI

small computer system interface

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

SVGA

super video graphics array

TFT

thin film transistor

tpi

tracks per inch

UMB

upper memory block

UPS

uninterruptible power supply

V

volt(s)

VAC

volt(s) alternating current

VDC

volt(s) direct current

VGA

video graphics array

VLSI

very-large-scale integration

VRAM

video random-access memory

VRM

voltage regulator module

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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