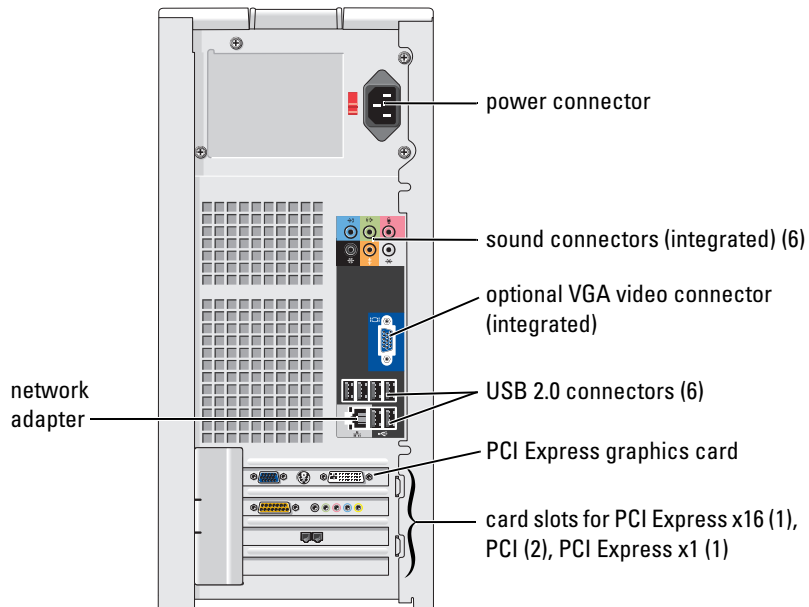
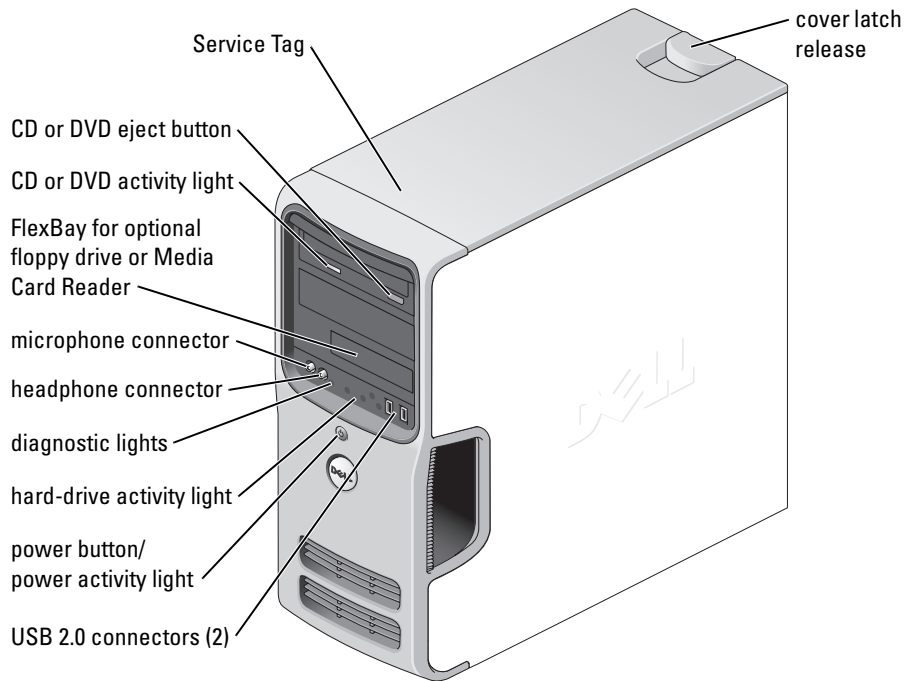


# Dell™ Dimension™ E520

## Owner's Manual



Model DCSM

## Notes, Notices, and Cautions



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



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



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

If you purchased a Dell™ n Series computer, any references in this document to Microsoft® Windows® operating systems are not applicable.

## Abbreviations and Acronyms

For a complete list of abbreviations and acronyms, see the "Glossary" on page 147.

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Model DCSM

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P/N NH730

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# Finding Information

 **NOTE:** Some features or media may be optional and may not ship with your computer. Some features or media may not be available in certain countries.

 **NOTE:** Additional information may ship with your computer.

## What Are You Looking For?

- Warranty information
- Terms and Conditions (U.S. only)
- Safety instructions
- Regulatory information
- Ergonomics information
- End User License Agreement

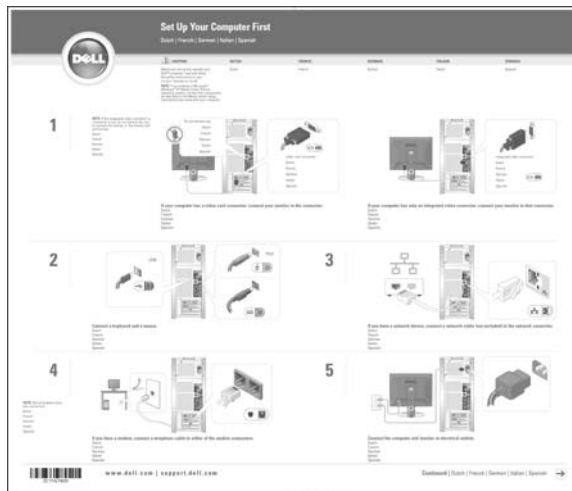
## Find it Here


### Dell™ Product Information Guide



- How to set up my computer

## Setup Diagram



| What Are You Looking For?  | Find it Here  |
|--|---|
| <ul style="list-style-type: none"> <li>• Service Tag and Express Service Code</li> <li>• Microsoft Windows License Label</li> </ul>  | <p><b>Service Tag and Microsoft® Windows® License</b></p> <p>These labels are located on your computer.</p> <ul style="list-style-type: none"> <li>• Use the Service Tag to identify your computer when you use <a href="http://support.dell.com">support.dell.com</a> or contact support.</li> <li>• Enter the Express Service Code to direct your call when contacting support.</li> </ul>    |
| <ul style="list-style-type: none"> <li>• Solutions — Troubleshooting hints and tips, articles from technicians, and online courses, frequently asked questions</li> <li>• Community — Online discussion with other Dell customers</li> <li>• Upgrades — Upgrade information for components, such as memory, the hard drive, and the operating system</li> <li>• Customer Care — Contact information, service call and order status, warranty, and repair information</li> <li>• Service and support — Service call status and support history, service contract, online discussions with technical support</li> <li>• Reference — Computer documentation, details on my computer configuration, product specifications, and white papers</li> <li>• Downloads — Certified drivers, patches, and software updates</li> <li>• Desktop System Software (DSS)— If you reinstall the operating system for your computer, you should also reinstall the DSS utility. DSS provides critical updates for your operating system and support for Dell™ 3.5-inch USB floppy drives, Intel® processors, optical drives, and USB devices. DSS is necessary for correct operation of your Dell computer. The software automatically detects your computer and operating system and installs the updates appropriate for your configuration.</li> </ul> | <p><b>Dell Support Website — <a href="http://support.dell.com">support.dell.com</a></b></p> <p><b>NOTE:</b> Select your region to view the appropriate support site.</p> <p><b>NOTE:</b> Corporate, government, and education customers can also use the customized Dell Premier Support website at <a href="http://premier.support.dell.com">premier.support.dell.com</a>.</p> <p>To download Desktop System Software:</p> <ol style="list-style-type: none"> <li>1 Go to <a href="http://support.dell.com">support.dell.com</a> and click <b>Downloads</b>.</li> <li>2 Enter your Service Tag or product model.</li> <li>3 In the <b>Download Category</b> drop-down menu, click <b>All</b>.</li> <li>4 Select the operating system and operating system language for your computer, and click <b>Submit</b>.</li> <li>5 Under <b>Select a Device</b>, scroll to <b>System and Configuration Utilities</b>, and click <b>Dell Desktop System Software</b>.</li> </ol> |

| What Are You Looking For?   | Find it Here   |
|---|--|
| <ul style="list-style-type: none"><li>• How to use Windows XP</li><li>• How to work with programs and files</li><li>• How to personalize my desktop</li></ul> | <p><b>Windows Help and Support Center</b></p> <ol style="list-style-type: none"><li><b>1</b> Click <b>Start</b>→ <b>Help and Support</b>.</li><li><b>2</b> Type a word or phrase that describes your problem and click the arrow icon.</li><li><b>3</b> Click the topic that describes your problem.</li><li><b>4</b> Follow the instructions on the screen.</li></ol> |



# Setting Up and Using Your Computer

## Setting Up a Printer



**NOTICE:** Complete the operating system setup before you connect a printer to the computer.

See the documentation that came with the printer for setup information, including how to:

- Obtain and install updated drivers.
- Connect the printer to the computer.
- Load paper and install the toner or ink cartridge.

For technical assistance, refer to the printer owner's manual or contact the printer manufacturer.

### Printer Cable

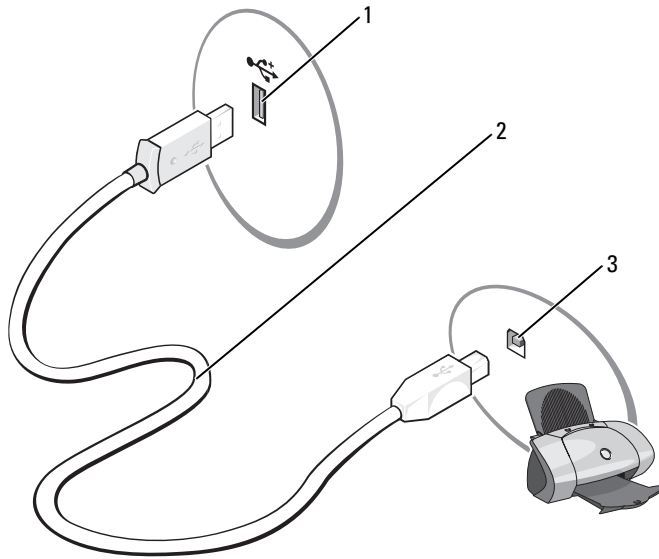
Your printer connects to your computer with a USB cable. Your printer may not come with a printer cable, so if you purchase a cable separately, ensure that it is compatible with your printer. If you purchased a printer cable at the same time you purchased your computer, the cable may arrive in the computer box.

### Connecting a Printer



**NOTE:** You can connect USB devices while the computer is turned on.


- 1 Complete the operating system setup if you have not already done so.
- 2 Attach the USB printer cable to the USB connectors on the computer and the printer. The USB connectors fit only one way.



1 USB connector on computer    2 USB printer cable    3 USB connector on printer

- 3 Turn on the printer and then turn on the computer. If the **Add New Hardware Wizard** window appears, click **Cancel**.
- 4 Install the printer driver if necessary. See the documentation that came with your printer.

## Connecting to the Internet

 **NOTE:** ISPs and ISP offerings vary by country.

To connect to the Internet, you need a modem or network connection and an Internet service provider (ISP). Your ISP will offer one or more of the following Internet connection options:

- Dial-up connections that provide Internet access through a telephone line. Dial-up connections are considerably slower than DSL and cable modem connections.
- DSL connections that provide high-speed Internet access through your existing telephone line. With a DSL connection, you can access the Internet and use your telephone on the same line simultaneously.
- Cable modem connections that provide high-speed Internet access through your local cable TV line.

If you are using a dial-up connection, connect a telephone line to the modem connector on your computer and to the telephone wall jack before you set up your Internet connection. If you are using a DSL or cable modem connection, contact your ISP for setup instructions.

## Setting Up Your Internet Connection

To set up an Internet connection with a provided ISP desktop shortcut:

- 1 Save and close any open files, and exit any open programs.
- 2 Double-click the ISP icon on the Microsoft® Windows® desktop.
- 3 Follow the instructions on the screen to complete the setup.

If you do not have an ISP icon on your desktop or if you want to set up an Internet connection with a different ISP:

- 1 Save and close any open files, and exit any open programs.
- 2 Click the **Start** button and click **Internet Explorer**.  
The **New Connection Wizard** appears.
- 3 Click **Connect to the Internet**.
- 4 In the next window, click the appropriate option:
  - If you do not have an ISP and want to select one, click **Choose from a list of Internet service providers (ISPs)**.
  - If you have already obtained setup information from your ISP but you did not receive a setup CD, click **Set up my connection manually**.
  - If you have a CD, click **Use the CD I got from an ISP**.
- 5 Click **Next**.

If you selected **Set up my connection manually**, continue to step 6. Otherwise, follow the instructions on the screen to complete the setup.



**NOTE:** If you do not know which type of connection to select, contact your ISP.

- 6 Click the appropriate option under **How do you want to connect to the Internet?**, and then click **Next**.
- 7 Use the setup information provided by your ISP to complete the setup.

If you are having problems connecting to the Internet, see "E-Mail, Modem, and Internet Problems" on page 33. If you cannot connect to the Internet but have successfully connected in the past, the ISP might have a service outage. Contact your ISP to check the service status, or try connecting again later.

## Playing CDs and DVDs

➡ **NOTICE:** Do not press down on the CD or DVD tray when you open or close it. Keep the tray closed when you are not using the drive.


➡ **NOTICE:** Do not move the computer when you are playing CDs or DVDs.

- 1 Press the eject button on the front of the drive.
- 2 Place the disc, label side up, in the center of the tray.











- 3 Press the eject button or gently push in the tray.

To format CDs for storing data, to create music CDs, or to copy CDs, see the CD software that came with your computer.

 **NOTE:** Ensure that you follow all copyright laws when you create CDs.

A CD player includes the following basic buttons:

---












|   |  |
|---|--|
|  | Play                                   |
|  | Move backward within the current track |
|  | Pause                                  |
|  | Move forward within the current track  |
|  | Stop                                   |
|  | Go to the previous track               |
|  | Eject                                  |
|  | Go to the next track                   |

---



A DVD player includes the following basic buttons:

---

|   |  |
|---|--|
|  | Stop   |
|  | Restart the current chapter                    |
|  | Play   |
|  | Fast forward                                   |
|  | Pause  |
|  | Fast reverse                                   |
|  | Advance a single frame while in pause mode     |
|  | Go to the next title or chapter                |
|  | Continuously play the current title or chapter |
|  | Go to the previous title or chapter            |
|  | Eject  |

---

For more information on playing CDs or DVDs, click **Help** on the CD or DVD player (if available).

## Adjusting the Volume



**NOTE:** When the speakers are muted, you do not hear the CD or DVD playing.

- 1 Click the **Start** button, point to **All Programs**→**Accessories**→**Entertainment**, and then click **Volume Control**.
- 2 In the **Volume Control** window, click and drag the bar in the **Volume Control** column and slide it up or down to increase or decrease the volume.


For more information on volume control options, click **Help** in the **Volume Control** window.

## Adjusting the Picture

If an error message notifies you that the current resolution and color depth are using too much memory and preventing DVD playback, adjust the display properties:

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a category**, click **Appearance and Themes**.
- 3 Under **Pick a task...**, click **Change the screen resolution**.
- 4 In the **Display Properties** window, click and drag the bar in **Screen resolution** to change the setting to 800 by 600 pixels.
- 5 Click the drop-down menu under **Color quality**, and then click **Medium (16 bit)**.
- 6 Click **OK**.

## Copying CDs and DVDs


 **NOTE:** Ensure that you observe all copyright laws when creating CDs or DVDs.

This section applies only to computers that have a CD-RW, DVD+/-RW, or CD-RW/DVD (combo) drive.

 **NOTE:** The types of CD or DVD drives offered by Dell may vary by country.

The following instructions explain how to make an exact copy of a CD or DVD. You can also use Sonic DigitalMedia for other purposes, such as creating music CDs from audio files stored on your computer or backing up important data. For help, open Sonic DigitalMedia and then click the question mark icon in the upper-right corner of the window.

### How to Copy a CD or DVD

 **NOTE:** CD-RW/DVD combo drives cannot write to DVD media. If you have a CD-RW/DVD combo drive and you experience recording problems, check for available software patches on the Sonic support website at [www.sonic.com](http://www.sonic.com).

The DVD-writable drives installed in Dell™ computers can write to and read DVD+/-R, DVD+/-RW and DVD+R DL (dual layer) media, but cannot write to and may not read DVD-RAM or DVD-R DL media.

 **NOTE:** Most commercial DVDs have copyright protection and cannot be copied using Sonic DigitalMedia.

1 Click **Start**→ **All Programs**→ **Sonic**→ **DigitalMedia Projects**→ **Copy**→ **Disc Copy**.

2 To copy the CD or DVD:

- *If you have one CD or DVD drive*, ensure that the settings are correct and click the **Disc Copy** button. The computer reads your source CD or DVD and copies the data to a temporary folder on your computer hard drive.

When prompted, insert a blank CD or DVD into the drive and click **OK**.

- *If you have two CD or DVD drives*, select the drive into which you have inserted your source CD or DVD and click the **Disc Copy** button. The computer copies the data from the source CD or DVD to the blank CD or DVD.

Once you have finished copying the source CD or DVD, the CD or DVD that you have created automatically ejects.

### Using Blank CDs and DVDs

CD-RW drives can write to CD recording media only (including high-speed CD-RW) while DVD-writable drives can write to both CD and DVD recording media.

Use blank CD-Rs to record music or permanently store data files. After creating a CD-R, you cannot write to that CD-R again (see the Sonic documentation for more information). Use blank CD-RWs to write to CDs or to erase, rewrite, or update data on CDs.

Blank DVD+/-Rs can be used to permanently store large amounts of information. After you create a DVD+/-R disc, you may not be able to write to that disc again if the disc is "finalized" or "closed" during the final stage of the disc creation process. Use blank DVD+/-RWs if you plan to erase, rewrite, or update information on that disc later.

#### CD-Writable Drives

| Media Type | Read | Write | Rewritable |
|------------|------|-------|------------|
| CD-R       | Yes  | Yes   | No         |
| CD-RW      | Yes  | Yes   | Yes        |

#### DVD-Writable Drives

| Media Type | Read | Write | Rewritable |
|------------|------|-------|------------|
| CD-R       | Yes  | Yes   | No         |
| CD-RW      | Yes  | Yes   | Yes        |
| DVD+R      | Yes  | Yes   | No         |
| DVD-R      | Yes  | Yes   | No         |
| DVD+RW     | Yes  | Yes   | Yes        |
| DVD-RW     | Yes  | Yes   | Yes        |
| DVD+R DL   | Yes  | Yes   | No         |

#### Helpful Tips

- Use Microsoft® Windows® Explorer to drag and drop files to a CD-R or CD-RW only after you start Sonic DigitalMedia and open a DigitalMedia project.
- Use CD-Rs to burn music CDs that you want to play in regular stereos. CD-RWs do not play in most home or car stereos.
- You cannot create audio DVDs with Sonic DigitalMedia.
- Music MP3 files can be played only on MP3 players or on computers that have MP3 software installed.
- Commercially available DVD players used in home theater systems may not support all available DVD formats. For a list of formats supported by your DVD player, see the documentation provided with your DVD player or contact the manufacturer.
- Do not burn a blank CD-R or CD-RW to its maximum capacity; for example, do not copy a 650-MB file to a blank 650-MB CD. The CD-RW drive needs 1–2 MB of the blank space to finalize the recording.

- Use a blank CD-RW to practice CD recording until you are familiar with CD recording techniques. If you make a mistake, you can erase the data on the CD-RW and try again. You can also use blank CD-RWs to test music file projects before you record the project permanently to a blank CD-R.
- See the Sonic website at [www.sonic.com](http://www.sonic.com) for additional information.

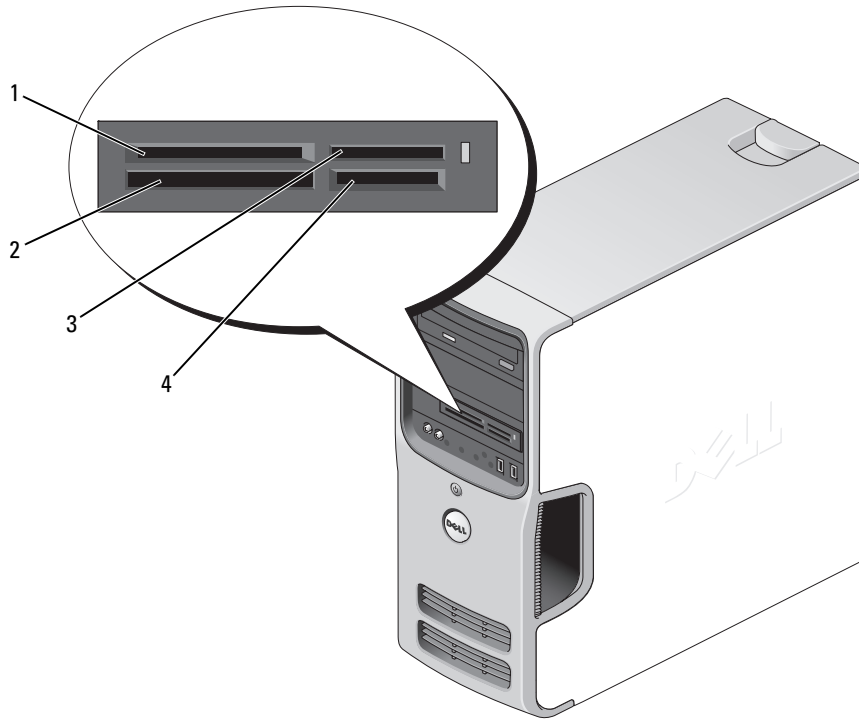
## Using a Media Card Reader (Optional)

Use the Media Card Reader to transfer data directly to your computer.

The Media Card Reader supports the following memory types:

- xD-Picture Card
- SmartMedia (SMC)
- CompactFlash Type I and II (CF I/II)
- MicroDrive Card
- SecureDigital Card (SD)
- MultiMediaCard (MMC)
- Memory Stick (MS/MS Pro)

For information on installing a Media Card Reader, see "Installing a Media Card Reader" on page 99.



- |   |  |   |  |   |                          |
|---|--|---|--|---|--------------------------|
| 1 | xD-Picture Card and SmartMedia (SMC)         | 2 | CompactFlash Type I and II (CF I/II) and MicroDrive Card | 3 | Memory Stick (MS/MS Pro) |
| 4 | SecureDigital Card (SD)/MultiMediaCard (MMC) |   |  |   |                          |

To use the Media Card Reader:

- 1 Check the media or card to determine the proper orientation for insertion.
- 2 Slide the media or card into the appropriate slot until it is completely seated in the connector.  
If you encounter resistance, do not force the media or card. Check the card orientation and try again.

## Connecting Two Monitors

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**NOTICE:** If you are connecting two monitors that have VGA connectors, you must have the optional DVI adapter. If you are connecting two flat-panel monitors, at least one of them must have a VGA connector. If you are connecting a TV, you may connect only one monitor (VGA or DVI) in addition to the TV.

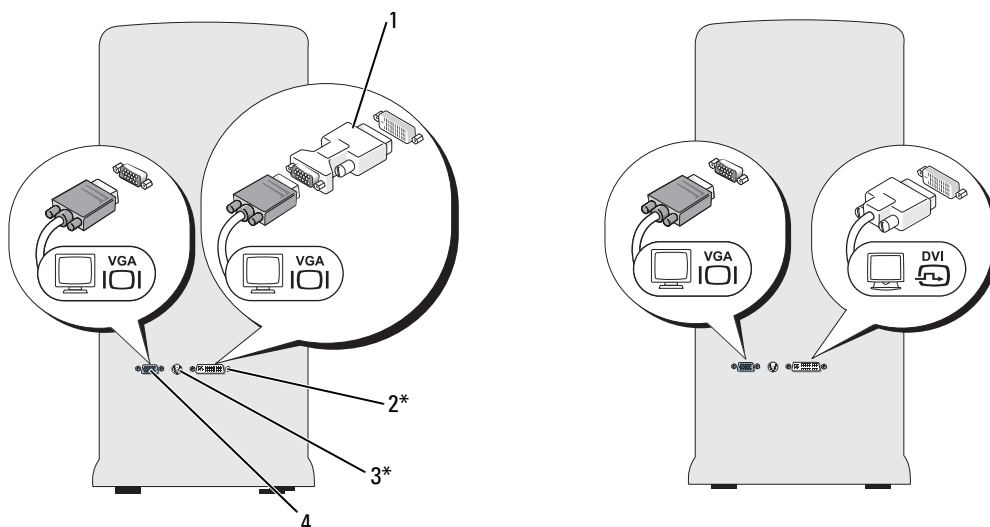
If you purchased a graphics card that supports dual monitors, follow these instructions to connect and enable your monitors. The instructions tell you how to connect either two monitors (each with a VGA connector), one monitor with a VGA connector and one monitor with a DVI connector, or a TV.

### Connecting Two Monitors With VGA Connectors

- 1 Follow the procedures in "Before You Begin" on page 59.

**NOTE:** If your computer has integrated video, do not connect either monitor to the integrated video connector. If the integrated video connector is covered by a cap, do not remove the cap to connect the monitor or the monitor will not function.

- 2 Connect one of the monitors to the VGA (blue) connector on the back of the computer.
- 3 Connect the other monitor to the optional DVI adapter and connect the DVI adapter to the DVI (white) connector on the back of the computer.



\*May not be present on your computer

- |   |                      |   |                       |   |                  |
|---|----------------------|---|-----------------------|---|------------------|
| 1 | optional DVI adapter | 2 | DVI (white) connector | 3 | TV-OUT connector |
| 4 | VGA (blue) connector |   |                       |   |                  |

## Connecting One Monitor With a VGA Connector and One Monitor With a DVI Connector

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Connect the VGA connector on the monitor to the VGA (blue) connector on the back of the computer.
- 3 Connect the DVI connector on the other monitor to the DVI (white) connector on the back of the computer.

## Connecting a TV



**NOTE:** You must purchase an S-video cable, available at most consumer electronics stores, to connect a TV to your computer. It is not included with your computer.

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Connect one end of the S-video cable to the optional TV-OUT connector on the back of the computer.
- 3 Connect the other end of the S-video cable to the S-video input connector on your TV.
- 4 Connect the VGA or DVI monitor.

## Changing the Display Settings

- 1 After you connect the monitor(s) or TV, turn on the computer.  
The Microsoft® Windows® desktop displays on the primary monitor.
- 2 Enable clone mode or extended desktop mode in the display settings.
  - In clone mode, both monitors display the same image.
  - In extended desktop mode, you can drag objects from one screen to the other, effectively doubling the amount of viewable work space.

For information on changing the display settings for your graphics card, see the user's guide in the Help and Support Center (click the **Start** button, click **Help and Support**, click **User and system guides**, click **Device guides**, and then click the guide for your graphics card).

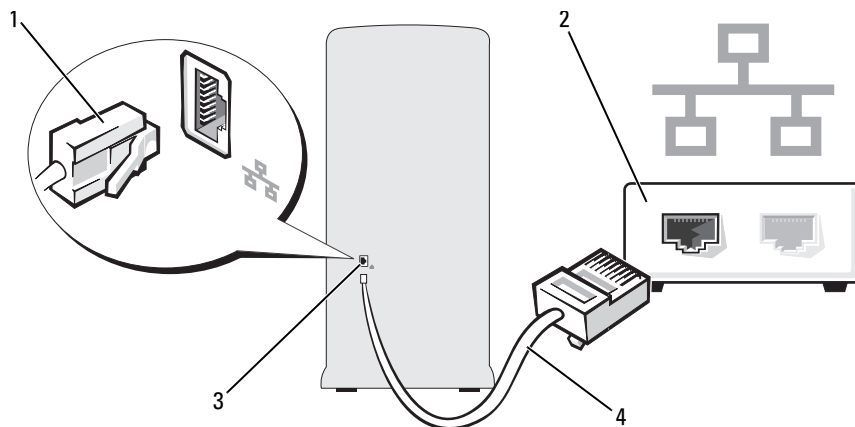
## Setting Up a Home and Office Network

### Connecting to a Network Adapter



**NOTICE:** Plug the network cable into the network adapter connector on the computer. Do not plug the network cable into the modem connector on the computer. Do not plug a network cable into a telephone wall jack.

- 1 Connect the network cable to the network adapter connector on the back of your computer.  
Insert the cable until it clicks into place, and then gently pull it to ensure that it is secure.
- 2 Connect the other end of the network cable to a network device.



- 1 network adapter connector      2 network device      3 network adapter connector on computer
- 4 network cable

## Network Setup Wizard

The Microsoft® Windows® XP operating system provides a Network Setup Wizard to guide you through the process of sharing files, printers, or an Internet connection between computers in a home or small office.

- 1 Click the **Start** button, point to **All Programs**→ **Accessories**→ **Communications**, and then click **Network Setup Wizard**.
- 2 On the welcome screen, click **Next**.
- 3 Click **Checklist for creating a network**.



**NOTE:** Selecting the connection method **This computer connects directly to the Internet** enables the integrated firewall provided with Windows XP Service Pack.

- 4 Complete the checklist and required preparations.
- 5 Return to the Network Setup Wizard and follow the instructions on the screen.

## Power Management

The Microsoft® Windows® XP power management features can reduce the amount of electricity your computer uses when it is on and you are not using it. You can reduce power to just the monitor or the hard drive, or you can use standby mode or hibernate mode to reduce power to the entire computer. When the computer exits from a power conservation mode, the Windows desktop is restored to the state it was in before it entered the mode.





**NOTE:** Windows XP Professional includes security and networking features not available in Windows XP Home Edition. When a Windows XP Professional computer is connected to a network, different options related to security and networking appear in certain windows.

## Standby Mode

Standby mode conserves power by turning off the display and the hard drive after a time-out. When the computer exits from standby mode, it returns to the operating state it was in before it entered standby mode.

To set standby mode to automatically activate after a defined period of inactivity:

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a category**, click **Performance and Maintenance**.
- 3 Under or pick a **Control Panel** icon, click **Power Options**.

To immediately activate standby mode without a period of inactivity, click the **Start** button, click **Turn Off Computer**, and then click **Stand by**.

To exit from standby mode, press a key on the keyboard or move the mouse.



**NOTICE:** If your computer loses power while in standby mode, it may lose data.

## Hibernate Mode

Hibernate mode conserves power by copying system data to a reserved area on the hard drive and then completely turning off the computer. When the computer exits from hibernate mode, the desktop is restored to the state it was in before it entered hibernate mode.

To activate hibernate mode:

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a category**, click **Performance and Maintenance**.
- 3 Under or pick a **Control Panel** icon, click **Power Options**.
- 4 Define your hibernate settings on the **Power Schemes** tab, **Advanced** tab, and **Hibernate** tab.

To exit from hibernate mode, press the power button. The computer may take a short time to exit from hibernate mode. Pressing a key on the keyboard or moving the mouse does not bring the computer out of hibernation, because the keyboard and the mouse do not function when the computer is in hibernate mode.

Because hibernate mode requires a special file on your hard drive with enough disk space to store the contents of the computer memory, Dell creates an appropriately sized hibernate mode file before shipping the computer to you. If the computer's hard drive becomes corrupted, Windows XP recreates the hibernate file automatically.

## Power Options Properties

Define your standby mode settings, hibernate mode settings, and other power settings in the **Power Options Properties** window. To access the **Power Options Properties** window:

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a category**, click **Performance and Maintenance**.
- 3 Under or pick a **Control Panel** icon, click **Power Options**.
- 4 Define your power settings on the **Power Schemes** tab, **Advanced** tab, and **Hibernate** tab.

### Power Schemes Tab

Each standard power setting is called a scheme. If you want to select one of the standard Windows schemes installed on your computer, choose a scheme from the **Power schemes** drop-down menu. The settings for each scheme appear in the fields below the scheme name. Each scheme has different settings for starting standby mode or hibernate mode, turning off the monitor, and turning off the hard drive.

The **Power schemes** drop-down menu displays the following schemes:

- **Always On** (default) — If you want to use your computer with no power conservation.
- **Home/Office Desk** — If you use your computer as a home or office computer and you require minimal power conservation.
- **Presentation** — If you want your computer to run without interruption (using no power conservation).
- **Minimal Power Management** — If you want your computer to run with minimal power conservation.
- **Max Battery** — If your computer is a portable computer and you run your computer from batteries for extended periods of time.


If you want to change the default settings for a scheme, click the drop-down menu in the **Turn off monitor**, **Turn off hard disks**, **System stand by**, or **System hibernates** field, and then select a time-out from the displayed list. Changing the time-out for a scheme field permanently changes the default settings for that scheme, unless you click **Save As** and enter a new name for the changed scheme.



**NOTICE:** If you set the hard drive (hard disk) to time-out before the monitor does, your computer may appear to be locked up. To recover, press any key on the keyboard or click the mouse. To avoid this problem, always set the monitor to time-out before the hard drive.

### Advanced Tab

The **Advanced** tab allows you to:

- Place the power options icon  in the Windows taskbar for quick access.
- Set the computer to prompt you for your Windows password before the computer exits from standby mode or hibernate mode.
- Program the power button to activate standby mode, activate hibernate mode, or turn off the computer.

To program these functions, click an option from the corresponding drop-down menu and click **OK**.

## Hibernate Tab

The **Hibernate** tab allows you to enable hibernate mode. If you want to use the hibernate settings you defined on the **Power Schemes** tab, click the **Enable hibernate support** check box on the **Hibernate** tab.

For more information on power management options:

- 1 Click the **Start** button and click **Help and Support**.
- 2 In the **Help and Support** window, click **Performance and maintenance**.
- 3 In the **Performance and maintenance** window, click **Conserving power on your computer**.

## Hyper-Threading

Hyper-Threading is an Intel® technology that can enhance overall computer performance by allowing one physical processor to function as two logical processors, capable of performing certain tasks simultaneously. It is recommended that you use the Microsoft® Windows® XP Service Pack 1 (SP1) or later operating system because Windows XP is optimized to take advantage of Hyper-Threading technology. While many programs can benefit from Hyper-Threading, some programs have not been optimized for Hyper-Threading and may require an update from the software manufacturer. Contact the software manufacturer for updates and information about using Hyper-Threading with your software.

To determine whether your computer is using Hyper-Threading technology:

- 1 Click the **Start** button, right-click **My Computer**, and then click **Properties**.
- 2 Click **Hardware** and click **Device Manager**.
- 3 In the **Device Manager** window, click the plus (+) sign next to **Processors**. If Hyper-Threading is enabled, the processor is listed twice.

You can enable or disable Hyper-Threading through system setup. For more information on accessing system setup, see "System Setup" on page 113. For more information on Hyper-Threading, search the Knowledge Base on the Dell Support website at [support.dell.com](http://support.dell.com).

## About RAID Configurations

This section provides an overview of the RAID configuration that you might have selected when you purchased your computer. Of the RAID configurations available in the computer industry for different uses, Dell offers RAID level 1 on your computer. A RAID level 1 configuration is recommended for users that desire a high level of data integrity.

The Intel RAID controller on your computer can only create a RAID level configuration using two physical drives. The drives should be the same size to ensure that the larger drive does not contain unallocated (and therefore unusable) space.



**NOTE:** If you purchased your Dell computer with RAID, your computer has been configured with two hard drives that are the same size.

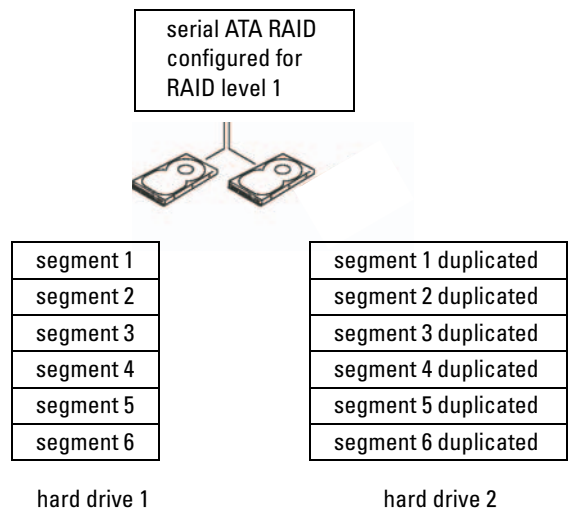
Verifying That RAID Is Working

Your computer displays information pertaining to your RAID configuration at startup, before loading the operating system. If RAID is not configured, the message `none defined` will be displayed under **RAID Volumes**, followed by a list of the physical drives installed in your system. If a RAID volume is identified, you can then check the **Status** field to determine the current state of your RAID configuration. The **Status** field contains information about the following conditions:

- **Normal** — Your RAID configuration is functioning properly.
- **Degraded** — One of your hard drives has failed. The computer is still bootable; however, RAID is not functioning and data is not being copied to the other drive.
- **Rebuild** — Following a degraded condition, the computer has detected the replacement/connection of a secondary hard drive and will automatically restore the RAID configuration the next time the operating system loads.

RAID Level 1

RAID level 1 uses a data-redundancy storage technique known as "mirroring." When data is written to the primary drive, the data is then duplicated—or mirrored—on the other drive. A RAID level 1 configuration sacrifices high-data access rates for its data redundancy advantages.



If a drive failure occurs, subsequent read and write operations are directed to the surviving drive. A replacement drive can then be rebuilt using the data from the surviving drive. Also, because data is duplicated on both drives, two 120-GB RAID level 1 drives collectively have a maximum of 120-GB on which to store data.

## Troubleshooting RAID

You can use one of two methods to troubleshoot RAID hard drive volumes. One method uses the Intel RAID Option ROM utility and is performed *before* you install the operating system onto the hard drive. The second method uses the Intel Matrix Storage Manager, or Intel Matrix Storage Console, and is performed *after* the operating system and the Intel Matrix Storage Console have been installed. Both methods require that you set your computer to RAID-enabled mode (see "Setting Your Computer to RAID-Enabled Mode" on page 30) before you begin.

### Recovering From a Multiple Hard Drive Failure Using the Intel® RAID Option ROM Utility



**NOTE:** The following steps procedure will not restore any data lost during the hard drive failure. It can be performed only after the failed hard drives have been replaced (see "Hard Drive" on page 88).

Although hard drives of any size may be combined to create a RAID configuration, the drives should ideally be of equal size when using the Intel RAID Option ROM utility. In a RAID level 1 configuration, the size of the configuration will be equivalent to the smaller of the two drives used.

- 1 Set your computer to RAID-enabled mode (see "Setting Your Computer to RAID-Enabled Mode" on page 30).
- 2 Press <Ctrl> <i> when you are prompted to enter the Intel RAID Option ROM utility.
- 3 Use the up- and down-arrow keys to highlight **Create RAID Volume** and press <Enter>.
- 4 Enter a RAID volume name or accept the default and press <Enter>.
- 5 Select **RAID1 (Mirror)** and press <Enter>.
- 6 Select the desired capacity for the volume, and press <Enter>. The default value is the maximum available size.
- 7 Press <Enter> to create the volume.
- 8 Press <y> to confirm that you want to create the RAID volume.
- 9 Confirm that the correct volume configuration is displayed on the main Intel RAID Option ROM utility screen.
- 10 Use the up- and down-arrow keys to select **Exit** and press <Enter>.
- 11 Install the operating system using the supplied media (see "Restoring Your Operating System" on page 53).

### Recovering From a Single Hard Drive Failure Using the Intel Matrix Storage Manager



**NOTE:** The following steps can be performed only after the failed hard drive has been replaced (see "Hard Drive" on page 88).

- 1 Click the **Start** button and point to **Programs→ Intel(R) Matrix Storage Manager→ Intel Matrix Storage Console** to launch the Intel Storage Utility.
- 2 Click the **Restore RAID 1 data protection** button.

- 3 Click the **Rebuild RAID volume now** button.
- 4 Click the **Yes** button to start rebuilding the RAID volume to the new hard drive.



**NOTE:** You can use your computer while the computer is rebuilding the RAID level 1 volume.

## Setting Your Computer to RAID-Enabled Mode

- 1 Enter system setup (see "System Setup" on page 113).
- 2 Press the up- and down-arrow keys to highlight **Drives**, and press <Enter>.
- 3 Press the up- and down-arrow keys to highlight **SATA Operation**, and press <Enter>.
- 4 Press the left- and right-arrow keys to highlight **RAID On**, press <Enter>, and then press <Esc>.



**NOTE:** For more information about RAID options, see "System Setup Options" on page 114.

- 5 Press the left- and right-arrow keys to highlight **Save/Exit**, and press <Enter> to exit system setup and resume the boot process.

## Dell™ DataSafe (Optional)

Dell DataSafe is a solution that helps you protect your data from unfortunate events such as data loss from system crashes, hard drive failures, software corruption, viruses, and other accidents. Using Intel technology, your computer has a robust level of data protection out of the factory. With Dell DataSafe, you will have a selected area on your system that automatically stores periodic copies of your computer's hard drive data.

Not only does Dell DataSafe help you to store and protect your valuable data such as photos, music, videos, files, and more, it also helps restore your computer and your data in the event of a failure. The included software can give you the power to roll back your system to a healthy state after a system problem, easily retrieve deleted files, and recover individual files or an entire hard drive, and the Intel Matrix Storage Console (RAID) allows for continued functionality in the case of a single hard drive failure.

# Solving Problems

## Troubleshooting Tips

Follow these tips when you troubleshoot your computer:

- If you added or removed a part before the problem started, review the installation procedures and ensure that the part is correctly installed.
- If a peripheral device does not work, ensure that the device is properly connected.
- If an error message appears on the screen, write down the exact message. This message may help technical support personnel diagnose and fix the problem.
- If an error message occurs in a program, see the program's documentation.

## Battery Problems



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



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**REPLACE THE BATTERY** — If you have to repeatedly reset time and date information after turning on the computer, or if an incorrect time or date displays during start-up, replace the battery (see "Replacing the Battery" on page 105). If the battery still does not work properly, contact Dell (see "Contacting Dell" on page 124).

# Drive Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**ENSURE THAT MICROSOFT® WINDOWS® RECOGNIZES THE DRIVE** — Click the **Start** button and click **My Computer**. If the floppy, CD, or DVD drive, is not listed, perform a full scan with your antivirus software to check for and remove viruses. Viruses can sometimes prevent Windows from recognizing the drive.

## **TEST THE DRIVE** —

- Insert another floppy disk, CD, or DVD to eliminate the possibility that the original one is defective.
- Insert bootable media and restart the computer.

**CLEAN THE DRIVE OR DISK** — See "Cleaning Your Computer" on page 121.

## **CHECK THE CABLE CONNECTIONS**

**RUN THE HARDWARE TROUBLESHOOTER** — See "Resolving Software and Hardware Incompatibilities" on page 53.

**RUN THE DELL DIAGNOSTICS** — See "Dell Diagnostics" on page 50.

## CD and DVD drive problems



**NOTE:** High-speed CD or DVD drive vibration is normal and may cause noise, which does not indicate a defect in the drive or the CD or DVD.



**NOTE:** Because of different regions worldwide and different disc formats, not all DVD titles work in all DVD drives.

## **ADJUST THE WINDOWS VOLUME CONTROL** —

- Click the speaker icon in the lower-right corner of your screen.
- Ensure that the volume is turned up by clicking the sidebar and dragging it up.
- Ensure that the sound is not muted by clicking any boxes that are checked.

**CHECK THE SPEAKERS AND SUBWOOFER** — See "Sound and Speaker Problems" on page 43.



## Problems writing to a CD/DVD-RW drive

**CLOSE OTHER PROGRAMS** — The CD/DVD-RW drive must receive a steady stream of data when writing. If the stream is interrupted, an error occurs. Try closing all programs before you write to the CD/DVD-RW.

**TURN OFF STANDBY MODE IN WINDOWS BEFORE WRITING TO A CD/DVD-RW DISC** — Search for the keyword *standby* in Windows Help.

## Hard drive problems

### **RUN CHECK DISK** —

- 1 Click the **Start** button and click **My Computer**.
- 2 Right-click **Local Disk C:**.
- 3 Click **Properties**.
- 4 Click the **Tools** tab.
- 5 Under **Error-checking**, click **Check Now**.
- 6 Click **Scan for and attempt recovery of bad sectors**.
- 7 Click **Start**.

## E-Mail, Modem, and Internet Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**NOTE:** Connect the modem to an analog telephone jack only. The modem does not operate while it is connected to a digital telephone network.

**CHECK THE MICROSOFT OUTLOOK® EXPRESS SECURITY SETTINGS** — If you cannot open your e-mail attachments:

- 1 In Outlook Express, click **Tools**, click **Options**, and then click **Security**.
- 2 Click **Do not allow attachments** to remove the checkmark.

**CHECK THE TELEPHONE LINE CONNECTION —**

**CHECK THE TELEPHONE JACK —**

**CONNECT THE MODEM DIRECTLY TO THE TELEPHONE WALL JACK —**

**USE A DIFFERENT TELEPHONE LINE —**

- Verify that the telephone line is connected to the jack on the modem. (The jack has either a green label or a connector-shaped icon next to it.)
- Ensure that you feel a click when you insert the telephone line connector into the modem.
- Disconnect the telephone line from the modem and connect it to a telephone. Listen for a dial tone.
- If you have other telephone devices sharing the line, such as an answering machine, fax machine, surge protector, or line splitter, then bypass them and use the telephone to connect the modem directly to the telephone wall jack. If you are using a line that is 3 m (10 ft) or more in length, try a shorter one.

**RUN THE MODEM HELPER DIAGNOSTICS —** Click the **Start** button, point to **All Programs**, and then click **Modem Helper**. Follow the instructions on the screen to identify and resolve modem problems. (Modem Helper is not available on all computers.)

**VERIFY THAT THE MODEM IS COMMUNICATING WITH WINDOWS —**

- 1 Click the **Start** button and click **Control Panel**.
  - 2 Click **Printers and Other Hardware**.
  - 3 Click **Phone and Modem Options**.
  - 4 Click the **Modems** tab.
  - 5 Click the COM port for your modem.
  - 6 Click **Properties**, click the **Diagnostics** tab, and then click **Query Modem** to verify that the modem is communicating with Windows.
- If all commands receive responses, the modem is operating properly.

**ENSURE THAT YOU ARE CONNECTED TO THE INTERNET —** Ensure that you have subscribed to an Internet provider. With the Outlook Express e-mail program open, click **File**. If **Work Offline** has a checkmark next to it, click the checkmark to remove it and connect to the Internet. For help, contact your Internet service provider.

## Error Messages

If the message is not listed, see the documentation for the operating system or the program that was running when the message appeared.

**A FILENAME CANNOT CONTAIN ANY OF THE FOLLOWING CHARACTERS: \ / : \* ? " < > | —** Do not use these characters in filenames.

**A REQUIRED .DLL FILE WAS NOT FOUND** — The program that you are trying to open is missing an essential file. To remove and then reinstall the program:

- 1 Click the **Start** button, click **Control Panel**, and then click **Add or Remove Programs**.
- 2 Select the program you want to remove.
- 3 Click the **Change or Remove Program** icon.
- 4 See the program documentation for installation instructions.

**ALERT! AIR TEMPERATURE SENSOR NOT DETECTED** — For any computer type except the ultra small form-factor computer, ensure that all cables are securely fastened to the I/O panel and to the system board and reboot your computer. If this does not resolve the problem or if you have an ultra small form-factor computer, contact Dell (see "Contacting Dell" on page 124).

**drive letter :\\ IS NOT ACCESSIBLE. THE DEVICE IS NOT READY** — The drive cannot read the disk. Insert a disk into the drive and try again.

**INSERT BOOTABLE MEDIA** — Insert a bootable floppy disk or CD.

**NON-SYSTEM DISK ERROR** — Remove the floppy disk from the drive and restart your computer.

**NOT ENOUGH MEMORY OR RESOURCES. CLOSE SOME PROGRAMS AND TRY AGAIN** — Close all windows and open the program that you want to use. In some cases, you might have to restart your computer to restore computer resources. If so, run the program that you want to use first.

**OPERATING SYSTEM NOT FOUND** — Contact Dell (see "Contacting Dell" on page 124).

## Keyboard Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

### CHECK THE KEYBOARD CABLE —

- Ensure that the keyboard cable is firmly connected to the computer.
- Shut down the computer (see "Turning Off Your Computer" on page 59), reconnect the keyboard cable as shown on the setup diagram for your computer, and then restart the computer.
- Check the cable connector for bent or broken pins and for damaged or frayed cables. Straighten bent pins.
- Remove keyboard extension cables and connect the keyboard directly to the computer.

**TEST THE KEYBOARD** — Connect a properly working keyboard to the computer, and try using the keyboard.

**RUN THE HARDWARE TROUBLESHOOTER** — See "Resolving Software and Hardware Incompatibilities" on page 53.

## Lockups and Software Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

### The computer does not start up

**CHECK THE DIAGNOSTIC LIGHTS** — See "Diagnostic Lights" on page 47.

**ENSURE THAT THE POWER CABLE IS FIRMLY CONNECTED TO THE COMPUTER AND TO THE ELECTRICAL OUTLET**

### The computer stops responding



**NOTICE:** You might lose data if you are unable to perform an operating system shutdown.

**TURN THE COMPUTER OFF** — If you are unable to get a response by pressing a key on your keyboard or moving your mouse, press and hold the power button for at least 8 to 10 seconds until the computer turns off. Then restart your computer.

### A program stops responding

**END THE PROGRAM** —

- 1 Press <Ctrl><Shift><Esc> simultaneously.
- 2 Click Applications.
- 3 Click the program that is no longer responding.
- 4 Click End Task.

## A program crashes repeatedly



**NOTE:** Software usually includes installation instructions in its documentation or on a floppy disk or CD.

**CHECK THE SOFTWARE DOCUMENTATION** — If necessary, uninstall and then reinstall the program.

## A program is designed for an earlier Microsoft® Windows® operating system

### **RUN THE PROGRAM COMPATIBILITY WIZARD** —

The Program Compatibility Wizard configures a program so it runs in an environment similar to non-Windows XP operating system environments.

- 1 Click the **Start** button, point to **All Programs→Accessories**, and then click **Program Compatibility Wizard**.
- 2 In the welcome screen, click **Next**.
- 3 Follow the instructions on the screen.

## A solid blue screen appears

**TURN THE COMPUTER OFF** — If you are unable to get a response by pressing a key on your keyboard or moving your mouse, press and hold the power button for at least 8 to 10 seconds until the computer turns off. Then restart your computer.

## Other software problems

### **CHECK THE SOFTWARE DOCUMENTATION OR CONTACT THE SOFTWARE MANUFACTURER FOR TROUBLESHOOTING INFORMATION** —

- Ensure that the program is compatible with the operating system installed on your computer.
- Ensure that your computer meets the minimum hardware requirements needed to run the software. See the software documentation for information.
- Ensure that the program is installed and configured properly.
- Verify that the device drivers do not conflict with the program.
- If necessary, uninstall and then reinstall the program.

### **BACK UP YOUR FILES IMMEDIATELY**

### **USE A VIRUS-SCANNING PROGRAM TO CHECK THE HARD DRIVE, FLOPPY DISKS, OR CDs**

**SAVE AND CLOSE ANY OPEN FILES OR PROGRAMS AND SHUT DOWN YOUR COMPUTER THROUGH THE START MENU**

## Media Card Reader Problems

### **NO DRIVE LETTER IS ASSIGNED —**

When Microsoft Windows XP detects the Media Card Reader, the device is automatically assigned a drive letter as the next logical drive after all other physical drives in the system. If the next logical drive after the physical drives is mapped to a network drive, Windows XP does not automatically assign a drive letter to the Media Card Reader.

To manually assign a drive for the Media Card Reader:

- 1** Right-click **My Computer** and select **Manage**.
- 2** Select the **Disk Management** option.
- 3** Right-click the corresponding drive letter in the right pane that needs to be changed.
- 4** Select **Drive Letter and Paths**.
- 5** From the drop-down list, select the new drive letter assignment for the Media Card Reader.
- 6** Click **OK** to confirm your selection.

**NOTE:** The Media Card Reader only appears as a mapped drive when it is connected. Each of the four Media Card Reader slots are mapped to a drive even if no media is installed. If you attempt to access the Media Card Reader when no media is inserted, you are prompted to insert media.

### **FLEXBAY DEVICE IS DISABLED —**

There is a **FlexBay disable** option in the BIOS setup that appears only when the FlexBay device is installed. If the FlexBay device is physically installed, but it is not running, check to see if it is enabled in the BIOS setup.

## Memory Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

### IF YOU RECEIVE AN INSUFFICIENT MEMORY MESSAGE —

- Save and close any open files and exit any open programs you are not using to see if that resolves the problem.
- See the software documentation for minimum memory requirements. If necessary, install additional memory (see "Installing Memory" on page 70).
- Reseat the memory modules (see "Installing Memory" on page 70) to ensure that your computer is successfully communicating with the memory.
- Run the Dell Diagnostics (see "Dell Diagnostics" on page 50).

### IF YOU EXPERIENCE OTHER MEMORY PROBLEMS —

- Reseat the memory modules (see "Installing Memory" on page 70) to ensure that your computer is successfully communicating with the memory.
- Ensure that you are following the memory installation guidelines (see "Installing Memory" on page 70).
- Your computer supports DDR2 memory. For more information about the type of memory supported by your computer, see "Memory" on page 109.
- Run the Dell Diagnostics (see "Dell Diagnostics" on page 50).

## Mouse Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**CLEAN THE MOUSE —** See "Mouse" on page 122 for instructions on cleaning the mouse.

### CHECK THE MOUSE CABLE —

- 1 Remove mouse extension cables, if used, and connect the mouse directly to the computer.
- 2 Reconnect the mouse cable as shown on the setup diagram for your computer.

#### **RESTART THE COMPUTER —**

- 1 Simultaneously press <Ctrl><Esc> to display the **Start** menu.
- 2 Type **u**, press the keyboard arrow keys to highlight **Shut down** or **Turn Off**, and then press <Enter>.
- 3 After the computer turns off, reconnect the mouse cable as shown on the on the setup diagram for your computer.
- 4 Start the computer.

**TEST THE MOUSE —** Connect a properly working mouse to the computer, and try using the mouse.

#### **CHECK THE MOUSE SETTINGS —**

- 1 Click the **Start** button, click **Control Panel**, and then click **Printers and Other Hardware**.
- 2 Click **Mouse**.
- 3 Try adjusting the settings.

**REINSTALL THE MOUSE DRIVER —** See "Reinstalling Drivers" on page 52.

**RUN THE HARDWARE TROUBLESHOOTER —** See "Resolving Software and Hardware Incompatibilities" on page 53.

## **Network Problems**



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**CHECK THE NETWORK CABLE CONNECTOR —** Ensure that the network cable is firmly inserted into both the network connector on the back of the computer and the network port or device.

**CHECK THE NETWORK LIGHTS ON THE BACK OF THE COMPUTER —** If the link integrity light is off, that indicates no network communication exists. Replace the network cable. For a description of network lights, see "Controls and Lights" on page 111.

#### **RESTART THE COMPUTER AND LOG ON TO THE NETWORK AGAIN**

**CHECK YOUR NETWORK SETTINGS —** Contact your network administrator or the person who set up your network to verify that your network settings are correct and that the network is functioning.



**RUN THE HARDWARE TROUBLESHOOTER** — See "Resolving Software and Hardware Incompatibilities" on page 53.

## Power Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**IF THE POWER LIGHT IS GREEN AND THE COMPUTER IS NOT RESPONDING** — See "Diagnostic Lights" on page 47.

**IF THE POWER LIGHT IS BLINKING GREEN** — The computer is in standby mode. Press a key on the keyboard, move the mouse, or press the power button to resume normal operation.

**IF THE POWER LIGHT IS OFF** — The computer is either turned off or is not receiving power.

- Reseat the power cable into both the power connector on the back of the computer and the electrical outlet.
- If the computer is plugged into a power strip, ensure that the power strip is plugged into an electrical outlet and that the power strip is turned on. Also bypass power protection devices, power strips, and power extension cables to verify that the computer turns on properly.
- Ensure that the electrical outlet is working by testing it with another device, such as a lamp.
- Ensure that the main power cable and front panel cable are securely connected to the system board (see "System Board Components" on page 68).

**IF THE POWER LIGHT IS STEADY AMBER** — A device might be malfunctioning or incorrectly installed.

- Ensure that the 12-volt power connector (12V) is securely connected to the system board (see "System Board Components" on page 68).
- Remove and then reinstall the memory modules (see "Installing Memory" on page 70).
- Remove and then reinstall any cards (see "Cards" on page 73).
- Remove and then reinstall the graphics card, if applicable (see "PCI Express Cards" on page 77).

**IF THE POWER LIGHT IS BLINKING AMBER** — The computer is receiving electrical power, but an internal power problem might exist.

- Ensure that the voltage selection switch is set to match the AC power at your location (if applicable). See "Back View of the Computer" on page 63.
- Ensure that the 12-volt power connector (12V) is securely connected to the system board (see "System Board Components" on page 68).

**ELIMINATE INTERFERENCE** — Some possible causes of interference are:

- Power, keyboard, and mouse extension cables
- Too many devices on a power strip
- Multiple power strips connected to the same electrical outlet

## Printer Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**NOTE:** If you need technical assistance for your printer, contact the printer's manufacturer.

**CHECK THE PRINTER DOCUMENTATION** — See the printer documentation for setup and troubleshooting information.

### ENSURE THAT THE PRINTER IS TURNED ON

#### CHECK THE PRINTER CABLE CONNECTIONS —

- See the printer documentation for cable connection information.
- Ensure that the printer cables are securely connected to the printer and the computer (see "Setting Up a Printer" on page 13).

**TEST THE ELECTRICAL OUTLET** — Ensure that the electrical outlet is working by testing it with another device, such as a lamp.

#### VERIFY THAT THE PRINTER IS RECOGNIZED BY WINDOWS —

- 1 Click the **Start** button, click **Control Panel**, and then click **Printers and Other Hardware**.
- 2 Click **View installed printers or fax printers**.  
If the printer is listed, right-click the printer icon.
- 3 Click **Properties** and click the **Ports** tab. Ensure that the **Print to the following port(s):** setting is **USB**.

**REINSTALL THE PRINTER DRIVER** — See the printer documentation for instructions.

## Scanner Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**NOTE:** If you need technical assistance for your scanner, contact the scanner's manufacturer.

**CHECK THE SCANNER DOCUMENTATION** — See the scanner documentation for setup and troubleshooting information.

**UNLOCK THE SCANNER** — Ensure that your scanner is unlocked if it has a locking tab or button.

**RESTART THE COMPUTER AND TRY THE SCANNER AGAIN**

**CHECK THE CABLE CONNECTIONS** —

- See the scanner documentation for cable connection information.
- Ensure that the scanner cables are securely connected to the scanner and the computer.

**VERIFY THAT THE SCANNER IS RECOGNIZED BY MICROSOFT WINDOWS** —

1 Click the Start button, click Control Panel, and then click Printers and Other Hardware.

2 Click Scanners and Cameras.

If your scanner is listed, Windows recognizes the scanner.

**REINSTALL THE SCANNER DRIVER** — See the scanner documentation for instructions.

## Sound and Speaker Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

### No sound from speakers



**NOTE:** The volume control in some MP3 players overrides the Windows volume setting. If you have been listening to MP3 songs, ensure that you did not turn the player volume down or off.

**CHECK THE SPEAKER CABLE CONNECTIONS** — Ensure that the speakers are connected as shown on the setup diagram supplied with the speakers. If you purchased a sound card, ensure that the speakers are connected to the card.

**ENSURE THAT THE SUBWOOFER AND THE SPEAKERS ARE TURNED ON** — See the setup diagram supplied with the speakers. If your speakers have volume controls, adjust the volume, bass, or treble to eliminate distortion.

**ADJUST THE WINDOWS VOLUME CONTROL** — Click or double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and that the sound is not muted.

**DISCONNECT HEADPHONES FROM THE HEADPHONE CONNECTOR** — Sound from the speakers is automatically disabled when headphones are connected to the computer's front-panel headphone connector.

**TEST THE ELECTRICAL OUTLET** — Ensure that the electrical outlet is working by testing it with another device, such as a lamp.

**ELIMINATE POSSIBLE INTERFERENCE** — Turn off nearby fans, fluorescent lights, or halogen lamps to check for interference.

**REINSTALL THE SOUND DRIVER** — See "Manually Reinstalling Drivers" on page 53.

**RUN THE HARDWARE TROUBLESHOOTER** — See "Resolving Software and Hardware Incompatibilities" on page 53.

## No sound from headphones

**CHECK THE HEADPHONE CABLE CONNECTION** — Ensure that the headphone cable is securely inserted into the headphone connector (see "Front View of the Computer" on page 61).

**ADJUST THE WINDOWS VOLUME CONTROL** — Click or double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and that the sound is not muted.

## Video and Monitor Problems



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**NOTE:** See the monitor documentation for troubleshooting procedures.

### If the screen is blank

#### **CHECK THE MONITOR CABLE CONNECTION —**

- Ensure that the graphics cable is connected as shown on the setup diagram for your computer.
- If you are using a graphics extension cable and removing the cable solves the problem, the cable is defective.
- Swap the computer and monitor power cables to determine whether the power cable is defective.
- Check the connector for bent or broken pins. (It is normal for monitor cable connectors to have missing pins.)

**CHECK THE MONITOR POWER LIGHT —** If the power light is off, firmly press the button to ensure that the monitor is turned on. If the power light is lit or blinking, the monitor has power. If the power light is blinking, press a key on the keyboard or move the mouse.

**TEST THE ELECTRICAL OUTLET —** Ensure that the electrical outlet is working by testing it with another device, such as a lamp.

**CHECK THE DIAGNOSTIC LIGHTS —** See "Diagnostic Lights" on page 47.

### If the screen is difficult to read

**CHECK THE MONITOR SETTINGS —** See the monitor documentation for instructions on adjusting the contrast and brightness, demagnetizing (degaussing) the monitor, and running the monitor self-test.

**MOVE THE SUBWOOFER AWAY FROM THE MONITOR —** If your speaker system includes a subwoofer, ensure that the subwoofer is at least 60 cm (2 ft) away from the monitor.

**MOVE THE MONITOR AWAY FROM EXTERNAL POWER SOURCES —** Fans, fluorescent lights, halogen lamps, and other electrical devices can cause the screen image to appear "shaky." Turn off nearby devices to check for interference.

**ROTATE THE MONITOR TO ELIMINATE SUNLIGHT GLARE AND POSSIBLE INTERFERENCE**

#### **ADJUST THE WINDOWS DISPLAY SETTINGS —**

- 1** Click the **Start** button, click **Control Panel**, and then click **Appearance and Themes**.
- 2** Click **Display** and click the **Settings** tab.
- 3** Try different settings for **Screen resolution** and **Color quality**.

# Troubleshooting Tools






## Diagnostic Lights















**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

To help you troubleshoot a problem, your computer has four lights labeled "1," "2," "3," and "4" on the front panel (see "Front View of the Computer" on page 61). When the computer starts normally, the lights flash. If the computer malfunctions, the color and sequence of the lights identify the problem.

| Light Pattern | Problem Description   | Suggested Resolution   |
|---------------|---|--|
|               | The computer is in a normal "off" condition, a normal "on" condition after the computer successfully booted to the operating system, or a possible pre-BIOS failure has occurred. | Plug the computer into a working electrical outlet and press the power button. Also see "Power Problems" on page 41.   |
|               | A possible processor failure has occurred.  | Contact Dell (see "Contacting Dell" on page 124).  |
|               | Memory modules are detected, but a memory failure has occurred.   | <ul style="list-style-type: none"><li>• If you have two or more memory modules installed, remove the modules, reinstall one module (see "Installing Memory" on page 70), and then restart the computer. If the computer starts normally, reinstall an additional module. Continue until you have identified a faulty module or reinstalled all modules without error.</li><li>• If available, install properly working memory of the same type into your computer (see "Installing Memory" on page 70).</li><li>• If the problem persists, contact Dell (see "Contacting Dell" on page 124).</li></ul> |

| Light Pattern   | Problem Description  | Suggested Resolution   |
|---|--|--|
|    | A possible graphics card failure has occurred.   | <ul style="list-style-type: none"> <li>• If the computer has a graphics card, remove the card, reinstall it (see "PCI Express Cards" on page 77), and then restart the computer.</li> <li>• If the problem still exists, install a graphics card that you know works and restart the computer.</li> <li>• If the problem persists or the computer has integrated graphics, contact Dell (see "Contacting Dell" on page 124).</li> </ul>  |
|    | A possible floppy or hard drive failure has occurred.                                  | Reseat all power and data cables and restart the computer.   |
|    | A possible USB failure has occurred.   | Reinstall all USB devices, check cable connections, and then restart the computer.   |
|    | No memory modules are detected.  | <ul style="list-style-type: none"> <li>• If you have two or more memory modules installed, remove the modules, reinstall one module (see "Installing Memory" on page 70), and then restart the computer. If the computer starts normally, reinstall an additional module. Continue until you have identified a faulty module or reinstalled all modules without error.</li> <li>• If available, install properly working memory of the same type into your computer (see "Installing Memory" on page 70).</li> <li>• If the problem persists, contact Dell (see "Contacting Dell" on page 124).</li> </ul> |
|  | Memory modules are detected, but a memory configuration or compatibility error exists. | <ul style="list-style-type: none"> <li>• Ensure that no special memory module/memory connector placement requirements exist (see "DDR2 Memory Overview" on page 69).</li> <li>• Verify that the memory modules that you are installing are compatible with your computer (see "DDR2 Memory Overview" on page 69).</li> <li>• If the problem persists, contact Dell (see "Contacting Dell" on page 124).</li> </ul>   |




| Light Pattern   | Problem Description  | Suggested Resolution   |
|---|--|--|
|             | A possible expansion card failure has occurred.                                    | <ol style="list-style-type: none"> <li><b>1</b> Determine whether a conflict exists by removing a card (not a graphics card) and restarting the computer. See "Cards" on page 73.</li> <li><b>2</b> If the problem persists, reinstall the card that you removed, remove a different card, and then restart the computer.</li> <li><b>3</b> Repeat this process for each card. If the computer starts normally, troubleshoot the last card removed from the computer for resource conflicts (see "Resolving Software and Hardware Incompatibilities" on page 53).</li> <li><b>4</b> If the problem persists, contact Dell (see "Contacting Dell" on page 124).</li> </ol>  |
|             | Another failure has occurred.  | <ul style="list-style-type: none"> <li>• Ensure that the cables are properly connected to the system board from the hard drive, CD drive, and DVD drive (see "Drives" on page 86).</li> <li>• If there is an error message on your screen identifying a problem with a device (such as the floppy drive or hard drive), check the device to ensure that it is functioning properly.</li> <li>• The operating system is attempting to boot from a device (such as the floppy drive or hard drive); check system setup to ensure that the boot sequence is correct for the devices installed on your computer (see "System Setup" on page 113).</li> <li>• If the problem persists, contact Dell (see "Contacting Dell" on page 124).</li> </ul> |
|     | All four lights flash when computer is in a normal operating condition after POST. | None.  |

# Dell Diagnostics

 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

If you experience a problem with your computer, perform the checks in "Solving Problems" on page 31 and run the Dell Diagnostics before you contact Dell for technical assistance.

 **NOTICE:** The Dell Diagnostics works only on Dell™ computers.

- 1 Turn on (or restart) your computer.
- 2 When the DELL™ logo appears, press <F12> immediately.  
If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft® Windows® desktop. Then shut down your computer (see "Turning Off Your Computer" on page 59) and try again.
- 3 When the boot device list appears, highlight **Boot to Utility Partition** and press <Enter>.
- 4 When the Dell Diagnostics **Main Menu** appears, select the test you want to run.


## Dell Diagnostics Main Menu

- 1 After the Dell Diagnostics loads and the **Main Menu** screen appears, click the button for the option you want.

| Option        | Function   |
|---------------|--|
| Express Test  | Performs a quick test of devices. This test typically takes 10 to 20 minutes and requires no interaction on your part. Run <b>Express Test</b> first to increase the possibility of tracing the problem quickly. |
| Extended Test | Performs a thorough check of devices. This test typically takes an hour or more and requires you to answer questions periodically.   |
| Custom Test   | Tests a specific device. You can customize the tests you want to run.  |
| Symptom Tree  | Lists the most common symptoms encountered and allows you to select a test based on the symptom of the problem you are having.   |

- 2 If a problem is encountered during a test, a message appears with an error code and a description of the problem. Write down the error code and problem description and follow the instructions on the screen.

If you cannot resolve the error condition, contact Dell (see "Contacting Dell" on page 124).

 **NOTE:** The Service Tag for your computer is located at the top of each test screen. If you contact Dell, technical support will ask for your Service Tag.

- 3** If you run a test from the **Custom Test** or **Symptom Tree** option, click the applicable tab described in the following table for more information.

| Tab           | Function   |
|---------------|--|
| Results       | Displays the results of the test and any error conditions encountered.   |
| Errors        | Displays error conditions encountered, error codes, and the problem description.   |
| Help          | Describes the test and may indicate requirements for running the test.   |
| Configuration | Displays your hardware configuration for the selected device.<br>The Dell Diagnostics obtains configuration information for all devices from system setup, memory, and various internal tests, and it displays the information in the device list in the left pane of the screen. The device list may not display the names of all the components installed on your computer or all devices attached to your computer. |
| Parameters    | Allows you to customize the test by changing the test settings.  |

- 4** Close the test screen to return to the **Main Menu** screen. To exit the Dell Diagnostics and restart the computer, close the **Main Menu** screen.

# Drivers

## What Is a Driver?

A driver is a program that controls a device such as a printer, mouse, or keyboard. All devices require a driver program.

A driver acts like a translator between the device and any other programs that use the device. Each device has its own set of specialized commands that only its driver recognizes.

Dell ships your computer to you with required drivers already installed—no further installation or configuration is needed.

Many drivers, such as the keyboard driver, come with your Microsoft® Windows® operating system. You may need to install drivers if you:

- Upgrade your operating system
- Reinstall your operating system
- Connect or install a new device

## Identifying Drivers

If you experience a problem with any device, identify whether the driver is the source of your problem and, if necessary, update the driver.

### Windows XP

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a Category**, click **Performance and Maintenance**.
- 3 Click **System**.
- 4 In the **System Properties** window, click the **Hardware** tab.
- 5 Click **Device Manager**.
- 6 Scroll down the list to see if any device has an exclamation point (a yellow circle with a [!]) on the device icon.

If an exclamation point is next to the device name, you may need to reinstall the driver or install a new driver.

## Reinstalling Drivers



**NOTICE:** The Dell Support website at [support.dell.com](http://support.dell.com) provides approved drivers for Dell™ computers. If you install drivers obtained from other sources, your computer might not work correctly.

### Using Windows XP Device Driver Rollback

If a problem occurs on your computer after you install or update a driver, use Windows XP Device Driver Rollback to replace the driver with the previously installed version.

- 1 Click the **Start** button and click **Control Panel**.
- 2 Under **Pick a Category**, click **Performance and Maintenance**.
- 3 Click **System**.
- 4 In the **System Properties** window, click the **Hardware** tab.
- 5 Click **Device Manager**.
- 6 Right-click the device for which the new driver was installed and click **Properties**.
- 7 Click the **Drivers** tab.
- 8 Click **Roll Back Driver**.

If Device Driver Rollback does not resolve the problem, then use System Restore to return your computer to the operating state that existed before you installed the new driver (see "Using Microsoft Windows XP System Restore" on page 54).

## Manually Reinstalling Drivers

- 1 After copying the required driver files to your hard drive, click the **Start** button and right-click **My Computer**.
- 2 Click **Properties**.
- 3 Click the **Hardware** tab and click **Device Manager**.
- 4 Double-click the type of device for which you are installing the driver.
- 5 Double-click the name of the device for which you are installing the driver.
- 6 Click the **Driver** tab and click **Update Driver**.
- 7 Click **Install from a list or specific location (Advanced)** and click **Next**.
- 8 Click **Browse** and browse to the location to which you previously extracted the driver files.
- 9 When the name of the appropriate driver appears, click **Next**.
- 10 Click **Finish** and restart your computer.

## Resolving Software and Hardware Incompatibilities

If a device is either not detected during the operating system setup or is detected but incorrectly configured, you can use the Hardware Troubleshooter to resolve the incompatibility.

To resolve incompatibilities using the Hardware Troubleshooter:

- 1 Click the **Start** button and click **Help and Support**.
- 2 Type `hardware troubleshooter` in the **Search** field and click the arrow to start the search.
- 3 Click **Hardware Troubleshooter** in the **Search Results** list.
- 4 In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer**, and click **Next**.

## Restoring Your Operating System

You can restore your operating system in the following ways:

- Microsoft® Windows® XP System Restore returns your computer to an earlier operating state without affecting data files. Use System Restore as the first solution for restoring your operating system and preserving data files.
- Dell PC Restore by Symantec restores your hard drive to the operating state it was in when you purchased the computer. Dell PC Restore permanently deletes all data on the hard drive and removes any applications installed after you received the computer. Use PC Restore only if System Restore did not resolve your operating system problem.
- *If you received an Operating System CD with your computer, you can use it to restore your operating system. Use the CD **only** if System Restore did not resolve your operating system problem.*

## Using Microsoft Windows XP System Restore

The Microsoft Windows XP operating system provides System Restore to allow you to return your computer to an earlier operating state (without affecting data files) if changes to the hardware, software, or other system settings have left the computer in an undesirable operating state. See the Windows Help and Support Center for information on using System Restore. To access the Windows Help and Support Center, see "Finding Information" on page 9.



**NOTICE:** Make regular backups of your data files. System Restore does not monitor your data files or recover them.



**NOTE:** The procedures in this document were written for the Windows default view, so they may not apply if you set your Dell™ computer to the Windows Classic view.

### Creating a Restore Point

- 1 Click the **Start** button and click **Help and Support**.
- 2 Click the task for **System Restore**.
- 3 Follow the instructions on the screen.

### Restoring the Computer to an Earlier Operating State

If problems occur after you install a device driver, use Device Driver Rollback (see "Using Windows XP Device Driver Rollback" on page 52) to resolve the problem. If that is unsuccessful, then use System Restore.



**NOTICE:** Before you restore the computer to an earlier operating state, save and close any open files and exit any open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.

- 1 Click the **Start** button, point to **All Programs**→**Accessories**→**System Tools**, and then click **System Restore**.
- 2 Ensure that **Restore my computer to an earlier time** is selected and click **Next**.
- 3 Click a calendar date to which you want to restore your computer.

The **Select a Restore Point** screen provides a calendar that allows you to see and select restore points. All calendar dates with available restore points appear in boldface type.

- 4 Select a restore point and click **Next**.

If a calendar date has only one restore point, then that restore point is automatically selected. If two or more restore points are available, click the restore point that you prefer.


- 5 Click **Next**.

The **Restoration Complete** screen appears after System Restore finishes collecting data and then the computer restarts.

- 6 After the computer restarts, click **OK**.

To change the restore point, you can either repeat the steps using a different restore point, or you can undo the restoration.

## Undoing the Last System Restore

 **NOTICE:** Before you undo the last system restore, save and close all open files and exit any open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.


- 1 Click the **Start** button, point to **All Programs**→**Accessories**→**System Tools**, and then click **System Restore**.
- 2 Click **Undo my last restoration** and click **Next**.


## Enabling System Restore

If you reinstall Windows XP with less than 200 MB of free hard-disk space available, System Restore is automatically disabled. To see if System Restore is enabled:

- 1 Click the **Start** button and click **Control Panel**.
- 2 Click **Performance and Maintenance**.
- 3 Click **System**.
- 4 Click the **System Restore** tab.
- 5 Ensure that **Turn off System Restore** is unchecked.

## Using Dell PC Restore by Symantec

 **NOTICE:** Using Dell PC Restore permanently deletes all data on the hard drive and removes any applications or drivers installed after you received your computer. If possible, back up the data before using PC Restore. Use PC Restore only if System Restore did not resolve your operating system problem.

 **NOTE:** Dell PC Restore by Symantec is not available in all countries or on all computers.

Use Dell PC Restore by Symantec only as the last method to restore your operating system. PC Restore restores your hard drive to the operating state it was in when you purchased the computer. Any programs or files added since you received your computer—including data files—are permanently deleted from the hard drive. Data files include documents, spreadsheets, e-mail messages, digital photos, music files, and so on. If possible, back up all data before using PC Restore.

To use PC Restore:


- 1 Turn on the computer.  
During the boot process, a blue bar with **www.dell.com** appears at the top of the screen.
- 2 Immediately upon seeing the blue bar, press <Ctrl><F11>.  
If you do not press <Ctrl><F11> in time, let the computer finish starting, and then restart the computer again.

 **NOTICE:** If you do *not* want to proceed with PC Restore, click **Reboot** in the following step.

- 3 On the next screen that appears, click **Restore**.
- 4 On the next screen, click **Confirm**.

The restore process takes approximately 6–10 minutes to complete.

- 5 When prompted, click **Finish** to reboot the computer.

 **NOTE:** Do not manually shut down the computer. Click **Finish** and let the computer completely reboot.

- 6 When prompted, click **Yes**.


The computer restarts. Because the computer is restored to its original operating state, the screens that appear, such as the End User License Agreement, are the same ones that appeared the first time the computer was turned on.

- 7 Click **Next**.

The **System Restore** screen appears and the computer restarts.

- 8 After the computer restarts, click **OK**.


### Removing Dell PC Restore


 **NOTICE:** Removing Dell PC Restore from the hard drive permanently deletes the PC Restore utility from your computer. After you have removed Dell PC Restore, you will not be able to use it to restore your computer's operating system.

Dell PC Restore enables you to restore your hard drive to the operating state it was in when you purchased your computer. It is recommended that you *do not* remove PC Restore from your computer, even to gain additional hard-drive space. If you remove PC Restore from the hard drive, you cannot ever recall it, and you will never be able to use PC Restore to return your computer's operating system to its original state.

To remove PC Restore:

- 1 Log on to the computer as a local administrator.
- 2 In Windows Explorer, go to `c:\dell\utilities\DSR`.
- 3 Double-click the filename **DSRIRRemv2.exe**.

 **NOTE:** If you do not log on as a local administrator, a message appears stating that you must log on as administrator. Click **Quit**, and then log on as a local administrator.

 **NOTE:** If the partition for PC Restore does not exist on your computer's hard drive, a message appears stating that the partition was not found. Click **Quit**; there is no partition to delete.

- 4 Click **OK** to remove the PC Restore partition on the hard drive.
- 5 Click **Yes** when a confirmation message appears.

The PC Restore partition is deleted and the newly available disk space is added to the free space allocation on the hard drive.

- 6 Right-click **Local Disk (C)** in Windows Explorer, click **Properties**, and verify that the additional disk space is available as indicated by the increased value for **Free Space**.
- 7 Click **Finish** to close the **PC Restore Removal** window.
- 8 Restart the computer.



## Using the Operating System CD

### Before You Begin

If you are considering a reinstall of the Windows XP operating system to correct a problem with a newly installed driver, first try using Windows XP Device Driver Rollback (see "Using Windows XP Device Driver Rollback" on page 52). If Device Driver Rollback does not resolve the problem, then use System Restore to return your operating system to the operating state it was in before you installed the new device driver (see "Using Microsoft Windows XP System Restore" on page 54).



**NOTICE:** Before performing the installation, back up all data files on your primary hard drive. For conventional hard drive configurations, the primary hard drive is the first drive detected by the computer.

To reinstall Windows XP, you need the following items:

- Dell™ *Operating System* CD
- Dell ResourceCD



**NOTE:** The ResourceCD contains drivers that were installed during assembly of the computer. Use the ResourceCD to load any required drivers. Depending on the region from where you ordered your computer, or whether you requested the CDs, the *Drivers and Utilities* CD and *Operating System* CD may not ship with your system.

### Reinstalling Windows XP

The reinstallation process can take 1 to 2 hours to complete. After you reinstall the operating system, you must also reinstall the device drivers, virus protection program, and other software.



**NOTICE:** The *Operating System* CD provides options for reinstalling Windows XP. The options can overwrite files and possibly affect programs installed on your hard drive. Therefore, do not reinstall Windows XP unless a Dell technical support representative instructs you to do so.

- 1 Save and close any open files and exit any open programs.
- 2 Insert the *Operating System* CD. Click **Exit** if the **Install Windows XP** message appears.
- 3 Restart the computer.
- 4 Press <F12> immediately after the DELL™ logo appears.

If the operating system logo appears, wait until you see the Windows desktop, and then shut down the computer and try again.

- 5 Follow the instructions on the screen to complete the installation.



# Removing and Installing Parts

## Before You Begin

This chapter provides procedures for removing and installing the components in your computer. Unless otherwise noted, each procedure assumes that the following conditions exist:

- You have performed the steps in "Turning Off Your Computer" on page 59 and "Before Working Inside Your Computer" on page 59.
- You have read the safety information in your Dell™ *Product Information Guide*.
- A component can be replaced or—if purchased separately—installed by performing the removal procedure in reverse order.

## Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Flash BIOS update program floppy disk or CD

## Turning Off Your Computer



**NOTICE:** To avoid losing data, save and close any open files and exit any open programs before you turn off your computer.

- 1 Shut down the operating system:
  - a Save and close any open files, exit any open programs, click the **Start** button, and then click **Turn Off Computer**.
  - b In the **Turn off computer** window, click **Turn off**.

The computer turns off after the operating system shutdown process finishes.
- 2 Ensure that the computer and any attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your operating system, press and hold the power button for 4 seconds.

## Before Working Inside Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help ensure your own personal safety.



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**CAUTION:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.



**NOTICE:** Only a certified service technician should perform repairs on your computer. Damage due to servicing that is not authorized by Dell is not covered by your warranty.



**NOTICE:** When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs; if you are disconnecting this type of cable, press in on the locking tabs before you disconnect the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before you connect a cable, ensure that both connectors are correctly oriented and aligned.



**NOTICE:** To avoid damaging the computer, perform the following steps before you begin working inside the computer.

- 1 Turn off your computer (see "Turning Off Your Computer" on page 59).



**NOTICE:** To disconnect a network cable, first unplug the cable from your computer and then unplug it from the network device.

- 2 Disconnect any telephone or telecommunication lines from the computer.
- 3 Disconnect your computer and all attached devices from their electrical outlets, and then press the power button to ground the system board.



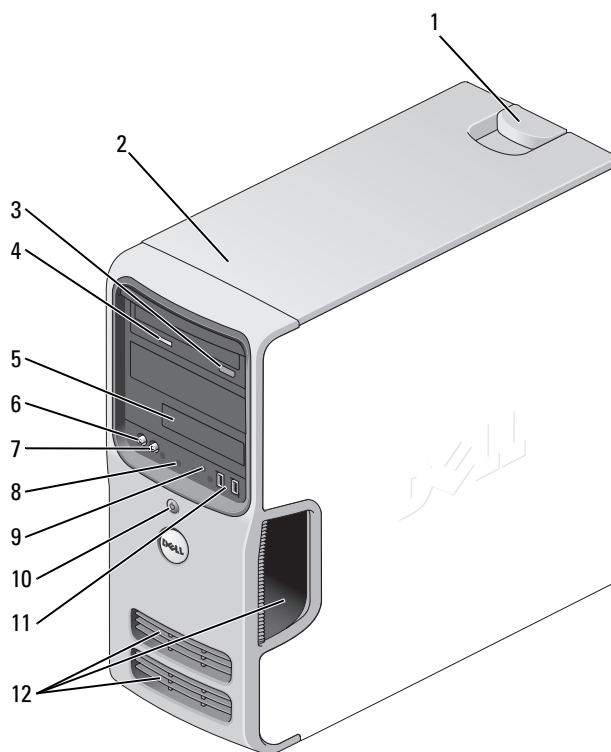
**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

- 4 Remove the computer cover (see "Removing the Computer Cover" on page 65).






**NOTICE:** Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate any static electricity that could harm internal components.

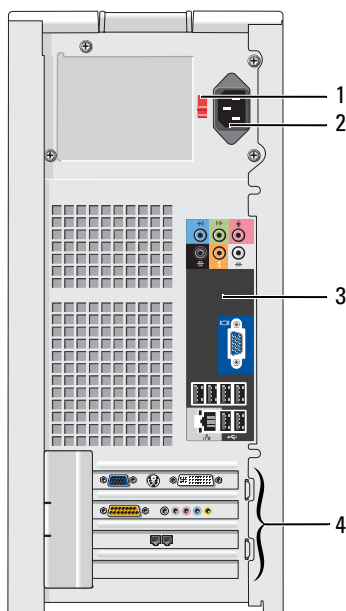
## Front View of the Computer



|   |                          |   |
|---|--------------------------|---|
| 1 | cover latch release      | Use this latch to remove the cover. See "Removing the Computer Cover" on page 65.   |
| 2 | location of Service Tag  | Use the Service Tag to identify your computer when you access the Dell Support website or call technical support.   |
| 3 | CD or DVD eject button   | Press to eject a disk from the CD or DVD drive.   |
| 4 | CD or DVD activity light | The drive light is on when the computer reads data from the CD or DVD drive.  |
| 5 | FlexBay drive            | Can contain an optional floppy drive or optional Media Card Reader. For information on using the Media Card Reader, see "Using a Media Card Reader (Optional)" on page 20.                                      |
| 6 | microphone connector     | Use the microphone connector to attach a personal computer microphone for voice or musical input into a sound or telephony program.<br>On computers with a sound card, the microphone connector is on the card. |

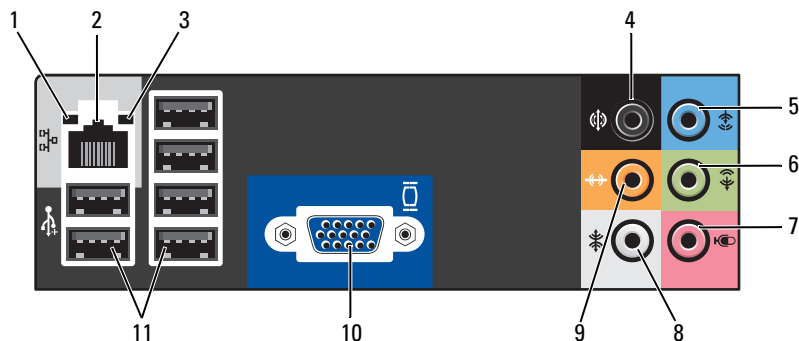
|    |                              |  |
|----|------------------------------|--|
| 7  | headphone connector          | Use the headphone connector to attach headphones and most kinds of speakers.   |
| 8  | diagnostic lights (4)        | Use the lights to help you troubleshoot a computer problem based on the diagnostic code. For more information, see "Diagnostic Lights" on page 47.   |
| 9  | hard-drive activity light    | The hard drive activity light is on when the computer reads data from or writes data to the hard drive. The light might also be on when a device such as a CD player is operating.   |
| 10 | power button,<br>power light | <p>Press the power button to turn on the computer. The light in the center of this button indicates power state. See "Controls and Lights" on page 111 for more information.</p> <p> <b>NOTICE:</b> To avoid losing data, do not use the power button to turn off the computer. Instead, perform an operating system shutdown.</p>  |
| 11 | USB 2.0 connectors (2)       | <p>Use the front USB connectors for devices that you connect occasionally, such as joysticks or cameras, or for bootable USB devices (see "System Setup Options" on page 114 for more information on booting to a USB device).</p> <p>It is recommended that you use the back USB connectors for devices that typically remain connected, such as printers and keyboards.</p>  |
| 12 | vents                        | <p>For adequate cooling, do not block any of the vents.</p> <p> <b>NOTICE:</b> Ensure that there is a minimum of two inches of space between all vents and any object near these vents.</p> <p> <b>NOTICE:</b> Keep the vent area clean and dust-free to ensure that the computer is adequately ventilated. Use only a dry cloth to clean the vent area to avoid water damage to the computer.</p> |

## Back View of the Computer



|   |  |   |
|---|--|---|
| 1 | voltage selection switch (may not be available on all computers) | See the safety instructions in the <i>Product Information Guide</i> for more information.                                       |
| 2 | power connector  | Insert the power cable.   |
| 3 | back panel connectors  | Plug USB, audio, and other devices into the appropriate connector. See "Back Panel Connectors" on page 64 for more information. |
| 4 | card slots   | Access connectors for any installed PCI and PCI Express cards.  |

## Back Panel Connectors



|   |                           |  |
|---|---------------------------|--|
| 1 | link integrity light      | <ul style="list-style-type: none"> <li>• Green — A good connection exists between a 10-Mbps network and the computer.</li> <li>• Orange — A good connection exists between a 100-Mbps network and the computer.</li> <li>• Off — The computer is not detecting a physical connection to the network.</li> </ul>  |
| 2 | network adapter connector | <p>To attach your computer to a network or broadband device, connect one end of a network cable to either a network port or your network or broadband device. Connect the other end of the network cable to the network adapter connector on the back panel of your computer. A click indicates that the network cable has been securely attached.</p> <p><b>NOTE:</b> Do not plug a telephone cable into the network connector.</p> <p>On computers with a network connector card, use the connector on the card. It is recommended that you use Category 5 wiring and connectors for your network. If you must use Category 3 wiring, force the network speed to 10 Mbps to ensure reliable operation.</p> |
| 3 | network activity light    | Flashes a yellow light when the computer is transmitting or receiving network data. A high volume of network traffic may make this light appear to be in a steady "on" state.  |
| 4 | surround connector        | Use the black surround connector to attach multichannel-capable speakers.  |



|    |                              |  |
|----|------------------------------|--|
| 5  | line-in connector            | Use the blue line-in connector to attach a record/playback device such as a cassette player, CD player, or VCR.<br>On computers with a sound card, use the connector on the card.  |
| 6  | line-out connector           | Use the green line-out connector (available on computers with integrated sound) to attach headphones and most speakers with integrated amplifiers.<br>On computers with a sound card, use the connector on the card.                             |
| 7  | micro-phone                  | Use the pink connector to attach a personal computer microphone for voice or musical input into a sound or telephony program.<br>On computers with a sound card, the microphone connector is on the card.  |
| 8  | side surround connector      | Use the silver connector to provide enhanced surround audio for computers with 7.1 speakers.<br>On computers with a sound card, the microphone connector is on the card.   |
| 9  | center/subwoofer connector   | Use the yellow connector to attach a speaker to a Low Frequency Effects (LFE) audio channel.   |
| 10 | optional VGA video connector | If your monitor has a VGA connector, plug it into the VGA connector on the computer.   |
| 11 | USB 2.0 connectors (6)       | Use the back USB connectors for devices that typically remain connected, such as printers and keyboards.<br><br>It is recommended that you use the front USB connectors for devices that you connect occasionally, such as joysticks or cameras. |

## Removing the Computer Cover



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

1 Follow the procedures in "Before You Begin" on page 59.



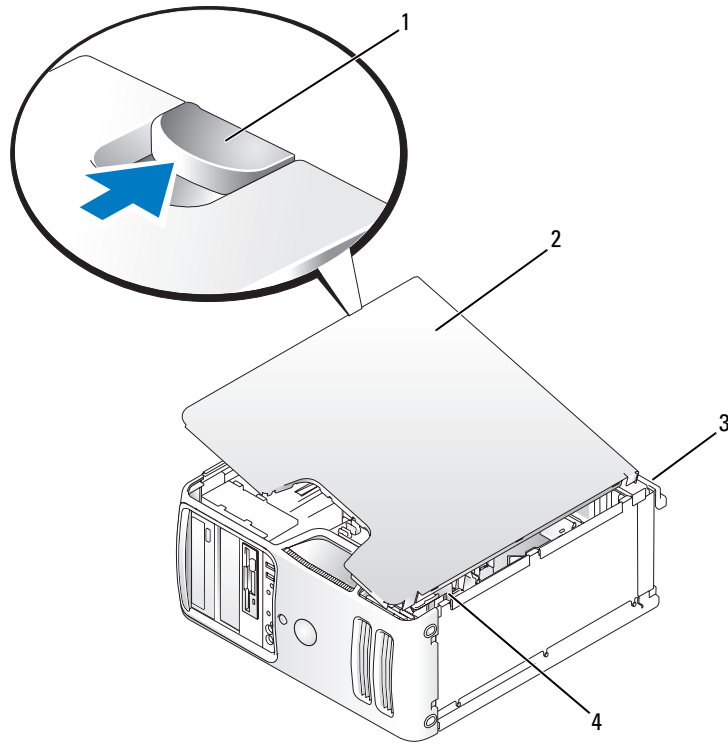
**NOTICE:** Ensure that sufficient space exists to support the removed cover—at least 30 cm (1 ft) of desk top space.



**NOTICE:** Ensure that you are working on a level, protected surface to avoid scratching either the computer or the surface on which it is resting.

2 Lay your computer on its side with the computer cover facing up.

3 Pull back the cover latch release located on the top panel.



1 cover latch release

2 computer cover

3 back of computer

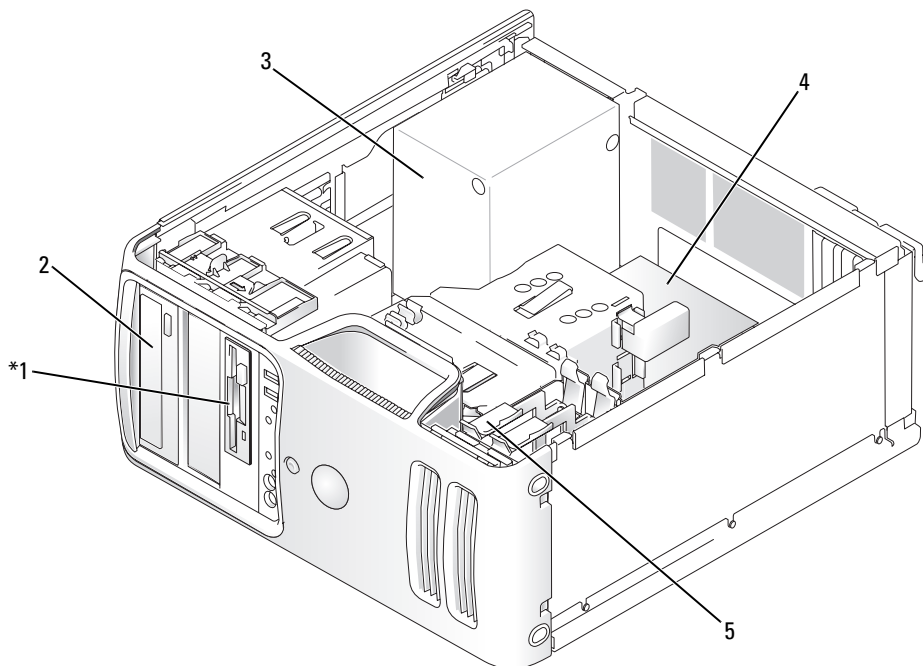
4 bottom hinges

- 4 Locate the three hinge tabs on the bottom edge of the computer.
- 5 Grip the sides of the computer cover and pivot the cover up, using the bottom hinges as leverage points.
- 6 Release the cover from the hinge tabs and set it aside in a secure location.

## Inside View of Your Computer



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



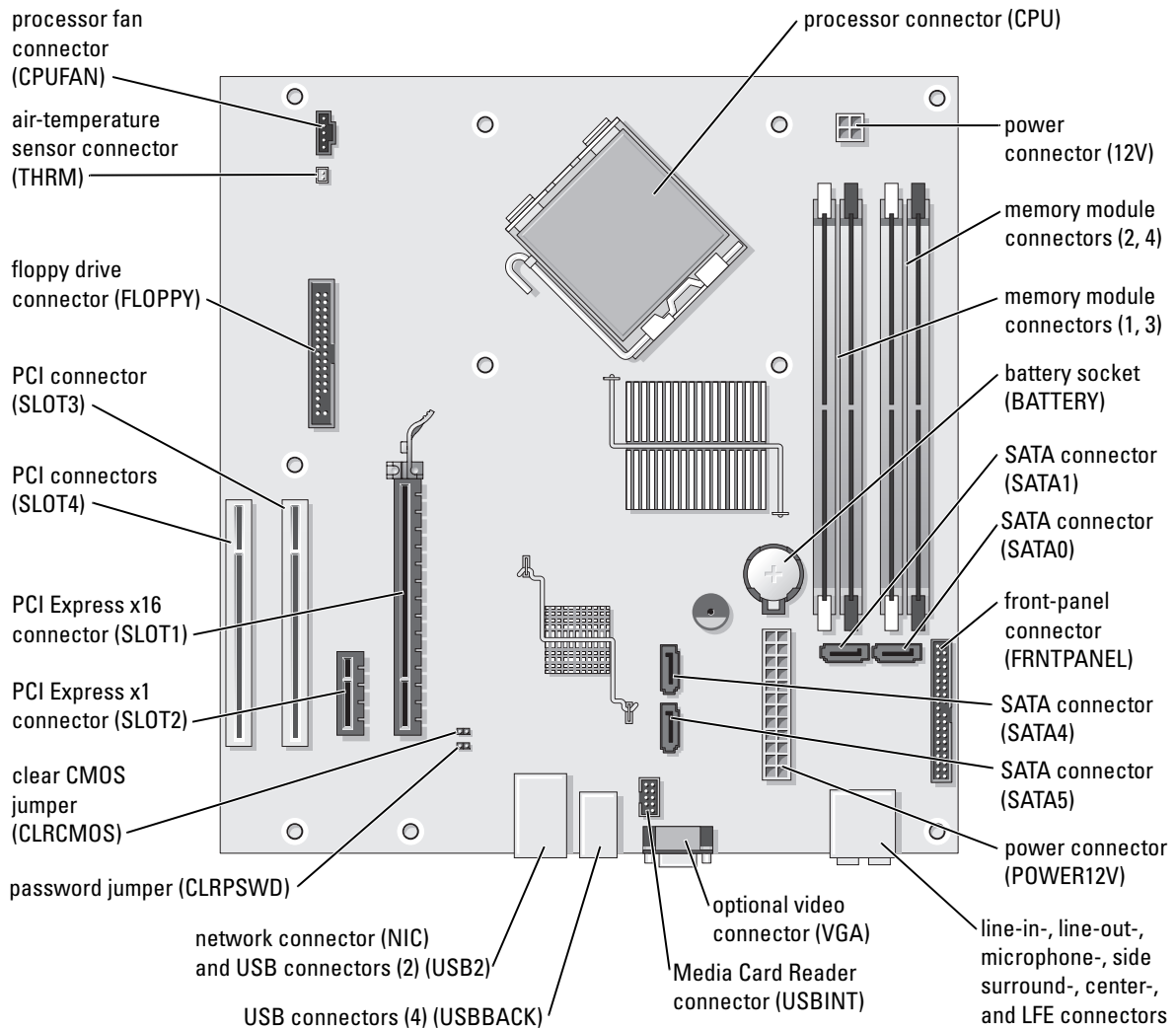
\*May not be present on all computers.

1 floppy drive  
4 system board

2 CD or DVD drive  
5 hard drive

3 power supply

# System Board Components



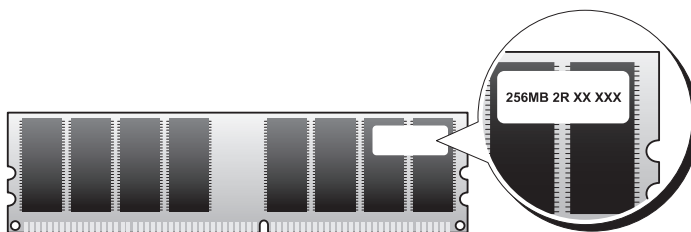
# Memory

You can increase your computer memory by installing memory modules on the system board.

Your computer supports DDR2 memory. For additional information on the type of memory supported by your computer, see "Memory" on page 109.

## DDR2 Memory Overview

DDR2 memory modules should be installed in *pairs of matched memory size, speed, and technology*. If the DDR2 memory modules are not installed in matched pairs, the computer will continue to operate, but with a slight reduction in performance. See the label on the module to determine the module's capacity.



**NOTE:** Always install DDR2 memory modules in the order indicated on the system board.

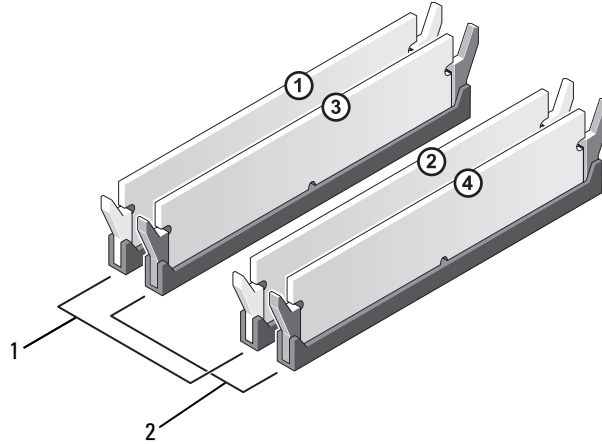
The recommended memory configurations are:

- A pair of matched memory modules installed in DIMM connectors 1 and 2
- or
- A pair of matched memory modules installed in DIMM connectors 1 and 2 and another matched pair installed in DIMM connectors 3 and 4



**NOTICE:** Do not install ECC or buffered memory modules. Only unbuffered, non-ECC memory is supported.

- If you install mixed pairs of DDR2 533-MHz and DDR2 667-MHz memory, the modules function at the slowest speed installed.
- Be sure to install a single memory module in DIMM connector 1, the connector closest to the processor, before you install modules in the other connectors.



- |   |   |
|---|---|
| <p>1 Channel A: matched pair of memory modules in connectors DIMM_1 and DIMM_2 (white securing clips)</p> | <p>2 Channel B: matched pair of memory modules in connectors DIMM_3 and DIMM_4 (black securing clips)</p> |
|---|---|

**NOTICE:** If you remove your original memory modules from the computer during a memory upgrade, keep them separate from any new modules that you may have, even if you purchased the new modules from Dell. If possible, do not pair an original memory module with a new memory module. Otherwise, your computer may not start properly. You should install your original memory modules in pairs either in DIMM connectors 1 and 2 or DIMM connectors 3 and 4.

**NOTE:** Memory purchased from Dell is covered under your computer warranty.

## Addressing Memory With 4-GB Configurations

Your computer supports a maximum of 4 GB of memory when you use four 1-GB DIMMs. Current 32-bit operating systems, such as Microsoft® Windows® XP, can use a maximum of 4 GB of address space; however, the amount of memory available to the operating system is less than that installed. Certain components within the computer require address space in the 4-GB range. Any address space reserved for these components cannot be used by computer memory.

## Installing Memory

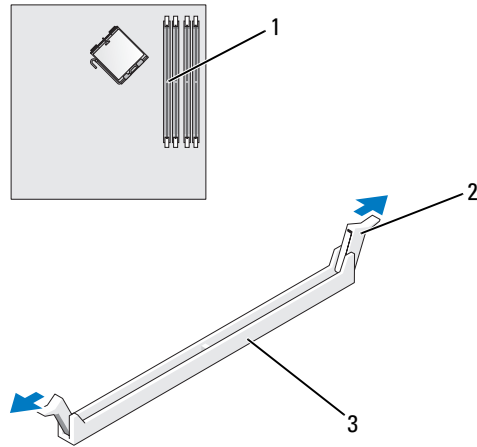


**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



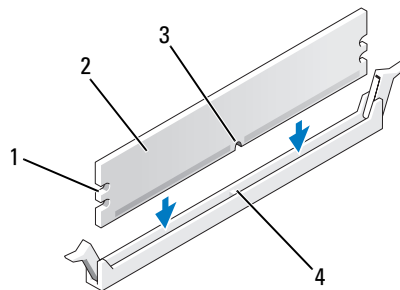
**NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Lay the computer on its side so that the system board is on the bottom of the inside of the computer.
- 3 Press out the securing clip at each end of the memory module connector.



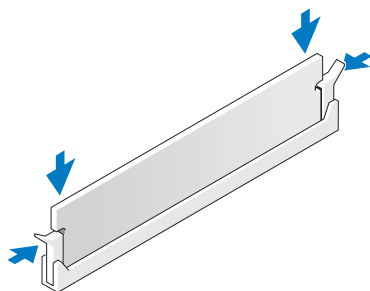
- 1 memory connector closest to processor      2 securing clips (2)      3 connector

- 4 Align the notch on the bottom of the module with the crossbar in the connector.



- 1 cutouts (2)      2 memory module      3 notch
- 4 crossbar

- ➡ **NOTICE:** To avoid damage to the memory module, press the module straight down into the connector while you apply equal force to each end of the module.
- 5 Insert the module into the connector until the module snaps into position.
- If you insert the module correctly, the securing clips snap into the cutouts at each end of the module.



- 6 Replace the computer cover.
- ➡ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 7 Connect your computer and devices to electrical outlets, and turn them on.
- 8 Right-click the **My Computer** icon and click **Properties**.
- 9 Click the **General** tab.
- 10 To verify that the memory is installed correctly, check the amount of memory (RAM) listed.

## Removing Memory

⚠ **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

➡ **NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Press out the securing clip at each end of the memory module connector.
- 3 Grasp the module and pull up.

If the module is difficult to remove, gently ease the module back and forth to remove it from the connector.



## Cards



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



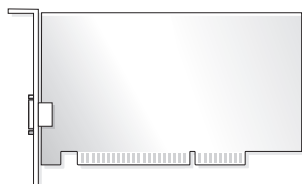
**NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

Your Dell™ computer provides the following slots for PCI and PCI Express cards:

- Two PCI card slots
- One PCI Express x16 card slot
- One PCI Express x1 card slot

### PCI Cards

Your computer supports two PCI cards.



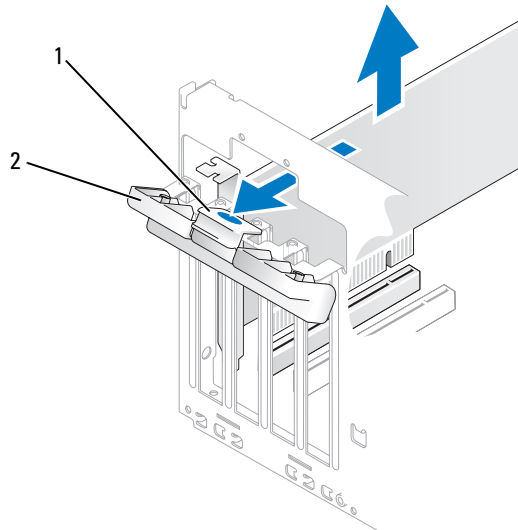
If you are installing or replacing a card, follow the procedures in the next section. If you are removing but not replacing a PCI card, see "Removing a PCI Card" on page 77.

If you are replacing a card, remove the current driver for the card from the operating system.

If you are installing or replacing a PCI Express card, see "Installing a PCI Express Card" on page 78.

## Installing a PCI Card

- 1 Follow the procedures in "Before You Begin" on page 59.



1 release tab

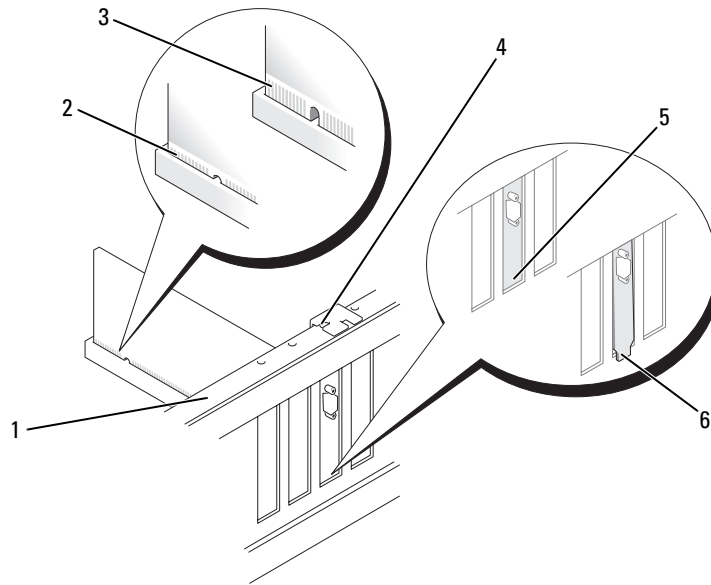
2 card retention door

- 2 Gently push the release tab on the card retention door from the inside to pivot the door open. Because the door is captive, it will remain in the open position.
- 3 If you are installing a new card, remove the filler bracket to create a card-slot opening. Then continue with step 5.
- 4 If you are replacing a card that is already installed in the computer, remove the card.  
If necessary, disconnect any cables connected to the card. Grasp the card by its top corners, and ease it out of its connector.
- 5 Prepare the card for installation.  
See the documentation that came with the card for information on configuring the card, making internal connections, or otherwise customizing it for your computer.



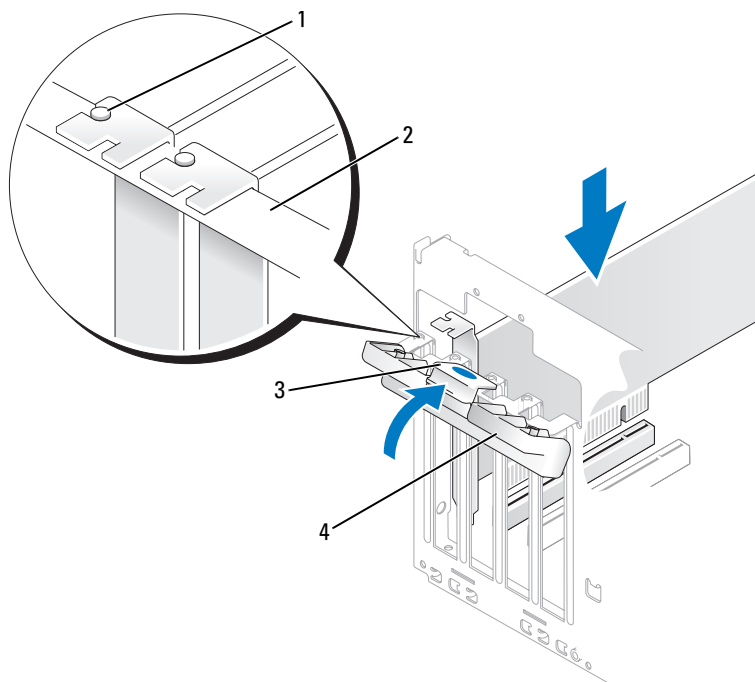
**CAUTION: Some network adapters automatically start the computer when they are connected to a network. To guard against electrical shock, be sure to unplug your computer from its electrical outlet before installing any cards.**

- 6 Place the card in the connector and press down firmly. Ensure that the card is fully seated in the slot.



- |   |                 |   |                     |   |                                |
|---|-----------------|---|---------------------|---|--------------------------------|
| 1 | alignment bar   | 2 | fully seated card   | 3 | not fully seated card          |
| 4 | alignment guide | 5 | bracket within slot | 6 | bracket caught outside of slot |

- 7** Before you close the card retention door, ensure that:
- The tops of all cards and filler brackets are flush with the alignment bar.
  - The notch in the top of the card or filler bracket fits around the alignment guide.



1 alignment guide

2 alignment bar

3 release tab

4 card retention door

8 Close the card retention door by snapping it into place to secure the cards.

**NOTICE:** Do not route card cables over or behind the cards. Cables routed over the cards can prevent the computer cover from closing properly or cause damage to the equipment.

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

See the documentation for the card for information about the card's cable connections.

**NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

10 Replace the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.



11 If you installed a sound card:

a Enter system setup (see "System Setup" on page 113), select **Audio Controller**, and then change the setting to **Off**.

b Connect external audio devices to the sound card's connectors. Do not connect external audio devices to the microphone, speaker/headphone, or line-in connectors on the back panel.

- 12 If you installed an add-in network adapter and want to disable the integrated network adapter:
  - a Enter system setup (see "System Setup" on page 113), select **Integrated NIC**, and then change the setting to **Off**.
  - b Connect the network cable to the add-in network adapter's connectors. Do not connect the network cable to the integrated connector on the back panel.
- 13 Install any drivers required for the card as described in the card documentation.

### Removing a PCI Card

- 1 Follow the procedures in "Before You Begin" on page 59.
  - 2 Gently push the release tab on the card retention door from the inside to pivot the door open. Because the door is captive, it will remain in the open position.
  - 3 If you are removing the card permanently, install a filler bracket in the empty card-slot opening.
-  **NOTE:** Installing filler brackets over empty card-slot openings is necessary to maintain FCC certification of the computer. The brackets also keep dust and dirt out of your computer.
- 4 Close the card retention door by snapping it into place to secure the cards.
-  **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 5 Replace the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.
  - 6 Remove the card's driver from the operating system.
  - 7 If you removed a sound card:
    - a Enter system setup (see "System Setup" on page 113), select **Audio Controller**, and then change the setting to **On**.
    - b Connect external audio devices to the audio connectors on the back panel of the computer.
  - 8 If you removed an add-in network connector:
    - a Enter system setup (see "System Setup" on page 113), select **Integrated NIC**, and then change the setting to **On**.
    - b Connect the network cable to the integrated connector on the back panel of the computer.

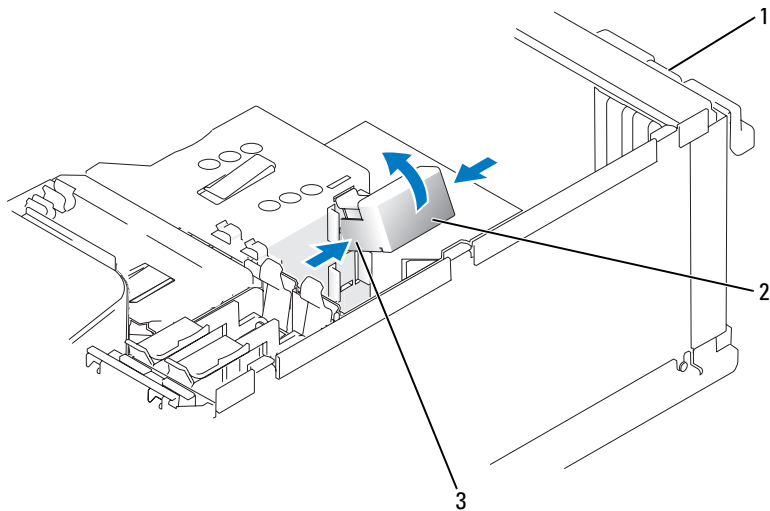
### PCI Express Cards

Your computer supports one PCI Express x16 card and one PCI Express x1 card. If you are installing or replacing a PCI Express card, follow the procedures in the next section. If you are removing but not replacing a card, see "Removing a PCI Express Card" on page 82. If you are installing or replacing a PCI card, see "Installing a PCI Card" on page 74.

If you are replacing a card, remove the current driver for the card from the operating system.

## Installing a PCI Express Card

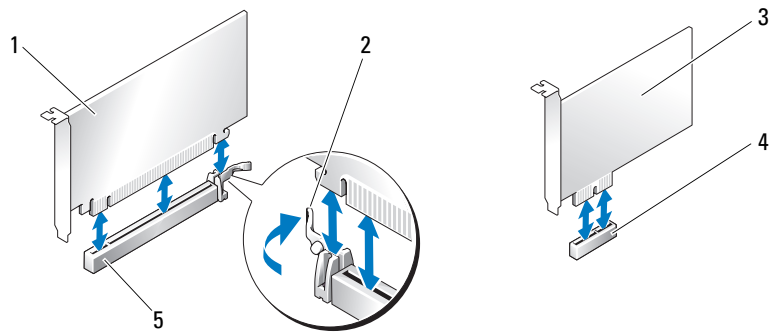
- 1 Follow the procedures in "Before You Begin" on page 59.



- 1 card retention door      2 card retention mechanism      3 release tabs (2)

- 2 Gently push the release tab on the card retention door from the inside to pivot the door open. Because the door is captive, it will remain in the open position (see "Installing a PCI Card" on page 74 for an illustration of the card retention door).
- 3 If your computer includes a card retention mechanism to secure the x16 card in place from the top:
  - a Pivot the mechanism upward and gently squeeze in on the sides to release the mechanism from the two tab slots holding it in place.
  - b Set the retention mechanism aside in a secure location.
- 4 If you are installing a new card, remove the filler bracket to create a card-slot opening. Then continue with step 5.
- 5 If you are replacing a card that is already installed in the computer, remove the card.

If necessary, disconnect any cables connected to the card. If your card includes a retention mechanism, remove the top of the retention mechanism by pressing the tab and pulling up on the top. Gently pull the securing tab, grasp the card by its top corners, and then ease it out of its connector.



- |   |                          |   |                           |   |                     |
|---|--------------------------|---|---------------------------|---|---------------------|
| 1 | PCI Express x16 card     | 2 | securing tab              | 3 | PCI Express x1 card |
| 4 | PCI Express x1 card slot | 5 | PCI Express x16 card slot |   |                     |

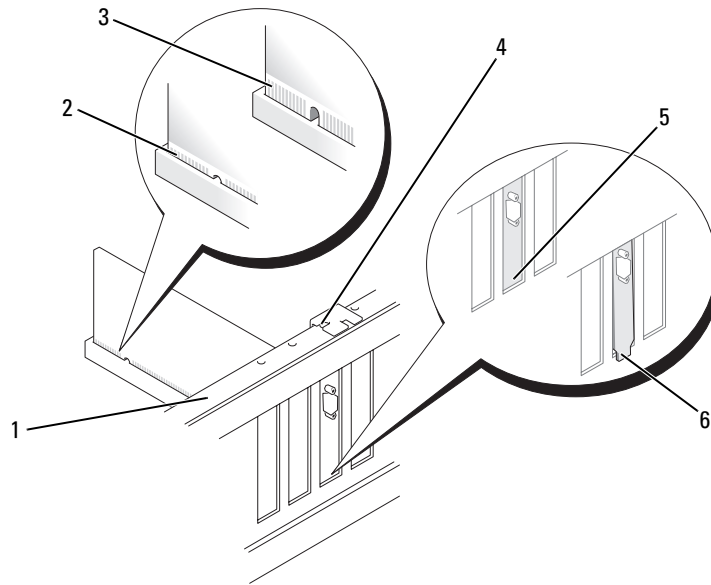
**6** Prepare the card for installation.

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



**CAUTION:** Some network adapters automatically start the computer when they are connected to a network. To guard against electrical shock, be sure to unplug your computer from its electrical outlet before installing any cards.

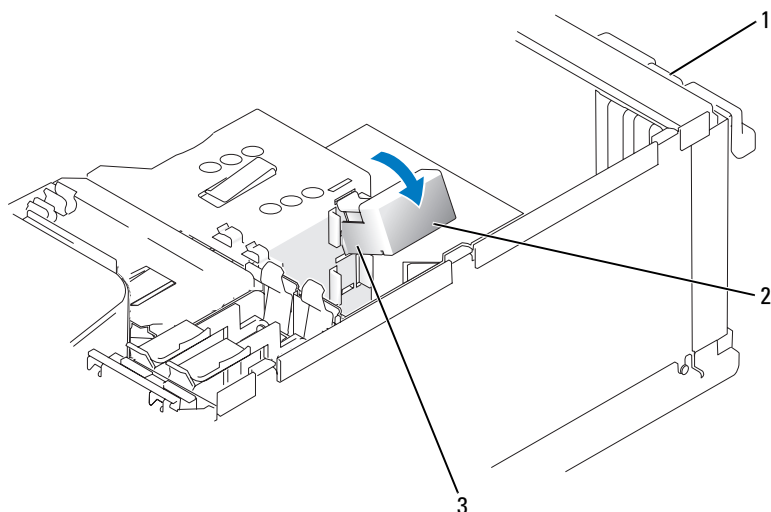
- 7** If you are installing the card into the x16 card connector, position the card so the securing slot is aligned with the securing tab, and gently pull the securing tab.
- 8** Place the card in the connector and press down firmly. Ensure that the card is fully seated in the slot.



- |   |                 |   |                     |   |                                |
|---|-----------------|---|---------------------|---|--------------------------------|
| 1 | alignment bar   | 2 | fully seated card   | 3 | not fully seated card          |
| 4 | alignment guide | 5 | bracket within slot | 6 | bracket caught outside of slot |

- 9** If you replaced a card that was already installed in the computer and you removed the retention mechanism, you may reinstall the retention mechanism.
- 10** Before replacing the card retention mechanism, ensure that:
  - The tops of all cards and filler brackets are flush with the alignment bar.
  - The notch in the top of the card or filler bracket fits around the alignment guide.
- 11** Snap the card retention mechanism into place, securing the x16 PCI card.







1 card retention door

2 card retention mechanism

3 release tabs (2)

- ➔ **NOTICE:** Do not route card cables over or behind the cards. Cables routed over the cards can prevent the computer cover from closing properly or cause damage to the equipment.
- ➔ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 12** Replace the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.
- 13** If you installed a sound card:
  - a** Enter system setup (see "System Setup" on page 113), select **Audio Controller**, and then change the setting to **Off**.
  - b** Connect external audio devices to the sound card's connectors. Do not connect external audio devices to the microphone, speaker/headphone, or line-in connectors on the back panel.
- 14** If you installed an add-in network adapter and want to disable the integrated network adapter:
  - a** Enter system setup (see "System Setup" on page 113), select **Integrated NIC**, and then change the setting to **Off**.
  - b** Connect the network cable to the add-in network adapter's connectors. Do not connect the network cable to the integrated connector on the back panel.
- 15** Install any drivers required for the card as described in the card documentation.

## Removing a PCI Express Card

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Gently push the release tab on the card retention door from the inside to pivot the door open. Because the door is captive, it will remain in the open position (see "Installing a PCI Card" on page 74 for an illustration of the card retention door).
- 3 If your computer includes a card retention mechanism, to secure the x16 card in place from the top:
  - a Pivot the mechanism upward and gently squeeze in on the sides to release the mechanism from the two tab slots holding it in place.
  - b Set the retention mechanism aside in a secure location.
- 4 If you are removing the card permanently, install a filler bracket in the empty card-slot opening.  
 **NOTE:** Installing filler brackets over empty card-slot openings is necessary to maintain FCC certification of the computer. The brackets also keep dust and dirt out of your computer.
- 5 Reseat the card retention mechanism in the tabs and pivot downward to snap it into place.
- 6 Close the card retention door to snap it into place, securing the cards.
-  **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 7 Replace the computer cover, reconnect the computer and devices to electrical outlets, and then turn them on.
- 8 Remove the card's driver from the operating system.
- 9 If you removed a sound card:
  - a Enter system setup (see "System Setup" on page 113), select **Audio Controller**, and then change the setting to **On**.
  - b Connect external audio devices to the audio connectors on the back panel of the computer.
- 10 If you removed an add-in network connector:
  - a Enter system setup (see "System Setup" on page 113), select **Integrated NIC**, and then change the setting to **On**.
  - b Connect the network cable to the integrated connector on the back panel of the computer.
- 11 Install any drivers required for the card as described in the card documentation.

## Drive Panel



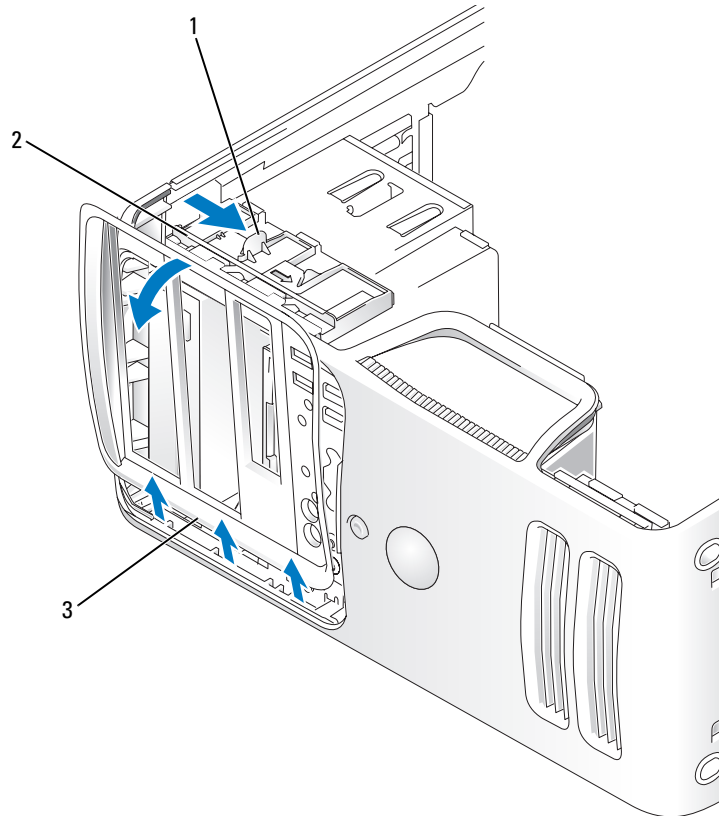
**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

## Removing the Drive Panel

- 1 Follow the procedures in "Before You Begin" on page 59.



1 sliding plate lever

2 sliding plate

3 drive panel

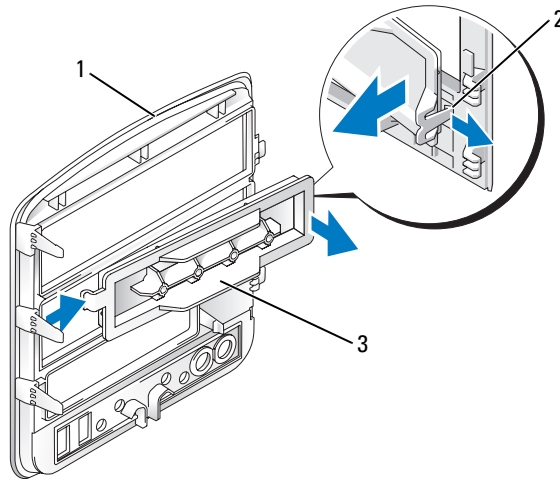
- 2 Grasping the lever on the sliding plate, pull the sliding plate to the right until it snaps into the open position.



**NOTE:** This sliding plate secures and releases the drive panel and helps to secure the drives.

- 3 By pushing from the inside and pivoting the drive panel to the left, you can release the drive panel from its side hinges.
- 4 Set the drive panel aside in a secure location.

## Removing the Drive-Panel Insert



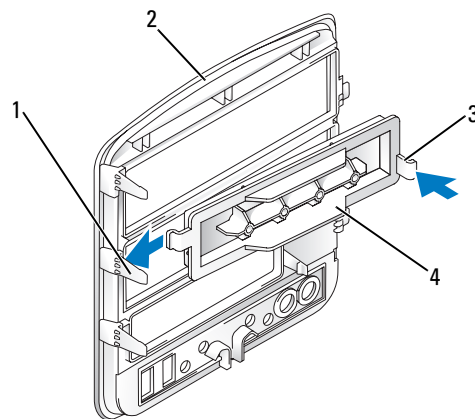
1 drive panel

2 drive-panel insert tab

3 drive-panel insert

- 1 Press the drive-panel insert tab towards the center of the drive-panel insert to disengage the insert from the drive panel.
- 2 Without releasing the tab, pivot the drive-panel insert out and away from the drive panel.
- 3 Set the drive-panel insert aside in a secure location.

## Replacing the Drive-Panel Insert



1 center drive-panel tab

2 drive panel

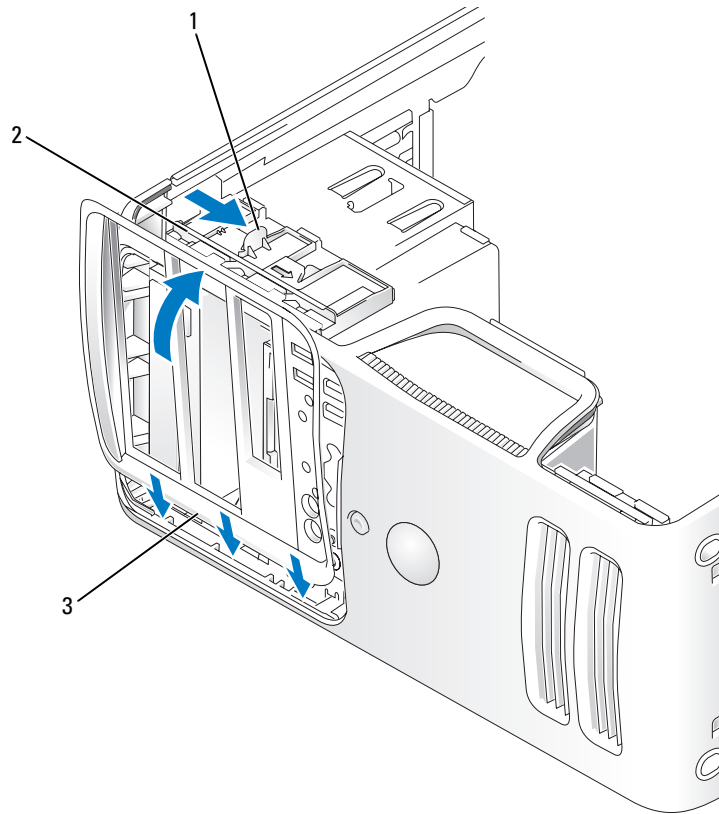
3 drive-panel insert tab

4 drive-panel insert

- 1 Slide the tab on the left side of the drive-panel insert under the center drive-panel tab.
- 2 Rotate the drive-panel insert into place and snap the drive-panel insert tab over the corresponding tab on the drive panel.

## Replacing the Drive Panel

- 1 Follow the procedures in "Before You Begin" on page 59.



1 sliding plate lever

2 sliding plate

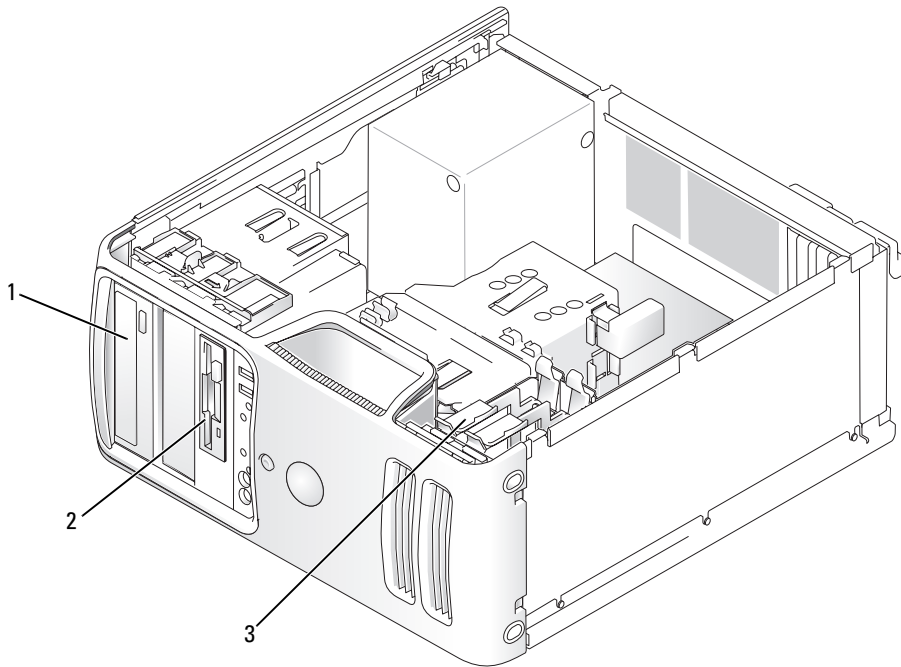
3 drive panel

- 2 Align the drive panel tabs with the side-door hinges.
- 3 Rotate the drive panel toward the computer until it snaps into place on the front panel.

## Drives

Your computer supports a combination of these devices:

- Up to two serial ATA hard drives
- One optional floppy drive or an optional Media Card Reader
- Up to two CD or DVD drives



1 CD/DVD drive

2 FlexBay for optional floppy  
drive or Media Card Reader

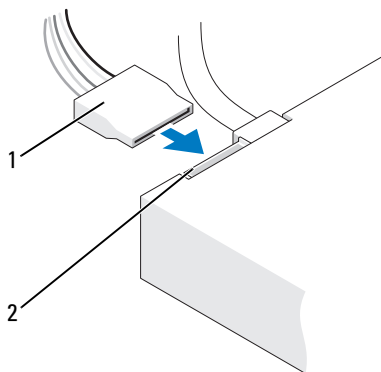
3 hard drive

Connect serial ATA CD or DVD drives to connectors labeled "SATA3" or "SATA4" on the system board. Serial ATA hard drives should be connected to connectors labeled "SATA0" or "SATA2" on the system board.

## Connecting Drive Cables

When you install a drive, you connect two cables—a DC power cable and a data cable—to the back of the drive.

### Power Connector



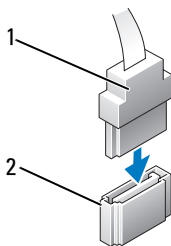
1 power cable

2 power input connector

## Drive Interface Connectors

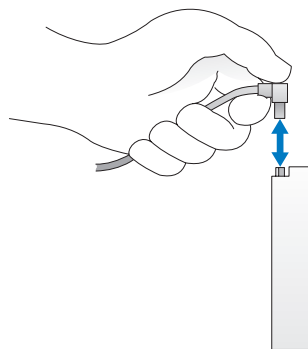
Most interface connectors are keyed for correct insertion; that is, a notch or a missing pin on one connector matches a tab or a filled-in hole on the other connector. Keyed connectors ensure that the pin-1 wire in the cable goes to the pin-1 end of the connector. The pin-1 end of a connector on a board or a card is usually indicated by a silk-screened “1” printed directly on the board or card.

### Serial ATA Connector



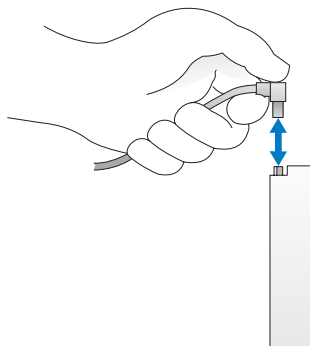
1 interface cable

2 interface connector



## Connecting and Disconnecting Drive Cables

When connecting and disconnecting a serial ATA data cable, disconnect the cable using the pull-tab. The serial ATA interface connectors are keyed for correct insertion; that is, a notch or a missing pin on one connector matches a tab or a filled-in hole on the other connector.



## Hard Drive

**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.

**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

**NOTICE:** To avoid damage to the drive, do not set it on a hard surface. Instead, set the drive on a surface, such as a foam pad, that will sufficiently cushion it.

**NOTICE:** If you are replacing a hard drive that contains data you want to keep, back up your files before you begin this procedure.

Check the documentation for the drive to verify that it is configured for your computer.

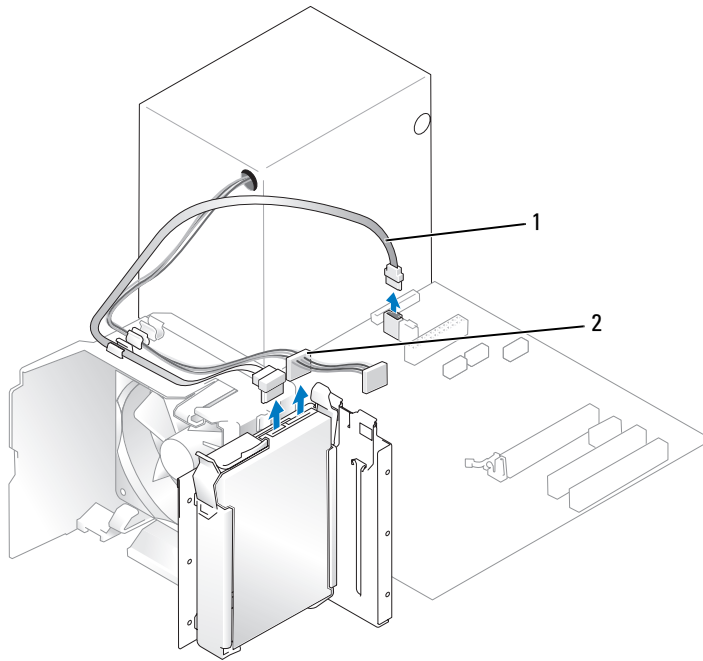
## Removing a Hard Drive

1 Follow the procedures in "Before You Begin" on page 59.

2 Disconnect the power and data cables from the drive.

**NOTICE:** Use the pull-tab to remove the data cable from your hard drive or from the system board.

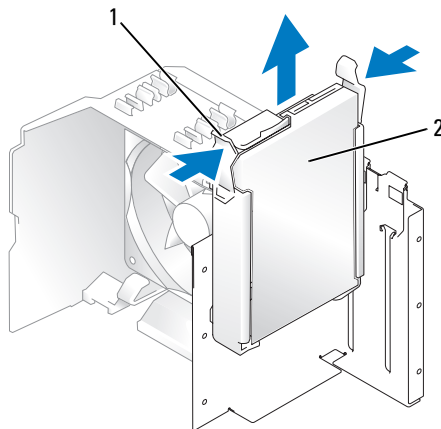




1 serial ATA data cable

2 power cable

- 3** Press in on the blue tabs on each side of the drive and slide the drive up and out of the computer.



1 tabs (2)

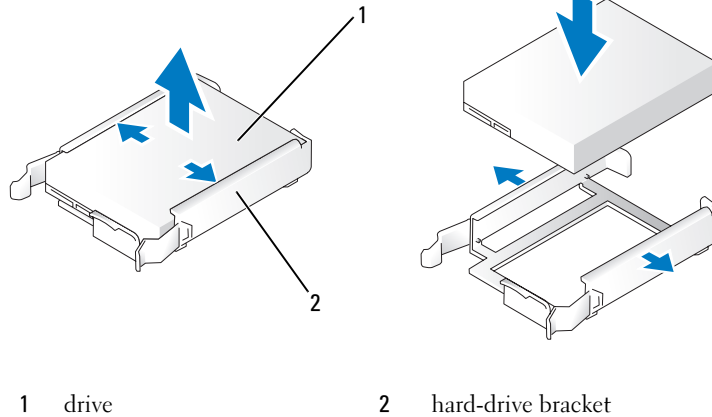
2 hard drive

## Installing a Hard Drive

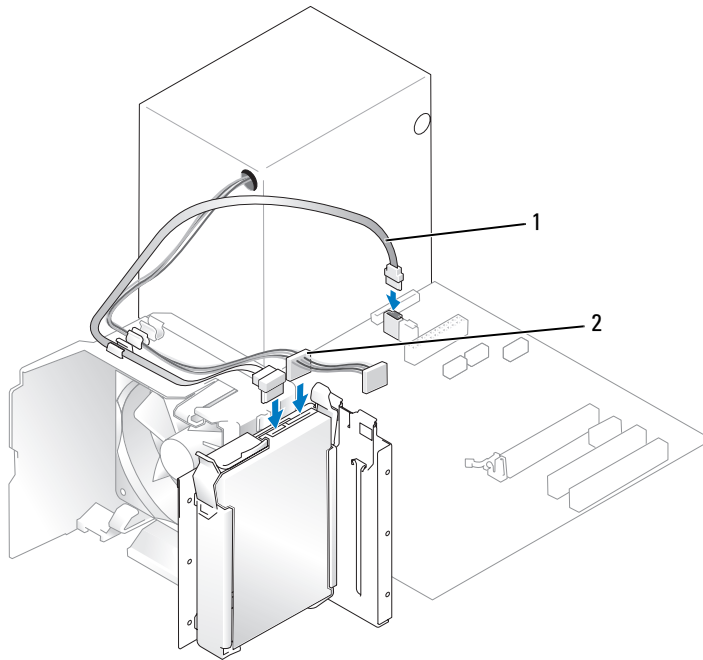
- 1 Unpack the replacement hard drive, and prepare it for installation.
- 2 Check the documentation for the drive to verify that it is configured for your computer.



**NOTE:** If your replacement hard drive does not have the hard drive bracket attached, remove the bracket from the old drive by unsnapping it from the drive. Snap the bracket onto the new drive.



- 3 Gently slide the drive into place until you feel a click or feel the drive securely installed.
- 4 Connect the power and hard-drive cables to the drive.



1 serial ATA data cable

2 power cable

5 Check all connectors to be certain that they are properly cabled and firmly seated.

6 Replace the computer cover (see "Replacing the Computer Cover" on page 106).



**NOTICE:** To connect a network cable, first plug the cable into the network port or device and then plug it into the computer.

7 Connect your computer and devices to electrical outlets, and turn them on.

See the documentation that came with the drive for instructions on installing any software required for drive operation.

### Adding a Second Hard Drive



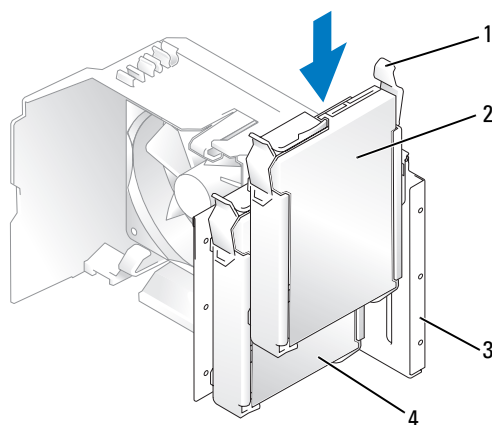
**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

**➡ NOTICE:** To avoid damage to the drive, do not set it on a hard surface. Instead, set the drive on a surface, such as a foam pad, that will sufficiently cushion it.

- 1 Check the documentation for the drive to verify that it is configured for your computer.
- 2 Follow the procedures in "Before You Begin" on page 59.
- 3 Press in on the blue release tabs on each side of the hard drive bracket and slide it up and out of the computer.
- 4 Snap the bracket to the hard drive.
- 5 Gently slide the new drive (second hard drive) into place until you feel a click or feel the drive securely installed.



- |   |                                 |   |                                |   |                |
|---|---------------------------------|---|--------------------------------|---|----------------|
| 1 | release tabs (2)                | 2 | second hard drive in lower bay | 3 | hard drive bay |
| 4 | primary hard drive in upper bay |   |                                |   |                |

- 6 Connect the power and hard-drive cables to the drive.
- 7 Ensure that the data cable is securely connected to the system board (see "System Board Components" on page 68).
- 8 Check all connectors to be certain that they are properly cabled and firmly seated.
- 9 Replace the computer cover (see "Replacing the Computer Cover" on page 106).

**➡ NOTICE:** To connect a network cable, first plug the cable into the network port or device and then plug it into the computer.

- 10 Connect your computer and devices to electrical outlets, and turn them on.  
See the documentation that came with the drive for instructions on installing any software required for drive operation.

# Floppy Drive



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions in the *Product Information Guide*.



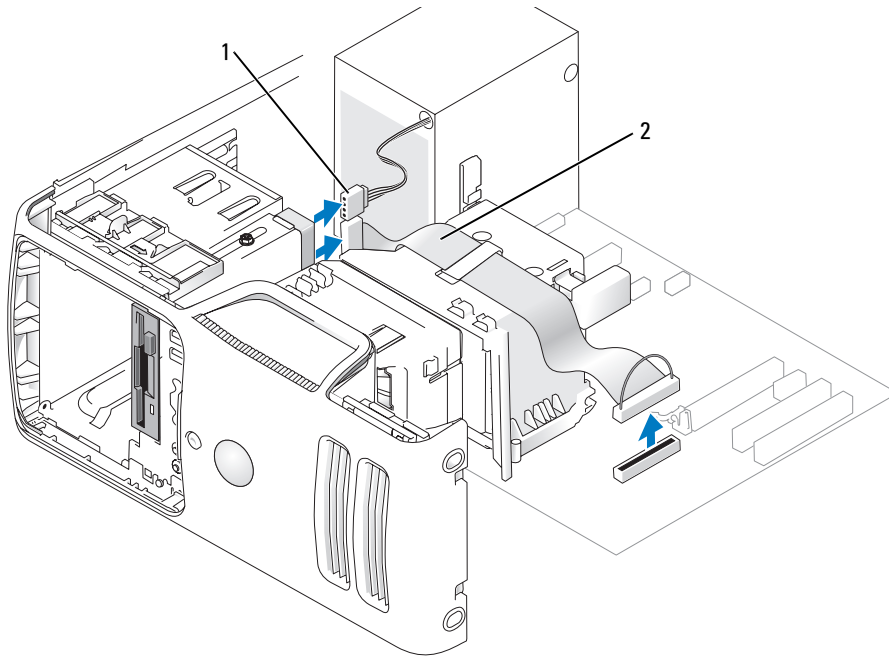
**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.



**NOTE:** If you are adding a floppy drive, see "Installing a Floppy Drive" on page 94.

## Removing a Floppy Drive

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Remove the drive panel (see "Removing the Drive Panel" on page 83).



1 power cable

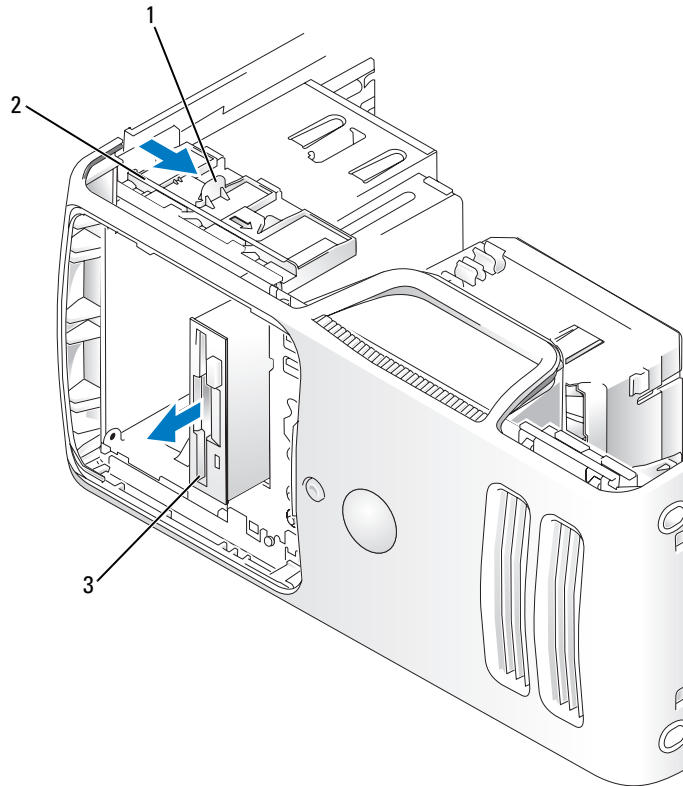
2 data cable

- 3 Disconnect the power and data cables from the back of the floppy drive.



**NOTE:** If you have installed a PCI Express x16 card, this card may cover the floppy-drive connectors. Remove this card before connecting the floppy-drive cables.

- 4 Slide the drive latch release toward the bottom of the computer and, without releasing the drive latch release, slide the floppy drive out through the front of the computer.



1 drive latch release

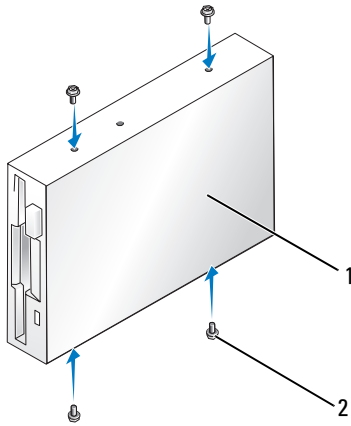
2 sliding plate

3 floppy drive

## Installing a Floppy Drive




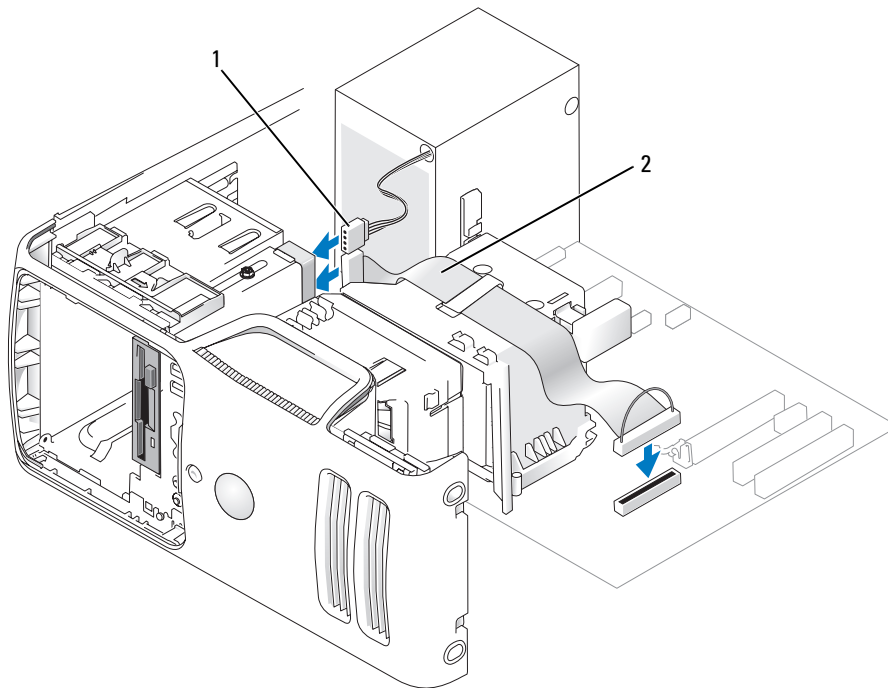
**NOTE:** In the event that the replacement or new floppy drive does not have shoulder screws, check for the screws located within the drive panel insert or, if applicable, reuse screws attached to the drive that you are replacing.



1 drive

2 screws (4)

- 1 Follow the procedures in "Before You Begin" on page 59.
  - 2 Remove the drive panel (see "Removing the Drive Panel" on page 83).
  - 3 Gently slide the drive into place until you feel a click or feel the drive securely installed.
-  **NOTE:** If you are installing a new floppy drive rather than replacing a drive, remove the drive panel insert where you want the drive to be installed, insert the shoulder screws located in the back of the drive panel insert into the drive, and then slide the drive back into place.
- 4 Attach the power and data cables to the floppy drive.
  - 5 Connect the other end of the data cable to the connector labeled "DSKT2" on the system board (see "System Board Components" on page 68) and route the cable through the clip on the shroud.



1 power cable

2 data cable

- 6 If you are installing a new floppy drive rather than replacing a drive, remove the appropriate drive-panel insert (see "Removing the Drive-Panel Insert" on page 84).
- 7 Check all cable connections, and fold cables out of the way to avoid blocking airflow between the fan and cooling vents.
- 8 Replace the drive panel (see "Replacing the Drive Panel" on page 85).
- 9 Replace the computer cover (see "Replacing the Computer Cover" on page 106).
- ➡ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 10 Connect your computer and devices to their electrical outlets, and turn them on.  
See the documentation that came with the drive for instructions on installing any software required for drive operation.
- 11 Enter system setup (see "System Setup" on page 113) and select the appropriate **Diskette Drive** option.
- 12 Verify that your computer works correctly by running the Dell Diagnostics (see "Dell Diagnostics" on page 50).



# Media Card Reader

For information on using the Media Card Reader, see "Using a Media Card Reader (Optional)" on page 20.

## Removing a Media Card Reader

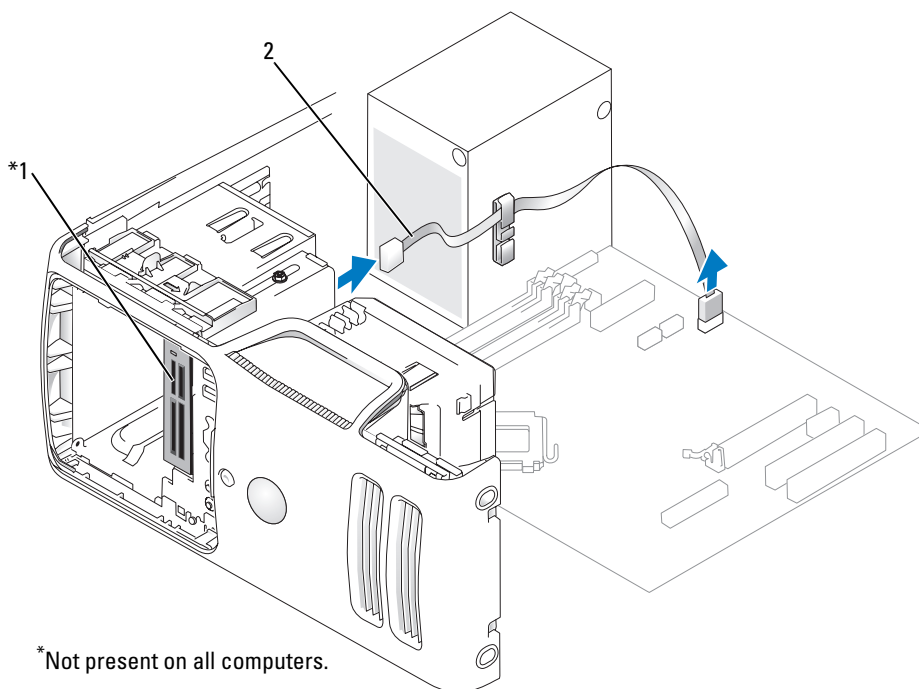


**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.



**NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

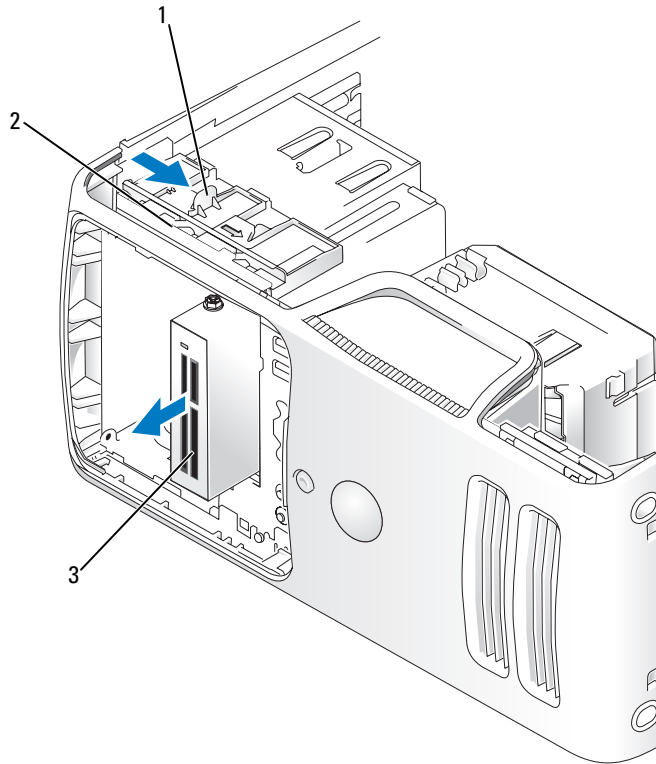
- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Remove the drive panel (see "Removing the Drive Panel" on page 83).



1 Media Card Reader

2 cable

- 3** Disconnect the FlexBay USB cable from the back of the Media Card Reader and from the Media Card Reader connector on the system board (see "System Board Components" on page 68) and route the cable through the cable routing clip.



1 drive latch release

2 sliding plate

3 Media Card Reader

- 4** Slide the drive latch release toward the bottom of the computer and, without releasing the drive latch release, slide the Media Card Reader out through the front of the computer.
- 5** Replace the drive panel (see "Replacing the Drive Panel" on page 85).
- 6** Replace the computer cover (see "Replacing the Computer Cover" on page 106).

## Installing a Media Card Reader

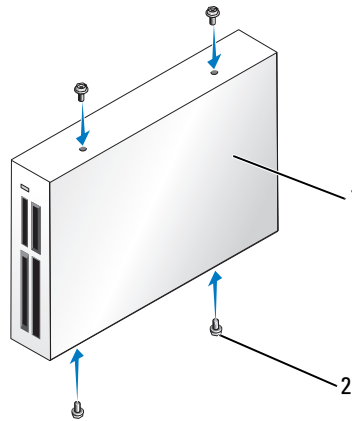


**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.



**NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.

- 1 Follow the procedures in "Before You Begin" on page 59.

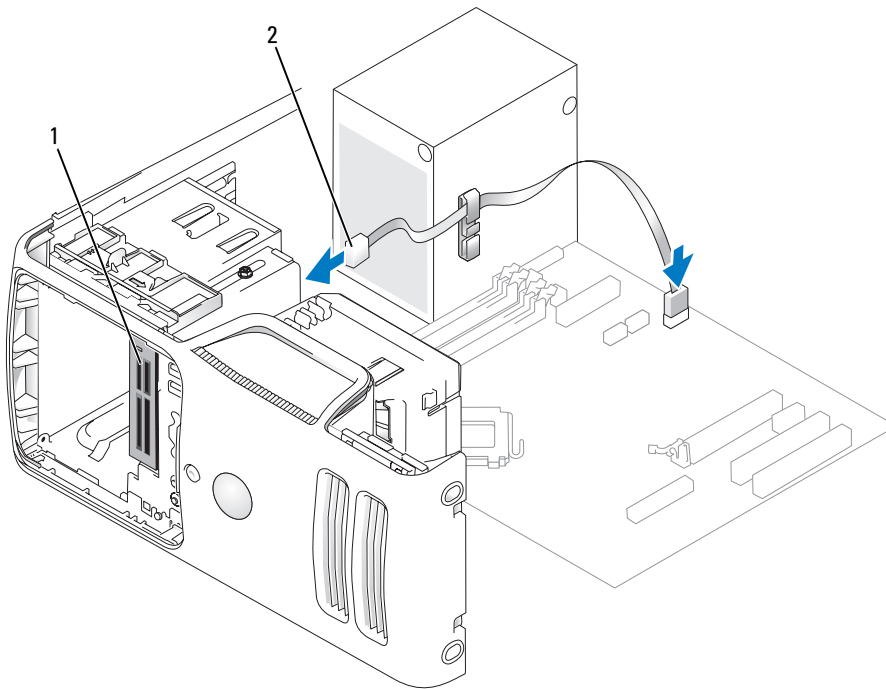


1 Media Card Reader

2 screws (4)

- 2 Remove the drive panel (see "Removing the Drive Panel" on page 83).
- 3 Remove the Media Card Reader and bracket from its packaging and ensure that all of the screws are included.
- 4 Gently slide the Media Card Reader into place until you feel a click or feel the drive securely installed. Ensure that the Media Card Reader is installed before the FlexBay cable is connected.

- 5 Connect the FlexBay USB cable to the back of the Media Card Reader and to the Media Card Reader connector on the system board (see "System Board Components" on page 68).



1 Media Card Reader

2 FlexBay USB cable

- 6 Route the FlexBay USB cable through the cable routing clip.
- 7 Replace the computer cover (see "Replacing the Computer Cover" on page 106).

## CD/DVD Drive



**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

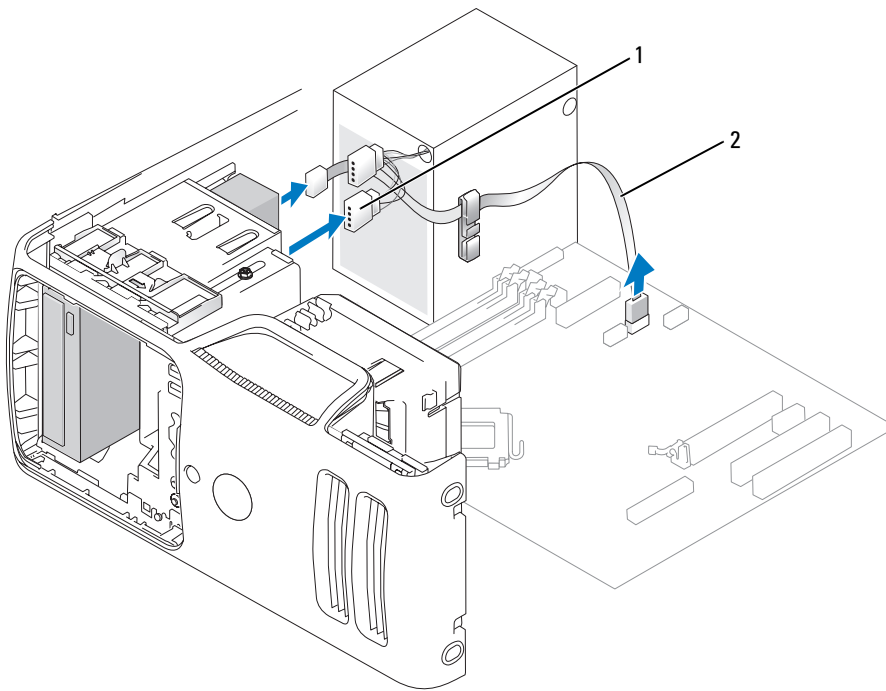


**CAUTION:** To guard against electrical shock, always unplug your computer from the electrical outlet before removing the cover.

### Removing a CD/DVD Drive

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Remove the drive panel (see "Removing the Drive Panel" on page 83).

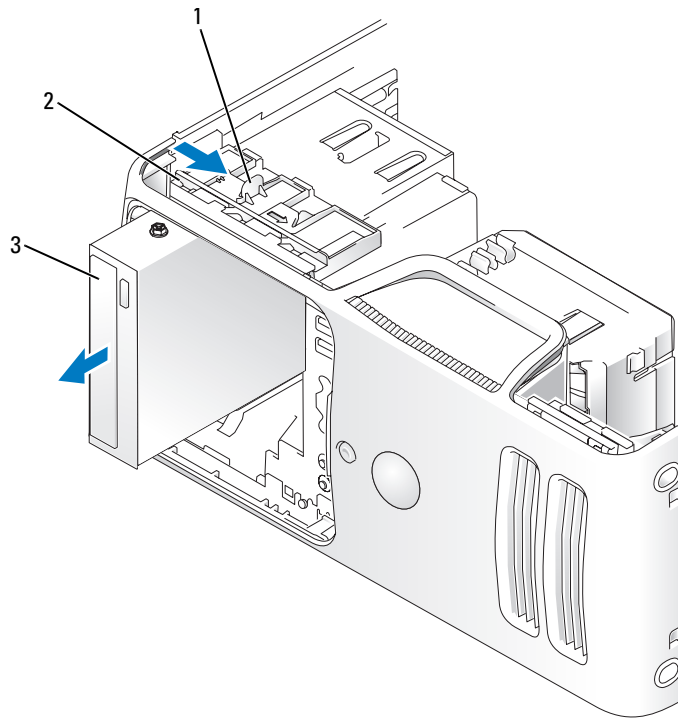
- 3** Disconnect the power and data cables from the back of the drive.



1 power cable

2 data cable

- 4** Slide the drive latch release toward the bottom of the computer and, without releasing the drive latch release, slide the CD/DVD drive out through the front of the computer.



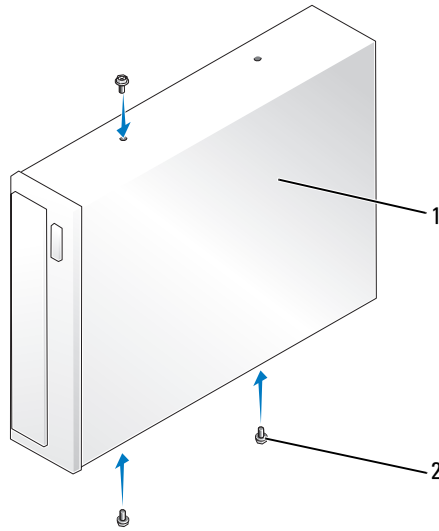
1 drive latch release

2 sliding plate

3 CD/DVD drive

### Installing a CD/DVD Drive

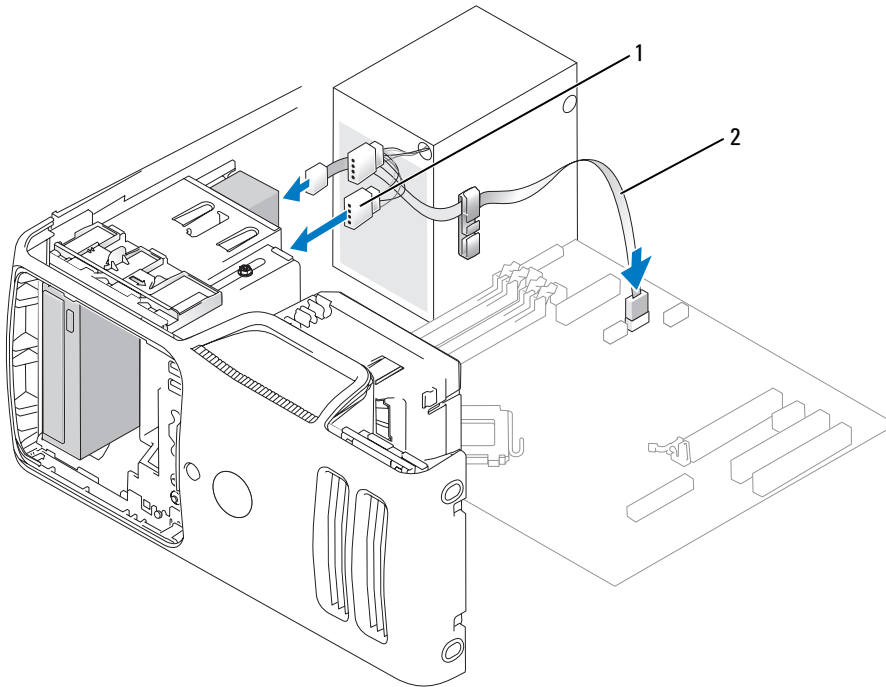
- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 If you are installing a new CD/DVD drive rather than replacing a drive, remove the appropriate drive-panel insert (see "Removing the Drive-Panel Insert" on page 84).
- 3 Gently slide the drive into place until you feel a click or feel the drive securely installed.



1 CD/DVD drive

2 screws (3)

**4** Connect the power and data cables to the drive.



1 power cable

2 data cable


- 5 Check all cable connections, and fold cables out of the way to avoid blocking airflow between the fan and cooling vents.
- 6 Replace the computer cover (see "Replacing the Computer Cover" on page 106).
- 7 Replace the drive panel (see "Replacing the Drive Panel" on page 85).
- ➔ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 8 Connect your computer and devices to their electrical outlets, and turn them on.  
See the documentation that came with the drive for instructions on installing any software required for drive operation.
- 9 Enter system setup (see "System Setup" on page 113) and select the appropriate **Drive** option.
- 10 Verify that your computer works correctly by running the Dell Diagnostics (see "Dell Diagnostics" on page 50).



# Battery

## Replacing the Battery

 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

 **NOTICE:** To prevent static damage to components inside your computer, discharge static electricity from your body before you touch any of your computer's electronic components. You can do so by touching an unpainted metal surface on the computer chassis.


A coin-cell battery maintains computer configuration, date, and time information. The battery can last several years.

If you have to repeatedly reset time and date information after turning on the computer, replace the battery.

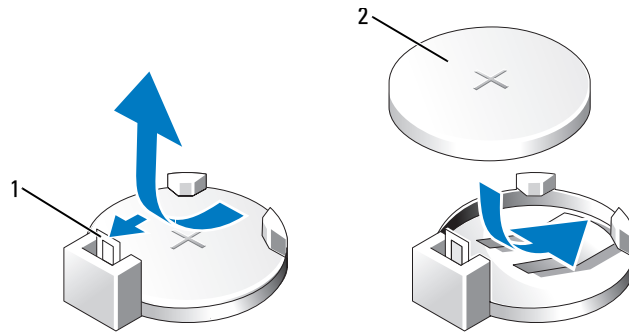
 **CAUTION:** A new battery can explode if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

To replace the battery:

- 1 Record all the screens in system setup (see "System Setup" on page 113) so that you can restore the correct settings in step 8.
- 2 Follow the procedures in "Before You Begin" on page 59.
- 3 Locate the battery socket (see "System Board Components" on page 68).

 **NOTICE:** If you pry the battery out of its socket with a blunt object, be careful not to touch the system board with the object. Ensure that the object is inserted between the battery and the socket before you attempt to pry out the battery. Otherwise, you may damage the system board by prying off the socket or by breaking circuit traces on the system board.

- 4 Remove the battery by carefully prying it out of its socket with your fingers or with a blunt, nonconducting object such as a plastic screwdriver.
- 5 Insert the new battery into the socket with the side labeled "+" facing up, and snap the battery into place.



1 battery release lever

2 battery (positive side)

6 Replace the computer cover (see "Replacing the Computer Cover" on page 106).



**NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

7 Connect your computer and devices to electrical outlets, and turn them on.

8 Enter system setup (see "System Setup" on page 113) and restore the settings you recorded in step 1.

9 Properly dispose of the old battery. See the *Product Information Guide* for battery disposal information.

## Replacing the Computer Cover



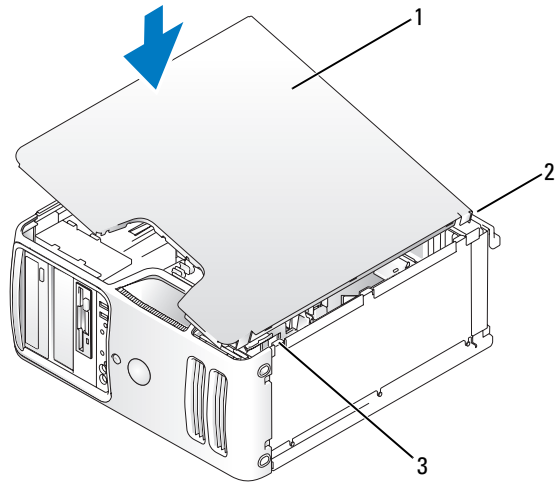
**CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

1 Ensure that all cables are connected, and fold cables out of the way.

2 Ensure that no tools or extra parts are left inside the computer.

3 Align the bottom of the cover with the tabs located along the bottom edge of the computer.

4 Using the tabs as leverage, rotate the cover downward and press down to close it.



1 computer cover

2 back of computer

3 bottom hinges

5 Ensure that the cover is seated correctly before moving it to the upright position.

➡ **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.

6 Connect your computer and devices to electrical outlets, and turn them on.



# Appendix

## Specifications

| Processor            |  |
|----------------------|--|
| Processor type       | Intel® Pentium® 4 with Hyper-Threading technology<br><b>NOTE:</b> Not all Pentium 4 processors support Hyper-Threading technology.                 |
| Level 1 (L1) cache   | 32 KB  |
| Level 2 (L2) cache   | 1 MB (depending on your computer configuration) pipelined-burst, eight-way set associative, write-back SRAM  |
| Memory               |  |
| Type                 | 533-MHz and 667-MHz dual DDR2 unbuffered SDRAM   |
| Memory connectors    | four   |
| Memory capacities    | 256 MB, 512 MB, or 1 GB non-ECC  |
| Minimum memory       | 256 MB   |
| Maximum memory       | 4 GB<br><b>NOTE:</b> See "Addressing Memory With 4-GB Configurations" on page 70 to verify the amount of memory available to the operating system. |
| BIOS address         | F0000h   |
| Computer Information |  |
| Chipset              | 965  |
| RAID Support         | RAID 1 (Mirroring)   |
| DMA channels         | eight  |
| Interrupt levels     | 24   |
| BIOS chip (NVRAM)    | 4 Mb   |
| NIC                  | Integrated network interface capable of 10/100 communication   |
| System clock         | 800- or 1066-MHz data rate   |

|                                |  |
|--------------------------------|--|
| <b>Video</b>                   |  |
| Type                           | optional integrated Intel 965 Graphics Media Accelerator (GMA965)<br>PCI Express                               |
| <b>Audio</b>                   |  |
| Type                           | Sigmatel 9227  |
| <b>Expansion Bus</b>           |  |
| Bus type                       | PCI 2.3<br>PCI Express x1 and x16  |
| Bus speed                      | PCI: 33 MHz<br>PCI Express:<br>x1 slot bidirectional speed - 500 MB/s<br>x16 slot bidirectional speed - 8 GB/s |
| PCI                            |  |
| connectors                     | two  |
| connector size                 | 120 pins   |
| connector data width (maximum) | 32 bits  |
| PCI Express                    |  |
| connector                      | one x1   |
| connector size                 | 36 pins  |
| connector data width (maximum) | 1 PCI Express lane   |
| PCI Express                    |  |
| connector                      | one x16  |
| connector size                 | 164 pins   |
| connector data width (maximum) | 16 PCI Express lanes   |
| <b>Drives</b>                  |  |
| Externally accessible:         |  |
| Bays                           | one 3.5-inch drive bay (FlexBay)<br>two 5.25-inch drive bays   |
| Available devices              | Serial ATA drives (4), floppy drive, USB memory devices, CD/DVD drive, and Media Card Reader                   |
| Internally accessible:         | two bays for 1-inch high serial ATA hard drives  |

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**Connectors**

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## External connectors:

|                 |   |
|-----------------|---|
| Video           | 15-hole connector   |
| Network adapter | RJ-45 connector   |
| USB             | two front-panel and six back-panel USB 2.0-compliant connectors |
| Audio           | six connectors for 7.1 support                                  |

## System board connectors:

|                 |  |
|-----------------|--|
| Serial ATA      | four 7-pin connectors  |
| FlexBay Drive   | one USB 10-pin header for optional Media Card Reader (3.5-inch bay device) |
| Floppy drive    | one 33-pin connector   |
| Fan             | one 5-pin connectors   |
| PCI 2.3         | two 120-pin connectors   |
| PCI Express x1  | one 36-pin connector   |
| PCI Express x16 | one 164-pin connector  |

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**Controls and Lights**

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|  |   |
|--|---|
| Power button   | push button   |
| Power light  | green light — Blinking green in sleep state; solid green for power-on state.<br><br>amber light — Blinking amber indicates a problem with the power supply inside the computer. If the system cannot boot and there is a solid amber light, this indicates a problem with the system board (see "Power Problems" on page 41). |
| Hard-drive access light                              | green   |
| Link integrity light (on integrated network adapter) | green light — A good connection exists between the network and the computer.<br><br>off (no light) — The computer is not detecting a physical connection to the network.  |
| Activity light (on integrated network adapter)       | yellow blinking light   |
| Diagnostic lights                                    | four lights on the front panel (see "Diagnostic Lights" on page 47.)  |
| Standby power light                                  | STBYLED on the system board   |

|   |   |
|---|---|
| <b>Power</b>  |   |
| DC power supply:  |   |
| Wattage   | 305 W   |
| Maximum heat dissipation  | 560.5 BTU/hr  |
| Voltage (see the safety instructions located in the <i>Product Information Guide</i> for important voltage setting information) | 90 to 135 V and 180 to 265 V at 50/60 Hz  |
| Backup battery  | 3-V CR2032 lithium coin cell  |
| <b>Physical</b>   |   |
| Height  | 41.4 cm (16.3 inches)   |
| Width   | 18.8 cm (7.4 inches)  |
| Depth   | 45.7 cm (18.0 inches)   |
| Weight  | 12.7 kg (28.0 lb)   |
| <b>Environmental</b>  |   |
| Temperature:  |   |
| Operating   | 10° to 35°C (50° to 95°F)   |
| Storage   | –40° to 65°C (–40° to 149°F)  |
| Relative humidity   | 20% to 80% (noncondensing)  |
| Maximum vibration:  |   |
| Operating   | 5 to 350 Hz at 0.0002 G <sup>2</sup> /Hz  |
| Storage   | 5 to 500 Hz at 0.001 to 0.01 G <sup>2</sup> /Hz   |
| Maximum shock:  |   |
| Operating   | 40 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 20 in/sec [51 cm/sec])   |
| Storage   | 105 G +/- 5% with pulse duration of 2 msec +/- 10% (equivalent to 50 in/sec [127 cm/sec]) |
| Altitude:   |   |
| Operating   | –15.2 to 3048 m (–50 to 10,000 ft)  |
| Storage   | –15.2 to 10,668 m (–50 to 35,000 ft)  |



# System Setup

## Overview

Use system setup as follows:

- To change the system configuration information after you add, change, or remove any hardware in your computer
- To set or change a user-selectable option such as the user password
- To read the current amount of memory or set the type of hard drive installed

Before you use system setup, it is recommended that you write down the system setup screen information for future reference.



**NOTICE:** Unless you are an expert computer user, do not change the settings for this program. Certain changes can make your computer work incorrectly.

## Entering System Setup

- 1 Turn on (or restart) your computer.
- 2 When the blue DELL™ logo is displayed, you must watch for the F2 prompt to appear.
- 3 Once this F2 prompt appears, press <F2> immediately.



**NOTE:** The F2 prompt indicates that the keyboard has initialized. This prompt can appear very quickly, so you must watch for it to display, and then press <F2>. If you press <F2> before you are prompted, this keystroke will be lost.


- 4 If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft® Windows® desktop. Then, shut down your computer (see "Turning Off Your Computer" on page 59) and try again.

## System Setup Screens

The system setup screen displays current or changeable configuration information for your computer.

| System  |  | Diskette Drive  |
|---|--|---|
| System Info<br>Processor Info<br>Memory Info<br>Date/Time<br>Boot Sequence  |  | <div> Off      USB      Internal      Read Only </div>  |
| <b>Drives</b><br><br>Diskette Drive<br>Drive 0<br>Drive 1<br>Drive 2<br>Drive 3<br>Drive 4<br>Drive 5<br>SATA Operation |  | <p>This field determines how the BIOS configures the floppy drive. Operating systems with USB support will recognize USB floppy drives regardless of this setting.</p> <p> <b>Off</b>                = All floppy drives are disabled.<br/> <b>USB</b>                = USB floppy drives are enabled<br/> <b>Internal</b>          = The integrated floppy drive is enabled.<br/> <b>Read Only</b>        = The integrated floppy drive is enabled and only allows reads. </p> <p>The factory default setting is <b>Internal</b>.</p> <p>Note: If <b>USB</b> is selected, ensure that the <b>USB Controller</b> field in the <b>Onboard Devices</b> group is set to <b>On</b>.</p> |
| <b>Onboard Devices</b><br><br>Integrated NIC<br>USB Controller<br>Front USB Ports<br>PCI Slots<br>Serial Port #1        |  |   |
| <b>Video</b><br><br>Primary Video<br>Video Memory Size  |  |   |
| <b>Maintenance Options</b><br><br>Load Defaults<br>Event Log  |  | <p>Use ENTER to modify this selection<br/> Use Up/Down arrows to select a different field<br/> Use ESC key to exit this program<br/> Use +/- keys to expand or collapse a group</p>   |

System Setup Options

 **NOTE:** Depending on your computer and installed devices, the items listed in this section may not appear, or may not appear exactly as listed.

| System         |   |
|----------------|---|
| System Info    | Displays the System name, BIOS Version number, BIOS Date, Service Tag, Express Service Code, and Asset Tag.<br><br><b>NOTE:</b> The system name listed in the BIOS may not appear exactly as the name that appears on the computer or in the computer’s documentation.            |
| Processor Info | Displays the following information for the processor installed in the system: Processor Type, Processor Clock Speed, Processor Bus Speed, Processor Cache Size, Processor ID number, whether the processor is Hyperthreading Capable, and if the processor has 64-bit Technology. |

|   |   |
|---|---|
| Memory Info                               | Displays the amount of <b>Installed Memory</b> , <b>Memory Speed</b> , <b>Memory Channel Mode</b> , and a description of the <b>Memory Technology</b> . This option also displays a table that describes the memory size, whether the memory module is ECC capable, single or dual rank, type, and organization.              |
| PCI Info                                  | Displays the contents of each PCI slot.   |
| Date/Time                                 | Controls the system's internal calendar and clock.  |
| Boot Sequence<br>(Diskette drive default) | Determines the order in which the system searches for boot devices during system startup.<br><b>NOTE:</b> If you insert a boot device and restart the computer, this option appears in the system setup menu. To boot from a USB memory device, select the USB device and move it so it becomes the first device in the list. |

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## Drives

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|   |   |
|---|---|
| Diskette Drive<br>(Internal default)            | Enables and disables the floppy drives and sets read permission for the internal floppy drive. <ul style="list-style-type: none"> <li>• <b>Off</b> — disables all floppy drives</li> <li>• <b>USB</b> — enables the USB floppy drive</li> <li>• <b>Internal</b> — enables the internal floppy drive</li> <li>• <b>Read Only</b> — enables the internal drive controller and allows the internal floppy drive read-only permission</li> </ul> <b>NOTE:</b> Operating systems with USB support will recognize USB floppy drives regardless of this setting. |
| Drives 0 through 3<br>(On default)              | Enables or disables an ATA or SATA device (such as hard-drive, CD drive, or DVD drive). <b>On</b> enables the interface so that the device can be used.<br><br>Displays the <b>Controller</b> type ( <b>ATA</b> or <b>SATA</b> ), <b>Port</b> number the drive is using, <b>Drive ID</b> number, <b>Capacity</b> , and whether the drive is controlled by the <b>BIOS</b> .   |
| SATA Operation<br>(RAID Autodetect/ATA default) | Identifies and defines the SATA controller settings for RAID. You can set the SATA controller to <b>RAID Autodetect/ATA</b> or <b>RAID On</b> .   |

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## Onboard Devices

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|                                |  |
|--------------------------------|--|
| Integrated NIC<br>(On default) | Enables or disables the integrated NIC controller. Settings are <b>On</b> , <b>Off</b> , or <b>On w/PXE</b> . When the <b>On w/PXE</b> setting is active (available only for setting up a future boot process), the computer prompts you to press <Ctrl><Alt><b>. Pressing this key combination causes a menu to display that allows you to select a method for booting from a network server. If a boot routine is not available from the network server, the computer attempts to boot from the next device in the boot sequence list. |
|--------------------------------|--|

|                                 |  |
|---------------------------------|--|
| Integrated Audio Controller     | Enables or disables the onboard audio controller.  |
| USB for Flexbay<br>(On default) | Enables or disables internal USB for FlexBay.<br><b>NOTE:</b> This USB option appears only if a FlexBay device is installed. |

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## Video

|                                     |  |
|-------------------------------------|--|
| Primary Video<br>(Auto default)     | Specifies which video controller is primary when two video controllers are present on the computer. <b>Auto</b> enables the add-in video controller. <b>Onboard</b> enables the integrated video controller. |
| Video Memory Size<br>(8 MB default) | Configures the system memory allocation reserved for the optional integrated video controller. Settings are 1MB and 8MB.   |

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## Performance

|                                 |   |
|---------------------------------|---|
| Hyper-Threading<br>(On default) | Determines whether the physical processor appears as one or two logical processors. The performance of some applications improve with additional logical processors installed.  |
| SpeedStep<br>(On default)       | Allows the BIOS to modify the processor fan and speed based on processor temperature readings.<br><b>NOTE:</b> SpeedStep is not supported by all processors; therefore, this option will appear only when a supported processor is installed.   |
| HDD Acoustic Mode               | <ul style="list-style-type: none"> <li>• <b>Bypass</b> — Your computer does not test or change the current acoustics mode setting.</li> <li>• <b>Quiet</b> — The hard drive operates at its most quiet setting.</li> <li>• <b>Suggested</b> — The hard drive operates at the level suggested by the drive manufacturer.</li> <li>• <b>Performance</b> — The hard drive operates at its maximum speed.</li> </ul> <p><b>NOTE:</b> Switching to performance mode will cause the drive heads to move faster, causing the hard drive to be noisier. However, some drives may not see an increase in data transfer rates.</p> <p><b>NOTE:</b> Changing the acoustics setting does not alter your hard drive image.</p> |

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## Security

|                                      |  |
|--------------------------------------|--|
| Admin Password<br>(Not Set default)  | Displays the current status of your system setup program's password security feature and allows you to verify and assign a new admin password. |
| System Password<br>(Not Set default) | Displays the current status of the system's password security feature and allows a new system password to be assigned and verified.            |

|  |   |
|--|---|
| Password Changes<br>(Unlocked default) | Determines the interaction between the <b>System</b> password and the <b>Admin</b> password. <ul style="list-style-type: none"> <li>• <b>Locked</b> — prevents a user without a valid <b>Admin</b> password from being able to modify the <b>System</b> password</li> <li>• <b>Unlocked</b> — allows a user without a valid <b>Admin</b> password to modify the system password</li> </ul>  |
| Execute Disable<br>(On default)        | Enables or disables <b>Execute Disable</b> memory protection technology.  |
| <b>Power Management</b>                |   |
| AC Recovery<br>(Off default)           | Determines how the system responds when AC power is re-applied after a power loss. <ul style="list-style-type: none"> <li>• <b>Off</b> — The system remains off when power is re-applied. You must press the front-panel power button before the system turns on.</li> <li>• <b>On</b> — The system turns on when power is re-applied.</li> <li>• <b>Last</b> — The system returns to the last power state the system was in just before it was turned off.</li> </ul>  |
| Auto Power On<br>(Off default)         | Sets the computer to automatically turn on. <ul style="list-style-type: none"> <li>• <b>Off</b> — disables the Auto Power On feature</li> <li>• <b>Everyday</b> — turns the computer on every day at the time set in <b>Auto Power Time</b></li> <li>• <b>Weekdays</b> — turns the computer on every day from Monday through Friday at the time set in <b>Auto Power Time</b></li> </ul> <p><b>NOTE:</b> This feature does not work if you turn off your computer using a power strip or surge protector.</p> |
| Auto Power Time                        | Sets time to automatically turn on the computer.<br><br>Time is kept in the standard 12-hour format ( <i>hours:minutes</i> ). Change the startup time by pressing the right- or left-arrow key to increase or decrease the numbers, or type numbers in both the date and time fields.   |
| Suspend Mode<br>(S3 default)           | Sets the computer's suspend mode. <ul style="list-style-type: none"> <li>• <b>S1</b> — sets the computer to a suspend state where the computer is running in a low-power mode</li> <li>• <b>S3</b> — sets the computer to a standby state where the power is reduced or turned off for most components; however, system memory remains active for both settings</li> </ul>  |

|   |   |
|---|---|
| <b>Maintenance</b>                          |   |
| SERR DMI Message<br>(On default)            | Controls the SERR DMI message mechanism.<br><b>NOTE:</b> Some graphics cards require that the SERR DMI message mechanism be disabled.   |
| Load Defaults                               | Restores system setup options to their factory defaults.  |
| Event Log                                   | Allows you to view the <b>Event Log</b> . Entries are marked <b>R</b> for <b>Read</b> and <b>U</b> for <b>Unread</b> . <b>Mark All Entries Read</b> puts an <b>R</b> to the left of all entries. <b>Clear Log</b> clears the <b>Event Log</b> .   |
| <b>POST Behavior</b>                        |   |
| Fastboot<br>(On default)                    | When enabled, this feature reduces computer startup time by bypassing some compatibility steps. <ul style="list-style-type: none"> <li>• <b>Off</b> — does not skip any steps during computer startup</li> <li>• <b>On</b> — starts the system more quickly</li> </ul>  |
| Numlock Key<br>(On default)                 | Determines the functionality of the numeric keys on the right side of your keyboard. <ul style="list-style-type: none"> <li>• <b>Off</b> — commands the right keypad keys to function as arrows</li> <li>• <b>On</b> — commands the right keypad keys to function as numbers</li> </ul>   |
| POST Hotkeys<br>(Setup & Boot Menu default) | Determines whether the sign-on screen displays a message stating the keystroke sequence that is required to enter the <b>Setup</b> program or the <b>Quickboot</b> feature. <ul style="list-style-type: none"> <li>• <b>Setup &amp; Boot Menu</b> — displays both messages (F2=Setup and F12=Boot Menu)</li> <li>• <b>Setup</b> — displays the setup message only (F2=Setup)</li> <li>• <b>Boot Menu</b> — displays the <b>Quickboot</b> message only (F12=Boot Menu)</li> <li>• <b>None</b> — displays no message</li> </ul> |
| Keyboard Errors<br>(Report default)         | When set to <b>Report</b> and an error is detected during POST, the BIOS will display the error message and prompt you to press <F1> to continue or press <F2> to enter system setup.<br><br>When set to <b>Do Not Report</b> (disabled) and an error is detected during POST, the BIOS will display the error message and continue booting the system.   |

## Boot Sequence

This feature allows you to change the boot sequence for devices.

### Option Settings

- **Diskette Drive** — The computer attempts to boot from the floppy drive. If the floppy disk in the drive is not bootable, if no floppy disk is in the drive, or if there is no floppy drive installed in the computer, the computer generates an error message.
- **Hard Drive** — The computer attempts to boot from the primary hard drive. If no operating system is on the drive, the computer generates an error message.
- **CD Drive** — The computer attempts to boot from the CD drive. If no CD is in the drive, or if the CD has no operating system, the computer generates an error message.
- **USB Flash Device** — Insert the memory device into a USB port and restart the computer. When **F12 = Boot Menu** appears in the upper-right corner of the screen, press <F12>. The BIOS detects the device and adds the USB flash option to the boot menu.



**NOTE:** To boot to a USB device, the device must be bootable. To make sure that your device is bootable, check the device documentation.

### Changing Boot Sequence for the Current Boot

You can use this feature, for example, to restart your computer to a USB device such as a floppy drive, memory key, or CD-RW drive.



**NOTE:** If you are booting to a USB floppy drive, you must first set the floppy drive to OFF in system setup (see "System Setup" on page 113).

- 1 If you are booting to a USB device, connect the USB device to a USB connector (see "Connectors" on page 111).
- 2 Turn on (or restart) your computer.
- 3 When **F2 = Setup**, **F12 = Boot Menu** appears in the upper-right corner of the screen, press <F12>.

If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop. Then shut down your computer (see "Turning Off Your Computer" on page 59) and try again.


The **Boot Device Menu** appears, listing all available boot devices. Each device has a number next to it.

- 4 At the bottom of the menu, enter the number of the device that is to be used for the current boot only. For example, if you are booting to a USB memory key, highlight **USB Flash Device** and press <Enter>.



**NOTE:** To boot to a USB device, the device must be bootable. To make sure your device is bootable, check the device documentation.

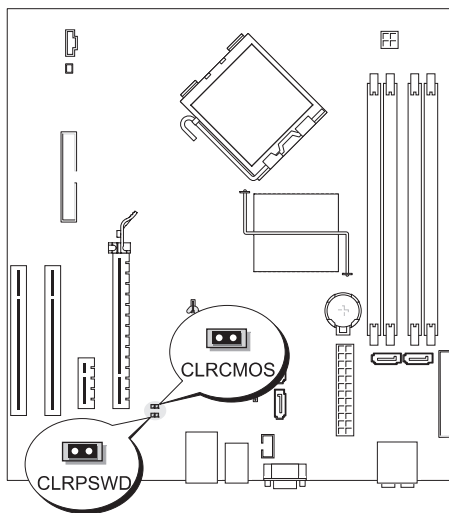
## Changing Boot Sequence for Future Boots

- 1 Enter system setup (see "Entering System Setup" on page 113).
  - 2 Use the arrow keys to highlight the **Boot Sequence** menu option and press <Enter> to access the menu.
-  **NOTE:** Write down your current boot sequence in case you want to restore it.
- 3 Press the up- and down-arrow keys to move through the list of devices.
  - 4 Press the spacebar to enable or disable a device (enabled devices have a checkmark).
  - 5 Press plus (+) or minus (-) to move a selected device up or down the list.

## Clearing Forgotten Passwords


 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

- 1 Follow the procedures in "Before You Begin" on page 59.




- 2 Locate the 2-pin password jumper (CLRPSWD) on the system board (see "System Board Components" on page 68), and remove the jumper plug from pins 1 and 2 to clear the password.
- 3 Close the computer cover (see "Replacing the Computer Cover" on page 106).
- 4 Connect your computer and monitor to electrical outlets, and turn them on.
- 5 After the Microsoft® Windows® desktop appears on your computer, shut down the computer (see "Turning Off Your Computer" on page 59).
- 6 Turn off the monitor and disconnect it from the electrical outlet.



- 7 Disconnect the computer power cable from the electrical outlet, and press the power button to ground the system board.
- 8 Open the computer cover (see "Removing the Computer Cover" on page 65).
- 9 Locate the 2-pin password jumper (CLRPSWD) on the system board (see "System Board Components" on page 68) and attach the jumper to pins 1 and 2 to reenable the password feature.
- 10 Close the computer cover (see "Replacing the Computer Cover" on page 106).
-  **NOTICE:** To connect a network cable, first plug the cable into the network device and then plug it into the computer.
- 11 Connect your computer and devices to electrical outlets, and turn them on.

## Clearing CMOS Settings


 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

- 1 Follow the procedures in "Before You Begin" on page 59.
- 2 Reset the current CMOS settings:
  - a Locate both the 2-pin password jumper (CLRPSWD) and the 2-pin CMOS jumper (CLRCMOS) on the system board (see "System Board Components" on page 68).
  - b Remove the 2-pin password jumper (CLRPSWD) from its pins.
  - c Place the password jumper plug on the CLRCMOS pins and wait approximately 5 seconds.
  - d Remove the jumper plug from the CLRCMOS pins and place it back upon the password (CLRPSWD) pins.
- 3 Close the computer cover (see "Replacing the Computer Cover" on page 106).
-  **NOTICE:** To connect a network cable, first plug the cable into the network port or device and then plug it into the computer.
- 4 Connect your computer and devices to electrical outlets, and turn them on.


## Cleaning Your Computer

 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions located in the *Product Information Guide*.

### Computer, Keyboard, and Monitor

 **CAUTION:** Before you clean your computer, disconnect the computer from the electrical outlet. Clean your computer with a soft cloth dampened with water. Do not use liquid or aerosol cleaners, which may contain flammable substances.

- Use a vacuum cleaner with a brush attachment to gently remove dust from the slots and holes on your computer and from between the keys on the keyboard.

 **NOTICE:** Do not wipe the display screen with any soap or alcohol solution. Doing so may damage the antiglare coating.

- To clean your monitor screen, lightly dampen a soft, clean cloth with water. If possible, use a special screen-cleaning tissue or solution suitable for the monitor's antistatic coating.
- Wipe the keyboard, computer, and plastic part of the monitor with a soft cleaning cloth moistened with a solution of three parts water and one part dishwashing detergent.


Do not soak the cloth or let water drip inside your computer or keyboard.

## Mouse

If your screen cursor skips or moves abnormally, clean the mouse. To clean a non-optical mouse:


- 1 Turn the retainer ring on the underside of your mouse counterclockwise, and then remove the ball.
- 2 Wipe the ball with a clean, lint-free cloth.
- 3 Blow carefully into the ball cage to dislodge dust and lint.
- 4 If the rollers inside the ball cage are dirty, clean the rollers with a cotton swab moistened lightly with isopropyl alcohol.
- 5 Recenter the rollers in their channels if they are misaligned. Ensure that fluff from the swab is not left on the rollers.
- 6 Replace the ball and retainer ring, and turn the retainer ring clockwise until it clicks into place.

## Floppy Drive

 **NOTICE:** Do not attempt to clean drive heads with a swab. You might accidentally misalign the heads, which prevents the drive from operating.


Clean your floppy drive using a commercially available cleaning kit. These kits contain pretreated floppy disks to remove contaminants that accumulate during normal operation.

## CDs and DVDs

 **NOTICE:** Always use compressed air to clean the lens in the CD/DVD drive, and follow the instructions that come with the compressed air. Never touch the lens in the drive.

If you notice problems, such as skipping, with the playback quality of your CDs or DVDs, try cleaning the discs.

- 1 Hold the disc by its outer edge. You can also touch the inside edge of the center hole.

 **NOTICE:** To prevent damaging the surface, do not wipe in a circular motion around the disc.

- 2 With a soft, lint-free cloth, gently wipe the bottom of the disc (the unlabeled side) in a straight line from the center to the outer edge of the disc.

For stubborn dirt, try using water or a diluted solution of water and mild soap. You can also purchase commercial products that clean discs and provide some protection from dust, fingerprints, and scratches. Cleaning products for CDs are safe to use on DVDs.

## Dell Technical Support Policy (U.S. Only)

Technician-assisted technical support requires the cooperation and participation of the customer in the troubleshooting process and provides for restoration of the operating system, software programs, and hardware drivers to the original default configuration as shipped from Dell, as well as the verification of appropriate functionality of the computer and all Dell-installed hardware. In addition to this technician-assisted technical support, online technical support is available at [support.dell.com](http://support.dell.com). Additional technical support options may be available for purchase.

Dell provides limited technical support for the computer and any "Dell-installed" software and peripherals<sup>1</sup>. Support for third-party software and peripherals is provided by the original manufacturer, including those purchased and/or installed through Dell Software and Peripherals, Readyware, and Custom Factory Integration<sup>2</sup>.

- <sup>1</sup> Repair services are provided pursuant to the terms and conditions of your limited warranty and any optional support service contract purchased with the computer.
- <sup>2</sup> All Dell-standard components included in a Custom Factory Integration (CFI) project are covered by the standard Dell limited warranty for your computer. However, Dell also extends a parts replacement program to cover all nonstandard, third-party hardware components integrated through CFI for the duration of the computer's service contract.

### Definition of "Dell-Installed" Software and Peripherals

Dell-installed software includes the operating system and some of the software programs that are installed on the computer during the manufacturing process (Microsoft® Office, Norton Antivirus, and so on).

Dell-installed peripherals include any internal expansion cards, or Dell-branded module bay or PC Card accessories. In addition, any Dell-branded monitors, keyboards, mice, speakers, microphones for telephonic modems, docking stations/port replicators, networking products, and all associated cabling are included.

### Definition of "Third-Party" Software and Peripherals

Third-party software and peripherals include any peripheral, accessory, or software program sold by Dell not under the Dell brand (printers, scanners, cameras, games, and so on). Support for all third-party software and peripherals is provided by the original manufacturer of the product.

## FCC Notice (U.S. Only)

### FCC Class B

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

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- 1 This device may not cause harmful interference.
- 2 This device must accept any interference received, including interference that may cause undesired operation.



**NOTICE:** The FCC regulations provide that changes or modifications not expressly approved by Dell Inc. could void your authority to operate this equipment.

These limits are designed to provide reasonable protection against harmful interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna.
- Relocate the system with respect to the receiver.
- Move the system away from the receiver.
- Plug the system into a different outlet so that the system and the receiver are on different branch circuits.

If necessary, consult a representative of Dell Inc. or an experienced radio/television technician for additional suggestions.

The following information is provided on the device or devices covered in this document in compliance with the FCC regulations:

- Product name: Dell™ Dimension™ E520
- Model number: DCSM
- Company name:  
Dell Inc.  
Worldwide Regulatory Compliance & Environmental Affairs  
One Dell Way  
Round Rock, TX 78682 USA  
512-338-4400



**NOTE:** For Further regulatory information, see your *Product Information Guide*.

## Contacting Dell

To contact Dell electronically, you can access the following websites:

- [www.dell.com](http://www.dell.com)
- [support.dell.com](http://support.dell.com) (support)

For specific web addresses for your country, find the appropriate country section in the table below.



**NOTE:** Toll-free numbers are for use within the country for which they are listed.



**NOTE:** In certain countries, support specific to Dell™ XPS™ computers is available at a separate telephone number listed for participating countries. If you do not see a telephone number listed that is specific for XPS computers, you may contact Dell through the support number listed and your call will be routed appropriately.

When you need to contact Dell, use the electronic addresses, telephone numbers, and codes provided in the following table. If you need assistance in determining which codes to use, contact a local or an international operator.



**NOTE:** The contact information provided was deemed correct at the time that this document went to print and is subject to change.

| Country (City)<br>International Access Code<br>Country Code<br>City Code                       | Department Name or Service Area,<br>Website and E-Mail Address  | Area Codes,<br>Local Numbers, and<br>Toll-Free Numbers  |
|--|---|---|
| Anguilla   | Website: <a href="http://www.dell.com.ai">www.dell.com.ai</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | toll-free: 800-335-0031   |
| Antigua and Barbuda  | Website: <a href="http://www.dell.com.ag">www.dell.com.ag</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | 1-800-805-5924  |
| Argentina (Buenos Aires)<br>International Access Code: 00<br>Country Code: 54<br>City Code: 11 | Website: <a href="http://www.dell.com.ar">www.dell.com.ar</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>E-mail for desktop and portable computers:<br><a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>E-mail for servers and EMC® storage products:<br><a href="mailto:la_enterprise@dell.com">la_enterprise@dell.com</a><br>Customer Care<br>Technical Support<br>Technical Support Services<br>Sales | toll-free: 0-800-444-0730<br>toll-free: 0-800-444-0733<br>toll-free: 0-800-444-0724<br>0-810-444-3355 |
| Aruba  | Website: <a href="http://www.dell.com.aw">www.dell.com.aw</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | toll-free: 800-1578   |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b>        | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>  |
|---|---|--|
| Australia (Sydney)<br>International Access Code: 0011<br>Country Code: 61<br>City Code: 2 | Website: support.ap.dell.com<br>E-mail: support.ap.dell.com/contactus<br>General Support  | 13DELL-133355  |
| Austria (Vienna)<br>International Access Code: 900<br>Country Code: 43<br>City Code: 1    | Website: support.euro.dell.com<br>E-mail: tech_support_central_europe@dell.com<br>Home/Small Business Sales<br>Home/Small Business Fax<br>Home/Small Business Customer Care<br>Preferred Accounts/Corporate Customer Care<br>Support for XPS<br>Home/Small Business Support for all other Dell computers<br>Preferred Accounts/Corporate Support<br>Switchboard | 0820 240 530 00<br>0820 240 530 49<br>0820 240 530 14<br>0820 240 530 16<br>0820 240 530 81<br>0820 240 530 17<br>0820 240 530 17<br>0820 240 530 00 |
| Bahamas   | Website: www.dell.com.bs<br>E-mail: la-techsupport@dell.com<br>General Support  | toll-free: 1-866-278-6818  |
| Barbados  | Website: www.dell.com/bb<br>E-mail: la-techsupport@dell.com<br>General Support  | 1-800-534-3142   |
| Belgium (Brussels)<br>International Access Code: 00<br>Country Code: 32<br>City Code: 2   | Website: support.euro.dell.com<br>Tech Support for XPS<br>Tech Support for all other Dell computers<br>Tech Support Fax<br>Customer Care<br>Corporate Sales<br>Fax<br>Switchboard   | 02 481 92 96<br>02 481 92 88<br>02 481 92 95<br>02 713 15 65<br>02 481 91 00<br>02 481 92 99<br>02 481 91 00   |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b>  | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>   | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>  |
|---|--|--|
| <b>Bermuda</b>  | Website: <a href="http://www.dell.com/bm">www.dell.com/bm</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support   | 1-877-890-0751   |
| <b>Bolivia</b>  | Website: <a href="http://www.dell.com/bo">www.dell.com/bo</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support   | toll-free: 800-10-0238   |
| <b>Brazil</b><br>International Access Code: 00<br>Country Code: 55<br>City Code: 51 | Website: <a href="http://www.dell.com/br">www.dell.com/br</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>Customer Support, Tech Support<br>Technical Support Fax<br>Customer Care Fax<br>Sales   | 0800 90 3355<br>51 3481 5470<br>51 3481 5480<br>0800 90 3390   |
| <b>British Virgin Islands</b>   | General Support  | toll-free: 1-866-278-6820  |
| <b>Brunei</b><br>Country Code: 673  | Technical Support (Penang, Malaysia)<br>Customer Care (Penang, Malaysia)<br>Transaction Sales (Penang, Malaysia)   | 604 633 4966<br>604 633 4888<br>604 633 4955   |
| <b>Canada (North York, Ontario)</b><br>International Access Code: 011               | Online Order Status: <a href="http://www.dell.ca/ostatus">www.dell.ca/ostatus</a><br>AutoTech (automated Hardware and Warranty Support)<br>Customer Service (Home Sales/Small Business)<br>Customer Service (med./large business, government)<br>Customer Service (printers, projectors, televisions, handhelds, digital jukebox, and wireless)<br>Hardware Warranty Support (Home Sales/Small Business)<br>Hardware Warranty Support (med./large bus., government)<br>Hardware Warranty Support (printers, projectors, televisions, handhelds, digital jukebox, and wireless)<br>Sales (Home Sales/Small Business)<br>Sales (med./large bus., government)<br>Spare Parts Sales & Extended Service Sales | toll-free: 1-800-247-9362<br>toll-free: 1-800-847-4096<br>toll-free: 1-800-326-9463<br>toll-free: 1-800-847-4096<br>toll-free: 1-800-906-3355<br>toll-free: 1-800-387-5757<br>1-877-335-5767<br>toll-free: 1-800-387-5752<br>toll-free: 1-800-387-5755<br>1 866 440 3355 |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|---|---|
| Cayman Islands   | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support   | 1-877-262-5415  |
| Chile (Santiago)   | Website: <a href="http://www.dell.com/cl">www.dell.com/cl</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a> |   |
| Country Code: 56<br>City Code: 2   | Sales and Customer Support  | toll-free: 1230-020-4823  |



| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>   | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>  |
|--|--|--|
| China (Xiamen)<br>Country Code: 86<br>City Code: 592                               | Technical Support website: <a href="http://support.dell.com.cn">support.dell.com.cn</a><br>Technical Support E-mail: <a href="mailto:cn_support@dell.com">cn_support@dell.com</a><br>Customer Care E-mail: <a href="mailto:customer_cn@dell.com">customer_cn@dell.com</a><br>Technical Support Fax<br>Technical Support (Dell™ Dimension™ and Inspiron)<br>Technical Support (OptiPlex™, Latitude™, and Dell Precision™)<br>Technical Support (servers and storage)<br>Technical Support (projectors, PDAs, switches, routers, and so on)<br>Technical Support (printers)<br>Customer Care<br>Customer Care Fax<br>Home and Small Business<br>Preferred Accounts Division<br>Large Corporate Accounts GCP<br>Large Corporate Accounts Key Accounts<br>Large Corporate Accounts North<br>Large Corporate Accounts North Government and Education<br>Large Corporate Accounts East<br>Large Corporate Accounts East Government and Education<br>Large Corporate Accounts Queue Team<br>Large Corporate Accounts South<br>Large Corporate Accounts West<br>Large Corporate Accounts Spare Parts | 592 818 1350<br>toll-free: 800 858 2968<br>toll-free: 800 858 0950<br>toll-free: 800 858 0960<br>toll-free: 800 858 2920<br>toll-free: 800 858 2311<br>toll-free: 800 858 2060<br>592 818 1308<br>toll-free: 800 858 2222<br>toll-free: 800 858 2557<br>toll-free: 800 858 2055<br>toll-free: 800 858 2628<br>toll-free: 800 858 2999<br>toll-free: 800 858 2955<br>toll-free: 800 858 2020<br>toll-free: 800 858 2669<br>toll-free: 800 858 2572<br>toll-free: 800 858 2355<br>toll-free: 800 858 2811<br>toll-free: 800 858 2621 |
| Colombia   | Website: <a href="http://www.dell.com/cl">www.dell.com/cl</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support   | 01-800-915-4755  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>                                      |
|--|---|--|
| Costa Rica   | Website: <a href="http://www.dell.com/cr">www.dell.com/cr</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | 0800-012-0231  |
| Czech Republic (Prague)<br>International Access Code: 00<br>Country Code: 420      | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a><br>E-mail: <a href="mailto:czech_dell@dell.com">czech_dell@dell.com</a><br>Technical Support<br>Customer Care<br>Fax<br>Technical Fax<br>Switchboard  | 22537 2727<br>22537 2707<br>22537 2714<br>22537 2728<br>22537 2711                                   |
| Denmark (Copenhagen)<br>International Access Code: 00<br>Country Code: 45          | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a><br>Technical Support for XPS<br>Technical Support for all other Dell computers<br>Customer Care (Relational)<br>Home/Small Business Customer Care<br>Switchboard (Relational)<br>Switchboard Fax (Relational)<br>Switchboard (Home/Small Business)<br>Switchboard Fax (Home/Small Business) | 7010 0074<br>7023 0182<br>7023 0184<br>3287 5505<br>3287 1200<br>3287 1201<br>3287 5000<br>3287 5001 |
| Dominica   | Website: <a href="http://www.dell.com/dm">www.dell.com/dm</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | toll-free: 1-866-278-6821  |
| Dominican Republic   | Website: <a href="http://www.dell.com/do">www.dell.com/do</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | 1-800-156-1588   |
| Ecuador  | Website: <a href="http://www.dell.com/ec">www.dell.com/ec</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support (calling from Quito)<br>General Support (calling from Guayaquil)   | toll-free: 999-119-877-655-3355<br>toll-free: 1800-999-119-877-655-3355                              |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b>                       | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>  |
|--|---|--|
| El Salvador  | Website: <a href="http://www.dell.com/ec">www.dell.com/ec</a><br>E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a><br>General Support  | 800-6132   |
| Finland (Helsinki)<br>International Access Code: 990<br>Country Code: 358<br>City Code: 9                | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a><br>E-mail: <a href="mailto:fi_support@dell.com">fi_support@dell.com</a><br>Technical Support<br>Customer Care<br>Switchboard<br>Sales under 500 employees<br>Fax<br>Sales over 500 employees<br>Fax   | 0207 533 555<br>0207 533 538<br>0207 533 533<br>0207 533 540<br>0207 533 530<br>0207 533 533<br>0207 533 530   |
| France (Paris) (Montpellier)<br>International Access Code: 00<br>Country Code: 33<br>City Codes: (1) (4) | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a><br><b>Home and Small Business</b><br>Technical Support for XPS<br>Technical Support for all other Dell computers<br>Customer Care<br>Switchboard<br>Switchboard (calls from outside of France)<br>Sales<br>Fax<br>Fax (calls from outside of France)<br><b>Corporate</b><br>Technical Support<br>Customer Care<br>Switchboard<br>Sales<br>Fax | 0825 387 129<br>0825 387 270<br>0825 823 833<br>0825 004 700<br>04 99 75 40 00<br>0825 004 700<br>0825 004 701<br>04 99 75 40 01<br><br>0825 004 719<br>0825 338 339<br>01 55 94 71 00<br>01 55 94 71 00<br>01 55 94 71 01 |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b> | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| <b>Germany (Frankfurt)</b>   | Website: support.euro.dell.com   |   |
| International Access Code: 00  | E-mail: tech_support_central_europe@dell.com                           |   |
| Country Code: 49   | Technical Support for XPS  | 069 9792 7222   |
| City Code: 69  | Technical Support for all other Dell computers                         | 069 9792-7200   |
|  | Home/Small Business Customer Care                                      | 0180-5-224400   |
|  | Global Segment Customer Care   | 069 9792-7320   |
|  | Preferred Accounts Customer Care                                       | 069 9792-7320   |
|  | Large Accounts Customer Care   | 069 9792-7320   |
|  | Public Accounts Customer Care  | 069 9792-7320   |
|  | Switchboard  | 069 9792-7000   |
| <b>Greece</b>  | Website: support.euro.dell.com   |   |
| International Access Code: 00  | Technical Support  | 00800-44 14 95 18   |
| Country Code: 30   | Gold Service Technical Support   | 00800-44 14 00 83   |
|  | Switchboard  | 2108129810  |
|  | Gold Service Switchboard   | 2108129811  |
|  | Sales  | 2108129800  |
|  | Fax  | 2108129812  |
| <b>Grenada</b>   | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | toll-free: 1-866-540-3355                                       |
| <b>Guatemala</b>   | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | 1-800-999-0136  |
| <b>Guyana</b>  | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | toll-free: 1-877-270-4609                                       |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                                     | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| <b>Hong Kong</b>   | Website: support.ap.dell.com   |   |
| International Access Code: 001   | Technical Support E-mail: HK_support@Dell.com  |   |
| Country Code: 852  | Technical Support (Dimension and Inspiron)   | 2969 3188   |
|  | Technical Support (OptiPlex, Latitude, and Dell Precision)   | 2969 3191   |
|  | Technical Support (PowerApp™, PowerEdge™, PowerConnect™, and PowerVault™)                                  | 2969 3196   |
|  | Customer Care  | 3416 0910   |
|  | Large Corporate Accounts   | 3416 0907   |
|  | Global Customer Programs   | 3416 0908   |
|  | Medium Business Division   | 3416 0912   |
|  | Home and Small Business Division   | 2969 3105   |
| <b>India</b>   | E-mail: india_support_desktop@dell.com<br>india_support_notebook@dell.com<br>india_support_Server@dell.com |   |
|  | Technical Support  | 1600338045<br>and 1600448046                                    |
|  | Sales (Large Corporate Accounts)   | 1600 33 8044  |
|  | Sales (Home and Small Business)  | 1600 33 8046  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                 | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| <b>Ireland (Cherrywood)</b>  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>              |   |
| International Access Code: 00  | E-mail: <a href="mailto:dell_direct_support@dell.com">dell_direct_support@dell.com</a> |   |
| Country Code: 353  | <b>Sales</b>   |   |
| City Code: 1   | Ireland Sales  | 01 204 4444   |
|  | Dell Outlet  | 1850 200 778  |
|  | Online Ordering HelpDesk   | 1850 200 778  |
|  | <b>Customer Care</b>   |   |
|  | Home User Customer Care  | 01 204 4014   |
|  | Small Business Customer Care   | 01 204 4014   |
|  | Corporate Customer Care  | 1850 200 982  |
|  | <b>Technical Support</b>   |   |
|  | Technical Support for XPS computers only   | 1850 200 722  |
|  | Technical Support for all other Dell computers   | 1850 543 543  |
|  | <b>General</b>   |   |
|  | Fax/Sales Fax  | 01 204 0103   |
|  | Switchboard  | 01 204 4444   |
|  | U.K. Customer Care (dial within U.K. only)   | 0870 906 0010   |
|  | Corporate Customer Care (dial within U.K. only)  | 0870 907 4499   |
|  | U.K. Sales (dial within U.K. only)   | 0870 907 4000   |
| <b>Italy (Milan)</b>   | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>              |   |
| International Access Code: 00  | <b>Home and Small Business</b>   |   |
| Country Code: 39   | Technical Support  | 02 577 826 90   |
| City Code: 02  | Customer Care  | 02 696 821 14   |
|  | Fax  | 02 696 821 13   |
|  | Switchboard  | 02 696 821 12   |
|  | <b>Corporate</b>   |   |
|  | Technical Support  | 02 577 826 90   |
|  | Customer Care  | 02 577 825 55   |
|  | Fax  | 02 575 035 30   |
|  | Switchboard  | 02 577 821  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                 | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| Jamaica  | E-mail: la-techsupport@dell.com<br>General Support (dial from within Jamaica only)     | 1-800-440-9205  |
| Japan (Kawasaki)   | Website: support.jp.dell.com   |   |
| International Access Code: 001   | Technical Support (servers)  | toll-free: 0120-198-498   |
| Country Code: 81   | Technical Support outside of Japan (servers)   | 81-44-556-4162  |
| City Code: 44  | Technical Support (Dimension and Inspiron)   | toll-free: 0120-198-226   |
|  | Technical Support outside of Japan (Dimension and Inspiron)                            | 81-44-520-1435  |
|  | Technical Support (Dell Precision, OptiPlex, and Latitude)                             | toll-free: 0120-198-433   |
|  | Technical Support outside of Japan (Dell Precision, OptiPlex, and Latitude)            | 81-44-556-3894  |
|  | Technical Support (PDAs, projectors, printers, routers)                                | toll-free: 0120-981-690   |
|  | Technical Support outside of Japan (PDAs, projectors, printers, routers)               | 81-44-556-3468  |
|  | Faxbox Service   | 044-556-3490  |
|  | 24-Hour Automated Order Status Service   | 044-556-3801  |
|  | Customer Care  | 044-556-4240  |
|  | Business Sales Division (up to 400 employees)  | 044-556-1465  |
|  | Preferred Accounts Division Sales (over 400 employees)                                 | 044-556-3433  |
|  | Public Sales (government agencies, educational institutions, and medical institutions) | 044-556-5963  |
|  | Global Segment Japan   | 044-556-3469  |
|  | Individual User  | 044-556-1760  |
|  | Switchboard  | 044-556-4300  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>    | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|---|---|
| <b>Korea (Seoul)</b>   | E-mail: <a href="mailto:krsupport@dell.com">krsupport@dell.com</a>        |   |
| International Access Code: <b>001</b>  | Support   | toll-free: 080-200-3800   |
| Country Code: <b>82</b>  | Support (Dimension, PDA, Electronics and Accessories)                     | toll-free: 080-200-3801   |
| City Code: <b>2</b>  | Sales   | toll-free: 080-200-3600   |
|  | Fax   | 2194-6202   |
|  | Switchboard   | 2194-6000   |
| <b>Latin America</b>   | Customer Technical Support (Austin, Texas, U.S.A.)                        | 512 728-4093  |
|  | Customer Service (Austin, Texas, U.S.A.)                                  | 512 728-3619  |
|  | Fax (Technical Support and Customer Service) (Austin, Texas, U.S.A.)      | 512 728-3883  |
|  | Sales (Austin, Texas, U.S.A.)   | 512 728-4397  |
|  | SalesFax (Austin, Texas, U.S.A.)  | 512 728-4600  |
|  |   | or 512 728-3772   |
| <b>Luxembourg</b>  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a> |   |
| International Access Code: <b>00</b>   | Support   | 342 08 08 075   |
| Country Code: <b>352</b>   | Home/Small Business Sales   | +32 (0)2 713 15 96  |
|  | Corporate Sales   | 26 25 77 81   |
|  | Customer Care   | +32 (0)2 481 91 19  |
|  | Fax   | 26 25 77 82   |
| <b>Macao</b>   | Technical Support   | toll-free: 0800 105   |
| Country Code: <b>853</b>   | Customer Service (Xiamen, China)  | 34 160 910  |
|  | Transaction Sales (Xiamen, China)   | 29 693 115  |



| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>   | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| Malaysia (Penang)  | Website: support.ap.dell.com   |   |
| International Access Code: 00  | Technical Support (Dell Precision, OptiPlex, and Latitude)               | toll-free: 1 800 880 193  |
| Country Code: 60   | Technical Support (Dimension, Inspiron, and Electronics and Accessories) | toll-free: 1 800 881 306  |
| City Code: 4   | Technical Support (PowerApp, PowerEdge, PowerConnect, and PowerVault)    | toll-free: 1800 881 386   |
|  | Customer Care  | toll-free: 1800 881 306<br>(option 6)                           |
|  | Transaction Sales  | toll-free: 1 800 888 202  |
|  | Corporate Sales  | toll-free: 1 800 888 213  |
| Mexico   | E-mail: la-techsupport@dell.com  |   |
| International Access Code: 00  | Customer Technical Support   | 001-877-384-8979  |
| Country Code: 52   |  | or 001-877-269-3383   |
|  | Sales  | 50-81-8800  |
|  |  | or 01-800-888-3355  |
|  | Customer Service   | 001-877-384-8979  |
|  |  | or 001-877-269-3383   |
|  | Main   | 50-81-8800  |
|  |  | or 01-800-888-3355  |
| Montserrat   | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | toll-free: 1-866-278-6822                                       |
| Netherlands Antilles   | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | 001-800-882-1519  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                   | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| Netherlands (Amsterdam)  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>                |   |
| International Access Code: 00  | Technical Support for XPS  | 020 674 45 94   |
| Country Code: 31   | Technical Support for all other Dell computers   | 020 674 45 00   |
| City Code: 20  | Technical Support Fax  | 020 674 47 66   |
|  | Home/Small Business Customer Care  | 020 674 42 00   |
|  | Relational Customer Care   | 020 674 4325  |
|  | Home/Small Business Sales  | 020 674 55 00   |
|  | Relational Sales   | 020 674 50 00   |
|  | Home/Small Business Sales Fax  | 020 674 47 75   |
|  | Relational Sales Fax   | 020 674 47 50   |
|  | Switchboard  | 020 674 50 00   |
|  | Switchboard Fax  | 020 674 47 50   |
| New Zealand  | Website: <a href="http://support.ap.dell.com">support.ap.dell.com</a>                    |   |
| International Access Code: 00  | E-mail: <a href="mailto:support.ap.dell.com/contactus">support.ap.dell.com/contactus</a> |   |
| Country Code: 64   | General Support  | 0800 441 567  |
| Nicaragua  | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>             |   |
|  | General Support  | 001-800-220-1377  |
| Norway (Lysaker)   | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>                |   |
| International Access Code: 00  | Technical Support for XPS  | 815 35 043  |
| Country Code: 47   | Technical Support for all other Dell products  | 671 16882   |
|  | Relational Customer Care   | 671 17575   |
|  | Home/Small Business Customer Care  | 23162298  |
|  | Switchboard  | 671 16800   |
|  | Fax Switchboard  | 671 16865   |
| Panama   | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>             |   |
|  | General Support  | 011-800-507-1264  |
| Peru   | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>             |   |
|  | General Support  | 0800-50-669   |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>         | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| <b>Poland (Warsaw)</b>   | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>      |   |
| International Access Code: 011   | E-mail: <a href="mailto:pl_support_tech@dell.com">pl_support_tech@dell.com</a> |   |
| Country Code: 48   | Customer Service Phone   | 57 95 700   |
| City Code: 22  | Customer Care  | 57 95 999   |
|  | Sales  | 57 95 999   |
|  | Customer Service Fax   | 57 95 806   |
|  | Reception Desk Fax   | 57 95 998   |
|  | Switchboard  | 57 95 999   |
| <b>Portugal</b>  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>      |   |
| International Access Code: 00  | Technical Support  | 707200149   |
| Country Code: 351  | Customer Care  | 800 300 413   |
|  | Sales  | 800 300 410 or 800 300 411 or<br>800 300 412 or 21 422 07 10    |
|  | Fax  | 21 424 01 12  |
| <b>Puerto Rico</b>   | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>   |   |
|  | General Support  | 1-877-537-3355  |
| <b>St. Kitts and Nevis</b>   | Website: <a href="http://www.dell.com/kn">www.dell.com/kn</a>                  |   |
|  | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>   |   |
|  | General Support  | toll-free: 1-866-540-3355                                       |
| <b>St. Lucia</b>   | Website: <a href="http://www.dell.com/lc">www.dell.com/lc</a>                  |   |
|  | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>   |   |
|  | General Support  | 1-800-882-1521  |
| <b>St. Vincent and the Grenadines</b>  | Website: <a href="http://www.dell.com/vc">www.dell.com/vc</a>                  |   |
|  | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>   |   |
|  | General Support  | toll-free: 1-877-441-4740                                       |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b>                    | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b>   |
|---|---|---|
| Singapore (Singapore)<br>International Access Code: 005<br>Country Code: 65                           | <b>NOTE:</b> The phone numbers in this section should be called from within Singapore or Malaysia only.<br><b>Website:</b> <a href="http://support.ap.dell.com">support.ap.dell.com</a><br>Technical Support (Dimension, Inspiron, and Electronics and Accessories)<br>Technical Support (OptiPlex, Latitude, and Dell Precision)<br>Technical Support (PowerApp, PowerEdge, PowerConnect, and PowerVault)<br>Customer Care<br>Transaction Sales<br>Corporate Sales | toll-free: 1 800 394 7430<br>toll-free: 1 800 394 7488<br>toll-free: 1 800 394 7478<br>toll-free: 1 800 394 7430 (option 6)<br>toll-free: 1 800 394 7412<br>toll-free: 1 800 394 7419 |
| Slovakia (Prague)<br>International Access Code: 00<br>Country Code: 421                               | <b>Website:</b> <a href="http://support.euro.dell.com">support.euro.dell.com</a><br><b>E-mail:</b> <a href="mailto:czech_dell@dell.com">czech_dell@dell.com</a><br>Technical Support<br>Customer Care<br>Fax<br>Tech Fax<br>Switchboard (Sales)   | 02 5441 5727<br>420 22537 2707<br>02 5441 8328<br>02 5441 8328<br>02 5441 7585  |
| South Africa (Johannesburg)<br>International Access Code: 09/091<br>Country Code: 27<br>City Code: 11 | <b>Website:</b> <a href="http://support.euro.dell.com">support.euro.dell.com</a><br><b>E-mail:</b> <a href="mailto:dell_za_support@dell.com">dell_za_support@dell.com</a><br>Gold Queue<br>Technical Support<br>Customer Care<br>Sales<br>Fax<br>Switchboard  | 011 709 7713<br>011 709 7710<br>011 709 7707<br>011 709 7700<br>011 706 0495<br>011 709 7700  |
| Southeast Asian and Pacific Countries   | Technical Support, Customer Service, and Sales (Penang, Malaysia)   | 604 633 4810  |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                                 | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| <b>Spain (Madrid)</b>  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>                              |   |
| International Access Code: <b>00</b>   | <b>Home and Small Business</b>   |   |
| Country Code: <b>34</b>  | Technical Support  | 902 100 130   |
| City Code: <b>91</b>   | Customer Care  | 902 118 540   |
|  | Sales  | 902 118 541   |
|  | Switchboard  | 902 118 541   |
|  | Fax  | 902 118 539   |
|  | <b>Corporate</b>   |   |
|  | Technical Support  | 902 100 130   |
|  | Customer Care  | 902 115 236   |
|  | Switchboard  | 91 722 92 00  |
|  | Fax  | 91 722 95 83  |
| <b>Sweden (Upplands Vasby)</b>   | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>                              |   |
| International Access Code: <b>00</b>   | Technical Support for XPS  | 0771 340 340  |
| Country Code: <b>46</b>  | Technical Support for all other Dell products  | 08 590 05 199   |
| City Code: <b>8</b>  | Relational Customer Care   | 08 590 05 642   |
|  | Home/Small Business Customer Care  | 08 587 70 527   |
|  | Employee Purchase Program (EPP) Support  | 020 140 14 44   |
|  | Technical Support Fax  | 08 590 05 594   |
|  | Sales  | 08 590 05 185   |
| <b>Switzerland (Geneva)</b>  | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>                              |   |
| International Access Code: <b>00</b>   | E-mail: <a href="mailto:Tech_support_central_Europe@dell.com">Tech_support_central_Europe@dell.com</a> |   |
| Country Code: <b>41</b>  | Technical Support for XPS  | 0848 33 88 57   |
| City Code: <b>22</b>   | Technical Support (Home and Small Business) for all other Dell products                                | 0844 811 411  |
|  | Technical Support (Corporate)  | 0844 822 844  |
|  | Customer Care (Home and Small Business)  | 0848 802 202  |
|  | Customer Care (Corporate)  | 0848 821 721  |
|  | Fax  | 022 799 01 90   |
|  | Switchboard  | 022 799 01 01   |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>                       | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| Taiwan   | Website: support.ap.dell.com   |   |
| International Access Code: 002   | E-mail: ap_support@dell.com  |   |
| Country Code: 886  | Technical Support (OptiPlex, Latitude, Inspiron, Dimension, and Electronics and Accessories) | toll-free: 00801 86 1011  |
|  | Technical Support (PowerApp, PowerEdge, PowerConnect, and PowerVault)                        | toll-free: 00801 60 1256  |
|  | Customer Care  | toll-free: 00801 60 1250<br>(option 5)                          |
|  | Transaction Sales  | toll-free: 00801 65 1228  |
|  | Corporate Sales  | toll-free: 00801 651 227  |
| Thailand   | Website: support.ap.dell.com   |   |
| International Access Code: 001   | Technical Support (OptiPlex, Latitude, and Dell Precision)                                   | toll-free: 1800 0060 07   |
| Country Code: 66   | Technical Support (PowerApp, PowerEdge, PowerConnect, and PowerVault)                        | toll-free: 1800 0600 09   |
|  | Customer Care  | toll-free: 1800 006 007<br>(option 7)                           |
|  | Corporate Sales  | toll-free: 1800 006 009   |
|  | Transaction Sales  | toll-free: 1800 006 006   |
| Trinidad/Tobago  | Website: www.dell.com/tt   |   |
|  | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | 1-800-805-8035  |
| Turks and Caicos Islands   | Website: www.dell.com/tc   |   |
|  | E-mail: la-techsupport@dell.com  |   |
|  | General Support  | toll-free: 1-877-441-4735                                       |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>   | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|--|---|
| U.K. (Bracknell)   | Website: <a href="http://support.euro.dell.com">support.euro.dell.com</a>  |   |
| International Access Code: 00  | E-mail: <a href="mailto:dell_direct_support@dell.com">dell_direct_support@dell.com</a>                               |   |
| Country Code: 44   | Customer Care website:   |   |
| City Code: 1344  | <a href="http://support.euro.dell.com/uk/en/ECare/form/home.asp">support.euro.dell.com/uk/en/ECare/form/home.asp</a> |   |
|  | <b>Sales</b>   |   |
|  | Home and Small Business Sales  | 0870 907 4000   |
|  | Corporate/Public Sector Sales  | 01344 860 456   |
|  | <b>Customer Care</b>   |   |
|  | Home and Small Business Customer Care  | 0870 906 0010   |
|  | Corporate Customer Care  | 01344 373 185   |
|  | Preferred Accounts (500–5000 employees)  | 0870 906 0010   |
|  | Global Accounts Customer Care  | 01344 373 186   |
|  | Central Government Customer Care   | 01344 373 193   |
|  | Local Government & Education Customer Care   | 01344 373 199   |
|  | Health Customer Care   | 01344 373 194   |
|  | <b>Technical Support</b>   |   |
|  | Technical Support for XPS computers only   | 0870 366 4180   |
|  | Technical Support (Corporate/Preferred Accounts/PAD [1000+ employees])   | 0870 908 0500   |
|  | Technical Support for all other products   | 0870 353 0800   |
|  | <b>General</b>   |   |
|  | Home and Small Business Fax  | 0870 907 4006   |
| Uruguay  | Website: <a href="http://www.dell.com/uy">www.dell.com/uy</a>  |   |
|  | E-mail: <a href="mailto:la-techsupport@dell.com">la-techsupport@dell.com</a>   |   |
|  | General Support  | toll-free: 000-413-598-2521                                     |

| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|---|---|
| U.S.A. (Austin, Texas)   | Automated Order-Status Service  | toll-free: 1-800-433-9014                                       |
| International Access Code: 011   | AutoTech (portable and desktop computers)   | toll-free: 1-800-247-9362                                       |
| Country Code: 1  | Hardware and Warranty Support (Dell TV, Printers, and Projectors) for Relationship customers                    | toll-free: 1-877-459-7298                                       |
|  | Americas Consumer XPS Support   | toll-free: 1-800-232-8544                                       |
|  | <b>Consumer</b> (Home and Home Office) Support for all other Dell products                                      | toll-free: 1-800-624-9896                                       |
|  | Customer Service  | toll-free: 1-800-624-9897                                       |
|  | Employee Purchase Program (EPP) Customers   | toll-free: 1-800-695-8133                                       |
|  | Financial Services website:<br><a href="http://www.dellfinancialservices.com">www.dellfinancialservices.com</a> |   |
|  | Financial Services (lease/loans)  | toll-free: 1-877-577-3355                                       |
|  | Financial Services (Dell Preferred Accounts [DPA])  | toll-free: 1-800-283-2210                                       |
|  | <b>Business</b>   |   |
|  | Customer Service and Support  | toll-free: 1-800-456-3355                                       |
|  | Employee Purchase Program (EPP) Customers   | toll-free: 1-800-695-8133                                       |
|  | Support for printers, projectors, PDAs, and MP3 players   | toll-free: 1-877-459-7298                                       |
|  | <b>Public</b> (government, education, and healthcare)   |   |
|  | Customer Service and Support  | toll-free: 1-800-456-3355                                       |
|  | Employee Purchase Program (EPP) Customers   | toll-free: 1-800-695-8133                                       |
|  | Dell Sales  | toll-free: 1-800-289-3355<br>or toll-free: 1-800-879-3355       |
|  | Dell Outlet Store (Dell refurbished computers)  | toll-free: 1-888-798-7561                                       |
|  | Software and Peripherals Sales  | toll-free: 1-800-671-3355                                       |
|  | Spare Parts Sales   | toll-free: 1-800-357-3355                                       |
|  | Extended Service and Warranty Sales   | toll-free: 1-800-247-4618                                       |
|  | Fax   | toll-free: 1-800-727-8320                                       |
|  | Dell Services for the Deaf, Hard-of-Hearing, or Speech-Impaired   | toll-free: 1-877-DELLTTY<br>(1-877-335-5889)                    |



| <b>Country (City)<br/>International Access Code<br/>Country Code<br/>City Code</b> | <b>Department Name or Service Area,<br/>Website and E-Mail Address</b>  | <b>Area Codes,<br/>Local Numbers, and<br/>Toll-Free Numbers</b> |
|--|---|---|
| U.S. Virgin Islands  | E-mail: la-techsupport@dell.com<br>General Support  | 1-877-702-4288  |
| Venezuela  | Website: <a href="http://www.dell.com/ve">www.dell.com/ve</a><br>E-mail: la-techsupport@dell.com<br>General Support | 0800-100-4752   |



# Glossary

Terms in this Glossary are provided for informational purposes only and may or may not describe features included with your particular computer.

## A

**AC** — alternating current — The form of electricity that powers your computer when you plug the AC adapter power cable in to an electrical outlet.

**ACPI** — advanced configuration and power interface — A power management specification that enables Microsoft® Windows® operating systems to put a computer in standby or hibernate mode to conserve the amount of electrical power allocated to each device attached to the computer.

**AGP** — accelerated graphics port — A dedicated graphics port that allows system memory to be used for video-related tasks. AGP delivers a smooth, true-color video image because of the faster interface between the video circuitry and the computer memory.

**AHCI** — Advanced Host Controller Interface — An interface for a SATA hard drive Host Controller which allows the storage driver to enable technologies such as Native Command Queuing (NCQ) and hot plug.

**ALS** — ambient light sensor — A feature that helps to control display brightness.

**antivirus software** — A program designed to identify, quarantine, and/or delete viruses from your computer.

**ASF** — alert standards format — A standard to define a mechanism for reporting hardware and software alerts to a management console. ASF is designed to be platform- and operating system-independent.

## B

**battery life span** — The length of time (years) during which a portable computer battery is able to be depleted and recharged.

**battery operating time** — The length of time (minutes or hours) that a portable computer battery powers the computer.

**BIOS** — basic input/output system — A program (or utility) that serves as an interface between the computer hardware and the operating system. Unless you understand what effect these settings have on the computer, do not change them. Also referred to as *system setup*.

**bit** — The smallest unit of data interpreted by your computer.

**Bluetooth® wireless technology** — A wireless technology standard for short-range (9 m [29 feet]) networking devices that allows for enabled devices to automatically recognize each other.

**boot sequence** — Specifies the order of the devices from which the computer attempts to boot.

**bootable CD** — A CD that you can use to start your computer. In case your hard drive is damaged or your computer has a virus, ensure that you always have a bootable CD or floppy disk available. Your *Drivers and Utilities* (or *ResourceCD*) is a bootable CD.

**bootable disk** — A disk that you can use to start your computer. In case your hard drive is damaged or your computer has a virus, ensure that you always have a bootable CD or floppy disk available.

**bps** — bits per second — The standard unit for measuring data transmission speed.

**BTU** — British thermal unit — A measurement of heat output.

**bus** — A communication pathway between the components in your computer.

**bus speed** — The speed, given in MHz, that indicates how fast a bus can transfer information.

**byte** — The basic data unit used by your computer. A byte is usually equal to 8 bits.

## C

**C** — Celsius — A temperature measurement scale where 0° is the freezing point and 100° is the boiling point of water.

**cache** — A special high-speed storage mechanism which can be either a reserved section of main memory or an independent high-speed storage device. The cache enhances the efficiency of many processor operations.

**L1 cache** — Primary cache stored inside the processor.

**L2 cache** — Secondary cache which can either be external to the processor or incorporated into the processor architecture.

**carnet** — An international customs document that facilitates temporary imports into foreign countries. Also known as a *merchandise passport*.

**CD-R** — CD recordable — A recordable version of a CD. Data can be recorded only once onto a CD-R. Once recorded, the data cannot be erased or written over.

**CD-RW** — CD rewritable — A rewritable version of a CD. Data can be written to a CD-RW disc, and then erased and written over (rewritten).

**CD-RW drive** — A drive that can read CDs and write to CD-RW (rewritable CDs) and CD-R (recordable CDs) discs. You can write to CD-RW discs multiple times, but you can write to CD-R discs only once.

**CD-RW/DVD drive** — A drive, sometimes referred to as a combo drive, that can read CDs and DVDs and write to CD-RW (rewritable CDs) and CD-R (recordable CDs) discs. You can write to CD-RW discs multiple times, but you can write to CD-R discs only once.

**clock speed** — The speed, given in MHz, that indicates how fast computer components that are connected to the system bus operate.

**COA** — Certificate of Authenticity — The Windows alpha-numeric code located on a sticker on your computer. Also referred to as the *Product Key* or *Product ID*.

**Control Panel** — A Windows utility that allows you to modify operating system and hardware settings, such as display settings.

**controller** — A chip that controls the transfer of data between the processor and memory or between the processor and devices.

**CRIMM** — continuity rambus in-line memory module — A special module that has no memory chips and is used to fill unused RIMM slots.

**cursor** — The marker on a display or screen that shows where the next keyboard, touch pad, or mouse action will occur. It often is a blinking solid line, an underline character, or a small arrow.

## D

**DDR SDRAM** — double-data-rate SDRAM — A type of SDRAM that doubles the data burst cycle, improving system performance.

**DDR2 SDRAM** — double-data-rate 2 SDRAM — A type of DDR SDRAM that uses a 4-bit prefetch and other architectural changes to boost memory speed to over 400 MHz.

**device** — Hardware such as a disk drive, printer, or keyboard that is installed in or connected to your computer.

**device driver** — See *driver*.

**DIMM** — dual in-line memory module — A circuit board with memory chips that connects to a memory module on the system board.

**DIN connector** — A round, six-pin connector that conforms to DIN (Deutsche Industrie-Norm) standards; it is typically used to connect PS/2 keyboard or mouse cable connectors.

**disk striping** — A technique for spreading data over multiple disk drives. Disk striping can speed up operations that retrieve data from disk storage. Computers that use

disk striping generally allow the user to select the data unit size or stripe width.

**DMA** — direct memory access — A channel that allows certain types of data transfer between RAM and a device to bypass the processor.

**docking device** — See *APR*.

**DMTF** — Distributed Management Task Force — A consortium of hardware and software companies who develop management standards for distributed desktop, network, enterprise, and Internet environments.

**domain** — A group of computers, programs, and devices on a network that are administered as a unit with common rules and procedures for use by a specific group of users. A user logs on to the domain to gain access to the resources.

**DRAM** — dynamic random-access memory — Memory that stores information in integrated circuits containing capacitors.

**driver** — Software that allows the operating system to control a device such as a printer. Many devices do not work properly if the correct driver is not installed in the computer.

**DSL** — Digital Subscriber Line — A technology that provides a constant, high-speed Internet connection through an analog telephone line.

**dual-core** — An Intel® technology in which two physical computational units exist inside a single processor package, thereby increasing computing efficiency and multi-tasking ability.

**dual display mode** — A display setting that allows you to use a second monitor as an extension of your display. Also referred to as *extended display mode*.

**DVD-R** — DVD recordable — A recordable version of a DVD. Data can be recorded only once onto a DVD-R. Once recorded, the data cannot be erased or written over.

**DVD+RW** — DVD rewritable — A rewritable version of a DVD. Data can be written to a DVD+RW disc, and then erased and written over (rewritten). (DVD+RW technology is different from DVD-RW technology.)

**DVD+RW drive** — drive that can read DVDs and most CD media and write to DVD+RW (rewritable DVDs) discs.

**DVI** — digital video interface — A standard for digital transmission between a computer and a digital video display.

## E

**ECC** — error checking and correction — A type of memory that includes special circuitry for testing the accuracy of data as it passes in and out of memory.

**ECP** — extended capabilities port — A parallel connector design that provides improved bidirectional data transmission. Similar to EPP, ECP uses direct memory access to transfer data and often improves performance.

**EIDE** — enhanced integrated device electronics — An improved version of the IDE interface for hard drives and CD drives.

**EMI** — electromagnetic interference — Electrical interference caused by electromagnetic radiation.

**ENERGY STAR®** — Environmental Protection Agency requirements that decrease the overall consumption of electricity.

**EPP** — enhanced parallel port — A parallel connector design that provides bidirectional data transmission.

**ESD** — electrostatic discharge — A rapid discharge of static electricity. ESD can damage integrated circuits found in computer and communications equipment.

**expansion card** — A circuit board that installs in an expansion slot on the system board in some computers, expanding the capabilities of the computer. Examples include video, modem, and sound cards.

**expansion slot** — A connector on the system board (in some computers) where you insert an expansion card, connecting it to the system bus.

**ExpressCard** — A removable I/O card adhering to the PCMCIA standard. Modems and network adapters are common types of ExpressCards. ExpressCards support both the PCI Express and USB 2.0 standard.

**Express Service Code** — A numeric code located on a sticker on your Dell™ computer. Use the Express Service Code when contacting Dell for assistance. Express Service Code service may not be available in some countries.

**extended display mode** — A display setting that allows you to use a second monitor as an extension of your display. Also referred to as *dual display mode*.

**extended PC Card** — A PC Card that extends beyond the edge of the PC Card slot when installed.

## F

**Fahrenheit** — A temperature measurement scale where 32° is the freezing point and 212° is the boiling point of water.

**FBD** — fully-buffered DIMM — A DIMM with DDR2 DRAM chips and an Advanced Memory Buffer (AMB) that speeds communication between the DDR2 SDRAM chips and the system.

**FCC** — Federal Communications Commission — A U.S. agency responsible for enforcing communications-related regulations that state how much radiation computers and other electronic equipment can emit.

**fingerprint reader** — A strip sensor that uses your unique fingerprint to authenticate your user identity to help secure your computer.

**folder** — A term used to describe space on a disk or drive where files are organized and grouped. Files in a folder can be viewed and ordered in various ways, such as alphabetically, by date, and by size.

**format** — The process that prepares a drive or disk for file storage. When a drive or disk is formatted, the existing information on it is lost.

**FSB** — front side bus — The data path and physical interface between the processor and RAM.

**FTP** — file transfer protocol — A standard Internet protocol used to exchange files between computers connected to the Internet.

## G

**G** — gravity — A measurement of weight and force.

**GB** — gigabyte — A measurement of data storage that equals 1024 MB (1,073,741,824 bytes). When used to

refer to hard drive storage, the term is often rounded to 1,000,000,000 bytes.

**GHz** — gigahertz — A measurement of frequency that equals one thousand million Hz, or one thousand MHz. The speeds for computer processors, buses, and interfaces are often measured in GHz.

**graphics mode** — A video mode that can be defined as *x* horizontal pixels by *y* vertical pixels by *z* colors. Graphics modes can display an unlimited variety of shapes and fonts.

**GUI** — graphical user interface — Software that interacts with the user by means of menus, windows, and icons. Most programs that operate on the Windows operating systems are GUIs.

## H

**hard drive** — A drive that reads and writes data on a hard disk. The terms hard drive and hard disk are often used interchangeably.

**heat sink** — A metal plate on some processors that helps dissipate heat.

**hibernate mode** — A power management mode that saves everything in memory to a reserved space on the hard drive and then turns off the computer. When you restart the computer, the memory information that was saved to the hard drive is automatically restored.

**HTTP** — hypertext transfer protocol — A protocol for exchanging files between computers connected to the Internet.

**Hyper-Threading** — Hyper-Threading is an Intel technology that can enhance overall computer performance by allowing one physical processor to function as two logical processors, capable of performing certain tasks simultaneously.

**Hz** — hertz — A unit of frequency measurement that equals 1 cycle per second. Computers and electronic devices are often measured in kilohertz (kHz), megahertz (MHz), gigahertz (GHz), or terahertz (THz).

## I

**IC** — integrated circuit — A semiconductor wafer, or chip, on which thousands or millions of tiny electronic components are fabricated for use in computer, audio, and video equipment.

**IDE** — integrated device electronics — An interface for mass storage devices in which the controller is integrated into the hard drive or CD drive.

**IEEE 1394** — Institute of Electrical and Electronics Engineers, Inc. — A high-performance serial bus used to connect IEEE 1394-compatible devices, such as digital cameras and DVD players, to the computer.

**infrared sensor** — A port that allows you to transfer data between the computer and infrared-compatible devices without using a cable connection.

**integrated** — Usually refers to components that are physically located on the computer's system board. Also referred to as *built-in*.

**I/O** — input/output — An operation or device that enters and extracts data from your computer. Keyboards and printers are I/O devices.

**I/O address** — An address in RAM that is associated with a specific device (such as a serial connector, parallel connector, or expansion slot) and allows the processor to communicate with that device.

**IrDA** — Infrared Data Association — The organization that creates international standards for infrared communications.

**IRQ** — interrupt request — An electronic pathway assigned to a specific device so that the device can communicate with the processor. Each device connection must be assigned an IRQ. Although two devices can share the same IRQ assignment, you cannot operate both devices simultaneously.

**ISP** — Internet service provider — A company that allows you to access its host server to connect directly to the Internet, send and receive e-mail, and access websites. The ISP typically provides you with a software package, user name, and access phone numbers for a fee.

## K

**Kb** — kilobit — A unit of data that equals 1024 bits. A measurement of the capacity of memory integrated circuits.

**KB** — kilobyte — A unit of data that equals 1024 bytes but is often referred to as 1000 bytes.

**key combination** — A command requiring you to press multiple keys at the same time.

**kHz** — kilohertz — A measurement of frequency that equals 1000 Hz.

## L

**LAN** — local area network — A computer network covering a small area. A LAN usually is confined to a building or a few nearby buildings. A LAN can be connected to another LAN over any distance through telephone lines and radio waves to form a wide area network (WAN).

**LCD** — liquid crystal display — The technology used by portable computer and flat-panel displays.

**LED** — light-emitting diode — An electronic component that emits light to indicate the status of the computer.

**local bus** — A data bus that provides a fast throughput for devices to the processor.

**LPT** — line print terminal — The designation for a parallel connection to a printer or other parallel device.

## M

**Mb** — megabit — A measurement of memory chip capacity that equals 1024 Kb.

**Mbps** — megabits per second — One million bits per second. This measurement is typically used for transmission speeds for networks and modems.

**MB** — megabyte — A measurement of data storage that equals 1,048,576 bytes. 1 MB equals 1024 KB. When used to refer to hard drive storage, the term is often rounded to 1,000,000 bytes.

**MB/sec** — megabytes per second — One million bytes per second. This measurement is typically used for data transfer ratings.

**media bay** — A bay that supports devices such as optical drives, a second battery, or a Dell TravelLite™ module.

**memory** — A temporary data storage area inside your computer. Because the data in memory is not permanent, it is recommended that you frequently save your files while you are working on them, and always save your files before you shut down the computer. Your computer 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.

**memory address** — A specific location where data is temporarily stored in RAM.

**memory mapping** — The process by which the computer assigns memory addresses to physical locations at start-up. Devices and software can then identify information that the processor can access.

**memory module** — A small circuit board containing memory chips, which connects to the system board.

**MHz** — megahertz — A measure of frequency that equals 1 million cycles per second. The speeds for computer processors, buses, and interfaces are often measured in MHz.

**Mini PCI** — A standard for integrated peripheral devices with an emphasis on communications such as modems and NICs. A Mini PCI card is a small external card that is functionally equivalent to a standard PCI expansion card.

**Mini-Card** — A small card designed for integrated peripherals, such as communication NICs. The Mini-Card is functionally equivalent to a standard PCI expansion card.

**modem** — A device that allows your computer to communicate with other computers over analog telephone lines. Three types of modems include: external, PC Card, and internal. You typically use your modem to connect to the Internet and exchange e-mail.

**module bay** — See *media bay*.

**MP** — megapixel — A measure of image resolution used for digital cameras.

**ms** — millisecond — A measure of time that equals one thousandth of a second. Access times of storage devices are often measured in ms.

## N

**network adapter** — A chip that provides network capabilities. A computer may include a network adapter on its system board, or it may contain a PC Card with an adapter on it. A network adapter is also referred to as a *NIC* (network interface controller).

**NIC** — See *network adapter*.

**notification area** — The section of the Windows taskbar that contains icons for providing quick access to programs and computer functions, such as the clock, volume control, and print status. Also referred to as *system tray*.

**ns** — nanosecond — A measure of time that equals one billionth of a second.

**NVRAM** — nonvolatile random access memory — A type of memory that stores data when the computer is turned off or loses its external power source. NVRAM is used for maintaining computer configuration information such as date, time, and other system setup options that you can set.

## O

**optical drive** — A drive that uses optical technology to read or write data from CDs, DVDs, or DVD+RWs. Example of optical drives include CD drives, DVD drives, CD-RW drives, and CD-RW/DVD combo drives.

## P

**parallel connector** — An I/O port often used to connect a parallel printer to your computer. Also referred to as an *LPT port*.

**partition** — A physical storage area on a hard drive that is assigned to one or more logical storage areas known as logical drives. Each partition can contain multiple logical drives.



**PC Card** — A removable I/O card adhering to the PCMCIA standard. Modems and network adapters are common types of PC Cards.

**PCI** — peripheral component interconnect — PCI is a local bus that supports 32-and 64-bit data paths, providing a high-speed data path between the processor and devices such as video, drives, and networks.

**PCI Express** — A modification to the PCI interface that boosts the data transfer rate between the processor and the devices attached to it. PCI Express can transfer data at speeds from 250 MB/sec to 4 GB/sec. If the PCI Express chip set and the device are capable of different speeds, they will operate at the slower speed.

**PCMCIA** — Personal Computer Memory Card International Association — The organization that establishes standards for PC Cards.

**PIO** — programmed input/output — A method of transferring data between two devices through the processor as part of the data path.

**pixel** — A single point on a display screen. Pixels are arranged in rows and columns to create an image. A video resolution, such as 800 x 600, is expressed as the number of pixels across by the number of pixels up and down.

**Plug-and-Play** — The ability of the computer to automatically configure devices. Plug and Play provides automatic installation, configuration, and compatibility with existing hardware if the BIOS, operating system, and all devices are Plug and Play compliant.

**POST** — power-on self-test — Diagnostics programs, loaded automatically by the BIOS, that perform basic tests on the major computer components, such as memory, hard drives, and video. If no problems are detected during POST, the computer continues the start-up.

**processor** — A computer chip that interprets and executes program instructions. Sometimes the processor is referred to as the CPU (central processing unit).

**PS/2** — personal system/2 — A type of connector for attaching a PS/2-compatible keyboard, mouse, or keypad.

**PXE** — pre-boot execution environment — A WfM (Wired for Management) standard that allows networked computers that do not have an operating system to be configured and started remotely.

## R

**RAID** — redundant array of independent disks — A method of providing data redundancy. Some common implementations of RAID include RAID 0, RAID 1, RAID 5, RAID 10, and RAID 50.

**RAM** — random-access memory — The primary temporary storage area for program instructions and data. Any information stored in RAM is lost when you shut down your computer.

**readme file** — A text file included with a software package or hardware product. Typically, readme files provide installation information and describe new product enhancements or corrections that have not yet been documented.

**read-only** — Data and/or files you can view but cannot edit or delete. A file can have read-only status if:

- It resides on a physically write-protected floppy disk, CD, or DVD.
- It is located on a network in a directory and the system administrator has assigned rights only to specific individuals.

**refresh rate** — The frequency, measured in Hz, at which your screen's horizontal lines are recharged (sometimes also referred to as its *vertical frequency*). The higher the refresh rate, the less video flicker can be seen by the human eye.

**resolution** — The sharpness and clarity of an image produced by a printer or displayed on a monitor. The higher the resolution, the sharper the image.

**RFI** — radio frequency interference — Interference that is generated at typical radio frequencies, in the range of 10 kHz to 100,000 MHz. Radio frequencies are at the lower end of the electromagnetic frequency spectrum and are more likely to have interference than the higher frequency radiations, such as infrared and light.

**ROM** — read-only memory — Memory that stores data and programs that cannot be deleted or written to by the computer. ROM, unlike RAM, retains its contents after you shut down your computer. Some programs essential to the operation of your computer reside in ROM.

**RPM** — revolutions per minute — The number of rotations that occur per minute. Hard drive speed is often measured in rpm.

**RTC** — real time clock — Battery-powered clock on the system board that keeps the date and time after you shut down the computer.

**RTCST** — real-time clock reset — A jumper on the system board of some computers that can often be used for troubleshooting problems.

## S

**SAS** — serial attached SCSI — A faster, serial version of the SCSI interface (as opposed to the original SCSI parallel architecture).

**SATA** — serial ATA — A faster, serial version of the ATA (IDE) interface.

**ScanDisk** — A Microsoft utility that checks files, folders, and the hard disk's surface for errors. ScanDisk often runs when you restart the computer after it has stopped responding.

**SCSI** — small computer system interface — A high-speed interface used to connect devices to a computer, such as hard drives, CD drives, printers, and scanners. The SCSI can connect many devices using a single controller. Each device is accessed by an individual identification number on the SCSI controller bus.

**SDRAM** — synchronous dynamic random-access memory — A type of DRAM that is synchronized with the optimal clock speed of the processor.

**serial connector** — An I/O port often used to connect devices such as a handheld digital device or digital camera to your computer.

**Service Tag** — A bar code label on your computer that identifies your computer when you access Dell Support at [support.dell.com](http://support.dell.com) or when you call Dell for customer service or technical support.

**setup program** — A program that is used to install and configure hardware and software. The **setup.exe** or **install.exe** program comes with most Windows software packages. *Setup program* differs from *system setup*.

**shortcut** — An icon that provides quick access to frequently used programs, files, folders, and drives. When you place a shortcut on your Windows desktop and double-click the icon, you can open its corresponding folder or file without having to find it first. Shortcut icons do not change the location of files. If you delete a shortcut, the original file is not affected. Also, you can rename a shortcut icon.

**SIM** — Subscriber Identity Module — A SIM card contains a microchip that encrypts voice and data transmissions. SIM cards can be used in phones or portable computers.

**smart card** — A card that is embedded with a processor and a memory chip. Smart cards can be used to authenticate a user on computers equipped for smart cards.

**S/PDIF** — Sony/Philips Digital Interface — An audio transfer file format that allows the transfer of audio from one file to another without converting it to and from an analog format, which could degrade the quality of the file.

**standby mode** — A power management mode that shuts down all unnecessary computer operations to save energy.

**Strike Zone™** — Reinforced area of the platform base that protects the hard drive by acting as a dampening device when a computer experiences resonating shock or is dropped (whether the computer is on or off).

**surge protectors** — Prevent voltage spikes, such as those that may occur during an electrical storm, from entering the computer through the electrical outlet. Surge protectors do not protect against lightning strikes or against brownouts, which occur when the voltage drops more than 20 percent below the normal AC-line voltage level.

Network connections cannot be protected by surge protectors. Always disconnect the network cable from the network connector during electrical storms.

**SVGA** — super-video graphics array — A video standard for video cards and controllers. Typical SVGA resolutions are 800 x 600 and 1024 x 768.

The number of colors and resolution that a program displays depends on the capabilities of the monitor, the video controller and its drivers, and the amount of video memory installed in the computer.

**S-video TV-out** — A connector used to attach a TV or digital audio device to the computer.

**SXGA** — super-extended graphics array — A video standard for video cards and controllers that supports resolutions up to 1280 x 1024.

**SXGA+** — super-extended graphics array plus — A video standard for video cards and controllers that supports resolutions up to 1400 x 1050.

**system board** — The main circuit board in your computer. Also known as the *motherboard*.

**system setup** — A utility that serves as an interface between the computer hardware and the operating system. System setup allows you to configure user-selectable options in the BIOS, such as date and time or system password. Unless you understand what effect the settings have on the computer, do not change the settings for this program.

## T

**TAPI** — telephony application programming interface — Enables Windows programs to operate with a wide variety of telephony devices, including voice, data, fax, and video.

**text editor** — A program used to create and edit files that contain only text; for example, Windows Notepad uses a text editor. Text editors do not usually provide word wrap or formatting functionality (the option to underline, change fonts, and so on).

**TPM** — trusted platform module — A hardware-based security feature that when combined with security software enhances network and computer security by enabling features such as file and e-mail protection.

**travel module** — A plastic device designed to fit inside the module bay of a portable computer to reduce the weight of the computer.

## U

**UMA** — unified memory allocation — System memory dynamically allocated to video.

**UPS** — uninterruptible power supply — A backup power source used when the electrical power fails or drops to an

unacceptable voltage level. A UPS keeps a computer running for a limited amount of time when there is no electrical power. UPS systems typically provide surge suppression and may also provide voltage regulation. Small UPS systems provide battery power for a few minutes to enable you to shut down your computer.

**USB** — universal serial bus — A hardware interface for a low-speed device such as a USB-compatible keyboard, mouse, joystick, scanner, set of speakers, printer, broadband devices (DSL and cable modems), imaging devices, or storage devices. Devices are plugged directly in to a 4-pin socket on your computer or in to a multi-port hub that plugs in to your computer. USB devices can be connected and disconnected while the computer is turned on, and they can also be daisy-chained together.

**UTP** — unshielded twisted pair — Describes a type of cable used in most telephone networks and some computer networks. Pairs of unshielded wires are twisted to protect against electromagnetic interference, rather than relying on a metal sheath around each pair of wires to protect against interference.

**UXGA** — ultra extended graphics array — A video standard for video cards and controllers that supports resolutions up to 1600 x 1200.

## V

**video controller** — The circuitry on a video card or on the system board (in computers with an integrated video controller) that provides the video capabilities—in combination with the monitor—for your computer.

**video memory** — Memory that consists of memory chips dedicated to video functions. Video memory is usually faster than system memory. The amount of video memory installed primarily influences the number of colors that a program can display.

**video mode** — A mode that describes how text and graphics are displayed on a monitor. Graphics-based software, such as Windows operating systems, displays in video modes that can be defined as *x* horizontal pixels by *y* vertical pixels by *z* colors. Character-based software, such as text editors, displays in video modes that can be defined as *x* columns by *y* rows of characters.

**video resolution** — See *resolution*.

**virus** — A program that is designed to inconvenience you or to destroy data stored on your computer. A virus program moves from one computer to another through an infected disk, software downloaded from the Internet, or e-mail attachments. When an infected program starts, its embedded virus also starts.

A common type of virus is a boot virus, which is stored in the boot sectors of a floppy disk. If the floppy disk is left in the drive when the computer is shut down and then turned on, the computer is infected when it reads the boot sectors of the floppy disk expecting to find the operating system. If the computer is infected, the boot virus may replicate itself onto all the floppy disks that are read or written in that computer until the virus is eradicated.

**V** — volt — The measurement of electric potential or electromotive force. One V appears across a resistance of 1 ohm when a current of 1 ampere flows through that resistance.

## W

**W** — watt — The measurement of electrical power. One W is 1 ampere of current flowing at 1 volt.

**WHr** — watt-hour — A unit of measure commonly used to indicate the approximate capacity of a battery. For example, a 66-WHr battery can supply 66 W of power for 1 hour or 33 W for 2 hours.

**wallpaper** — The background pattern or picture on the Windows desktop. Change your wallpaper through the Windows Control Panel. You can also scan in your favorite picture and make it wallpaper.

**WLAN** — wireless local area network. A series of interconnected computers that communicate with each other over the air waves using access points or wireless routers to provide Internet access.

**write-protected** — Files or media that cannot be changed. Use write-protection when you want to protect data from being changed or destroyed. To write-protect a 3.5-inch floppy disk, slide its write-protect tab to the open position.

**WWAN** — wireless wide area network. A wireless high-speed data network using cellular technology and covering a much larger geographic area than WLAN.

**WXGA** — wide-aspect extended graphics array — A video standard for video cards and controllers that supports resolutions up to 1280 x 800.

## X

**XGA** — extended graphics array — A video standard for video cards and controllers that supports resolutions up to 1024 x 768.

## Z

**ZIF** — zero insertion force — A type of socket or connector that allows a computer chip to be installed or removed with no stress applied to either the chip or its socket.

**Zip** — A popular data compression format. Files that have been compressed with the Zip format are called Zip files and usually have a filename extension of **.zip**. A special kind of zipped file is a self-extracting file, which has a filename extension of **.exe**. You can unzip a self-extracting file by double-clicking it.

**Zip drive** — A high-capacity floppy drive developed by Iomega Corporation that uses 3.5-inch removable disks called Zip disks. Zip disks are slightly larger than regular floppy disks, about twice as thick, and hold up to 100 MB of data.

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