Dell™ PowerVault™ 715N Systems User's Guide

Notes, Notices, and Cautions

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

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

CAUTION: A CAUTION indicates a potential for property damage, personal injury, or death.

Initial release: 19 Sep 01

Features and Other Information

Dell™ PowerVault™ 715N Systems User's Guide

The Dell™ PowerVault™ 715N network attached storage (NAS) appliance enables you to easily add storage to a workgroup, small office or small business network, and offload the file management responsibilities from the server. It is a "headless" device, which means it has no keyboard, mouse, or monitor but can be managed through the network or by using console redirection through a serial connection. The system offers the data security capabilities of general-purpose servers.

This document provides basic information about the system features and specifications. For information about installing, servicing, or managing the system, see the documents listed in "Other Documents You Might Need."

Front-Panel Features

This section provides a basic overview of the system's features on the front panel, which is shown in Figure 1-2.

Bezel

The system's front bezel includes the power button and clear markings of the light emitting diodes (LEDs) for each hard drive. See the following sections for more information about the front panel LEDs. Remove the bezel if you need to remove or replace hard drives. To remove the bezel, push the release latches inward, and pull the bezel away from the system (see Figure 1-1).

Figure 1-1. Removing the Front Bezel
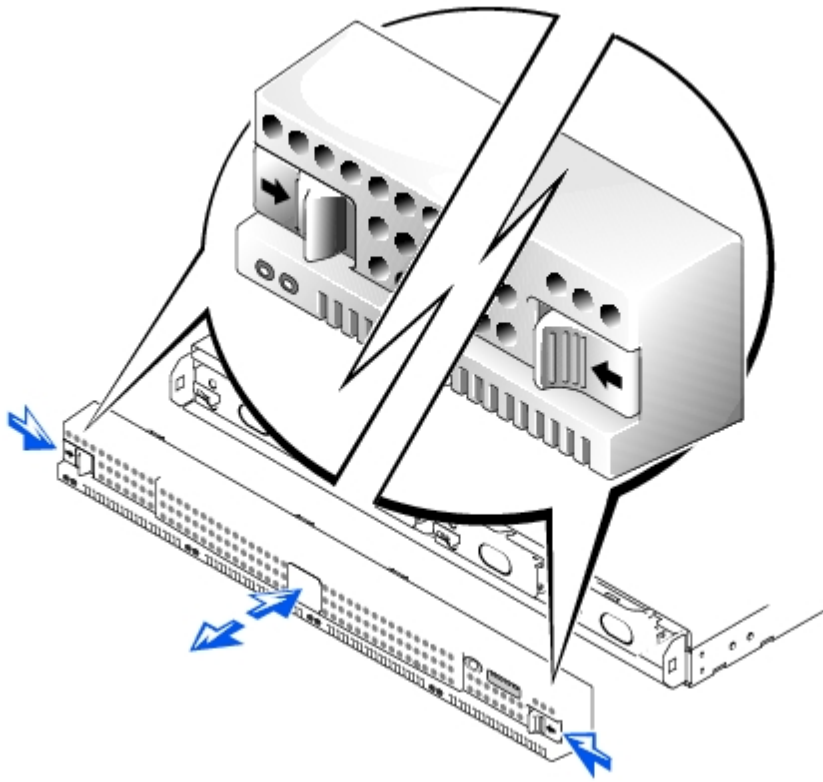
Power Button

Push the power button to turn on the system.

Hard Drives

The system has four integrated drive electronics (IDE) hard drives. Each hard drive is mounted in a carrier that snaps into one of the four hard drive bays on the system.

NOTE: The hard drives are not hot-swappable. Therefore, before you replace a drive, you must shut down and turn off the system.

Figure 1-2. Front-Panel Indicators
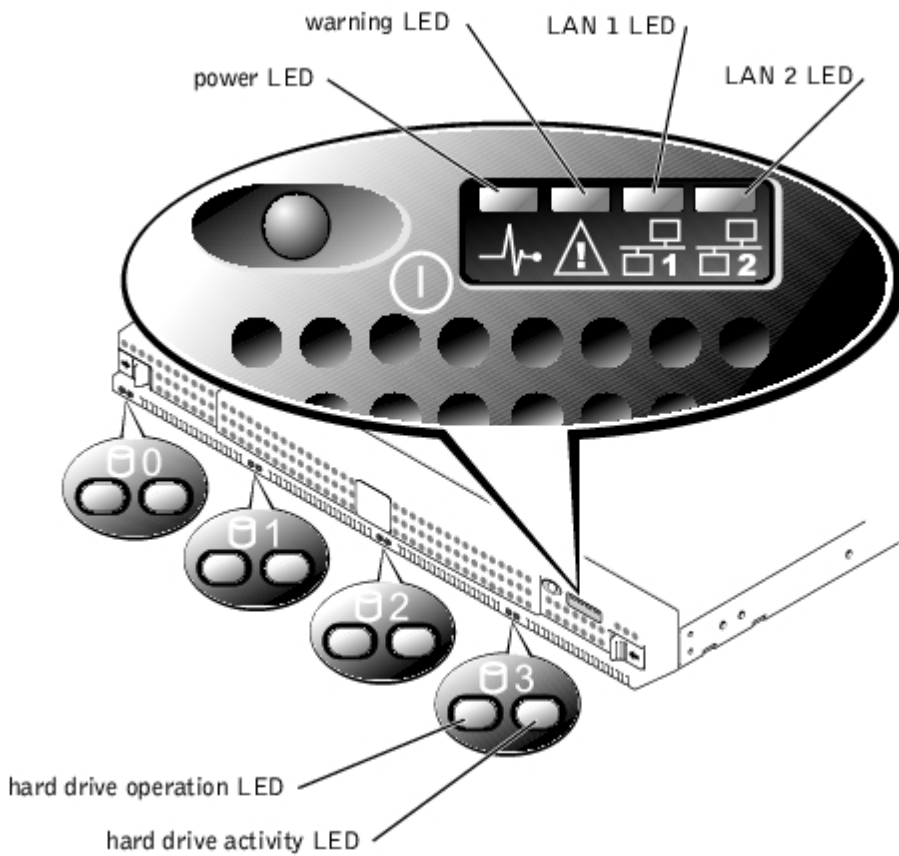
Power LED

- Green indicates the system is turned on and running.

- Off indicates the system is turned off.

Warning LED

- Amber indicates a system failure has occurred.

- Off indicates normal operation.

LAN 1 LED

- Green indicates the system is connected to the network through the LAN 1 port.

- Flashing green indicates activity between the system and other devices on the network.

- Off indicates the system is disconnected from the network or the LAN 1 port is not working correctly.

LAN 2 LED

- Green indicates the system is connected to the network through the LAN 2 port.

- Flashing green indicates activity between the system and other devices on the network.

- Off indicates the system is disconnected from the network or the LAN 2 port is not working correctly.

Hard Drive LEDs

Each hard drive has two LEDs. The LEDs are most visible when the bezel is attached to the front of the system. The LEDs provide the following information for each hard drive:

- When the LED on the left side is green, the hard drive is installed in the drive bay and working. When this LED is amber, the hard drive is installed in the bay, but it is not working correctly.

- When the LED on the right side flashes amber, the hard drive is active.

Back-Panel Features

This section provides a basic overview of the system's features on the back panel. Figure 1-3 shows the back-panel features of the system.

Power Connector

The power cable plugs in to this connector.

LAN Connectors

Two LAN ports connect the system to an Ethernet network with RJ-45 connector LAN cables.

Serial Port

The serial port enables you to connect to the appliance through console redirection or remote access services (RAS).

✎ **NOTE:** Console redirection is enabled by default. However, if you disable it in the BIOS Setup utility, you can re-enable it only by pressing the console redirection button on the system board. See your Installation and Troubleshooting Guide for information about enabling console redirection.

Figure 1-3. Back-Panel Features
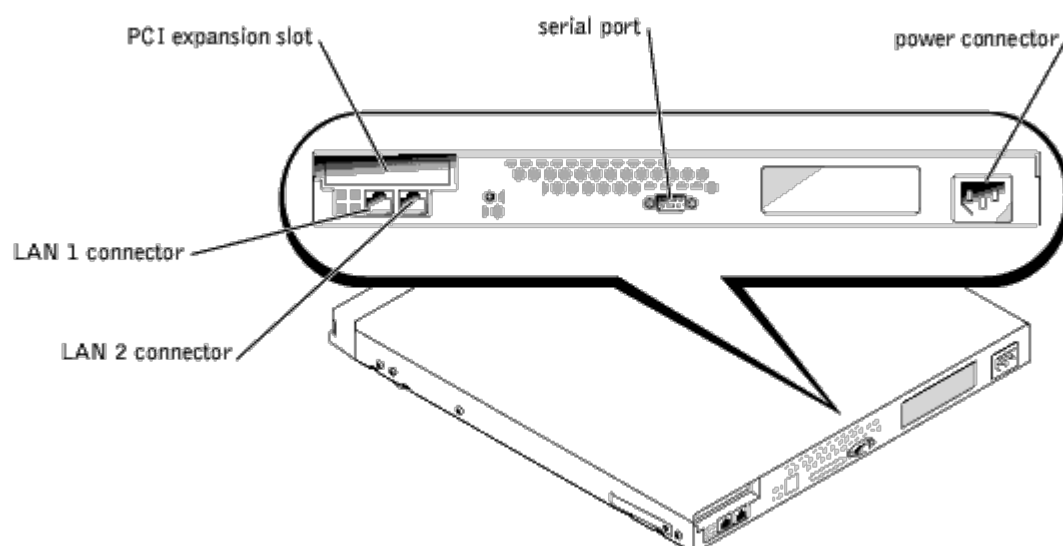
System Cover

Although you do not need to configure the system hardware, you can remove the cover as needed to troubleshoot the hardware or replace parts. To remove the cover, press the latches on the cover inward, grasp the cover on both sides, then slide the cover backwards about an inch and carefully lift it off (see Figure 1-4).

To replace the system cover, fit the cover over the sides of the chassis, and slide the cover forward, slightly applying pressure to the rear part of the cover, until it snaps into place.

Figure 1-4. Removing the System Cover
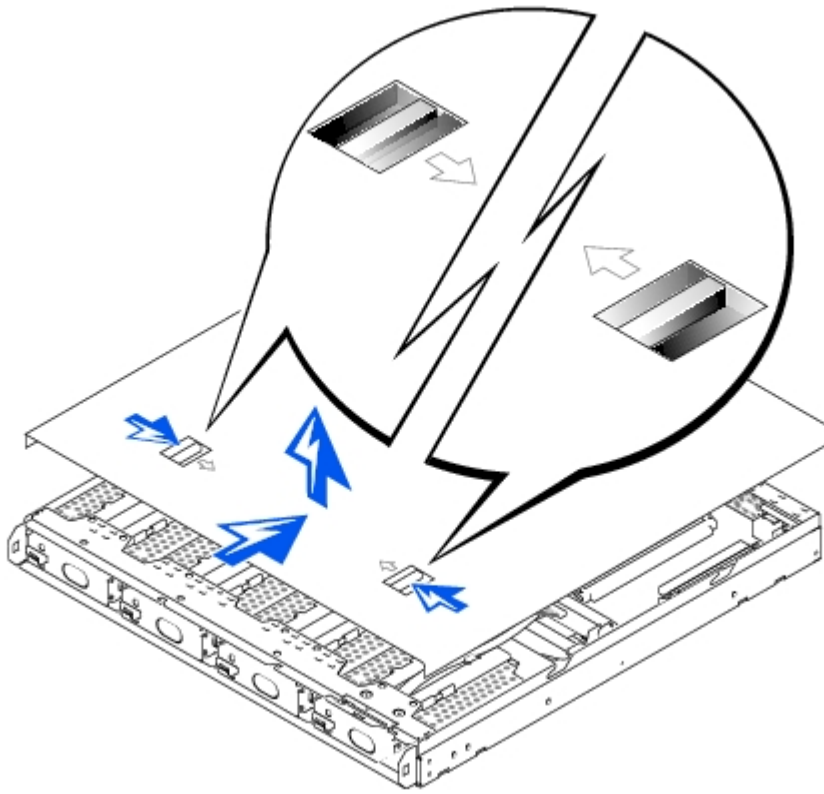
Support Brackets

The system comes with plastic brackets that you can clip to the sides (see Figure 1-5). Use this option if you do not plan to install the system in a rack. You can also use the brackets to stack systems on top of each other. If you are installing the system in a rack, see your *Rack Installation Guide.*

Figure 1-5. Support Brackets
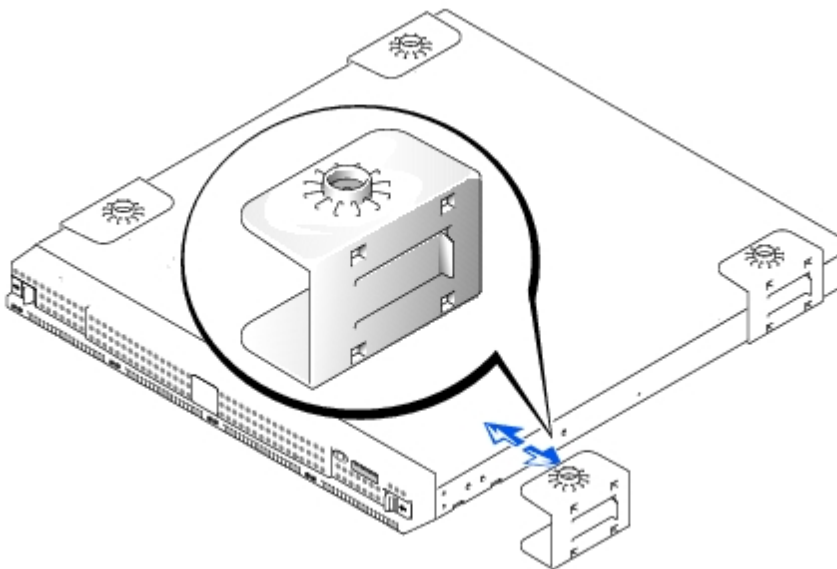
System Features

Your system includes the following features:

- 1-U chassis

- Intel® microprocessor

- Two 64-bit dual in-line memory module (DIMM) slots, each supporting at least 128 megabytes (MB) of synchronous dynamic random-access memory (SDRAM)

- Four IDE hard drives connected to four IDE master channels in a software RAID configuration

- 162-watt power supply

- System cooling fan and two power-supply cooling fans

- Serial port used for console redirection

- Two Intel 10/100 network interface controllers (NICs) with RJ-45 Ethernet ports

- One 32-bit, 33 MHz low-profile peripheral component interconnect (PCI) slot

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Software Features

The following software is included with your Dell system:

- Microsoft® Windows® Powered operating system with Service Pack 2.

- Microsoft Server Appliance (SA) kit.

- Services for UNIX®, Novell® NetWare®, and Macintosh (integrated on the Microsoft Windows Powered operating system).

- Protocol support for TCP/IP, DHCP (client support), DNS (client support), NIS (client support), IPX, IPV6.

- First Time Configuration support through DHCP, Dell OpenManage™ Kick-Start, or RAS serial connection (setup through serial connection in non-DHCP environments).

- Disk management through Dell OpenManage Array Manager.

- Network backup support for VERITAS™ Backup Exec™ version 8.5 or later and Computer Associates® ARCserve® 2000.

- Local backup support for VERITAS Backup Exec version 8.5 or later and Windows NT®/2000 Backup.

- Dell ActiveArchive™ snapshot software.

- A BIOS Setup utility for quickly viewing and changing the system configuration information. For more information about this program, see "Using the BIOS Setup Utility."

- Diagnostics for evaluating your system's components and devices. For information about using the system diagnostics, see your *Installation and Troubleshooting Guide.*

Options at Boot Time

Normally, the system boots fully on its own with no intervention. However, if you want to update or make changes to the BIOS, run diagnostics, or reinstall the system image, use the **Function Select** menu. To access the **Function Select** menu, you must connect a client system to the appliance through console redirection. See the *Administrator's Guide* for information about console redirection. When the appliance boots, press <F2> (or <Esc><2> if running Windows 2000 prior to Service Pack 2) when the screen displays the following message:

```
Press F2 to enter the Function Select Menu
```

The following options are available:

- **Normal Boot** — sets the system to boot from disks 0 and 1, which is the default.

- **Recovery Boot** — boots the system from Disks 2 and 3. The disks contain a mirrored operating system image with preinstalled default settings. The restored image uses the default settings as they were when you received your system. See your *Administrator's Guide* for more information about how to perform a recovery boot.

- **Reinstallation** — enables the appliance to boot from the appliance's reinstallation console, which is installed on the client system. This operation can destroy all operating system data on your system. To perform this type of recovery, use a crossover cable and null modem serial cable to connect directly to the system that is not on the

network. See your *System Administrator's Guide* for information about this type of reinstallation.

- **System Diagnostics** — runs the System Diagnostics program. See your *Installation and Troubleshooting Guide* for information about system diagnostics.

- **Update BIOS Flash ROM** — updates the BIOS on your system. See "Updating the BIOS" in "Features and Other Information" for information about updating the BIOS.

- **Enter BIOS Setup Utility** — starts the BIOS Setup utility, which enables you to change system settings. See "BIOS Setup Options" for information about using the BIOS Setup utility.

- **Exit** — exits the **Function Select** menu and resumes the normal boot process.

Power Protection Devices

Devices are available that protect against power problems such as power surges, transients, and power failures. The following subsections describe some of the devices.

Surge Protectors

Surge protectors are available in a variety of types and usually provide a level of protection commensurate with the cost of the device. Surge protectors prevent voltage spikes, such as those caused during an electrical storm, from entering a system through the electrical outlet. Surge protectors, however, do not offer protection against brownouts, which occur when the voltage drops more than 20 percent below the normal AC line voltage level.

Line Conditioners

Line conditioners go beyond the overvoltage protection of surge protectors. Line conditioners keep a system's AC power source voltage at a fairly constant level and, therefore, can handle brownouts. Because of this added protection, line conditioners cost more than surge protectors—up to several hundred dollars. However, the devices cannot protect against a complete loss of power.

Uninterruptible Power Supplies

UPS systems offer the most complete protection against variations in power because they use battery power to keep the system running when AC power is lost. The battery is charged by the AC power while it is available, so once AC power is lost, the battery can provide power to the system for a limited amount of time—from 15 minutes to an hour or so—depending on the UPS system.

UPS systems range in price from a few hundred dollars to several thousand dollars, with the more expensive units allowing you to run larger systems for a longer period of time when AC power is lost. UPS systems that provide only 5 minutes of battery power allow you to conduct an orderly shutdown of the system, but they are not intended to provide continued operation. Surge protectors should be used with all UPS systems, and the UPS system should be Underwriters Laboratories (UL) safety-approved.

Other Documents You Might Need

In addition to this *User's Guide*, the following documentation is included with your system:

- The system *Installation and Troubleshooting Guide* provides information about installing and troubleshooting your system.

- The *System Administrator's Guide* provides system operation and management information.

- Dell PowerVault NAS Manager online help.

- The *System Information* document provides important safety, regulatory, and warranty information.

- The *Rack Installation Guide* provides information for installing the system in a rack.

- Microsoft Windows Powered help.

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

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

When you purchase options separately from your system, you typically receive the documentation that you need to configure and install the options in your Dell system.

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

Getting Help

If at any time you do not understand a procedure described in this guide or if your system does not perform as expected, Dell provides tools to help you. For more information about the help tools, see "Getting Help" in your *Installation and Troubleshooting Guide*.

Using the BIOS Setup Utility

Dell™ PowerVault™ 715N Systems User's Guide

- [Entering the BIOS Setup Utility](#)
- [BIOS Setup Options](#)
- [Updating the BIOS](#)
- [Disabling a Forgotten Password](#)

You can use the BIOS Setup utility as follows:

- To change the system configuration information after you add, change, or remove any hardware in your system

- To set or change user-selectable options—for example, the time or date on your system

- To enable or disable all integrated devices in your system

After you set up your system, run the BIOS Setup utility to become familiar with your system configuration information and optional settings. Dell recommends that you record the information for future reference.

> ✎ **NOTE:** To use the BIOS Setup utility, you must use the console redirection function on the serial port. See "Entering the BIOS Setup Utility" for information about connecting to the system through console redirection.

Entering the BIOS Setup Utility

To enter the BIOS Setup utility, perform the following steps:

1. Using a null modem serial cable, connect the client system to the appliance.

2. Turn on the client system and set up a Hyperterminal connection.

   a. Click the **Start** button and point to **Programs—>Accessories—>Hyperterminal—>Hyperterminal**.

   b. Select **115200** for the **Bits per second**, **8** for **Data Bits**, **None** for **Parity**, **1** for **Stop Bits**, and **Xon\Xoff** for **Flow control**.

3. Restart the appliance.

4. Press <F2> immediately after you see the following message:

   ```
   Press <F2> to enter the Function Select menu
   ```

   > ✎ **NOTE:** If you use a version of Microsoft® Windows® 2000 earlier than Service Pack 2, the function keys do not work. You must press <Esc><2>.

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

5. When the **Function Select** menu appears, press **6** to run the BIOS Setup utility.

Responding to Error Messages

If an error message appears on your screen while the system is booting, make a note of the message. Next, before entering the BIOS Setup utility, see "System Beep Codes" and "System Messages" in your *Installation and Troubleshooting Guide* for an explanation of the message and suggestions for correcting any errors.

Navigating the BIOS Setup Utility

lists the basic keys used to view or change information in the screens and to exit the program. The keys used to navigate screens in the appliance differ, depending on the version of the operating system installed on your console redirection client system.

Because of ANSI limitations, not all keys can be used with console redirection. shows keystroke combinations used for the version of Windows on your client system.

Table 2-1. BIOS Setup Navigation Keys (Normal Operation)

Keys	Action
Down arrow	Moves to the next field.
Up arrow	Moves to the previous field.
Space bar	Cycles through the settings in a field. In many fields, you can also type the appropriate value.
<Esc>	Exits the BIOS Setup utility and reboots the system if any changes were made. For most of the options, any changes you make are recorded but do not take effect until the next time you boot the system. For some options (as noted in the Help area), the changes take effect immediately.

Table 2-2. Console Redirection Keys

Normal Keys (As They Appear on the Keyboard)	Keys Used for Windows 2000 Prior to Service Pack 2	Keys Used for All Other Windows Operating Systems
Home	<Esc><h>	<Esc><h>
End	<Esc><k>	<Esc><k>
Insert	<Esc><+>	<Esc><+>
Delete	<Esc><->	<Esc><->
Page Up	< Esc><?>	<Page Up>
Page Down	<Esc></>	<Page Down>
F1	<Esc><1>	<F1>
F2	<Esc><2>	<F2>
F3	<Esc><3>	<F3>
F4	<Esc><4>	<F4>
F5	<Esc><5>	<Esc><5>
F6	<Esc><6>	<Esc><6>
F7	<Esc><7>	<Esc><7>
F8	<Esc><8>	<Esc><8>
F9	<Esc><9>	<Esc><9>
F10	<Esc><0>	<Esc><0>
F11	<Esc><!>	<Esc><!>
F12	<Esc><@>	<Esc><@>
Up arrow	<Esc><w>	Up arrow
Right arrow	<Esc><a>	Right arrow
Left arrow	<Esc><d>	Left arrow
Down arrow	<Esc><x>	Down arrow
<Ctrl><Alt><Delete>	<Esc><Shift><r> <Esc><r> <Esc><Shift><r> OR <Esc><Shift><b>	<Esc><Shift><r> <Esc><r> <Esc><Shift><r> OR <Esc><Shift><b>

BIOS Setup Options

This section provides information about using the BIOS Setup utility to change the default settings on your system.

Main Screen

When the BIOS Setup utility starts, the main program screen appears. The following options or information fields appear on the main **BIOS Setup** screen.

- **Standard CMOS Setup** — sets basic information, such as the date and time, the IDE devices, and the diskette drives.

- **Advanced CMOS Setup** — enables you to make some changes to the basic operation of the system, such as primary and secondary boot device and password check.

- **Advanced Chipset Setup** — enables you to make advanced changes to SDRAM, DRAM, and memory size.

- **Power Management Setup** — sets parameters for power management operation.

- **PCI/Plug and Play Setup** — sets how the system handles plug-and-play devices and PCI bus devices.

- **Peripheral Setup** — sets parameters for peripheral items on the system.

- **Hardware Monitor Setup** — sets hardware monitoring parameters so that the system can warn you when critical parameters are exceeded. You can also view your system's asset tag on this screen.

- **Change Supervisor Password** — enables you to set a supervisor password. See "Updating the BIOS" for more information.

- **Auto Configuration with Default Settings** — automatically assigns the optimal setting for all items in the BIOS Setup utility.

- **Save Settings and Exit** — saves any changes that you made in the BIOS Setup utility and exits.

- **Exit Without Saving** — exits the BIOS Setup utility and does not save any changes you made.

Standard CMOS Setup Screen

Use this screen to view and set basic information, such as date, time, and primary or secondary drives.

- **Date and Time** — sets the correct date and time for the system.

- **Primary/Secondary Master/Slave** — displays the characteristics of IDE 0 and IDE 1, which are the first two drives of the system. The system automatically detects most modern hard disks using the **Auto-Detect Hard Disks** option from the main menu. See "Advanced CMOS Setup Screen," found later in this section, for information about how this feature works.

  If the system does not automatically detect a drive, find a preset type from 1 through 46 that matches your hard drive. If a preset does not exist, set the type to **User** and enter the characteristics of the drive in the specified columns.

- **Boot Sector Virus Protection** — provides protection against viruses that attack the boot sector of a hard drive.

- **Base/Extd Memory** — displays the total amount of base and extended memory on your system. The fields are display only.

Advanced CMOS Setup Screen

Use this screen to make changes to the basic operation of your system.

- Clear DMI event logs — when set to Yes, clears the DMI event log, which is a log of system events.

- Event Logging — enables the DMI event log.

- **Mark DMI events as read** — marks the events as read after you open them in the event log.

- Memory Test — when enabled, verifies the amount of memory on your system when you boot.

- **1st/2nd/3rd/4th Boot Device** — determines where and in which order the system looks for a bootable operating system each time it is started.

Advanced Chipset Setup

Use this screen to make changes to the system's memory settings.

- **DRAM Integrity Mode** — when enabled, allows BIOS to perform a parity/ECC check to the POST memory tests.

Power Management Setup

Use this page to set parameters for system power management operation.

- **Power Management/APM** — allows operating systems that have advanced power management (APM) to control some of the power management operations on the system.

- **System Thermal** — when enabled, the system shuts down after exceeding the Thermal Active Temperature threshold of 75°C or 167°F.

- **Thermal Active Temperature** — the temperature at which the system automatically shuts down if **System Thermal** is enabled. This field is display only.

- **Restore on AC/Power Loss** — sets the power state after a shutdown caused by an unexpected interruption of AC power. When the value is set to **ON**, the system turns back on. If the value is set to **OFF**, the system remains off after the power interruption. If the value is set to **KEEP LAST**, the system returns to the last power state.

PCI/Plug and Play Setup

Use this screen to set how the system handles plug-and-play devices and PCI bus devices.

- **Clear NVRAM** — when set to Yes, this option removes information in the Non-Volatile Random Access Memory (NVRAM) about the configuration of plug-and-play devices. The system creates new configuration information the next time you boot.

- **PCI Latency Timer (PCI Clocks)** — allows the chipset to use an embedded, 32-bit posted write buffer to support timed delay transaction cycles.

Peripheral Setup

Use this screen to set parameters for peripheral items on the system.

- **Onboard Serial Port 1 and Serial Port 2** — disables the serial ports or assigns a port address and name to the ports. Dell recommends that you set the items to Auto so the system can dynamically assign port addresses and names.

- **Onboard IDE** — enables or disables the primary and secondary IDE channels installed on the system board.

- **Console Redirect** — enables and selects the serial port for console redirection. Use **C.R. Baud Rate** to set a specific baud rate for the serial port and use **C.R. Mode** to assign the console redirection function working only on POST or runtime mode.

> **NOTE:** Console redirection is enabled by default. However, if you disable it in the BIOS Setup utility, you can re-enable it only by pressing the console redirection button on the system board. See your Installation and Troubleshooting Guide for information about enabling console redirection.

Hardware Monitor Setup

This screen, which is display only, shows the hardware monitoring parameters and the system's asset tag and service tag number. The system warns you when the monitoring parameters are exceeded.

Change Supervisor Password

Use this screen to set a supervisor password for the BIOS Setup utility. A supervisor has access to all features in the BIOS Setup utility.

> ![note icon] **NOTE:** The system password is disabled by default. Because the password is required to enter the BIOS Setup utility, do not enable it unless security is a concern.

To change a supervisor password, perform the following steps:

1. Highlight **Change Supervisor Password** and press <Enter>.

2. Enter a password in the dialog box that appears.

   You can enter no more than six letters or numbers.

3. Press <Enter>.

4. To confirm, enter the password again in the dialog box that appears.

5. Press <Enter>.

   The password is required at boot time or when the user enters the BIOS Setup utility.

Auto Configuration With Default Settings

To install default settings for all features in the BIOS Setup utility, highlight this menu item and press <Enter>. When asked if you want to install default settings for all the items in the BIOS Setup utility, press <Y> and then press <Enter> to install the settings.

Save Settings and Exit

Highlight this item and press <Enter> to save any changes that you have made in the BIOS Setup utility and exit. When asked if you want to save the changes, press <Y> to save the changes and exit, or press <N> to return to the main menu.

Exit Without Saving

Highlight this item and press <Enter> to discard any changes you made in the BIOS Setup utility and exit. When asked if you want to discard the changes, press <Y> to discard changes and exit, or press <N> to return to the main menu.

Updating the BIOS

You should occasionally see **http://support.dell.com** to check if an updated BIOS is available for your system.

To upgrade the BIOS, perform the following steps:

1. Download the most recent BIOS from **http://support.dell.com**.

2. Using a null modem serial cable, connect the client system to the appliance.

3. Turn on the client system and set up a Hyperterminal connection.

   a. Click the **Start** button and point to **Programs—>Accessories—>Hyperterminal —>Hyperterminal**.

   b. Select **115200** for the **Bits per second**, **8** for **Data Bits**, **None** for **Parity**, **1** for **Stop Bits**, and **Xon\Xoff** for **Flow control**.

4. Restart the appliance.

5. Press <F2> immediately after you see the following message:

```
Press <F2> to enter the Function Select menu
```

   > **NOTE:** If you use a version of Windows 2000 earlier than Service Pack 2, the function keys do not work. You must press <Esc><2>.

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

6. When the **Function Select** menu appears, press **5** to update the BIOS Flash ROM.

7. When a message appears asking if you want to update the BIOS, press <y>.

8. When the message Flash System BIOS appears in the **HyperTerminal** window, click **Transfer**, and then select **Send File**.

9. When the **Send File** dialog appears, click **Browse** and select the downloaded BIOS file.

10. Select **XModem** on the **Protocol** menu, and then click **Send**.

   The client system sends the file to the appliance and automatically updates the BIOS. The appliance beeps four times, and then reboots.

Disabling a Forgotten Password

If you forget your supervisor password, you cannot operate your system or change settings in the BIOS Setup utility until a trained service technician opens the system chassis, changes the password jumper setting to disable the password, and erases the existing password.

To disable the password, perform the following steps.

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

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

2. Remove the cover, and then remove the battery.

   See your *Installation and Troubleshooting Guide* for more information about removing the battery.

3. Move the jumper plug from jumpers 1-2 and move it to jumpers 2-3 for no less than 5 seconds.

   The jumpers are located next to the battery, with jumper 1 being closest to the battery and jumper 3 being the farthest from the battery.

4. Move the jumper plug back to jumpers 1-2.

5. Replace the battery and system cover.

6. Reconnect the appliance to an electrical outlet and to the client system.

7. Turn on the appliance.

   The appliance beeps twice to indicate that the password has been cleared.

8. If you want, enter a new supervisor password.

   For information about assigning a password, see "Change Supervisor Password."

Technical Specifications

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- Power
- Microprocessor
- Expansion Bus
- Memory
- Drives
- Ports and Connectors
- Physical
- Environmental

Microprocessor	
Microprocessor type	Intel® microprocessor

Expansion Bus	
Bus type	PCI
Expansion slot	One 32-bit, 33-MHz slot

Memory	
Architecture	ECC PC-133 SDRAM, 2-to-1 interleaved
Memory module sockets	two DIMM sockets
Memory module capacities	at least 128-MB registered SDRAM DIMMs
Minimum RAM	256 MB

Drives	
IDE drives	Four 1-inch, internal hard drives, each with capacities of no less than 40 GB

Ports and Connectors	
Externally accessible:	
Serial	one 9-pin connectors; UART 6550-compatible
NIC	Two RJ-45 connectors for integrated 10/100 NIC

Power	
DC power supply	
Wattage	162 usable watts
Voltage	100 - 240V, 47- 63 Hz
System battery	3V lithium ion coin cell

Physical	
Height	4.2 cm (1.6 inches)
Width	42.5 cm (16.7 inches)
Depth	46.3 cm (18.2 inches)
Weight	9.5 kg (21 pounds)

| Environmental	
Temperature:	
Operating	10° to 35° C (50° F to 95° F) at 10,000 feet above sea level 10° to 40° C (50° F to 104° F) at sea level
Storage	-40° to 65° C (104° F to 149° F)
Relative Humidity	
Operating	20% to 80% (non-condensing)
Storage	5% to 95% (non-condensing)
NOTE: For the full name of an abbreviation or acronym used in this table, see the Glossary.	

I/O Ports and Connectors
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- Serial Port
- Integrated NIC Connector

The I/O ports and connectors on the back panel of the system are the gateways through which the system communicates with the network. Figure B-1 identifies the I/O ports and connectors for your appliance.

Figure B-1. I/O Ports and Connectors
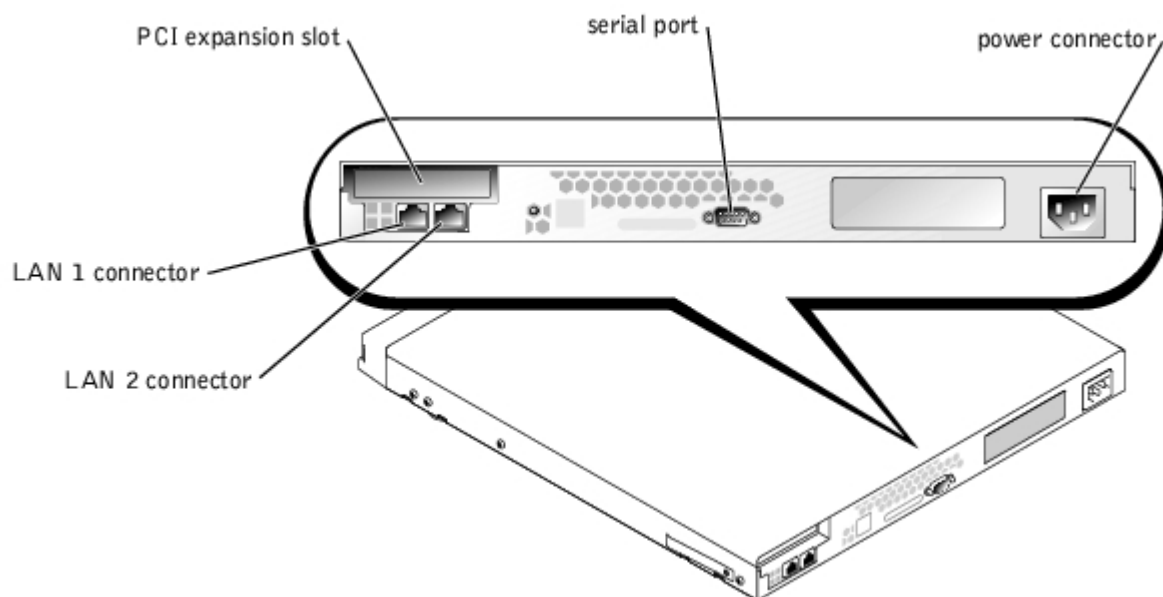
Serial Port

The serial port uses nine-pin D-subminiature connectors on the back panel. Most software uses the term COM (for communications) and a number to designate a serial port (for example, COM1).

Use COM1 to connect to a server for console redirection or RAS connection. For more information about console redirection and RAS, see your *System Administrator's Guide*.

Serial Port Connector

If you reconfigure your hardware, you might need pin number and signal information for the serial port connectors. Figure B-2 illustrates the pin numbers for the serial port connectors, and Table B-1 defines the pin assignments and interface signals for the serial port connector.

Figure B-2. Pin Numbers for the Serial Port Connector

Table B-1. Pin Numbers for the Serial Port Connectors

Pin	Signal	I/O	Definition
1	DCD	I	Data carrier detect
2	SIN	I	Serial input
3	SOUT	O	Serial output
4	DTR	O	Data terminal ready
5	GND	N/A	Signal ground
6	DSR	I	Data set ready
7	RTS	O	Request to send
8	CTS	I	Clear to send
9	RI	I	Ring indicator
Shell	N/A	N/A	Chassis ground

Integrated NIC Connector

Your system has two integrated 10/100–megabit-per-second (Mbps) NIC. The NIC provides all the functions of a separate network expansion card and supports both the 10BASE-T and 100BASE-TX Ethernet standards.

Network Cable Requirements

Your system's RJ-45 NIC connector is designed for attaching an unshielded twisted pair (UTP) Ethernet cable equipped with standard RJ-45-compatible plugs. Press one end of the UTP cable into the NIC connector until the plug snaps securely into place. Connect the other end of the cable to an RJ-45 jack wall plate or an RJ-45 port on a UTP concentrator or hub, depending on your network configuration. Observe the following cabling restrictions for 10BASE-T and 100BASE-TX networks.

⊖ **NOTICE:** To avoid line interference, voice and data lines must be in separate sheaths.

- For 10BASE-T networks, use Category 5 or greater wiring and connectors.

- For 100BASE-TX networks, use Category 5 or greater wiring and connectors.

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

- For 10BASE-T networks, the maximum number of daisy-chained concentrators on one network segment is four.

Glossary

Dell™ PowerVault™ 715N Systems User's Guide

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

A

Abbreviation for ampere(s).

AC

Abbreviation for alternating current.

adapter card

An expansion card that plugs into an expansion-card connector on the system board. An adapter card adds some specialized function to the system by providing an interface between the expansion bus and a peripheral device. Examples of adapter cards include network cards, sound cards, and SCSI adapters.

asset tag code

An individual code assigned to a system, usually by a system administrator, for security or tracking purposes.

backup

A copy of a program or data file. As a precaution, you should back up your system's hard drive on a regular basis. Before making a change to the configuration of your system, you should back up important startup files from your operating system.

BIOS

Acronym for basic input/output system. Your system's BIOS contains programs stored on a flash memory chip. The BIOS controls the following:

- Communications between the microprocessor and peripheral devices, such as the keyboard and the video adapter

- Miscellaneous functions, such as system messages

bit

The smallest unit of information interpreted by your system.

boot routine

When you start your system, it clears all memory, initializes devices, and loads the operating system. Unless the operating system fails to respond, you can reboot (also called **warm boot**) your system by pressing <Ctrl><Alt><Delete>; otherwise, you must perform a cold boot by pressing the reset button or by turning the system off, and then back on.

bps

Abbreviation for bits per second.

bus

An information pathway between the components of a system. Your system contains an expansion bus that allows the microprocessor to communicate with controllers for all the various peripheral devices connected to the system. Your system also contains an address bus and a data bus for communications between the microprocessor and RAM.

byte

Eight contiguous bits of information, the basic data unit used by your system.

C

Abbreviation for Celsius.

cache

A fast storage area that keeps a copy of data or instructions for quicker data retrieval. For example, your system's BIOS may cache ROM code in faster RAM, or a disk-cache utility may reserve RAM in which to store frequently accessed information from your system's disk drives; when a program makes a request to a drive for data that is in the cache, the disk-cache utility can retrieve the data from RAM faster than from the hard drive.

COMn

The device names for the first through fourth serial ports on your system are COM1, COM2, COM3, and COM4. The default interrupt for COM1 and COM3 is IRQ4, and the default interrupt for COM2 and COM4 is IRQ3. Therefore, you must be careful when configuring software that runs a serial device so that you do not create an interrupt conflict.

controller

A chip that controls the transfer of data between the microprocessor and memory or between the micro-processor and a peripheral device such as a hard drive or the keyboard.

control panel

The part of the system that contains indicators and controls, such as the power switch, hard drive access indicator, and power indicator.

conventional memory

The first 640 KB of RAM. Conventional memory is found in all systems. Unless they are specially designed, MS-DOS® programs are limited to running in conventional memory.

coprocessor

A chip that relieves the system's microprocessor of specific processing tasks. A math coprocessor, for example, handles numeric processing. A graphics coprocessor handles video rendering. The Intel® Pentium® microprocessor, for example, includes a built-in math coprocessor.

CM

Abbreviation for centimeter.

CPU

Abbreviation for central processing unit. See microprocessor.

DC

Abbreviation for direct current.

Diagnostics

A comprehensive set of diagnostic tests for your Dell system. You can run the diagnostics from either the utility partition on your hard drive or from a set of diskettes that you create from the *Resource* CD. See your *Installation and Troubleshooting Guide* for more information about using the system diagnostics.

device driver

A program that allows the operating system or some other program to interface correctly with a peripheral device, such as a printer. Some device drivers, such as network drivers, must be loaded from the **config.sys** file (with a device= statement) or as memory-resident programs (usually, from the **autoexec.bat** file). Others—such as video drivers—must load when you start the program for which they were designed.

DIMM

Acronym for dual in-line memory module. A small circuit board containing DRAM chips that connects to the system board.

DIN

Acronym for *Deutsche Industrie Norm*.

directory

Directories help keep related files organized on a disk in a hierarchical, "inverted tree" structure. Each disk has a "root" directory; for example, a C:\> prompt normally indicates that you are at the root directory of hard drive C. Additional directories that branch off of the root directory are called *subdirectories*. Subdirectories may contain additional directories branching off of them.

DMA

Abbreviation for direct memory access. A DMA channel allows certain types of data transfer between RAM and a device to bypass the microprocessor.

DRAM

Abbreviation for dynamic random-access memory. A system's RAM is usually made up entirely of DRAM chips. Because DRAM chips cannot store an electrical charge indefinitely, your system continually refreshes each DRAM microprocessor in the system.

drive-type number

Your system can recognize a number of specific hard drives. Each is assigned a drive-type number that is stored in SDRAM. The hard drive(s) specified in your system's System Setup program must match the actual drive(s) installed in the system. The System Setup program also allows you to specify physical parameters (logical cylinders, logical heads, cylinder number, and logical sectors per pack) for drives not included in the table of drive types stored in SDRAM.

ECC

Abbreviation for error checking and correction.

EEPROM

Acronym for electrically erasable programmable read-only memory.

EMC

Abbreviation for electromagnetic compatibility.

EMI

Abbreviation for electromagnetic interference.

expansion bus

Your system contains an expansion bus that allows the microprocessor to communicate with controllers for peripheral devices, such as a network card or an internal modem.

expansion-card connector

A connector on the system board or riser board for plugging in an expansion card.

extended memory

RAM above 1 MB. Most software that can use it, such as the Windows operating system, requires that extended memory be under the control of an XMM.

F

Abbreviation for fahrenheit.

format

To prepare a hard drive or diskette for storing files. An unconditional format deletes all data stored on the disk.

ft

Abbreviation for feet.

g

Abbreviation for gram(s).

GB

Abbreviation for gigabyte(s). A gigabyte equals 1,024 megabytes or 1,073,741,824 bytes.

host adapter

A host adapter implements communication between the system's bus and the controller for a peripheral device. (Hard drive controller subsystems include integrated host adapter circuitry.) To add a SCSI expansion bus to your system, you must install or connect the appropriate host adapter.

Hz

Abbreviation for hertz.

I/O

Abbreviation for input/output. The keyboard is an input device, and a printer is an output device. In general, I/O activity can be differentiated from computational activity.

For example, when a program sends a document to the printer, it is engaging in output activity; when the program sorts a list of terms, it is engaging in computational activity.

ID

Abbreviation for identification.

internal microprocessor cache

An instruction and data cache built in to the microprocessor. The Intel Pentium microprocessor includes a 16-KB internal

cache, which is set up as an 8-KB read-only instruction cache and an 8-KB read/write data cache.

IRQ

Abbreviation for interrupt request. A signal that data is about to be sent to or received by a peripheral device travels by an IRQ line to the microprocessor. Each peripheral connection must be assigned an IRQ number. For example, the first serial port in your system (COM1) is assigned to IRQ4 by default. Two devices can share the same IRQ assignment, but you cannot operate both devices simultaneously.

ISA

Acronym for Industry-Standard Architecture. A 16-bit expansion bus design. The expansion-card connectors in an ISA system are also compatible with 8-bit ISA expansion cards.

KB

Abbreviation for kilobyte(s), 1,024 bytes.

Kbit(s)

Abbreviation for kilobit(s), 1,024 bits.

key combination

A command requiring you to press multiple keys at the same time. For example, you can reboot your system by pressing the <Ctrl><Alt><Delete> key combination.

kg

Abbreviation for kilogram(s), 1,000 grams.

kHz

Abbreviation for kilohertz, 1,000 hertz.

lb

Abbreviation for pound(s).

LED

Abbreviation for light-emitting diode. An electronic device that lights up when a current is passed through it.

local bus

On a system with local-bus expansion capability, certain peripheral devices (such as the video adapter circuitry) can be designed to run much faster than they would with a traditional expansion bus. Some local-bus designs allow peripherals to run at the same speed and with the same width data path as the system's microprocessor.

m

Abbreviation for meter(s).

Mb

Abbreviation for megabit.

MB

Abbreviation for megabyte(s). The term *megabyte* means 1,048,576 bytes; however, when referring to hard drive storage, the term is often rounded to mean 1,000,000 bytes.

MB/sec

Abbreviation for megabytes per second.

Mbps

Abbreviation for megabits per second.

memory

A system can contain several different forms of memory, such as RAM, ROM, and video memory. Frequently, the word "memory" is used as a synonym for RAM; for example, an unqualified statement such as "a system with 16 MB of memory" refers to a system with 16 MB of RAM.

memory module

A small circuit board containing DRAM chips that connects to the system board.

MHz

Abbreviation for megahertz.

microprocessor

The primary computational chip inside the system that controls the interpretation and execution of arithmetic and logic functions. Software written for one microprocessor must usually be revised to run on another microprocessor. *CPU* is a synonym for microprocessor.

mm

Abbreviation for millimeter(s).

mouse

A pointing device that controls the movement of the cursor on a screen. Mouse-aware software allows you to activate commands by clicking a mouse button while pointing at objects displayed on the screen.

MS-DOS

Abbreviation for Microsoft Disk Operating System.

NAS

Abbreviation for network attached storage.

NIC

Acronym for network interface controller.

NVRAM

Abbreviation for nonvolatile random-access memory. Memory that does not lose its contents when you turn off your system. NVRAM is used for maintaining the date, time, and system configuration information.

parallel port

An I/O port used most often to connect a parallel printer to your system. You can usually identify a parallel port on your system by its 25-hole connector.

PCI

Abbreviation for Peripheral Component Interconnect. A standard for local-bus implementation developed by Intel Corporation.

peripheral device

An internal or external device—such as a printer, a hard drive, or a keyboard—connected to a system.

POST

Acronym for power-on self-test. Before the operating system loads when you turn on your system, the POST tests various system components such as RAM, the hard drives, and the keyboard.

RAID

Acronym for redundant arrays of independent disks. This phrase was introduced by David Patterson, Garth Gibson, and Randy Katz at the University of California at Berkeley in 1987. The goal of RAID is to use multiple small, inexpensive disk drives to provide high storage capacity and performance while maintaining or improving the reliability of the disk subsystem.

Patterson, Gibson, and Katz described five different methods, which are known as RAID levels 1 through 5. Each level uses one or more extra drives to provide a means of recovering data lost when a disk fails, so that the effective failure rate of the whole disk subsystem becomes very low.

RAID 0

RAID 0 is commonly called striping. This was not originally defined as a RAID level but has since come into popular use. In this array configuration, data is written sequentially across the available disks and no redundancy is provided. RAID 0 configurations provide very high performance but relatively low reliability. RAID 0 is the best choice when controller cards are duplexed. See striping.

RAID 1

RAID 1 is commonly called mirroring. RAID 1 also uses striping, so RAID 1 may be regarded as the mirroring of RAID 0 configurations. RAID 1 is the best choice in high-availability applications that require high performance or relatively low data capacity. See mirroring, RAID 10, striping.

RAID 4

RAID 4 is commonly called guarding. It uses data striping, like RAID 0, but adds a single, dedicated parity drive. The parity data stored on this drive can be used to recover data lost from a single failed drive. RAID 4 configurations write data slowly because parity data has to be generated and written to the parity drive, and the generation of the parity data frequently requires reading data from multiple physical drives. See guarding and striping.

RAID 5

RAID 5, like RAID 4, is commonly called guarding. RAID 5 is identical to RAID 4, except that the parity data is distributed evenly across all physical drives instead of a parity drive. In configurations using a large number of physical drives in which a large number of simultaneous small write operations are being performed, RAID 5 offers potentially higher performance than RAID 4. RAID 4 and RAID 5 configurations are appropriate in high-availability applications where performance is less critical or where high-data capacity is required. See guarding.

RAID 10

RAID 10 is a mirroring technique in which data is duplicated across two identical RAID 0 arrays or hard drives. All data on a physical drive in one array is duplicated, or mirrored, on a drive in the second array. Mirroring offers complete redundancy of data for greater data security. See mirroring, RAID 1, and striping.

RAM

Acronym for random-access memory. The system's primary temporary storage area for program instructions and data. Each location in RAM is identified by a number called a **memory address**. Any information stored in RAM is lost when you turn off your system.

RAS

Abbreviation for remote access services.

readme file

A text file included with a software package or hardware product that contains information supplementing or updating the documentation for the software or hardware. Typically, readme files provide installation information, describe new product enhancements or corrections that have not yet been documented, and list known problems or other things you need to be aware of as you use the software or hardware.

ROM

Acronym for read-only memory. Your system contains some programs essential to its operation in ROM code. Unlike RAM, a ROM chip retains its contents even after you turn off your system. Examples of code in ROM include the program that initiates your system's boot routine and the POST.

rpm

Abbreviation for revolutions per minute.

SCSI

Acronym for small computer system interface. An I/O bus interface with faster data transmission rates than standard ports. You can connect up to seven devices (15 for some newer SCSI types) to one SCSI interface.

SDMS

Abbreviation for SCSI device management system.

SDRAM

Abbreviation for synchronous dynamic random-access memory.

sec

Abbreviation for second(s).

serial port

An I/O port used most often to connect a modem to your system. You can usually identify a serial port on your system by its 9-pin connector.

service tag number

A bar code label on the system that identifies it when you call Dell for customer or technical support.

SIMM

Acronym for single in-line memory module. A small circuit board containing DRAM chips that connects to the system board.

SMP

Abbreviation for symmetric multiprocessing.

SNMP

Abbreviation for Simple Network Management Protocol. SNMP is an industry-standard interface that allows a network manager to remotely monitor and manage workstations.

Striping

In composite drivers with two or more physical drives, the drive array subsystem uses a method of data storage called striping. With this method, data is divided into a series of pieces called blocks and each data block is stored on a different physical drive. When each drive contains a block of data, the process starts over with the first physical drive. When the size of the data block is carefully selected, the chance that the information needed can be read from or written to multiple physical drives at once is increased, greatly increasing the performance of the composite drive. See RAID.

system board

As the main circuit board, the system board usually contains most of your system's integral components, such as the following:

- Microprocessor

- RAM

- Controllers for standard peripheral devices, such as the keyboard

- Various ROM chips

Frequently used synonyms for system board are motherboard and logic board.

system configuration information

Data stored in memory that tells a system what hardware is installed and how the system should be configured for operation.

system memory

System memory is a synonym for RAM.

System Setup program

A BIOS-based program that allows you to configure your system's hardware and customize the system's operation by setting such features as password protection and energy management. Some options in the System Setup program require that you reboot the system (or the system may reboot automatically) in order to make a hardware configuration change. Because the System Setup program is stored in NVRAM, any settings remain in effect until you change them again.

system.ini file

A startup file for the Windows operating system. When you start Windows, it consults the **system.ini** file to determine a variety of options for the Windows operating environment.

Running the Control Panel or Windows Setup program might change options in the **system.ini** file. On other occasions, you might need to change or add options to the **system.ini** file manually with a text editor, such as Notepad.

UART

Abbreviation for universal asynchronous receiver-transmitter.

upper memory area

The 384 KB of RAM located between 640 KB and 1 MB. If the system has an Intel386 or higher microprocessor, a utility called a memory manager can create UMBs in the upper-memory area, in which you can load device drivers and memory-resident programs.

UPS

Abbreviation for uninterruptible power supply. A battery-powered unit that automatically supplies power to your system in the event of an electrical failure.

utility

A program used to manage system resources—memory, hard drives, or printers, for example.

V

Abbreviation for volt(s).

W

Abbreviation for watt(s).