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## **Preface**

This guide is intended for anyone who uses a Dell PowerEdge 350 system. The guide can be used by both first-time and experienced users who want to learn about the features and operation of their systems or who want to upgrade their systems. The sections are summarized as follows:

- Chapter 1, “Introduction” — Overview of system features, description of indicators on the front panel, and general discussion of connecting external devices to the system back panel
- Chapter 2, “Using the Dell OpenManage Server Assistant CD” — Overview on using the utilities and diagnostics
- Chapter 3, “Using the System Setup Program” — Overview of configuration changes to the system and password features
- Appendix A, “Technical Specifications” — Overview of technical specifications of PowerEdge 350 systems
- Appendix B, “I/O Ports and Connectors” — Overview of ports and connectors on the back panel of your system
- “Glossary” — Definitions of terms, acronyms, and abbreviations used in this guide

## **Warranty and Return Policy Information**

Dell Computer Corporation (“Dell”) manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. See your *Dell PowerEdge System Information* document for complete warranty information for your system.

## Other Documents You May Need

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

- The *Installation and Troubleshooting Guide* provides instructions for installing system hardware and includes troubleshooting and diagnostic procedures for testing your computer system.
- The *Dell PowerEdge System Information* document, which provides information about your system.

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

- Operating system documentation is included with the system if you ordered the operating system software from Dell. This documentation describes how to install (if necessary), configure, and use the operating system software.
- The rack installation documentation provides detailed instructions for installing the system in a rack.
- 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 Dell system.
- 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.
- 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.

## Typographical Conventions

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

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

Example: Click **OK**.

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

Example: <Enter>

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

Example: <Ctrl><Alt><Enter>

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

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

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

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

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

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

- *Syntax lines* consist of a command and all its possible parameters. Commands are presented in lowercase bold; variable parameters (those for which you substitute a value) are presented in lowercase italics; constant parameters are presented in lowercase bold. The brackets indicate items that are optional.

Example: **del** [*drive:*] [*path*] *filename* [**/p**]

- *Command lines* consist of a command and may include one or more of the command's possible parameters. Command lines are presented in the Courier New font.

Example: `del c:\myfile.doc`

- *Screen text* is a message or text that you are instructed to type as part of a command (referred to as a *command line*). Screen text is presented in the Courier New font.

Example: The following message appears on your screen:

`No boot device available`

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

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

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





# CHAPTER 1

## ***Introduction***

The Dell™ PowerEdge™ 350 system is an ultra-slim, rack-mounted server. This system is a full-featured system which provides a robust, reliable, rack-optimized platform on which both large and small customers can deploy Internet infrastructure applications.

This chapter describes the system's major hardware and software features, provides information about the indicators and controls on the system's front panel, and discusses connecting external devices.



*NOTE: The PowerEdge 350 system is a "headless" system that operates without keyboard, monitor or mouse. While it is possible to connect these peripherals to the system, it is generally not necessary unless troubleshooting the system.*

## ***System Features***

PowerEdge 350 systems contain the following major features:

- An Intel® Celeron™ microprocessor with 128 kilobytes (KB) of level 2 (L2) cache memory and a minimum operating speed of 600 megahertz (MHz).  
or  
An Intel Pentium® III microprocessor with 256 KB of L2 cache memory and an operating speed of 750 MHz.
- Up to 1 gigabyte (GB) of system memory.
- Two 1-inch integrated drive electronics (IDE) hard-disk drives.
- A single, 1.44-megabyte (MB) 3.5-inch diskette drive.
- An IDE CD-ROM drive.
- A video graphics array (VGA)-compatible video controller card.
- Two integrated Intel PRO/100+ network interface controllers (NICs), which provide two Ethernet interfaces.
- A Personal System/2 (PS/2)-style keyboard port and mouse port, two serial ports, and two Universal Serial Bus (USB) connectors.

- The System Setup program, which can be accessed at system boot for quickly viewing and changing the system configuration information for your system. For more information about the System Setup program, see Chapter 3, “Using the System Setup Program.”
- The Dell OpenManage™ software. For information on this software, see the software documentation provided with your system.
- Diagnostics for evaluating your system’s components and devices. For information on using the system diagnostics, see “Running the Dell Diagnostics” in your *Installation and Troubleshooting Guide*.

## Supported Operating Systems

Dell supports the following network operating systems for use on PowerEdge 350 systems:

- Microsoft® Windows® 2000 Server
- Microsoft Windows NT® Server 4.0
- Red Hat Linux 7.x



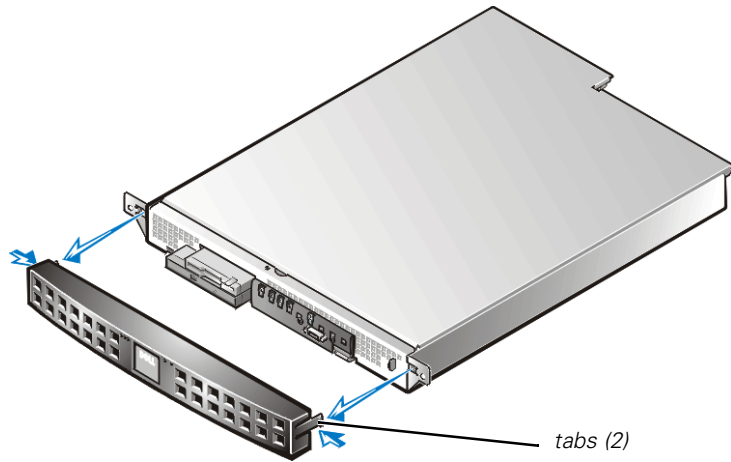
*NOTE: Installation service and support for other operating systems are available through DellPlus™. For more information, see “Getting Help” in your Installation and Troubleshooting Guide.*

## System Orientation

The front panel of your system contains switches, indicator lights, and diskette and CD-ROM drives. To view the front panel, you must remove the optional front bezel from the system.

### Removing the Optional Front Bezel

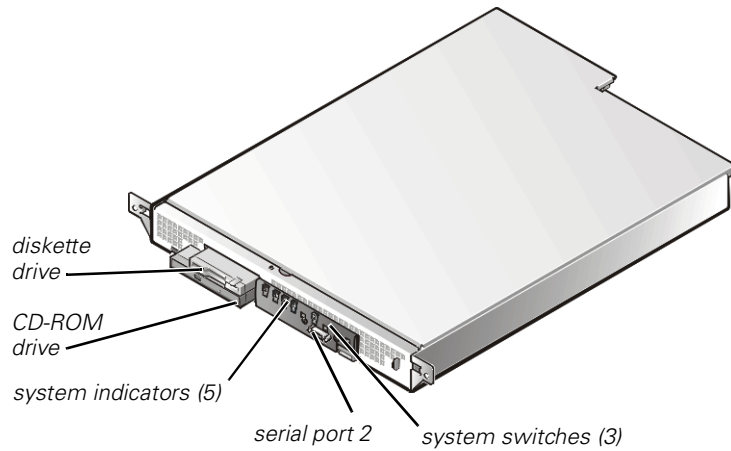
To remove the optional front bezel, press the tab on each end of the bezel and lift the bezel from the chassis (see Figure 1-1).



**Figure 1-1. Removing the Optional Front Bezel**

## **Front-Panel Features**

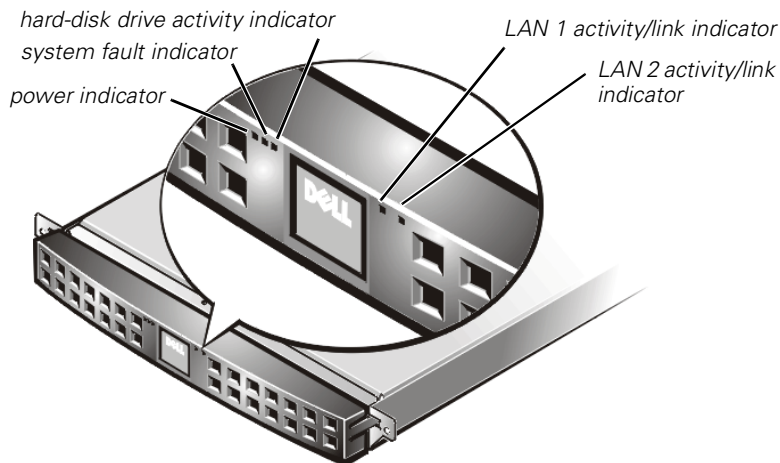
Figure 1-2 shows the main features on the system front panel.



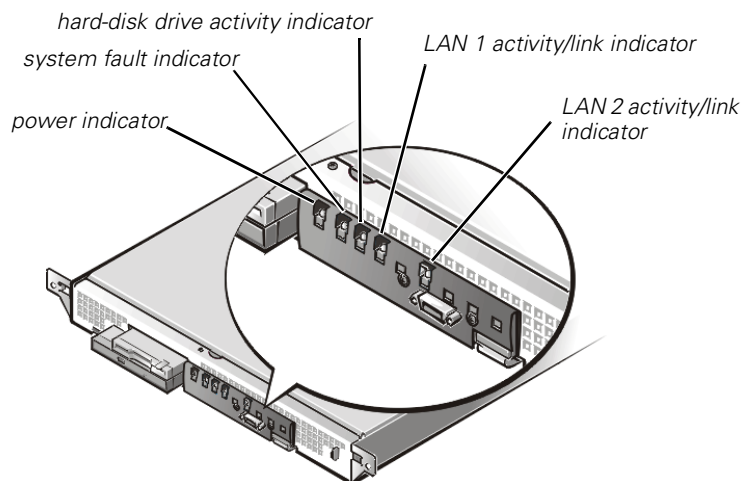
**Figure 1-2. Front-Panel Features**

## System Indicators

While troubleshooting your system, you may need to check the status of the indicators on the system's front panel, shown in Figure 1-3 and Figure 1-4.



**Figure 1-3. Front-Panel Indicators**



**Figure 1-4. Front-Panel Indicators (Bezel Removed)**

Table 1-1 describes the appearance and function of the front-panel indicators.

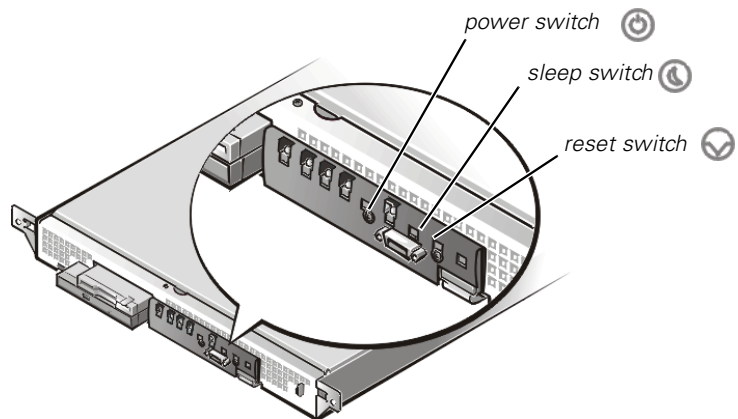
**Table 1-1. Front-Panel Indicators**

Indicator	Color	Function
Power	Green	Lights up when the system is connected to an AC power source; blinks when the system is in sleep mode
System fault	Amber	Blinks during system startup, or when a system fault is detected
Hard-disk drive activity	Green	Blinks when hard-disk drive activity occurs
LAN 1 activity/link	Amber	Lights up when the LAN 1 connector is linked to an Ethernet port; blinks when activity occurs on this channel
LAN 2 activity/link	Amber	Lights up when the LAN 2 connector is linked to an Ethernet port; blinks when activity occurs on this channel

### System Switches

Figure 1-5 shows the location of the three switches on the system front panel. To activate a switch, press the corresponding icon on the front panel as shown in Figure 1-5.

**NOTICE: To prevent accidental system lockup, system reset, or false error messages, do not press areas of the front panel other than the three switch locations shown in Figure 1-5. Reserved test switches are located in other areas of the front panel.**



**Figure 1-5. Front-Panel Switches**

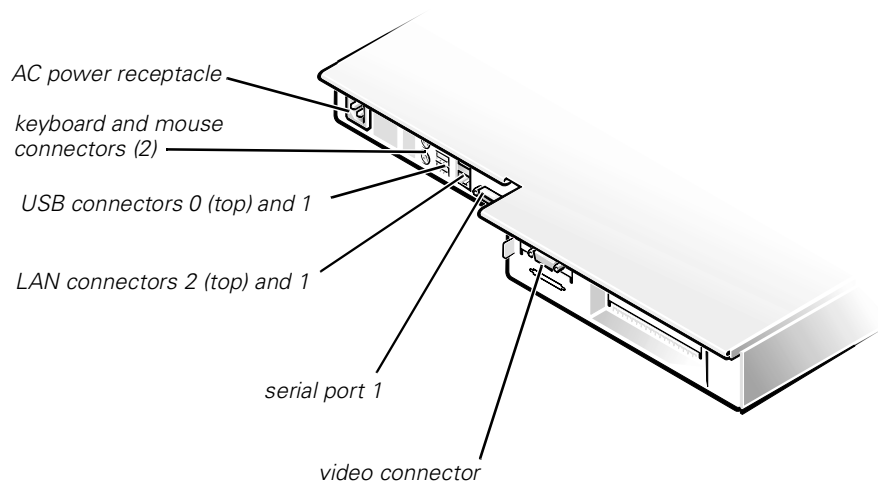
Table 1-2 describes the function of the three front-panel switches.

**Table 1-2. Front-Panel Switches**

Switch	Function
Power switch	Turns power to the system board on or off.  <i>NOTE: To turn system power off, press and hold this switch for at least 4 seconds.</i>
Sleep switch	Places the system in sleep mode.
Reset switch	Reboots the system. If the system locks up and you cannot shut down the system using the operating system, press the reset switch.

## Connecting External Devices

You can connect various external devices, such as a mouse or network connection, to the input/output (I/O) ports and connectors on the system's back panel. Figure 1-6 shows the back-panel connections on your system.



**Figure 1-6. Back-Panel Connections**

The system basic input/output system (BIOS) detects the presence of external devices when you boot or reboot your system. When you connect external devices to your system, follow these guidelines:

- Check the documentation that accompanied the device for specific installation and configuration instructions.
- Always attach external devices while your system is turned off. Turn on any external devices before turning on the system unless the documentation for the device specifies otherwise. (If the system does not seem to recognize the device, try turning on the system before turning on the device.)

## ***Power Protection Devices***

A number of devices are available that protect your system against power problems such as power surges, transients, and power failures. The following subsections describe some of these 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, these devices cannot protect against a complete loss of power.

### ***Uninterruptible Power Supplies***

Uninterruptible power supply (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 let you conduct an orderly shutdown of the system, but 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.

## **Getting Help**

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

## **Safety, Regulatory, and Warranty Information**

For safety, regulatory, and warranty information for your system, see the *System Information* document included with your system.



## CHAPTER 2

# ***Using the Dell OpenManage Server Assistant CD***

The *Dell OpenManage Server Assistant* CD contains utilities, diagnostics, drivers, and other items that can help you configure your system to best meet your needs. This chapter describes how to use the *Dell OpenManage Server Assistant* CD.

## ***Starting the Dell OpenManage Server Assistant CD***

The Dell OpenManage Server Assistant application program has two modes of operation: a *setup mode* for setting up and configuring your system, creating diskettes, and viewing information, and a *service mode* for creating diskettes and viewing information. Documentation is available on the *Dell Online Documentation* CD.

In both setup mode and service mode, the **Dell OpenManage Server Assistant** main screen gives you the option to choose one of the supported languages as the language for the screen text. You can choose a language at any time from the main screen.

### ***Setup Mode***

To set up your system, as well as to access the utilities, drivers, and other items available on the *Dell OpenManage Server Assistant* CD, insert the *Dell OpenManage Server Assistant* CD into your CD-ROM drive, and turn on or reboot the system. The **Dell OpenManage Server Assistant** main page appears.

If the CD does not boot, verify that the **Boot Sequence** is set to **CD-ROM device** in the System Setup program.

### ***Service Mode***

You can create system diskettes and view information on any system that has Microsoft Internet Explorer 4.0 (or later). When you insert the CD in a system that uses the Microsoft Windows NT or Windows 2000 Server operating system, the system automatically starts the browser software and displays the **Dell OpenManage Server Assistant** main page.

## Navigating the CD

The *Dell OpenManage Server Assistant* CD utilizes a standard Web browser interface. Navigating the CD is accomplished by clicking the mouse on the various icons and text hyperlinks.

Click the **Back** icon to return to the previous screen. Click the **Exit** icon to exit the program. Exiting the program causes the system to reboot to the standard operating system boot partition.

## Setting Up Your System

If you purchase a system that does not have an operating system preinstalled by Dell, or if you reinstall an operating system at a later date, you should use the **Server Setup** option to configure your system or install your operating system.

### Server Setup Mode

Dell recommends using the Server Setup program for most situations including installing and reinstalling an operating system. The *Dell OpenManage Server Assistant* CD guides you through the operating system setup and configuration process. The program prompts you to select the operating system used on the drive and leads you through a step-by-step process to install the operating system.

To start the Server Setup program, perform the following steps:

1. Click the **SETUP** icon at the top of the screen.
2. Click **Server Setup**.

After you start the Server Setup program, follow the directions on the screen to complete the installation and configuration process. The Server Setup program takes you through the following tasks:

- Configuring your redundant array of independent disks (RAID) controller (if applicable)
- Entering operating system and hard-disk drive information
- Entering operating system configuration
- Installing an operating system

## Running System Diagnostics

To run the system diagnostics you must create diagnostics diskettes from the *Dell OpenManage Server Assistant* CD. See the following subsection, "Creating Diagnostic Diskettes."

The system hardware diagnostics are described in "Running the Dell Diagnostics" in your *Installation and Troubleshooting Guide*.

## Creating Diagnostic Diskettes

To create diagnostic diskettes from the *Dell OpenManage Server Assistant* CD, select **Create Diskettes** from the **Dell OpenManage Server Assistant** menu and then continue down the menu hierarchy by selecting the following categories:

**PowerEdge 350, Diskette Set, System Utilities, Server Diagnostics.** Create five Server Diagnostics diskettes. To run the diagnostics, reboot your system with the first diskette you made.

## Creating an Asset Tag

Using Dell OpenManage IT Assistant, you can enter an asset tag number for your system. An asset tag number can have up to ten characters and any combination of characters, excluding spaces.

To create an asset tag number, perform the following steps:

1. From the *Dell OpenManage Server Assistant* CD, select Dell OpenManage IT Assistant in Read/Write mode.
2. From the main Dell OpenManage IT Assistant window, select **Servers**.
3. From the new window, select the particular server for which you wish to create the asset tag.
4. Select the **Status** tab and click the **Asset Tag Field**.
5. Log in to Dell OpenManage IT Assistant. You must have administrative rights to do this.
6. In the **Edit Attribute** dialog box, type the asset tag number you want to assign to the system and click **OK**.





## CHAPTER 3

# Using the System Setup Program

Each time you turn on your system, the system compares the configuration of the hardware installed in the system to the hardware listed in the system configuration information stored in nonvolatile random-access memory (NVRAM) on the system board. If the system detects a discrepancy, it generates error messages that identify the incorrect configuration settings. The system then prompts you to enter the System Setup program to correct the setting.

You can use the System Setup program 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

After you set up your system, run the System Setup program to familiarize yourself with your system configuration information and optional settings. Dell recommends that you print the System Setup screens (by pressing <Print Screen>) or record the information for future reference.

Before you use the System Setup program, you need to know the kind of diskette drive(s) and hard-disk drive(s) installed in your system. If you are unsure of any of this information, see the Manufacturing Test Report that was shipped with your system. You can access the **Manufacturing Test Report** from the **Dell Accessories** folder.



*NOTE: The PowerEdge 350 system is a “headless” system that operates without keyboard, monitor, or mouse. You must connect the keyboard and monitor to perform the procedures in this chapter.*

## Entering the System Setup Program

Enter the System Setup program as follows:

1. Turn on your system.  
If your system is already on, shut it down and then restart it.
2. Press <F2> immediately after you see the following message:

F2 = Setup

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



**NOTE:** To ensure an orderly system shutdown, consult the documentation that accompanied your operating system.

You can also enter the System Setup program by responding to certain error messages. See “Responding to Error Messages” in the following section.

## Responding to Error Messages

If an error message appears on your monitor screen while the system is booting, make a note of the message. Then, before entering the System Setup program, see “POST Beep Codes” and “System Messages” in your *Installation and Troubleshooting Guide* for an explanation of the message and suggestions for correcting any errors. (An exception to this routine: It is normal to receive an error message the first time you boot your system after installing a memory upgrade. In that situation, do not refer to “POST Beep Codes” and “System Messages.” Instead, follow the instructions for performing a memory upgrade in “Memory Modules” in your *Installation and Troubleshooting Guide*.)

If you are given an option of pressing either <F1> to continue or <F2> to run the System Setup program, press <F2>.





## Using the System Setup Navigation Keys

Table 3-1 lists the keys that you use to view, move around in, or change information on the System Setup screens and to exit the program.








**NOTE:** For help using the System Setup program, press <F1>.

**Table 3-1. System Setup Navigation Keys**

Keys	Action
	Activates submenus, displays a list, or selects a subfield depending on the type of action being performed.
	Selects a field within a configurable field.
 or 	Selects the previous or next value in a list, or the previous or next feature in a menu item's option list.

**Table 3-1. System Setup Navigation Keys** (continued)

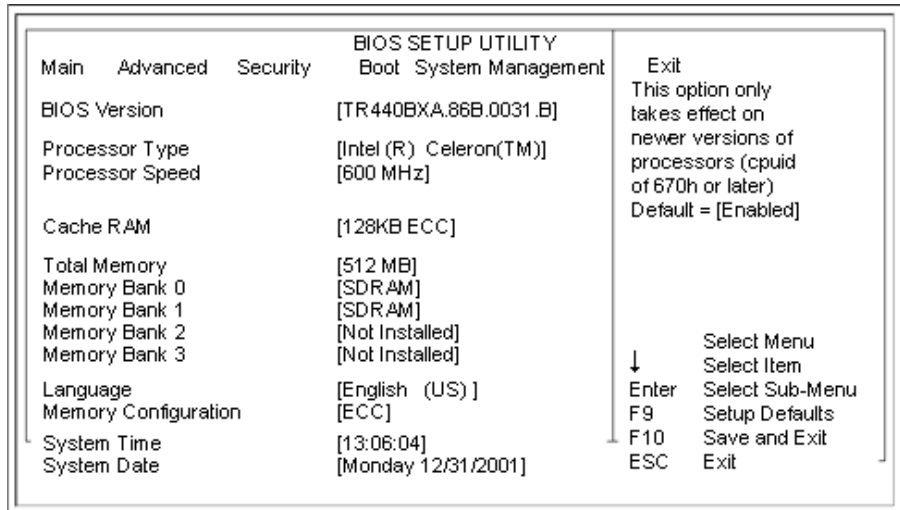
Keys	Action
 or 	Moves between major menu pages.
	Backs you out of any field. This key also undoes any action completed by pressing <Enter>, branches back to the parent menu if pressed while editing any field or selecting features in a menu, branches back to the parent menu when pressed in any submenu, or displays the exit confirmation window and asks whether changes can be discarded when pressed in any major menu.
	Loads the default values for all fields. A menu appears asking you to confirm. Select <b>Yes</b> to load the default options; select <b>No</b> to remain in the System Setup program.
	Saves the current field values and exits System Setup. A menu appears asking you to confirm. Select <b>Yes</b> to save and exit; select <b>No</b> to remain in the System Setup program.

# System Setup Menus and Options

The following subsections outline the menus and their associated options on the System Setup menu bar.

## Main Menu

When the System Setup program runs, the **BIOS SETUP UTILITY** main program screen appears (see Figure 3-1).



**Figure 3-1. BIOS Setup Utility Screen**

Notice that along the top of the screen is the **BIOS SETUP UTILITY** menu bar containing the following **BIOS SETUP UTILITY** menu options:

- **Main**
- **Advanced**
- **Security**
- **Boot**
- **System Management**
- **Exit**

These menu option items are explained in more detail in the following subsections.

The following options or information fields appear on the **Main BIOS SETUP UTILITY** screen:

- **BIOS Version** — Displays the basic input/output system (BIOS) version.
- **Processor Type** — Displays the microprocessor type. This option has no user-selectable settings.



- **Processor Speed** — Displays the microprocessor speed in megahertz (MHz). This option has no user-selectable settings.
- **Processor Serial Number** — Enables or disables (the default option) the microprocessor serial number (PSN).

*NOTE: This option is only available on systems with a Pentium III processor.*

- **Cache RAM** — Displays the cache random access memory (RAM) size in kilobytes (KB). This option has no user-selectable settings.
- **Total Memory** — Displays the amount of system memory. This option has no user-selectable settings.
- **Memory Bank 0, Memory Bank 1, Memory Bank 2, Memory Bank 3** — Displays the memory type for each memory back. If no memory is present, `Not Installed` displays. This option has no user-selectable settings.
- **Language** — Selects the language used by the systems BIOS. The options are:
  - English (the default option)
  - French
  - German
  - Italian
  - Spanish



- **Memory Configuration** — Allows you to turn error reporting on or off.

*NOTE: This option is only available on systems with system and memory that support error correction code (ECC).*

- **System Time** — Resets the time on the system's internal clock.
- **System Date** — Resets the date on the system's internal calendar.



*NOTE: You can use the plus and minus keys to set the system time and date. Use the keys on the numeric keypad only; it does not matter if NumLock is on or off.*

## Advanced Menu

Selecting the **Advanced** option on the menu bar allows you to configure the following advanced system features:

- **Boot Configuration** — Configures the following functions on your system's next reboot:
  - **Plug & Play O/S** — Specifies if a Plug and Play operating system is being used. The default, **No**, configures all the devices in the system. **Yes** allows the system to configure Plug and Play devices not required for boot (assuming your system has a Plug and Play operating system).
  - **Reset Config Data** — Clears the peripheral component interconnect/Plug and Play (PCI/Plug and Play) configuration (stored in flash memory) on the next boot.
  - **NumLock** — Selects whether the <NumLock> key is off or on at system power on.
- **Peripheral Configuration** — Configures the following peripheral ports and devices.
  - **Serial Port A** — Enables (the default) or disables your system's serial port 1.
  - **Serial Port B** — Enables (the default) or disables serial port 2.
  - **Legacy USB Support** — Enables or disables (the default) support for your system's legacy USB.
- **IDE Configuration** — Configures the following IDE devices:
  - **IDE Controller** — **Disabled** disables your system's integrated IDE controller. **Primary** enables only your system's primary IDE controller. **Secondary** enables your system's secondary IDE controller. **Both** (the default) enables both of your system's IDE controllers.
  - **Hard-Disk Predelay** — Selects your system's hard-disk drive predelay: **3 seconds**, **6 seconds**, **9 seconds**, **12 seconds**, **15 seconds**, **21 seconds**, or **30 seconds**. This option also configures your system's primary and secondary IDE devices either as the name of the drive found, or as **Not Enabled**.
  - **Primary IDE Master** — Displays the name of your system's installed device, or displays **Not Installed**. If an IDE device is detected, you can configure the following options: **Type** (**Auto** is the default), **LBA Mode Control** (**Enabled** is the default), **Multi-Sector Transfers** (**16 sectors** is the default), **PIO Mode** (**Auto** is the default), **Ultra MDA** (**Disabled** is the default).
  - **Primary IDE Slave** — Displays the name of your system's installed device, or displays **Not Installed**. If an IDE device is detected, you can configure the following options: **Type** (**Auto** is the default), **LBA Mode Control** (**Enabled** is the default), **Multi-Sector Transfers** (**16 sectors** is the default), **PIO Mode** (**Auto** is the default), **Ultra MDA** (**Disabled** is the default).

- **Secondary IDE Master** — Displays the name of your system's installed device, or displays **Not Installed**. If an IDE device is detected, you can configure the following options: **Type** (**Auto** is the default), **LBA Mode Control** (**Enabled** is the default), **Multi-Sector Transfers** (**16 sectors** is the default), **PIO Mode** (**Auto** is the default), **Ultra MDA** (**Disabled** is the default).
- **Secondary IDE Slave** — Displays the name of your system's installed device, or displays **Not Installed**. If an IDE device is detected, you can configure the following options: **Type** (**Auto** is the default), **LBA Mode Control** (**Enabled** is the default), **Multi-Sector Transfers** (**16 sectors** is the default), **PIO Mode** (**Auto** is the default), **Ultra MDA** (**Disabled** is the default).
- **Diskette Configuration** — Configures the following diskette drive settings:
  - **Diskette Controller** — Enables (the default) or disables the integrated diskette controller.
  - **Floppy A** — Enables (the default) or disables the diskette drive and specifies its size: **360 KB 5.25"**, **1.2 MB 5.25"**, **720 KB 3.5"**, **1.44/1.25 MB 3.5"** (the default), or **2.88 MB 3.5"**.
  - **Diskette Write Protect** — Enables or disables (the default) write-protect for the diskette drive.
- **Event Log Configuration** — Configures the following event log options:
  - **Event Log** — Displays whether or not space is available in your system's event log. This option has no user configurable settings.
  - **Event Log Validity** — Displays whether or not the contents of your system's event log are valid. This option has no user configurable settings.
  - **Clear All Event Logs** — Clears your system's event log after rebooting. **No** is the default option.
  - **Event Logging** — Enables (the default) or disables event logging.
  - **ECC Event Logging** — Enables (the default) or disables ECC event logging.

## Security Menu

Selecting the **Security** option on the menu bar allows you to set the following password and security features:

- **User Password Is** — Displays whether or not your system has a user password installed (entered). This option has no user configurable settings.
- **Supervisor Password Is** — Displays whether or not your system has a supervisor password installed (entered). This option has no user configurable settings.
- **Set Supervisor Password** — Specifies a supervisor password that can be up to seven alphanumeric characters long. The default option is no supervisor password installed.
- **Set User Password** — Specifies a user password that can be up to seven alphanumeric characters long. The default option is no supervisor password installed.



- **Clear User Password** — Clears your system's installed user password. This option has no user configurable settings.

*NOTE: This feature is displayed only after the supervisor password is set.*

- **User Access Level** — **Limited** allows the user to only change limited fields, such as **Date** and **Time**. **No Access** prevents user access to the Setup Utility. **View Only** allows user access to the Setup Utility but no fields can be changed. **Full** allows the user to change any fields. Only the Supervisor password can set the user access levels.

## Boot Menu

Selecting the **Boot Menu** option on the menu bar allows you to set the following boot features and the boot sequence:

- **Quiet Boot** — Enables or disables (the default) displaying normal power-on self-test (POST) messages.
- **Quick Boot** — Enables or disables (the default) your system's quick boot capability. This capability allows your system to skip certain tests while rebooting which decreases the time needed to boot your system.
- **After Power Failure** — Specifies the mode of operation when power is lost: **Stays Off** keeps your system off after power is restored, **Power On** boots the system after power is restored, **Last State** (the default) restores the system to the same state it was in before the power failed.



*NOTE: To enable to BIOS to correctly set this feature, your system must be shut down using the power switch.*

- **On Modem Ring** — Determines whether or not your system will **Stay Off** (the default) or **Power On** when its power is off and the modem is ringing.
- **On LAN** — Determines whether or not your system will **Stay Off** or **Power On** (the default) when a local area network (LAN) wake up event occurs.
- **On PME** — Determines whether or not your system will **Stay Off** (the default) or **Power On** when its PCI Power Management Enabled wake up event occurs.
- **IDE Drive Configuration** — Configures your system's peripheral devices. See the following configurable options for other IDE devices which are similar to the Primary Master IDE options:
  - **Primary Master IDE** — Specifies the **Primary Master IDE** drive configuration: **1st IDE** (the default), **2nd IDE**, **3rd IDE**, or **4th IDE**.
  - **Primary Slave IDE** — Specifies the **Primary Slave IDE** drive configuration: **1st IDE**, **2nd IDE** (the default), **3rd IDE**, or **4th IDE**.
  - **Secondary Master IDE** — Specifies the **Secondary Master IDE** drive configuration: **1st IDE**, **2nd IDE**, **3rd IDE** (the default), or **4th IDE**.
  - **Secondary Slave IDE** — Specifies the **Secondary Slave IDE** drive configuration: **1st IDE**, **2nd IDE**, **3rd IDE**, or **4th IDE** (the default).
- **1st to 8th Boot** — Configures your system's boot sequence from its available devices: **Floppy** (the default), **IDE-HDD**, **ATAPI CD-ROM**, and **IDE-HDD**.

## System Management Menu

Selecting the **System Management** menu option allows you to set the following server management features:

- **Serial Console Redirection** — Enables or disables (the default) your system's serial console redirection.
- **Baud Rate** — Sets your system's baud rate: **9600**, **19.2 KB** (the default), **38.4 KB**, or **115 KB**.
- **Flow Control** — Enables or disables one of the following flow controls: **No Flow Control**, **CTS/RTS** (the default), **XON/XOFF**, or **CTS/RTS+CD**.

## Exit Menu

Selecting the **Exit** menu option allows you to exit the System Setup program while saving, discarding, or loading default settings:

- **Exit Saving Changes** — Exits your system's setup and saves changes. This option has no user-configurable settings.
- **Exit Discarding Changes** — Exits your system's setup and discard changes. This option has no user-configurable settings.
- **Load Setup Defaults** — Loads your system's setup default settings. This option has no user-configurable settings.
- **Load Custom Defaults** — Loads your system's custom settings. This option has no user-configurable settings.
- **Save Custom Defaults** — Saves your system's custom settings. This option has no user-configurable settings.
- **Discard Changes** — Discards your system's changes. This option has no user-configurable settings.

## Using the System Password Features

**NOTICE: The password features provide a basic level of security for the data on your system. However, they are not foolproof. If your data requires more security, it is your responsibility to obtain and use additional forms of protection, such as data encryption programs.**

The System Setup program allows you to install supervisor and user passwords. A supervisor password is used to access the System Setup program while a user password is used to access the system, such as when logging in.

Your Dell system is shipped to you without the supervisor password feature installed. If system security is a concern, you should operate your system only with supervisor password protection.

You can assign a supervisor password whenever you use the System Setup program. After a supervisor password is assigned, only those who know the password have full use of the System Setup program.

When the **Set Supervisor Password** option is **Installed**, the system then prompts you for the supervisor password (only when going into system setup) just after the system boots.

To change an existing supervisor password, you must know the supervisor password (see the section “Deleting or Changing an Existing Supervisor Password” found later in this chapter). If you assign and later forget a supervisor password, you need to be able to remove the system cover to change a jumper setting that disables the supervisor password feature (see the section “Deleting a Forgotten Password” found later in this chapter). Note that this procedure erases the user password at the same time.

**NOTICE: If you leave your system running and unattended without having a supervisor password assigned, or if you leave your system unlocked so that someone can disable the password by changing a jumper setting, anyone can access the data stored on your hard-disk drive.**

### **Assigning a Supervisor Password (System Setup Only)**

Before you can assign a supervisor password, you must enter the System Setup program and select the **Set Supervisor Password** option.



*NOTE: The supervisor password controls the user password access to the system setup. See “Security Menu” earlier in this chapter for a description of the levels of user password access.*

When a supervisor password is assigned, the setting shown for the **Set Supervisor Password** option is **Installed**.

When no supervisor password is assigned and the password jumper on the system board is in the uninstalled position (its default), the setting shown for the **Set Supervisor Password** option is **Not Installed**. Only when this option is set to **Not Installed** can you assign a supervisor password, using the following procedure:

1. Enter the System Setup program by pressing <F2>.
2. Select the **Security** screen.
3. Verify that the **Supervisor Password Is** option is set to **Not Installed**.
4. Select the **Set Supervisor Password** option and press <Enter>.

The system prompts you to Enter Supervisor Password.

5. Type your supervisor password.

You can use up to seven characters in your password.

As you press each character key (or the spacebar key for a blank space), an asterisk (\*) placeholder appears in the field.

The password assignment operation recognizes keys by their location on the keyboard; it is case sensitive. This means that the software distinguishes between lowercase and uppercase characters. For example, if you have an *M* in your password, the system does not recognize either *M* or *m* as correct; your system will

only accept *M*. Certain keys and key combinations are not valid. If you enter one of these keys or combinations, the system does not accept them. To erase a character when entering your password, press <Backspace> or the left-arrow key.



*NOTE: To escape from the field without assigning a supervisor password, press the <Esc> key at any time before completing step 5.*

6. Press <Enter>.

The system prompts you to `Confirm New Password`, followed by another empty seven-character field in square brackets.

7. To confirm your new password, type it a second time and press <Enter>.

The system tells you the `Password Successfully Installed`.

The password setting changes to **Installed**. Your supervisor password is now set; you can exit the System Setup program and begin using your system. Note, however, that password protection does not take effect until you reboot the system by turning the system off and then on again.

## **Using Your Supervisor Password to Secure Your System Setup**

If the **Supervisor Password Is** option is set to **Installed**, the following prompt appears:

```
Enter CURRENT Password
```

After you type the correct supervisor password and press <Enter>, you can log on to the system as you normally would.

If a wrong or incomplete supervisor password is entered, the following message appears:

```
Enter CURRENT Password
```

If an incorrect or incomplete supervisor password is entered again, the same message appears.

The third and subsequent times an incorrect or incomplete supervisor password is entered, the system displays the following message:

```
Invalid Password-System Halted
```

To reboot the system and either set a new password, press <Ctrl><Alt><Del> or the reset button on the system unit.

The number of unsuccessful attempts made to enter the correct supervisor password can alert you to an unauthorized person attempting to use your system.

Even after your system is turned off and on, the previous message is displayed each time an incorrect or incomplete supervisor password is entered.



*NOTE: The supervisor password only applies to the System Setup program. A user password should be installed to completely secure your system. See “Assigning a User Password” found later in this chapter.*

## **Deleting or Changing an Existing Supervisor Password**

To delete or change an existing supervisor password, perform the following steps:

1. Enter the System Setup program by pressing <F2>.
2. Select the **Security** screen field to verify that the **Supervisor Password Is** option is set to **Installed**.
3. Select the **Set Supervisor Password** option and press <Enter>.

The system prompts you to Enter Current Password.

4. Type your current supervisor password and press <Enter>

The system prompts you to Enter Supervisor Password.



*NOTE: If you want to delete the password and not enter a new password, press <Enter> without typing in a new password, leaving the **Enter Supervisor Password** field blank.*

5. To assign a new password, follow the procedure from step 4 on in “Assigning a Supervisor Password (System Setup Only)” found earlier in this chapter.

## **Using the User Password Feature**

Your Dell system is shipped to you without the user password feature installed. If system security is a concern, you should operate your system with user password protection.

You can assign a user password whenever you use the System Setup program. After a user password is assigned, only those who know the password have access to the System Setup program.

To change an existing user password, you must know the user password (see the section “Deleting or Changing an Existing User Password” found later in this chapter). If you assign and later forget a user password, you need to be able to remove the system cover to change a jumper setting that disables the user password feature. See “Deleting a Forgotten Password” found later in this chapter. Note that this procedure erases the supervisor password at the same time.

**NOTICE: If you leave your system running and unattended without having a user password assigned, or if you leave your system unlocked so that someone can disable the password by changing a jumper setting, anyone can access the data stored on your hard-disk drive.**

## Assigning a User Password

Before you can assign a user password, you must enter the System Setup program and select the **Set User Password** option.

To assign a user password, perform the following steps:

1. Enter the System Setup program by pressing <F2>.
2. Select the **Security** screen.
3. Select the **Set User Password** option and press <Enter>.

The system prompts you to Enter User Password.

4. Type your user password.

You can use up to seven characters in your password.

As you press each character key (or the spacebar key for a blank space), an asterisk (\*) placeholder appears in the field.

The password assignment operation recognizes keys by their location on the keyboard; it is case sensitive. This means that the software distinguishes between lowercase and uppercase characters. For example, if you have an *M* in your password, the system does not recognize either *M* or *m* as correct; your system will only accept *M*. Certain keys and key combinations are not valid. If you enter one of these keys or combinations, the system does not accept them. To erase a character when entering your password, press <Backspace> or the left-arrow key.



*NOTE: To escape from the field without assigning a user password, press the <Esc> key at any time prior to completing step 4.*

5. Press <Enter>.

The system prompts you to Confirm New Password, followed by another empty seven-character field in square brackets.

6. To confirm your password, type it a second time and press <Enter>.

The system tells you that the Password Successfully Installed.

The password setting changes to **Installed**. Your supervisor password is now set; you can exit the System Setup program and begin using your system. A change to the **Set User Password** option becomes effective immediately (rebooting the system is not required).



*NOTES: The user password can be the same as the supervisor password.*

*If the two passwords are different, the user password can be used as an alternate supervisor password. However, the supervisor password cannot be used in place of the user password.*

## Operating With a User Password Installed

If **Set User Password** is set to **Installed**, you must enter the correct user password before you can modify the majority of the System Setup options. When you start the System Setup program, the program prompts you to type the password.

If you do not enter the correct password in three tries, the system displays the following message:

Invalid Password-System Halted

## Deleting or Changing an Existing User Password

To delete or change an existing user password, perform the following steps:

1. Enter the System Setup program by pressing <F2>.
2. Select the **Security** screen field to verify that the **User Password Is** option is set to **Installed**.
3. Select the **Set User Password** option and press <Enter>.

The system prompts you to Enter Current Password.

4. Type your current user password and press <Enter>

The system prompts you to Enter User Password.



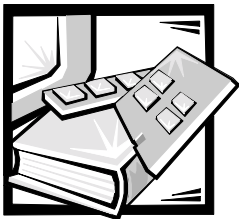
*NOTE: If you want to delete the password and not enter a new password, press <Enter> without typing in a new password, leaving the **Enter User Password** field blank.*

5. To assign a new password, follow the procedure from step 4 in “Assigning a User Password” found earlier in this chapter.

## Deleting a Forgotten Password

If you forget your supervisor or user password, you cannot operate your system or change settings in the System Setup program until someone having a supervisor password clears and installs a new user password.

If you forgot your supervisor or user password, you cannot operate your system or change settings in the System Setup program until a trained service technician opens the system chassis, changes the password jumper setting to disable the passwords, and erases the existing passwords. This procedure is described in “Disabling Forgotten Passwords” in the *Installation and Troubleshooting Guide*.



# APPENDIX A

## Technical Specifications

**Table A-1. Technical Specifications**

<b>Microprocessor</b>	
Microprocessor type	Intel Celeron microprocessor with a minimum internal operating frequency of 600 MHz  or  Intel Pentium III microprocessor with an internal operating frequency of 750 MHz
L2 cache	128 KB, internal to microprocessor for the Celeron processor; 256 KB for the Pentium III microprocessor
Math coprocessor	internal to microprocessor
<b>Expansion Bus</b>	
Bus type	PCI bus
Expansion slots	one full-length PCI, one low-profile PCI (occupied by video controller)
<b>Memory</b>	
DIMM sockets	72-bit wide, 168-pin sockets
DIMM capacities	128-, or 256-MB registered SDRAM DIMMs; must be rated for 100-MHz operation
Minimum RAM	128 MB
Maximum RAM	1 GB

*NOTE: For the full name of an abbreviation or acronym used in this table, see the "Glossary."*

**Table A-1. Technical Specifications** (continued)

<b>Drives</b>	
Diskette drive	3.5-inch, 1.44-MB diskette drive included with standard system
Hard-disk drives	two 1-inch form-factor ATA-100 IDE hard-disk drives
CD-ROM drive	IDE
<b>Ports</b>	
<b>Externally accessible:</b>	
Serial	two 9-pin connectors
USB	two 4-pin connectors
RJ45	two RJ45 connectors for connection to two integrated Intel 82559 10/100 Ethernet controllers
Video	15-pin connector on expansion card
PS/2-style keyboard	6-pin mini-DIN
PS/2-compatible mouse	6-pin mini-DIN
<b>Video</b>	
Video type	PCI video controller; VGA connector
Video memory (standard)	8 MB SDRAM
<b>Power<sup>1</sup></b>	
<b>AC power supply:</b>	
Wattage	125 W
Voltage	100 to 120 V at 50 Hz/200 to 240 V at 60 Hz
System battery	CR2032 3-V lithium coin cell

<sup>1</sup> Under typical line conditions and over the entire system ambient operating range, the inrush may reach 140A.

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

**Table A-1. Technical Specifications** (continued)

<b>Physical</b>	
Height	4.3 cm (1.7 inches)
Width	42.5 cm (16.7 inches)
Depth	55 cm (22 inches)
Weight	10 kg (23 lb) maximum
<b>Environmental (PE)</b>	
<b>Temperature:</b>	
Operating	10° to 35°C (50° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)
<b>Relative humidity:</b>	
Operating	8% to 80% (noncondensing) with a humidity gradation of 10% per hour
Storage	5% to 95% (noncondensing)
<b>Maximum vibration:</b>	
Operating	0.25 G (half-sine wave) at a sweep of 3 to 200 Hz for 15 minutes
Storage	0.5 G at 3 to 200 Hz for 15 minutes
<b>Maximum shock:</b>	
Operating	six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 41 G for up to 2 ms
Storage (non-operational)	six consecutively executed shock pulses in the positive and negative x, y, and z axes (one pulse on each side of the system) of 71 G for 2 ms
<b>Altitude:</b>	
Operating	–16 to 3048 m (–50 to 10,000 ft)
Storage	–16 to 10,600 m (–50 to 35,000 ft)

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





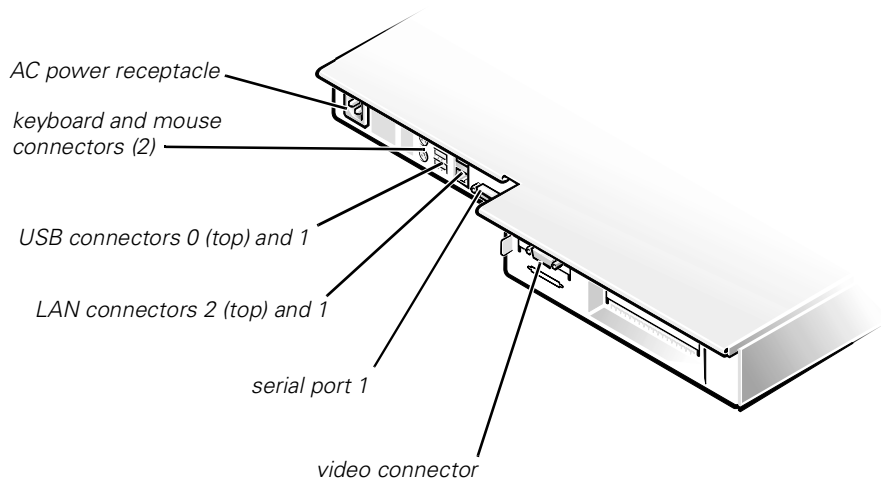
## **APPENDIX B**

### ***I/O Ports and Connectors***

This section provides specific information about the input/output (I/O) ports and connectors on the back panel of the system.

### ***I/O Ports and Connectors***

The I/O ports and connectors on the back panel of the system are the gateways through which the system communicates with external devices, such as a keyboard, mouse, printer, and monitor. Figure B-1 identifies the I/O ports and connectors for your system.



**Figure B-1. I/O Ports and Connectors**

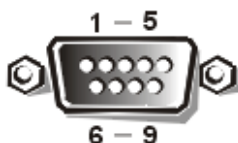
## Serial Ports

The two integrated serial ports on the front and back panels of the system use 9-pin D-subminiature connectors. These ports support devices such as external modems, printers, plotters, and mice that require serial data transmission (the transmission of data one bit at a time over one line).

Most software uses the term COM (for communications) plus a number to designate a serial port (for example, COM1 or COM2). The default designations of your system's integrated serial ports are COM1 and COM2.

### Serial Port Connectors

If you reconfigure your hardware, you may 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 Connectors**

**Table B-1. Serial Port Pin Assignments**

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

# Keyboard and Mouse Connectors

The system uses a Personal System/2 (PS/2)-style keyboard and supports a PS/2-compatible mouse. Cables from both devices attach to 6-pin, miniature *Deutsche Industrie Norm* (DIN) connectors on the back panel of your system.

Mouse driver software can give the mouse priority with the microprocessor by issuing IRQ12 whenever a new mouse movement is detected. The driver software also passes along the mouse data to the application program that is in control.

## Keyboard Connector

If you reconfigure your hardware, you may need pin number and signal information for the keyboard connector. Figure B-3 illustrates the pin numbers for the keyboard connector and Table B-2 defines the pin assignments and interface signals for the keyboard connector.



**Figure B-3. Pin Numbers for the Keyboard Connector**

**Table B-2. Keyboard Connector Pin Assignments**

Pin	Signal	I/O	Definition
1	KBDATA	I/O	Keyboard data
2	NC	N/A	No connection
3	GND	N/A	Signal ground
4	FVcc	N/A	Fused supply voltage
5	KBCLK	I/O	Keyboard clock
6	NC	N/A	No connection
Shell	N/A	N/A	Chassis ground

## Mouse Connector

If you reconfigure your hardware, you may need pin number and signal information for the mouse connector. Figure B-4 illustrates the pin numbers for the mouse connector, and Table B-3 defines the pin assignments and interface signals for the mouse connector.



**Figure B-4. Pin Numbers for the Mouse Connector**

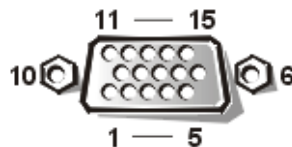
**Table B-3. Mouse Connector Pin Assignments**

Pin	Signal	I/O	Definition
1	MSDATA	I/O	Mouse data
2	NC	N/A	No connection
3	GND	N/A	Signal ground
4	FVcc	N/A	Fused supply voltage
5	MSCLK	I/O	Mouse clock
6	NC	N/A	No connection
Shell	N/A	N/A	Chassis ground

## Video Connector

The system uses a 15-pin high-density D-subminiature connector on a video controller for attaching a video graphics array (VGA)-compatible monitor to your system. The video circuitry on the system board synchronizes the signals that drive the red, green, and blue electron guns in the monitor.

If you reconfigure your hardware, you may need pin number and signal information for the video connector. Figure B-5 illustrates the pin numbers for the video connector, and Table B-4 defines the pin assignments and interface signals for the video connector.



**Figure B-5. Pin Numbers for the Video Connector**

**Table B-4. Video Connector Pin Assignments**

Pin	Signal	I/O	Definition
1	RED	O	Red video
2	GREEN	O	Green video
3	BLUE	O	Blue video
4	NC	N/A	No connection
5-8, 10	GND	N/A	Signal ground
9	VCC	N/A	Vcc
11	NC	N/A	No connection
12	DDC data out	O	Monitor detect data
13	HSYNC	O	Horizontal synchronization
14	VSNC	O	Vertical synchronization
15	DDC clock out	O	Monitor detect clock
Shell	N/A	N/A	Chassis ground

## USB Connectors

Your system contains two Universal Serial Bus (USB) connectors for attaching USB-compliant devices. USB devices are typically peripherals such as mice, printers, keyboards, and system speakers.

**NOTICE: Do not attach a USB device or a combination of USB devices that draw a maximum current over 500 milliamperes (mA) per channel or +5 volts (V). Attaching devices that exceed this threshold may cause the USB ports to shut down. See the documentation that accompanied the USB devices for their maximum current ratings.**

If you reconfigure your hardware, you may need pin number and signal information for the USB connectors. Figure B-6 illustrates the USB connector and Table B-5 defines the pin assignments and interface signals for the USB connector.

**Figure B-6. Pin Numbers for the USB Connector**

**Table B-5. USB Connector Pin Assignments**

Pin	Signal	I/O	Definition
1	Vcc	N/A	Supply voltage
2	DATA	I	Data in
3	+DATA	O	Data out
4	GND	N/A	Signal ground

## **Integrated Network Interface Controller Connector**

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

Each NIC includes a Wakeup On LAN feature that enables the system to be started by a special local area network (LAN) signal from a server management console. Wakeup On LAN provides remote system setup, software downloading and installation, file updates, and asset tracking after hours and on weekends when LAN traffic is typically at a minimum.

### **Network Cable Requirements**

Your system's RJ45 NIC connectors are designed for attaching an unshielded twisted pair (UTP) Ethernet cable equipped with standard RJ45-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 RJ45 jack wall plate or to an RJ45 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 3 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 feet (ft) (100 meters [m]).
- For 10BASE-T networks, the maximum number of daisy-chained concentrators on one network segment is four.





# Glossary

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's 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 boards, and SCSI adapters.

## **application program**

Software designed to help you perform a specific task, such as a spreadsheet or word processor. Application programs are distinct from operating system and utility software.

## **backup**

A copy of a program or data file. As a precaution, you should back up your system's hard-disk drive on a regular basis.

## **baud rate**

Data transmission speed. For example, modems are designed to transmit data at one or more specified baud rate(s) through the COM (serial) port of a system.

## **BBS**

Abbreviation for bulletin board service. A system that serves as a central location for accessing data or relaying messages by modem. For example, Dell's TechConnect BBS contains the latest version of software such as video drivers and the Dell Directory. If your system has a modem, you can access the BBS and download the most recent version of this software.

## **beep code**

A diagnostic system message in the form of a series of beeps from your system's speaker. See your *Installation and Troubleshooting Guide* for a complete discussion of system beep codes.

## **BIOS**

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

- 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><Del>; otherwise, you must perform a cold boot by pressing the reset button (if your system has one) or by turning the system off and then back on.

### **bootable diskette**

You can start your system from a diskette in drive A. To make a bootable diskette, insert a diskette in drive A, type `sys a:` at the command line prompt and then press <Enter>. Use this bootable diskette if your system will not boot from the hard-disk drive.

### **bus**

A bus forms 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**

To facilitate quicker data retrieval, a storage area for keeping a copy of data or instructions. 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 disk drive for data that is in the cache, the disk-cache utility can retrieve the data from RAM faster than from the disk drive.

### **CD-ROM**

Abbreviation for compact disc read-only memory. CD-ROM drives use optical technology to read data from compact discs. CDs are read-only storage devices; you cannot write new data to a CD with standard CD-ROM drives.

## **cm**

Abbreviation for centimeter(s).

### **controller**

A chip or expansion card that controls the transfer of data between the microprocessor and a peripheral such as a diskette drive or the keyboard.

### **conventional memory**

The first 640 KB of RAM. Unless they are specially designed, MS-DOS programs are limited to running in conventional memory. See also EMM, expanded memory, extended memory, HMA, memory manager, upper memory area, and XMM.

### **coprocessor**

A coprocessor 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 includes an integrated math coprocessor.

## **cpi**

Abbreviation for characters per inch.

## **CPU**

Abbreviation for central processing unit. See also microprocessor.

## **DC**

Abbreviation for direct current.

### **device driver**

A device driver allows the operating system or a program to interface correctly with a peripheral such as a printer or network card. 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.

### **DHCP**

Acronym for Dynamic Host Configuration Protocol.

**diagnostics**

See diskette-based diagnostics.

**DIMM**

Acronym for dual in-line memory module.

**DIN**

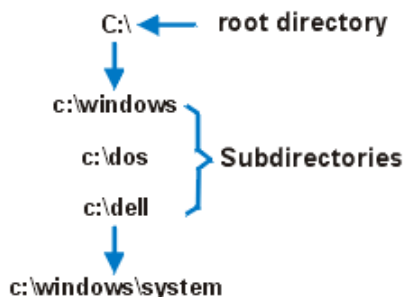
Acronym for Deutsche Industrie Norm.

**DIP**

Acronym for dual in-line package. A circuit board, such as a system board or expansion card, may contain DIP switches for configuring the circuit board. DIP switches are always toggle switches, with an ON position and an OFF position.

**directory**

Directories help keep related files organized 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-disk drive C. Additional directories that branch off of the root directory are called subdirectories. Subdirectories may contain additional directories branching off of them.

**diskette-based diagnostics**

A comprehensive set of diagnostic tests for your Dell system. To use the diskette-based diagnostics, you must boot your system from the *Dell Diagnostics*

*Diskette*. Refer to your *Installation and Troubleshooting Guide* for a complete discussion about how to use the diskette-based diagnostics.

**display adapter**

See video adapter.

**DMA**

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

**DRAC**

Acronym for Dell OpenManage Remote Assistant Card.

**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 chip in the system.

**drive-type number**

Your system can recognize a number of specific hard-disk drives. Each is assigned a drive-type number that is stored in NVRAM. The hard-disk 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 (cylinders, heads, write precomp, landing zone, and capacity) for drives not included in the table of drive types stored in NVRAM.

**ECC**

Abbreviation for error checking and correction.

**EEPROM**

Acronym for electrically erasable programmable read-only memory.

**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's system board for plugging in an expansion card.

**external cache memory**

A RAM cache using SRAM chips. Because SRAM chips operate at several times the speed of DRAM chips, the microprocessor can retrieve data and instructions faster from external cache memory than from RAM.

**F**

Abbreviation for Fahrenheit.

**flash memory**

A type of EEPROM chip that can be reprogrammed from a utility on diskette while still installed in a system; most EEPROM chips can only be rewritten with special programming equipment.

**format**

To prepare a hard-disk drive or diskette for storing files. An unconditional format deletes all data stored on the disk. The format command in MS-DOS 5.0 or higher includes an option that allows you to unformat a disk if you have not yet used the disk for file storage.

**ft**

Abbreviation for foot/feet.

**g**

Abbreviation for gram(s).

**G**

Abbreviation for gravities.

**GB**

Abbreviation for gigabyte(s). A gigabyte equals 1024 megabytes or 1,073,741,824 bytes.

**GUI**

Acronym for graphical user interface.

**h**

Abbreviation for hexadecimal.

**host adapter**

A host adapter implements communication between the system's bus and the

controller for a peripheral. (Hard-disk drive controller subsystems include integrated host adapter circuitry.) To add a SCSI expansion bus to your system, you must install the appropriate host adapter.

**Hz**

Abbreviation for hertz.

**IC**

Abbreviation for integrated circuit.

**I/O**

Abbreviation for input/output. The keyboard and a printer, for example, are I/O devices. 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 I/O activity; when the program sorts a list of terms, it is engaging in computational activity.

**ID**

Abbreviation for identification.

**IDE**

Integrated drive electronics.

**IP**

Acronym for Internet Protocol.

**IRQ**

Abbreviation for interrupt request. A signal that data is about to be sent to or received by a peripheral 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.

**K**

Abbreviation for kilo-, indicating 1000.

**KB**

Abbreviation for kilobyte(s), 1024 bytes.

**KB/sec**

Abbreviation for kilobyte(s) per second.

**Kbit(s)**

Abbreviation for kilobit(s), 1024 bits.

**Kbps**

Abbreviation for kilobit(s) per second.

**key combination**

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

**kg**

Abbreviation for kilogram(s), 1000 grams.

**kHz**

Abbreviation for kilohertz, 1000 hertz.

**LAN**

Acronym for local area network. A LAN system is usually confined to the same building or a few nearby buildings, with all equipment linked by wiring dedicated specifically to the LAN.

**lb**

Abbreviation for pound(s).

**LCD**

Abbreviation for liquid crystal display. A low-power display often used for notebook systems. An LCD consists of a liquid crystal solution between two sheets of polarizing material. An electric current causes each crystal to act like a shutter that can open to allow light past or close to block the light.

**LED**

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

**LUN**

Acronym for logical unit number.

**m**

Abbreviation for meter(s).

**mA**

Abbreviation for milliamper(s).

**mAh**

Abbreviation for milliamper(s)-hour(s).

**MB**

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

**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 8 MB of memory" refers to a system with 8 MB of RAM.

**memory address**

A specific location, usually expressed as a hexadecimal number, in the system's RAM.

**MHz**

Abbreviation for megahertz.

**microprocessor**

Because it is the primary computational chip inside the system, it is customary to refer to the microprocessor as "the system's brain." The microprocessor contains an arithmetic processing unit and a control unit. Software written for one microprocessor must usually be revised to run on another microprocessor. CPU is a synonym for microprocessor.

**min**

Abbreviation for minute(s).

**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**

Abbreviation for millisecond(s).

**MS-DOS**

Abbreviation for Microsoft Disk Operating System.

**mV**

Abbreviation for millivolt(s).

**NIC**

Acronym for network interface controller.

**NiCad**

Acronym for nickel cadmium.

**NiMH**

Abbreviation for nickel-metal hydride.

**ns**

Abbreviation for nanosecond(s), one billionth of a second.

**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 setup options.

**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.

**parameter**

A value or option that you specify to a program. A parameter is sometimes called a switch or an argument.

**PC Card**

Slightly larger than a credit card, a PC Card is a removable I/O card—such as a modem, LAN, SRAM, or flash memory card—that adheres to the PCMCIA standards. See also PCMCIA.

**PCI**

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

**PDC**

Acronym for primary domain controller.

**peripheral device**

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

**PGA**

Abbreviation for pin grid array, a type of microprocessor socket that allows you to remove the microprocessor chip.

**pixel**

Arranged in rows and columns, a pixel is a single point on a video display. Video resolution—640 x 480, for example—is expressed as the number of pixels across by the number of pixels up and down.

**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 disk drives, and the keyboard.

**program diskette set**

The set of diskettes from which you can perform a complete installation of an application program. When you reconfigure a program, you often need its program diskette set.

**PS/2**

Abbreviation for Personal System/2.

**RAID**

Acronym for redundant arrays of independent disks.

**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.

**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.

***RTC***

Abbreviation for real-time clock. Battery-powered clock circuitry inside the system that keeps the date and time after you turn off the system.

***SDRAM***

Abbreviation for synchronous dynamic random-access memory.

***SEC***

Abbreviation for single-edge contact.

***sec***

Abbreviation for second(s).

***serial port***

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

***SNMP***

Abbreviation for Simple Network Management Protocol.

***switch***

See parameter.

***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
- Expansion-card connectors
- Controllers for standard peripheral devices such as the keyboard
- Various ROM chips

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

***system diskette***

System diskette is a synonym for bootable diskette.

***system memory***

System memory is a synonym for RAM.

***System Setup program***

System Setup program options allow you to configure your system's hardware. Some options in the System Setup program require that you reboot the system to effect a hardware-configuration change. Because the System Setup program is stored in NVRAM, any options that you set remain in effect until you change them again.

***TCP/IP***

Abbreviation for Transmission Control Protocol/Internet Protocol.

***terminator***

Some devices, especially disk drives, contain a terminator to absorb and dissipate excess current. When more than one such device is connected in a series, you may need to remove the terminator—or change a jumper setting to disable it—unless it is the last device in the series. However, some devices have terminators that should never be removed or disabled.

***UPS***

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

***USB***

Abbreviation for Universal Serial Bus.

***utility***

A program used to manage system resources—memory, disk drives, or printers, for example. The **diskcopy** command for duplicating diskettes and the **himem.sys** device driver for managing extended memory are utilities included in MS-DOS.

***V***

Abbreviation for volt(s).

**VAC**

Abbreviation for volt(s) alternating current.

**VDC**

Abbreviation for volt(s) direct current.

**VGA**

Abbreviation for video graphics array.

**video adapter**

The logical circuitry that provides—in combination with the monitor or display—your system's video capabilities. A video adapter may support more or fewer features than a specific monitor offers. Typically, a video adapter comes with video drivers for displaying popular application programs and operating environments in a variety of video modes.

On most current Dell systems, a video adapter is integrated into the system board. Also available are many video adapter cards that plug into an expansion-card connector.

Video adapters can include memory separate from RAM on the system board. The amount of video memory, along with the adapter's video drivers, may affect the number of colors that can be simultaneously displayed. Video adapters can also include their own coprocessor chip for faster graphics rendering.

**video driver**

Graphics-mode application programs and operating environments, such as Windows, often require video drivers to display at a chosen resolution with the desired number of colors. A program may include some "generic" video drivers. Any additional video drivers may need to match the video adapter; you can find these drivers on a separate diskette with your system or video adapter.

**video memory**

Most VGA and SVGA video adapters include VRAM or DRAM memory chips in addition to your system's RAM. The amount of video memory installed primarily influences the number of colors that a

program can display (with the appropriate video drivers and monitor capability).

**video mode**

Video adapters normally support multiple text and graphics display modes. Character-based software (such as MS-DOS) displays in text modes that can be defined as x columns by y rows of characters. Graphics-based software (such as Windows) displays in graphics modes that can be defined as x horizontal by y vertical pixels by z colors.

**video resolution**

Video resolution—640 x 480, for example—is expressed as the number of pixels across by the number of pixels up and down. To display a program at a specific graphics resolution, you must install the appropriate video drivers and your monitor must support the resolution.

**W**

Abbreviation for watt(s).

**write-protected**

Read-only files are said to be write-protected. You can write-protect a 3.5-inch diskette by sliding its write-protect tab to the open position; you can write-protect a 5.25-inch diskette by placing an adhesive label over its write-protect notch.

**WWW**

Abbreviation for World Wide Web.

**XMS**

Abbreviation for eXtended Memory Specification. See also EMS, extended memory, and memory manager.

**ZIF**

Acronym for zero insertion force. Some systems use ZIF sockets and connectors to allow devices such as the microprocessor chip to be installed or removed with no stress applied to the device.



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