

Dell Precision™ Mobile
Workstation M6300
User's Guide

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.

Abbreviations and Acronyms

For a complete list of abbreviations and acronyms, see "Glossary" on page 251.

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

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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?

- A diagnostic program for my computer
- Drivers for my computer
- My device documentation
- Notebook System Software (NSS)

Find It Here

Drivers and Utilities Media

NOTE: The *Drivers and Utilities* media may be optional and may not ship with your computer.

Documentation and drivers are already installed on your computer. You can use the media to reinstall drivers (see "Reinstalling Drivers and Utilities" on page 142), to run the Dell Diagnostics (see "Dell Diagnostics" on page 115).

Readme files may be included on your media to provide last-minute updates about technical changes to your computer or advanced technical-reference material for technicians or experienced users.



NOTE: Drivers and documentation updates can be found at support.dell.com.

What Are You Looking For?

- How to set up my computer
- How to care for my computer
- Basic troubleshooting information
- How to run the Dell Diagnostics
- Tools and utilities
- How to set up a printer
- How to open my computer

Find It Here

Quick Reference Guide

NOTE: This document may be optional and may not ship with your computer.



NOTE: This document is available as a PDF at support.dell.com.

Dell™ Product Information Guide



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

What Are You Looking For?

- Service Tag and Express Service Code
- Microsoft Windows License Label

Find It Here

Service Tag and Microsoft® Windows® License

These labels are located on your computer.

- Use the Service Tag to identify your computer when you use support.dell.com or contact support.
- Enter the Express Service Code to direct your call when contacting support.



NOTE: As an increased security measure, the newly designed Microsoft Windows license label incorporates a missing portion or "hole" to discourage removal of the label.

What Are You Looking For?

- Solutions — Troubleshooting hints and tips, articles from technicians, and online courses, frequently asked questions
- Community — Online discussion with other Dell customers
- Upgrades — Upgrade information for components, such as memory, the hard drive, and the operating system
- Customer Care — Contact information, service call and order status, warranty, and repair information
- Service and support — Service call status and support history, service contract, online discussions with technical support
- Dell Technical Update Service — Proactive e-mail notification of software and hardware updates for your computer
- Reference — Computer documentation, details on my computer configuration, product specifications, and white papers
- Downloads — Certified drivers, patches, and software updates
- Notebook System Software (NSS)— If you reinstall the operating system for your computer, you should also reinstall the NSS utility. NSS provides critical updates for your operating system and support for processors, optical drives, USB devices, and so on. NSS 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.

Find It Here

Dell Support Website — support.dell.com

NOTE: Select your region or business segment to view the appropriate support site.

To download Notebook System Software:


- 1** Go to support.dell.com and click Drivers & Downloads.
- 2** Enter your Service Tag or Product Type and Product Model, and click **Go**.
- 3** Scroll to **System and Configuration Utilities**→**Dell Notebook System Software** and click **Download Now**.
- 4** Select **Drivers & Downloads** and click **Go**.

NOTE: The support.dell.com user interface may vary depending on your selections.

What Are You Looking For?

- Software upgrades and troubleshooting hints — Frequently asked questions, hot topics, and general health of your computing environment
- How to use Microsoft® Windows® XP and Microsoft Windows Vista®
- How to work with programs and files
- How to personalize my desktop
- Information on network activity, the Power Management Wizard, hotkeys, and other items controlled by Dell QuickSet.
- How to reinstall my operating system

Find It Here**Dell Support Utility**

The Dell Support Utility is an automated upgrade and notification system installed on your computer. This support provides real-time health scans of your computing environment, software updates, and relevant self-support information. Access the Dell Support Utility from the  icon in the taskbar.

Windows Help and Support Center

- 1** Click **Start**→**Help and Support**.
- 2** Type a word or phrase that describes your problem and click the arrow icon.
- 3** Click the topic that describes your problem.
- 4** Follow the instructions on the screen.

Dell QuickSet Help

To view *Dell QuickSet Help*, right-click the QuickSet icon in the Microsoft® Windows® taskbar.

For more information on Dell QuickSet, see "Dell™ QuickSet" on page 125.

Operating System Media

NOTE: The *Operating System* media may be optional and may not ship with your computer.

What Are You Looking For?

Find It Here

The operating system is already installed on your computer. To reinstall your operating system, use the *Operating System* media. See "Restoring Your Operating System" on page 146.



After you reinstall your operating system, use the *Drivers and Utilities* media to reinstall drivers for the devices that came with your computer.

Your operating system product key label is located on your computer.

NOTE: The color of your media varies based on the operating system you ordered.

About Your Computer

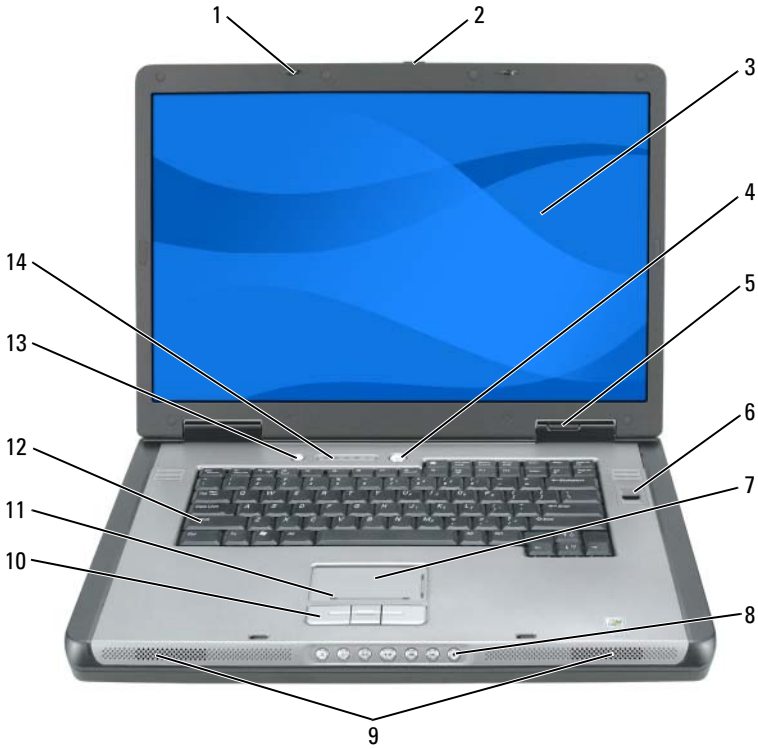
Determining Your Computer's Configuration

Based on selections that you made when purchasing your computer, your computer has one of several different video controller configurations. To determine your computer's video controller configuration:

- 1 Access the Windows Help and Support Center. For instructions, see "Windows Help and Support Center" on page 20.
- 2 Under **Pick a Task**, click **Use Tools to view your computer information and diagnose problems**.
- 3 Under **My Computer Information**, select **Hardware**.

From the **My Computer Information - Hardware** screen, you can view the type of video controller installed in your computer, as well as the other hardware components.

Front View



- | | | | |
|----|-----------------------------|----|-------------------------------------|
| 1 | display latches (2) | 2 | display latch release |
| 3 | display | 4 | power button |
| 5 | device status lights | 6 | biometric reader (optional) |
| 7 | touch pad | 8 | media control buttons |
| 9 | speakers (2) | 10 | touch pad buttons |
| 11 | touch-pad scroll zone | 12 | keyboard |
| 13 | battery conservation button | 14 | keyboard and wireless status lights |

DISPLAY LATCHES — Keep the display closed.


DISPLAY LATCH RELEASE — Slide to release the display latches and open the display.

DISPLAY — For more information about your display, see "Using the Display" on page 59.



POWER BUTTON — Press to turn on the computer or to enter or exit a power management mode. For more information on power management modes, see "Power Management Modes" on page 47.


DEVICE STATUS LIGHTS



 Turns on when you turn on the computer, and blinks when the computer is in a power management mode.

 Turns on when the computer reads or writes data.

 **NOTICE:** To avoid loss of data, never turn off the computer while the  light is flashing.

 Turns on steadily or blinks to indicate battery charge status.

If the computer is connected to an electrical outlet, the  light operates as follows:

- Solid green: The battery is charging.
- Flashing green: The battery is almost fully charged.
- Off: The battery is adequately charged (or external power is not available to charge battery).

If the computer is running on a battery, the  light operates as follows:





- Off: The battery is adequately charged (or the computer is turned off).
- Flashing orange: The battery charge is low.
- Solid orange: The battery charge is critically low.

TOUCH PAD — Provides the functionality of a mouse. See "Touch Pad" on page 56.

TOUCH-PAD SCROLL ZONE — Provides the functionality of the scroll button on a mouse. A vertical scroll zone is located on the right side of the touch pad. A horizontal scroll zone is located on the bottom of the touch pad.

MEDIA CONTROL BUTTONS — Control CD, DVD, and Media Player playback.



-  Mute the sound.
-  Turn the volume down.
-  Turn the volume up.
-  Play or pause.

- ⏮ Play the previous track.
- ⏭ Play the next track.
- Stop.

SPEAKERS — To adjust the volume of the integrated speakers, press the media control buttons or speaker-volume keyboard shortcuts. For more information, see "Speaker Functions" on page 55.

TOUCH PAD BUTTONS — Touch pad buttons provide the same functionality as mouse buttons.








KEYBOARD — The keyboard includes a numeric keypad as well as the Microsoft Windows logo key. For information on supported keyboard shortcuts, see "Key Combinations" on page 54.

BATTERY CONSERVATION BUTTON — Press the battery conservation button to change the battery optimization modes.


KEYBOARD AND WIRELESS STATUS LIGHTS



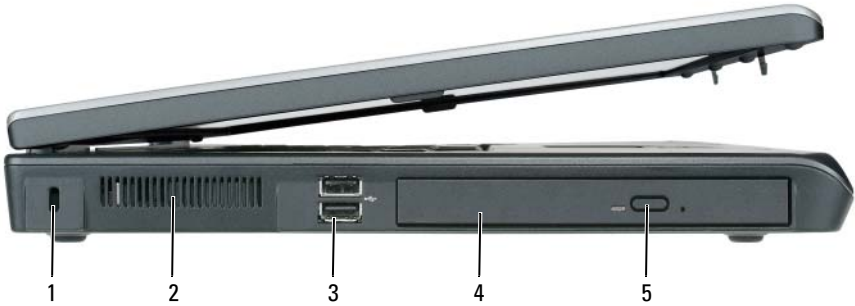
The lights located above the keyboard indicate the following:

	Turns on when the numeric keypad is enabled.
	Turns on when the uppercase letter function is enabled.
	Turns on when the scroll lock function is enabled.
	Turns on when wireless networking is enabled. To quickly enable or disable wireless networking, press <Fn><F2>.
	Turns on when a card with Bluetooth® wireless technology is enabled. NOTE: The card with Bluetooth wireless technology is an optional feature, so the  light turns on only if you ordered the card with your computer. For more information, see the documentation that came with your card. To turn off only the Bluetooth wireless technology functionality, right-click the  icon in the Windows taskbar (in the lower-right corner of your screen) and click Disable Bluetooth Radio . To quickly enable or disable all wireless devices, press <Fn><F2>.

BIOMETRIC READER — An optional feature that allows you to gain access to your computer, by placing your finger on the biometric reader security device. This device reads and grants authorized access to your computer by reading your fingerprint

 **NOTE:** This procedure requires the *Operating System* media. This media is optional and may not be included with certain computers.

Left Side View



- | | | | |
|---|---------------------------------|---|---------------|
| 1 | security cable slot | 2 | air vent |
| 3 | USB connectors (2) | 4 | optical drive |
| 5 | optical-drive tray eject button | | |

SECURITY CABLE SLOT — Lets you attach a commercially available antitheft device to the computer. For more information, see "Security Cable Lock" on page 105.

AIR VENT — The computer uses fan(s) to create airflow through the vent(s), which prevents the computer from overheating.

⚠ CAUTION: Do not block, push objects into, or allow dust to accumulate in the air vents. Do not store your computer in a low-airflow environment, such as a closed briefcase, while it is running. Restricting the airflow can damage the computer or cause a fire. The computer turns on the fan when the computer gets hot. Fan noise is normal and does not indicate a problem with the fan or the computer.

USB CONNECTORS — Connect USB devices, such as a mouse, keyboard, or printer. You can also connect the optional floppy drive directly to a USB connector using the optional floppy-drive cable.

OPTICAL DRIVE — You can install devices such as a DVD drive or other optical drive in the optical drive bay. For more information, see "Optical Drive" on page 158.

OPTICAL-DRIVE-TRAY EJECT BUTTON — Press this button to eject a CD or DVD from the optical drive. This button only works when the computer is turned on.

Right Side View



- | | | | |
|---|---------------------------------|---|----------------------|
| 1 | smart card slot | 2 | hard drive |
| 3 | ExpressCard slot | 4 | IEEE 1394 connector |
| 5 | 5-in-1 media memory card reader | 6 | audio connectors (2) |
| 7 | air vent | | |

SMART CARD SLOT — Supports one smart card. See "Smart Cards" on page 102.

HARD DRIVE — Stores software and data.

EXPRESSCARD SLOT — Supports one ExpressCard, such as a modem or network adapter. The computer ships with a plastic blank installed in the slot to prevent foreign matter from entering the computer interior when a card is not installed. For more information, see "Using Cards" on page 99.



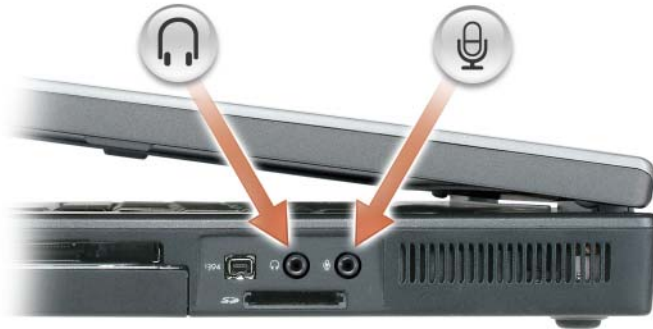
NOTE: The ExpressCard slot does not support PC cards.


IEEE 1394 CONNECTOR — Connects devices supporting IEEE 1394 high-speed transfer rates, such as some digital video cameras.


5-IN-1 MEDIA MEMORY CARD READER — Provides a fast and convenient way to view and share digital photos, music, and videos stored on a media memory card. The 5-in-1 media memory card reader reads the following digital media memory cards:

- Secure Digital (SD) card/SDIO
- MultiMediaCard (MMC)
- Memory Stick
- Memory Stick PRO
- XD-Picture Card


AUDIO CONNECTORS



Attach headphones or speakers to the  connector.

Attach a microphone to the  connector.

AIR VENT — The computer uses fan(s) to create airflow through the vent(s), which prevents the computer from overheating.

 **CAUTION:** Do not block, push objects into, or allow dust to accumulate in the air vents. Do not store your computer in a low-airflow environment, such as a closed briefcase, while it is running. Restricting the airflow can damage the computer or cause a fire. The computer turns on the fan when the computer gets hot. Fan noise is normal and does not indicate a problem with the fan or the computer

Back View



- | | | | |
|---|---|----|--------------------------|
| 1 | air vent | 2 | S-video TV-out connector |
| 3 | network (RJ-45) connector | 4 | modem (RJ-11) connector |
| 5 | USB connectors (2) | 6 | USB connectors (2) |
| 7 | Digital-Video Interface (DVI) connector | 8 | video (VGA) connector |
| 9 | AC adapter connector | 10 | air vent |

S-VIDEO TV-OUT CONNECTOR

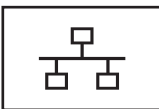


Connects your computer to a TV. Also connects digital audio capable devices using the TV/digital audio adapter cable.

NETWORK CONNECTOR (RJ-45)



NOTICE: The network connector is slightly larger than the modem connector. To avoid damaging the computer, do not plug a telephone line into the network connector.



Connects the computer to a network. The solid light on the connector provides link status information. Off indicates no link, green indicates a 10-Mb/sec link, orange indicates a 100-Mb/sec link, and yellow indicates a 1000-Mb/sec link. The blinking yellow light on the connector indicates activity on the wired network connection.

For information on using the network adapter, see the network adapter documentation supplied with your computer under the Windows Help and Support Center. To access the Help and Support Center, see "Windows Help and Support Center" on page 20.

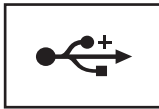
MODEM CONNECTOR (RJ-11)



To use the internal modem, connect the telephone line to the modem connector.

For additional information on using the modem, see the modem documentation supplied with your computer under the Windows Help and Support Center. To access the Help and Support Center, see "Windows Help and Support Center" on page 20.

USB CONNECTORS



Connect USB devices, such as a mouse, keyboard, or printer.

DIGITAL-VIDEO INTERFACE (DVI) CONNECTOR



Connects an external DVI-compatible monitor, such as a flat-panel monitor. With an adapter cable, you can also connect an external VGA-compatible monitor to the DVI connector.

VIDEO CONNECTOR



Connects an external VGA-compatible monitor.

AC ADAPTER CONNECTOR — Attaches an AC adapter to the computer.



The AC adapter converts AC power to the DC power required by the computer. You can connect the AC adapter with your computer turned either on or off. For optimum performance, use only the AC adapter that came with your computer.

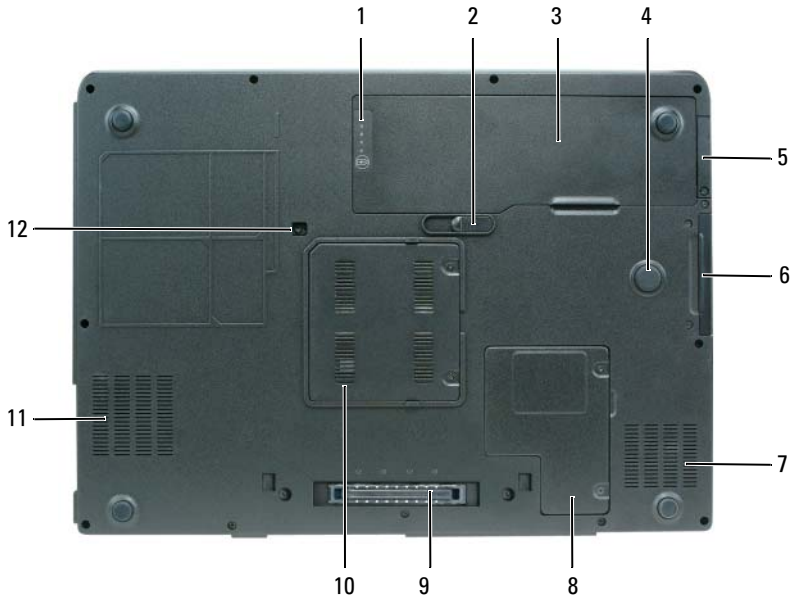


CAUTION: The AC adapter works with electrical outlets worldwide. However, power connectors and power strips vary among countries. Using an incompatible cable or improperly connecting the cable to the power strip or electrical outlet may cause fire or equipment damage. The computer turns on the fan when the computer gets hot. Fan noise is normal and does not indicate a problem with the fan or the computer



NOTICE: When you disconnect the AC adapter cable from the computer, grasp the connector, not the cable itself, and pull firmly but gently to avoid damaging the cable. When you wrap the AC adapter cable, ensure that you follow the angle of the connector on the AC adapter to avoid damaging the cable.

Bottom View



- | | | | |
|----|--|----|-----------------------------|
| 1 | battery charge/health gauge | 2 | battery-bay latch release |
| 3 | battery | 4 | strike zone |
| 5 | cover for optional internal card with Bluetooth [®] wireless technology | 6 | hard drive |
| 7 | air vent | 8 | mini-card/modem cover |
| 9 | docking-device connector | 10 | memory module cover |
| 11 | air vent | 12 | optical-drive locking screw |

BATTERY CHARGE GAUGE/HEALTH GAUGE — Provides information on the battery charge status. For more information, see "Checking the Battery Charge" on page 44.

BATTERY-BAY LATCH RELEASE — Releases the battery from the battery bay. For more information, see "Removing the Battery" on page 60.

BATTERY — When a battery is installed, you can use the computer without connecting the computer to an electrical outlet. For more information, see "Using a

Battery" on page 43.

STRIKE-ZONE — Circular rubber pad between the mini-card cover and the battery. 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).

COVER FOR OPTIONAL INTERNAL CARD WITH BLUETOOTH® WIRELESS TECHNOLOGY — For more information, see the documentation that came with your card. To quickly enable or disable all wireless devices, press <Fn><F2>.

HARD DRIVE — Stores software and data. For more information, see "Hard Drive" on page 159. The size displayed for your hard drive in Windows Explorer is the capacity of the drive before any operating system or programs are installed.

MINI-CARD/MODEM COVER — Covers the compartment that contains the mini-card and the modem. For more information, see "Modem" on page 165.

DOCKING-DEVICE CONNECTOR — Lets you attach your computer to the Media Base or other docking device. See the Dell documentation that came with your docking device for more information.



NOTICE: Your computer features Undock & Go™ technology that allows you to undock your computer without going into standby mode. Because the computer may not automatically go into standby mode when it is undocked, be sure the settings in the Power Options control panel do not prohibit the computer from going into standby mode. If you change the Power Options control panel to prohibit the computer from going into standby mode, you greatly increase the chances of causing your battery to wear down quickly or causing your computer to overheat.

MEMORY MODULE COVER — Covers the compartment that contains the memory modules. For more information, see "Memory" on page 161.

OPTICAL-DRIVE LOCKING SCREW — Secures the optical drive in the optical drive bay. For more information, see "Optical Drive" on page 158.

STRIKE-ZONE — Circular rubber pad between the mini-card cover and the battery. 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).

Setting Up Your Computer

Transferring Information to a New Computer

You can use your operating system "wizards" to help you transfer files and other data from one computer to another—for example, from an *old* computer to a *new* computer. For instructions, see the following section that corresponds to the operating system that your computer is running

Microsoft® Windows® XP

The Microsoft® Windows® XP operating system provides a **Files and Settings Transfer Wizard** to move data from a source computer to a new computer. You can transfer data, such as:

- E-mail messages
- Toolbar settings
- Window sizes
- Internet bookmarks

You can transfer the data to the new computer over a network connection, or you can store it on a removable media, such as a writable CD, for transfer to the new computer.

For transferring information to a new computer, you must run the **Files and Settings Transfer Wizard**. You can use the optional *Operating System* media for this process or you can create a wizard disk with the **Files and Settings Transfer Wizard**.

Running the Files and Settings Transfer Wizard

Running the Files and Settings Transfer Wizard With the Operating System Media



NOTE: This procedure requires the *Operating System* media. This media is optional and may not be included with certain computers.

To prepare a new computer for the file transfer:

- 1 Open the **Files and Settings Transfer Wizard**: click **Start**→**All Programs**→**Accessories**→**System Tools**→**Files and Settings Transfer Wizard**.
- 2 When the **Files and Settings Transfer Wizard** welcome screen appears, click **Next**.
- 3 On the **Which computer is this?** screen, click **New Computer**→**Next**.
- 4 On the **Do you have a Windows XP CD?** screen, click **I will use the wizard from the Windows XP CD**→**Next**.
- 5 When the **Now go to your old computer** screen appears, go to your old or source computer. *Do not* click **Next** at this time.

To copy data from the old computer:

- 1 On the old computer, insert the Windows XP *Operating System* media.
- 2 On the **Welcome to Microsoft Windows XP** screen, click **Perform additional tasks**.
- 3 Under **What do you want to do?**, click **Transfer files and settings**→**Next**.
- 4 On the **Which computer is this?** screen, click **Old Computer**→**Next**.
- 5 On the **Select a transfer method** screen, click the transfer method you prefer.
- 6 On the **What do you want to transfer?** screen, select the items you want to transfer and click **Next**.

After the information has been copied, the **Completing the Collection Phase** screen appears.

- 7 Click **Finish**.

To transfer data to the new computer:

- 1 On the **Now go to your old computer** screen on the new computer, click **Next**.

- 2 On the **Where are the files and settings?** screen, select the method you chose for transferring your settings and files and click **Next**.

The wizard reads the collected files and settings and applies them to your new computer.

When all of the settings and files have been applied, the **Finished** screen appears.

- 3 Click **Finished** and restart the new computer.

Running the Files and Settings Transfer Wizard Without the Operating System Media

To run the **Files and Settings Transfer Wizard** without the *Operating System* media, you must create a wizard disk that will allow you to create a backup image file to removable media.

To create a wizard disk, use your new computer with Windows XP and perform the following steps:

- 1 Open the **Files and Settings Transfer Wizard**: click **Start**→**All Programs**→**Accessories**→**System Tools**→**Files and Settings Transfer Wizard**.
- 2 When the **Files and Settings Transfer Wizard** welcome screen appears, click **Next**.
- 3 On the **Which computer is this?** screen, click **New Computer**→**Next**.
- 4 On the **Do you have a Windows XP CD?** screen, click **I want to create a Wizard Disk in the following drive**→**Next**.
- 5 Insert the removable media, such as a writable CD, and click **OK**.
- 6 When the disk creation completes and the **Now go to your old computer** message appears, *do not* click **Next**.
- 7 Go to the old computer.

To copy data from the old computer:

- 1 On the old computer, insert the wizard disk.
- 2 Click **Start**→**Run**.
- 3 In the **Open** field on the **Run** window, browse to the path for **fastwiz** (on the appropriate removable media) and click **OK**.
- 4 On the **Files and Settings Transfer Wizard** welcome screen, click **Next**.

- 5 On the **Which computer is this?** screen, click **Old Computer**→**Next**.
- 6 On the **Select a transfer method** screen, click the transfer method you prefer.
- 7 On the **What do you want to transfer?** screen, select the items you want to transfer and click **Next**.

After the information has been copied, the **Completing the Collection Phase** screen appears.

- 8 Click **Finish**.

To transfer data to the new computer:

- 1 On the **Now go to your old computer** screen on the new computer, click **Next**.
- 2 On the **Where are the files and settings?** screen, select the method you chose for transferring your settings and files and click **Next**. Follow the instructions on the screen.

The wizard reads the collected files and settings and applies them to your new computer.

When all of the settings and files have been applied, the **Finished** screen appears.

- 3 Click **Finished** and restart the new computer.




NOTE: For more information about this procedure, search support.dell.com for document #154781 (*What Are The Different Methods To Transfer Files From My Old Computer To My New Dell™ Computer Using the Microsoft® Windows® XP Operating System?*).



NOTE: Access to the Dell™ Knowledge Base document may not be available in certain countries.


Microsoft Windows Vista®

- 1 Click the Windows Vista Start button , and then click **Transfer files and settings**→**Start Windows Easy Transfer**.
- 2 In the **User Account Control** dialog box, click **Continue**.
- 3 Click **Start a new transfer** or **Continue a transfer in progress**.


Follow the instructions provided on the screen by the **Windows Easy Transfer Wizard**.

Using a Battery


Battery Performance


 **NOTE:** For information about the Dell warranty for your computer, see the *Product Information Guide* or separate paper warranty document that shipped with your computer.

For optimal computer performance and to help preserve BIOS settings, operate your Dell™ portable computer with the main battery installed at all times. One battery is supplied as standard equipment in the battery bay.

 **NOTE:** Because the battery may not be fully charged, use the AC adapter to connect your new computer to an electrical outlet the first time you use the computer. For best results, operate the computer with the AC adapter until the battery is fully charged. To view battery charge status, check the Power Meter in Power Options (see "Accessing Power Options Properties" on page 49).

Battery operating time varies depending on operating conditions.

 **NOTE:** Battery operating time (the time the battery can hold a charge) decreases over time. Depending on how often the battery is used and the conditions under which it is used, you may need to purchase a new battery during the life of your computer.


 **NOTE:** It is recommended that you connect your computer to an electrical outlet when writing to a CD or DVD.


Operating time is significantly reduced when you perform operations including, but not limited to, the following:


- Using optical drives.
- Using wireless communications devices, PC Cards, ExpressCards, media memory cards, or USB devices.
- Using high-brightness display settings, 3D screen savers, or other power-intensive programs such as complex 3D graphics applications.

- Running the computer in maximum performance mode. See "Configuring Power Management Settings" on page 48 for information about accessing Windows Power Options Properties or Dell QuickSet, which you can use to configure power management settings.



You can check the battery charge before you insert the battery into the computer. You can also set power management options to alert you when the battery charge is low.

 **CAUTION: Using an incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell. The battery is designed to work with your Dell computer. Do not use a battery from other computers with your computer.**

 **CAUTION: Do not dispose of batteries with household waste. When your battery no longer holds a charge, call your local waste disposal or environmental agency for advice on disposing of a lithium-ion battery. See "Battery Disposal" in the *Product Information Guide*.**

 **CAUTION: Misuse of the battery may increase the risk of fire or chemical burn. Do not puncture, incinerate, disassemble, or expose the battery to temperatures above 65°C (149°F). Keep the battery away from children. Handle damaged or leaking batteries with extreme care. Damaged batteries may leak and cause personal injury or equipment damage.**

Checking the Battery Charge


The Dell QuickSet **Battery Meter**, the Microsoft Windows **Power Meter** window and battery meter icon ( or ), the battery charge gauge and health gauge, and the low-battery warning provide information on the battery charge.

Dell™ QuickSet Battery Meter

If Dell QuickSet is installed, press <Fn><F3> to display the QuickSet Battery Meter. The Battery Meter displays status, battery health, charge level, and charge completion time for the battery in your computer.



For more information about QuickSet, right-click the QuickSet icon in the taskbar, and click **Help**.


Microsoft® Windows Vista® Power Meter

The Windows Vista Power Meter indicates the remaining battery charge. To check the Power Meter, move your cursor over the **Power**  icon in the Notification area to display the **Power** icon flyout.

If the computer is connected to an electrical outlet, the **Power** icon flyout displays the (plugged in charging) message.

Microsoft® Windows® Power Meter

The Windows Power Meter indicates the remaining battery charge. To check the Power Meter, double-click battery meter icon ( or ) on the taskbar.

If the computer is connected to an electrical outlet, a  icon appears.

Charge Gauge

By either pressing once or *pressing and holding* the status button on the charge gauge on the battery, you can check:

- Battery charge (check by pressing and *releasing* the status button)
- Battery health (check by pressing and *holding* the status button)

The battery operating time is largely determined by the number of times it is charged. After hundreds of charge and discharge cycles, batteries lose some charge capacity—or battery health. That is, a battery can show a status of "charged" but maintain a reduced charge capacity (health).

Check the Battery Charge

To check the battery charge, *press and release* the status button on the battery charge gauge to illuminate the charge-level lights. Each light represents approximately 20 percent of the total battery charge. For example, if the battery has 80 percent of its charge remaining, four of the lights are on. If no lights appear, the battery has no charge.

Check the Battery Health



NOTE: You can check battery health in one of two ways: by using the charge gauge on the battery as described below and by using the Battery Meter in Dell QuickSet. For information about QuickSet, right-click the icon in the taskbar, and click **Help**.

To check the battery health using the charge gauge, *press and hold* the status button on the battery charge gauge for at least 3 seconds. If no lights appear, the battery is in good condition, and more than 80 percent of its original charge capacity remains. Each light represents incremental degradation. If five lights appear, less than 60 percent of the charge capacity remains, and you should consider replacing the battery. See "Battery Performance" on page 43 for more information about the battery operating time.

Low-Battery Warning



NOTICE: To avoid losing or corrupting data, save your work immediately after a low-battery warning. Then connect the computer to an electrical outlet. If the battery runs completely out of power, hibernate mode begins automatically.

A pop-up window warns you when the battery charge is approximately 90 percent depleted. If two batteries are installed, the low-battery warning means that the combined charge of both batteries is approximately 90 percent depleted. The computer enters hibernate mode when the battery charge is at a critically low level.

You can change the settings for the battery alarms in **QuickSet** or the **Power Options Properties** window. See "Configuring Power Management Settings" on page 48 for information about accessing **QuickSet** or the **Power Options Properties** window.

Conserving Battery Power

Perform the following actions to conserve battery power:

- Connect the computer to an electrical outlet when possible because battery life is largely determined by the number of times the battery is used and recharged.
- Place the computer in standby mode or hibernate mode when you leave the computer unattended for long periods of time. See "Power Management Modes" on page 47.
- Use the Power Management Wizard or the **Power Options Properties** window to select options to optimize your computer's power usage. These options can also be set to change when you press the power button, close the display, or press <Fn><Esc>.



NOTE: See "Configuring Power Management Settings" on page 48 for information on conserving battery power.

Power Management Modes


Standby and Sleep Mode

Standby mode (sleep mode in Microsoft Windows Vista) conserves power by turning off the display and the hard drive after a predetermined period of inactivity (a time-out). When the computer exits standby or sleep mode, it returns to the same operating state it was in before entering standby or sleep mode.



NOTICE: If your computer loses AC and battery power while in standby or sleep mode, it may lose data.

To enter standby mode in Windows XP, click the **Start** button, click **Turn off computer**, and then click **Stand by**.

To enter sleep mode in Windows Vista, click the Windows Vista Start button, , and move your mouse over the right triangle beside the lock option to open the **Power Options Properties** window, and then click **Sleep**.


Depending on how you set the power management options in the **Power Options Properties** window or the **QuickSet Power Management Wizard**, you may also use one of the following methods:

- Press the power button.
- Close the display.
- Press <Fn><Esc>.

To exit standby or sleep mode, press the power button or open the display, depending on how you set the power management options. You cannot make the computer exit standby or sleep mode by pressing a key or touching the touch pad or track stick.


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 hibernate mode, it returns to the same operating state it was in before entering hibernate mode.

 **NOTICE:** You cannot remove devices or undock your computer while your computer is in hibernate mode.

Your computer enters hibernate mode if the battery charge level becomes critically low.


To manually enter hibernate mode in Windows XP, click the **Start** button, click **Turn off computer**, press and hold <Shift>, and then click **Hibernate**.

To manually enter hibernate mode in Windows Vista, click the Windows Vista **Start** button , and move your mouse over the right triangle beside the Lock icon to open the **Power Options Properties** window, and then click **Hibernate**.

 **NOTE:** If your portable system has **Hybrid Sleep** enabled, then **Hybrid** will not be displayed.

Depending on how you set the power management options in the **Power Options Properties** window or the **QuickSet Power Management Wizard**, you may also use one of the following methods to enter hibernate mode:

- Press the power button.
- Close the display.
- Press <Fn><Esc>.

 **NOTE:** Some Express Cards may not operate correctly after the computer exits hibernate mode. Remove and reinsert the card (see "Removing an ExpressCard or Blank" on page 101), or simply restart (reboot) your computer.

To exit hibernate mode, press the power button. The computer may take a short time to exit hibernate mode. You cannot make the computer exit hibernate mode by pressing a key or touching the touch pad. For more information on hibernate mode, see the documentation that came with your operating system.

Configuring Power Management Settings



You can use the **QuickSet Power Management Wizard** or **Windows Power Options Properties** to configure the power management settings on your computer. For more information about **QuickSet**, right-click the **QuickSet** icon in the taskbar and click **Help**.

Accessing Power Options Properties

Windows XP

Click the **Start** button, point to **Control Panel**→**Performance and Maintenance**, and then click **Power Options**

Windows Vista

- Click the Windows Vista Start button , then click the Windows **Power**  icon in the Notification area to display the **Power** icon flyout window.
- Select one of the following from the **Select a Power Plan** section.
 - **Dell Recommended**
 - **Power Saver**
 - **High Performance**
 - Any custom power plan you have created.
- To access additional power options, click **More Power Options** at the bottom of the flyout.


Charging the Battery

When you connect the computer to an electrical outlet or install a battery while the computer is connected to an electrical outlet, the computer checks the battery charge and temperature. If necessary, the AC adapter then charges the battery and maintains the battery charge.



NOTE: With Dell™ ExpressCharge™, when the computer is turned off, the AC adapter charges a completely discharged battery to 80 percent in about 1 hour and to 100 percent in approximately 2 hours. Charge time is longer with the computer turned on. You can leave the battery in the computer for as long as you like. The battery's internal circuitry prevents the battery from overcharging.

If the battery is hot from being used in your computer or being in a hot environment, the battery may not charge when you connect the computer to an electrical outlet.

The battery is too hot to start charging if the  light flashes alternately green and orange. Disconnect the computer from the electrical outlet and allow the computer and the battery to cool to room temperature. Then connect the computer to an electrical outlet to continue charging the battery.

For information about resolving problems with a battery, "Power Problems" on page 128.

Removing the Battery



CAUTION: Using an incompatible battery may increase the risk of fire or explosion. Replace the battery only with a compatible battery purchased from Dell. The battery is designed to work with your Dell™ computer. Do not use a battery from other computers with your computer.



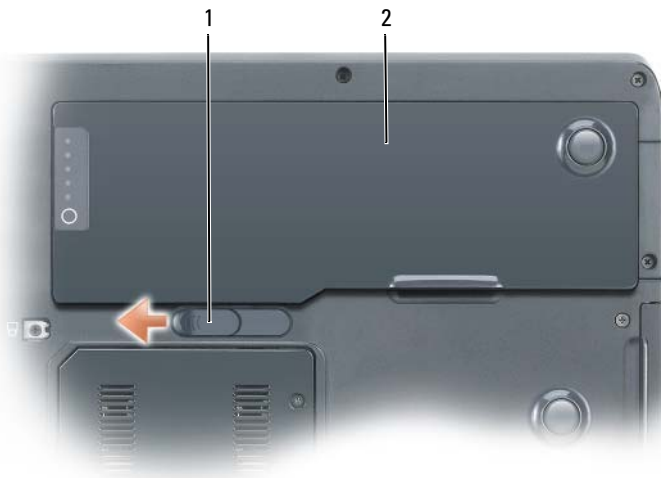
CAUTION: Before performing these procedures, turn off the computer, disconnect the AC adapter from the electrical outlet and the computer, disconnect the modem from the wall connector and computer, and remove any other external cables from the computer.



NOTICE: You must remove all external cables from the computer to avoid possible connector damage.

To remove the battery:

- 1 If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.
- 2 Ensure that the computer is turned off or suspended in a power management mode.
- 3 Slide the battery-bay latch release on the bottom of the computer, and then remove the battery from the bay.



1 battery-bay latch release

2 battery

To replace the battery, follow the removal procedure in reverse order.

Storing a Battery

Remove the battery when you store your computer for an extended period of time. A battery discharges during prolonged storage. After a long storage period, recharge the battery fully before you use it. See "Charging the Battery" on page 49.


5

Using the Keyboard

Numeric Keypad



The numeric keypad functions like the numeric keypad on an external keyboard. Each key on the keypad has multiple functions. The keypad numbers and symbols are marked in blue on the right of the keypad keys. To type a number or symbol, hold down <Fn> and press the desired key.

- To enable the keypad, press <Num Lk>. The  light indicates that the keypad is active.
- To disable the keypad, press <Num Lk> again.

Key Combinations

System Functions

<Ctrl><Shift><Esc> Opens the **Task Manager** window.

Battery

<Fn><F3> Displays the Dell™ QuickSet Battery Meter. For more information about the Battery Meter, see "Dell™ QuickSet Battery Meter" on page 44.

CD or DVD Tray

<Fn><F10> Ejects the tray out of the drive (if Dell QuickSet is installed). For more information about Dell QuickSet, see "Dell™ QuickSet" on page 227.

Display Functions

<Fn><F8> Switches the video image to the next display option. The options include the integrated display, an external monitor, and both displays simultaneously.

<Fn> and up-arrow key Increases brightness on the integrated display only (not on an external monitor).

<Fn> and down-arrow key Decreases brightness on the integrated display only (not on an external monitor).

Wireless Networking and Bluetooth® Wireless Technology Function

<Fn><F2> Enables and disables wireless networking and Bluetooth wireless technology.

Power Management

<Fn><Esc>	Activates a power management mode. You can reprogram this keyboard shortcut to activate a different power management mode using the Advanced tab in the Power Options Properties window. See "Power Management Modes" on page 47.
<Fn><F1>	Puts the computer into hibernate mode (if you have used QuickSet to set up this keyboard shortcut). For more information, see "Dell™ QuickSet" on page 227.

Speaker Functions

<Fn><Page Up>	Increases the volume of the integrated speakers and external speakers, if attached.
<Fn><Page Dn>	Decreases the volume of the integrated speakers and external speakers, if attached.
<Fn><End>	Enables and disables the integrated speakers and external speakers, if attached.

Microsoft® Windows® Logo Key Functions

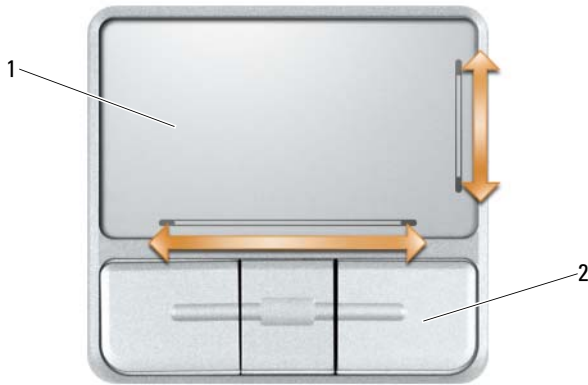
Windows logo key and <m>	Minimizes all open windows.
Windows logo key and <Shift><m>	Restores all minimized windows. This command functions as a toggle to restore minimized windows following the use of the Windows logo key and <m> key combination.
Windows logo key and <e>	Runs Windows Explorer.
Windows logo key and <r>	Opens the Run dialog box.
Windows logo key and <f>	Opens the Search Results dialog box.
Windows logo key and <Ctrl><f>	Opens the Search Results-Computer dialog box (if the computer is connected to a network).
Windows logo key and <Pause>	Opens the System Properties dialog box.

Microsoft® Windows Vista® Logo Key Functions

Windows logo key and <TAB>	Cycle through programs on the taskbar by using Windows Flip 3-D (only if using the Aero interface).
CTRL+Windows logo key and <TAB>	Use the arrow keys to cycle through programs on the taskbar by using Windows Flip 3-D (only if using the Aero interface)
Windows logo key and <SPACEBAR>	Bring all gadgets to the front and select Window Sidebar (if using Windows Sidebar).
Windows logo key and <G>	Cycles through Sidebar gadgets (if using Windows Vista sidebar.
Windows logo key and <U>	Opens the Ease of Access Center .
Windows logo key and <X>	Opens the Windows Mobility Center .
Windows logo key and any number key	Opens the Quick Launch shortcut that is in the position that corresponds to the number. For example, use the Windows logo key and <1> to launch the first shortcut in the Quick Launch menu.

Touch Pad

The touch pad detects the pressure and movement of your finger to allow you to move the cursor on the display. Use the touch pad and touch pad buttons as you would use a mouse.



1 touch pad

2 touch pad buttons (3)

- To move the cursor, lightly slide your finger over the touch pad.
- To select an object, lightly tap once on the surface of the touch pad or use your thumb to press the left touch-pad button.
- To select and move (or drag) an object, position the cursor on the object and tap twice on the touch pad. On the second tap, leave your finger on the touch pad and move the selected object by sliding your finger over the surface.
- To double-click an object, position the cursor on the object and tap twice on the touch pad or use your thumb to press the left touch-pad button twice.

The touch pad has silk screening on the right side and the bottom to indicate scrolling abilities. Scrolling is enabled by default. To disable this feature, modify the mouse properties within the Control Panel.



NOTE: The scroll zones may not work with all applications. For the scroll zones to function properly, the application being used must support the touch pad scroll feature.

Customizing the Touch Pad

You can use the **Mouse Properties** window to disable the touch pad or adjust its settings.

- 1** Open the Control Panel, and then click **Mouse**. For information about the Control Panel, see the Windows Help and Support Center. To access the Help and Support Center, see "Windows Help and Support Center" on page 20.
- 2** In the **Mouse Properties** window, click the **Touch Pad** tab to adjust touch pad settings.
- 3** Click **OK** to save the settings and close the window.

Using the Display

Adjusting Brightness

When a Dell™ computer is running on battery power, you can conserve power by setting the display brightness to the lowest comfortable setting by pressing <Fn> and the up- or down-arrow key on the keyboard.



NOTE: Brightness key combinations only affect the display on your portable computer, not monitors or projectors that you attach to your portable computer or docking device. If your computer is connected to an external monitor and you try to change the brightness level, the Brightness Meter may appear, but the brightness level on the external device does not change.

You can press the following keys to adjust display brightness:

- Press <Fn> and the up-arrow key to increase brightness on the integrated display only (not on an external monitor).
- Press <Fn> and the down-arrow key to decrease brightness on the integrated display only (not on an external monitor).




NOTE: In some cases you will not be able to keep your manual selections after using Sleep/Standby mode. Your selections may come back with a darker LCD.

Using a Projector


When you start the computer with an external device (such as an external monitor or projector) attached and turned on, the image may appear on either the computer display or the external device.

Press <Fn><F8> to switch the video image between the display only, the external device only, or the display and the external device simultaneously.

Making Images and Text Look Bigger or Sharper

 **NOTE:** If you change the display resolution from the current settings, the image may appear blurry or text may be hard to read if you change the resolution to one not supported by your computer and display. Before you change any of the display settings, make a note of the current settings so you can change back to the previous settings if you need to.

You can enhance the legibility of text and change the appearance of images on the screen by adjusting display resolution. As you increase resolution, items appear smaller on the screen. In contrast, lower resolution causes text and images to appear larger and can benefit people with vision impairments. To display a program at a specific resolution, both the video card and the display must support the program, and the necessary video drivers must be installed.


 **NOTE:** Use only the Dell-installed video drivers, which are designed to offer the best performance with your Dell-installed operating system.

If you choose a resolution or color palette that is higher than the display supports, the settings adjust automatically to the closest supported values.


To set the display resolution and refresh rate for your display, perform the steps in the following section that corresponds to the operating system your computer is using.

Microsoft® Windows® XP

- 1 Click **Start**→**Settings**→**Control Panel**.
- 2 Under **Pick a category**, click **Appearance and Themes**.
- 3 Under **Pick a task...**, click the area you want to change, or under or **pick a Control Panel icon**, click **Display**.
- 4 In the **Display Properties** window, click the **Settings** tab.
- 5 Try different settings for **Color quality** and **Screen resolution**.

 **NOTE:** As the resolution increases, icons and text appear smaller on the screen.

Windows Vista®

- 1 Click the Windows Vista Start button, , and click **Control Panel**.
- 2 Under **Appearance and Personalization**, click **Adjust screen resolution**.

- 3** In the **Display Settings** window, under **Resolution**, slide the slide bar to the left/right to decrease/increase the screen resolution.
- 4** Click **How do I get the best display?** for further instructions.


Using Multimedia

Playing CDs or 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 while playing CDs or DVDs.
 - 1 Press the eject button on the front of the drive.
 - 2 Pull out the tray.




- 3 Place the disc, label side up, in the center of the tray and snap the disc onto the spindle.









 **NOTE:** If you use a module that shipped with another computer, you need to install the drivers and software necessary to play DVDs or write data. For more information, see the *Drivers and Utilities* CD (the CD is optional and may not be available for your computer or in certain countries).

- 4 Push the tray back into the drive.









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).

Copying CD, DVD, and Blu-ray Disc™ (BD) Media

 **NOTE:** Ensure that you observe all copyright laws when copying media.


This section applies only to computers that have a DVD+/-RW drive or a BD-RE drive.


 **NOTE:** The types of optical drives offered by Dell may vary by country.

The following instructions explain how to make an exact copy of a CD, DVD, or BD using Roxio Creator. You can also use Roxio Creator for other purposes, such as creating music CDs from audio files stored on your computer or backing up important data. For help, open Roxio Creator, and then press <F1>.


The DVD drives and BD drives installed in Dell computers do not support HD-DVD media. For a list of supported media formats, see "Using Blank CD, DVD, and BD Media" on page 66.

How to Copy a CD, DVD, or BD

 **NOTE:** BD media can only be copied to other BD media.

 **NOTE:** Copying a BD-R to BD-RE will not produce an exact copy.

 **NOTE:** Most commercial DVDs and BDs have copyright protection and cannot be copied using Roxio Creator.

- 1 Click **Start**  → **All Programs** → **Roxio Creator** → **Projects** → **Copy**.
- 2 Under the **Copy** tab, click **Copy Disc**.
- 3 To copy the CD, DVD, or BD:
 - *If you have one optical drive*, insert the source disc into the drive, ensure that the settings are correct, and then click the **Copy Disc** button to continue. The computer reads your source disc and copies the data to a temporary folder on your computer hard drive.

When prompted, insert a blank disc into the drive and click **OK**.

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

Once you have finished copying the source disc, the disc that you have created automatically ejects.

Using Blank CD, DVD, and BD Media

DVD-writable drives can write to both CD and DVD recording media. BD-writable drives can write to CD, DVD and BD 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 a blank CD-RW if you plan to erase, rewrite, or update information on that disc later.

Blank DVD+/-R or BD-R media can be used to permanently store large amounts of information. After you create a DVD+/-R or BD-R, 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+/-RW or BD-RE media 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

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

BD-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
DVD-R DL	Yes	Yes	No
BD-R	Yes	Yes	No
BD-RE	Yes	Yes	Yes

Helpful Tips

- Use Microsoft® Windows® Explorer to drag and drop files to a CD-R or CD-RW only after you start Roxio Creator and open a Creator project.
- Use CD-Rs to burn music CDs that you want to play in regular stereos. CD-RWs may not play in many home or car stereos.
- You cannot create audio DVDs with Roxio Creator.
- 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 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 sonic.com for additional information.
- See the Roxio website at www.sonic.com or the Blu-ray Disc™ Association website at blu-raydisc.com for additional information

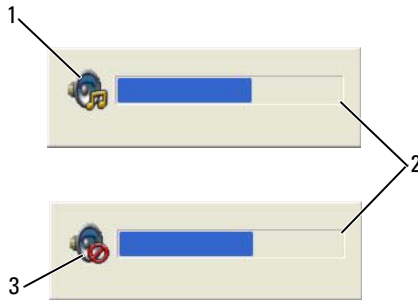
Adjusting the Volume

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

- 1 Open the **Volume Control** window.
- 2 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.

The Volume Meter displays the current volume level, including mute, on your computer. Either click the **QuickSet** icon in the taskbar and select or deselect **Disable On Screen Volume Meter**, or press the volume control buttons to enable or disable the Volume Meter on the screen.



- 1 volume icon
- 2 Volume Meter
- 3 mute icon

When the meter is enabled, adjust the volume with the volume control buttons or by pressing the following keys:

- Press <Fn> <PageUp> to increase volume.
- Press <Fn> <PageDn> to decrease volume.
- Press <Fn> <End> to mute volume.

For more information about QuickSet, right-click the icon in the taskbar and click **Help**.


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.

Microsoft Windows XP

- 1 Click **Start**→**Control Panel**→**Appearance and Themes**.
- 2 Under **Pick a task...**, click **Change the screen resolution**.
- 3 Under **Screen resolution**, click and drag the bar to reduce the resolution setting.
- 4 In the drop-down menu under **Color quality**, click **Medium (16 bit)** and click **OK**.

Microsoft Windows Vista® Operating System

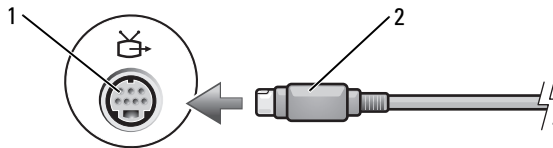
- 1 Click the Windows Vista Start button , click **Control Panel**, and then click **Appearance and Personalization**.
- 2 Under **Personalization**, click **Adjust Screen Resolution**.
The **Display Properties** window appears.
- 3 Under **Resolution**: click and drag the bar reduce the resolution setting.
- 4 In the drop-down menu under **Colors**:, click **Medium (16 bit)**.
- 5 Click **OK**.

Connecting Your Computer to a TV or Audio Device

NOTE: Video and audio cables for connecting your computer to a TV or other audio device may not be included with your computer. Cables and TV/digital audio adapter cables are available for purchase from Dell.

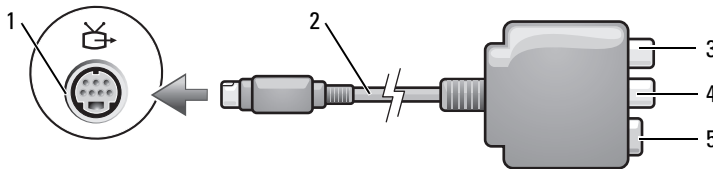
Your computer has an S-video TV-out connector that, together with a standard S-video cable, a composite video adapter cable, or a component video adapter cable (available from Dell), enable you to connect the computer to a TV.

Your TV has either an S-video input connector, a composite video-input connector, or a component video-input connector. Depending on what type of connector is available on your TV, you can use a commercially available S-video cable, composite video cable, or component video cable to connect your computer to your TV.



1 S-video TV-out connector

2 S-video connector



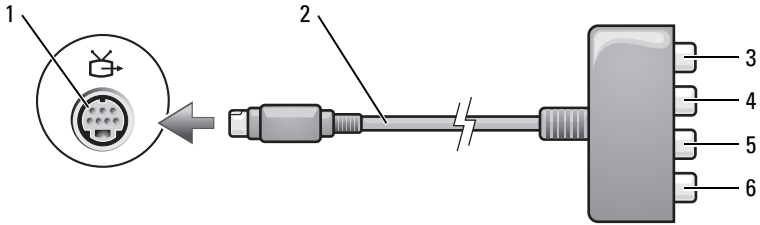
1 S-video TV-out connector

2 composite video adapter

3 S/PDIF digital audio connector

4 composite video-output connector

5 S-video connector



- | | | | |
|---|--|---|--|
| 1 | S-video TV-out connector | 2 | component video adapter |
| 3 | S/PDIF digital audio connector | 4 | Pr (red) component video-output connector |
| 5 | Pb (blue) component video-output connector | 6 | Y (green) component video-output connector |

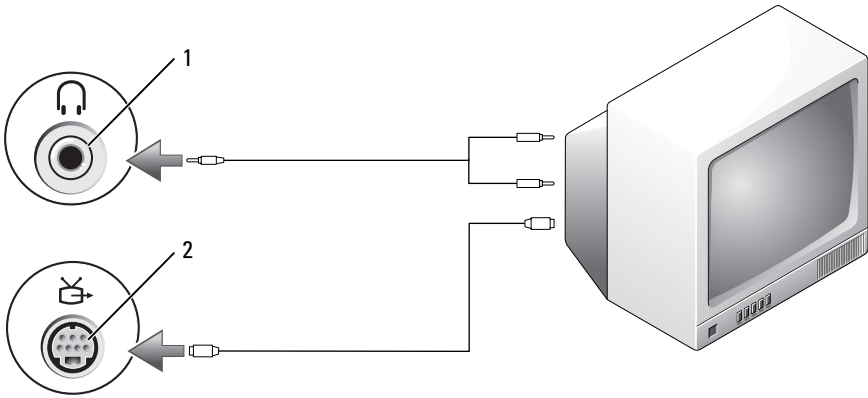
If you want to connect your computer to a TV or audio device, it is recommended that you connect video and audio cables to your computer in one of the following combinations.

- S-video and standard audio
- Composite video and standard audio
- Component-out video and standard audio

NOTE: See the diagrams at the beginning of each subsection to help you determine which method of connection you should use.

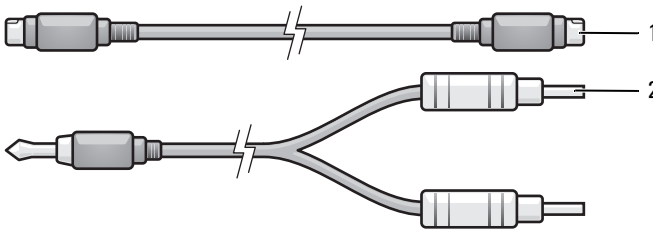
When you finish connecting the video and audio cables between your computer and your TV, you must enable your computer to work with the TV. See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV. Additionally, if you are using S/PDIF digital audio, see "S-Video and S/PDIF Digital Audio" on page 73.

S-Video and Standard Audio



1 audio connector

2 S-video TV-out connector



1 standard S-video cable

2 standard audio cable

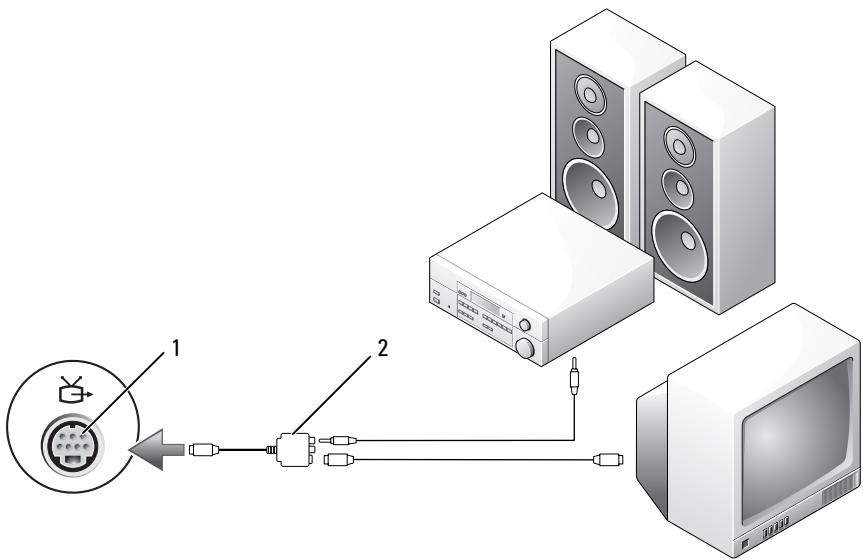
- 1 Turn off the computer and the TV and/or audio device that you want to connect.

NOTE: If your TV or audio device supports S-video but not S/PDIF digital audio, you can connect an S-video cable directly to the S-video TV-out connector on the computer (without the TV/digital audio adapter cable).

- 2 Plug one end of the S-video cable into the S-video output connector on the computer.
- 3 Plug the other end of the S-video cable into the S-video input connector on your TV.

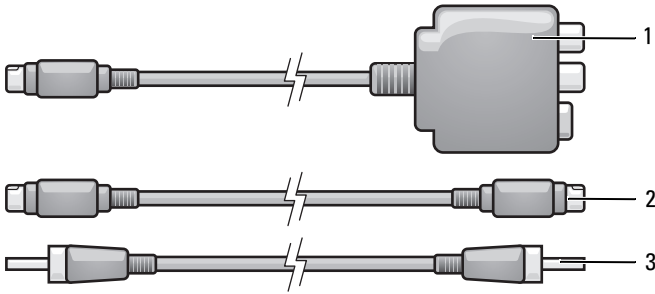
- 4 Plug the single-connector end of the audio cable into the headphone connector on your computer.
- 5 Plug the two RCA connectors on the other end of the audio cable into the audio input connectors on your TV or other audio device.
- 6 Turn on the TV and any audio device that you connected (if applicable), and then turn on the computer.
- 7 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

S-Video and S/PDIF Digital Audio



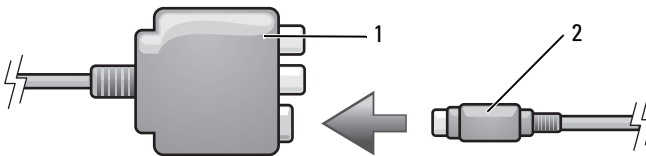
1 S-video TV-out connector

2 composite video adapter



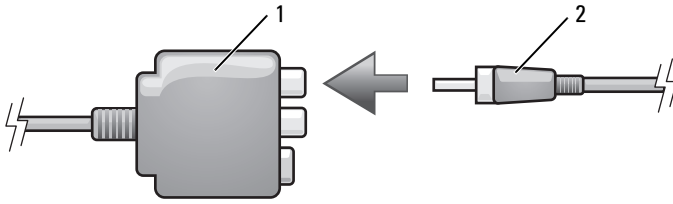
- 1 composite video adapter
- 2 S-video cable
- 3 S/PDIF digital audio cable

- 1 Turn off the computer and the TV and/or the audio device that you want to connect.
- 2 Connect the composite video adapter to the S-video TV-out connector on your computer.
- 3 Plug one end of the S-video cable into the S-video output connector on the composite video adapter.



- 1 composite video adapter
- 2 S-video cable

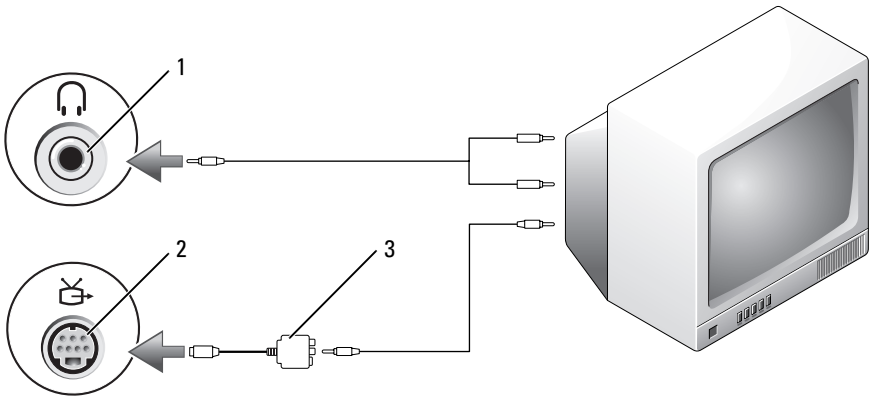
- 4 Plug the other end of the S-video cable into the S-video input connector on the TV.
- 5 Plug one end of the S/PDIF digital audio cable into the digital audio connector on the composite video adapter cable.



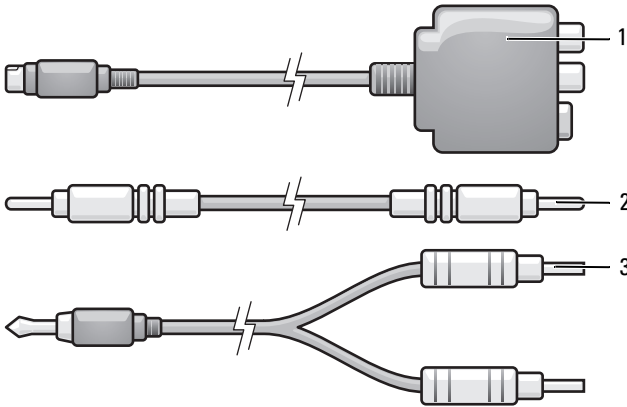
- 1 composite video adapter 2 S/PDIF digital audio cable

- 6 Plug the other end of the S/PDIF digital audio cable into the audio input connector on your TV or audio device.
- 7 Turn on the TV, turn on any audio device that you connected (if applicable), and then turn on the computer.
- 8 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

Composite Video and Standard Audio

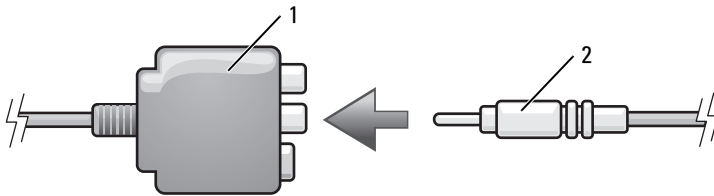


- 1 audio input connector 2 S-video TV-out connector
3 composite video adapter



- 1 composite video adapter
- 2 composite video cable
- 3 standard audio cable

- 1 Turn off the computer and the TV and/or audio device that you want to connect.
- 2 Connect the composite video adapter to the S-video TV-out connector on your computer.
- 3 Plug one end of the composite video cable into the composite video-output connector on the composite video adapter.

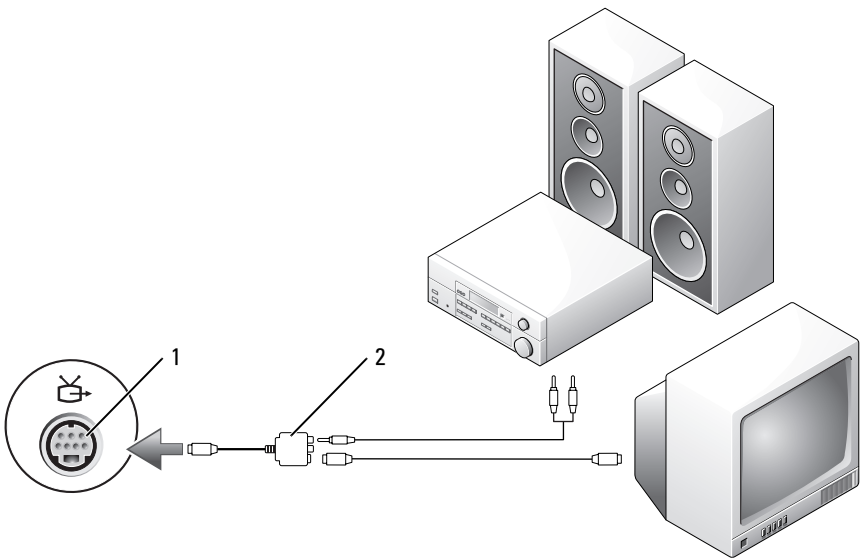


- 1 composite video adapter
- 2 composite video cable

- 4 Plug the other end of the composite video cable into the composite video-input connector on the TV.

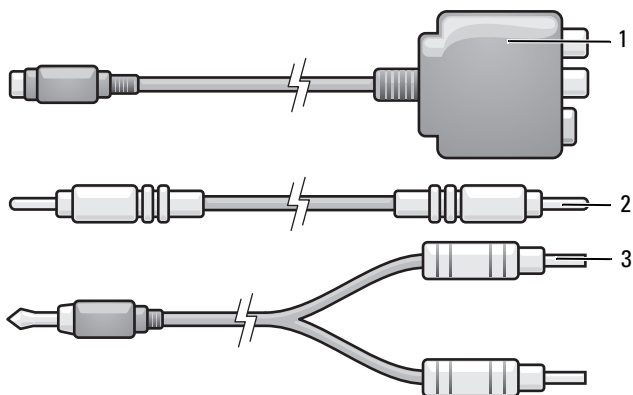
- 5 Plug the single-connector end of the audio cable into the headphone connector on the computer.
- 6 Plug the two RCA connectors on the other end of the audio cable in to the audio input connectors on your TV or other audio device.
- 7 Turn on the TV, turn on any audio device that you connected (if applicable), and then turn on the computer.
- 8 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

Composite Video and S/PDIF Digital Audio



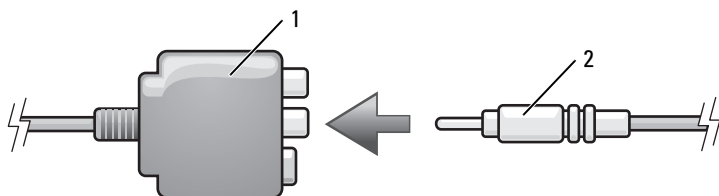
1 S-video TV-out connector

2 composite video adapter



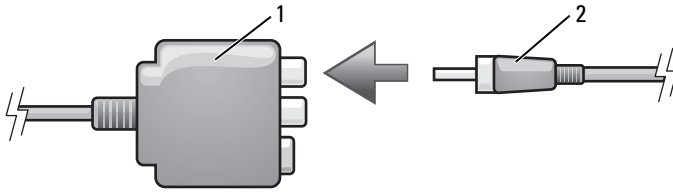
- 1 composite video adapter
- 2 composite video cable
- 3 standard audio cable

- 1 Turn off the computer and the TV and/or audio device that you want to connect.
- 2 Connect the composite video adapter to the S-video TV-out connector on the computer.
- 3 Plug one end of the composite video cable into the composite video-input connector on the composite video adapter.



- 1 composite video adapter
- 2 composite video cable

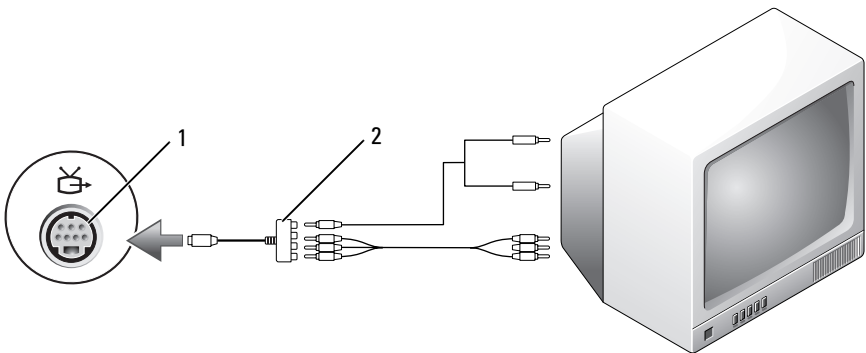
- 4 Plug the other end of the composite video cable into the composite video-input connector on the TV.
- 5 Plug one end of the S/PDIF digital audio cable in to the S/PDIF audio connector on the composite video adapter.



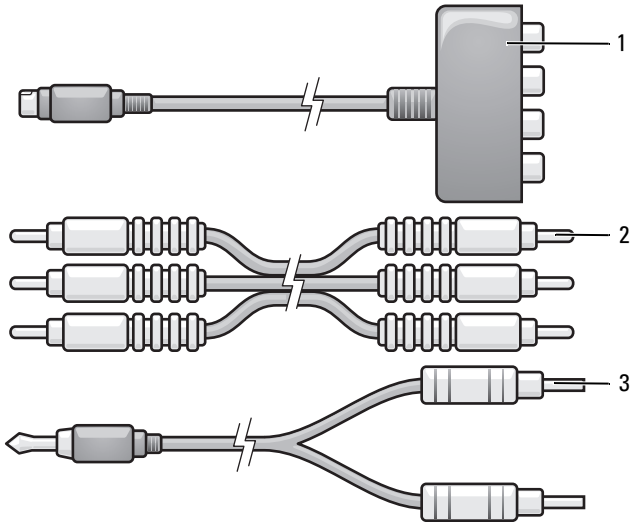
- 1 composite video adapter 2 S/PDIF digital audio cable

- 6 Plug the other end of the digital audio cable into the S/PDIF input connector on your TV or other audio device.
- 7 Turn on the TV, turn on any audio device that you connected (if applicable), and then turn on the computer.
- 8 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

Component Video and Standard Audio

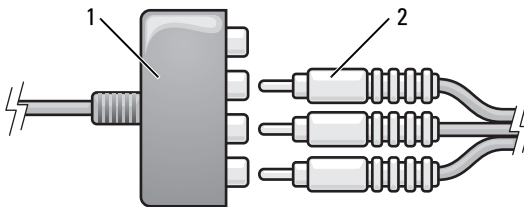


- 1 S-video TV-out connector 2 component video adapter



- 1 component video adapter
- 2 component video cable
- 3 standard audio cable

- 1 Turn off the computer and the TV and/or audio device that you want to connect.
- 2 Connect the component video adapter to the S-video TV-out connector on your computer.
- 3 Plug all three ends of the component video cable into the component video-output connectors on the component video adapter. Make sure that the red, green, and blue colors of the cable match the corresponding adapter ports.

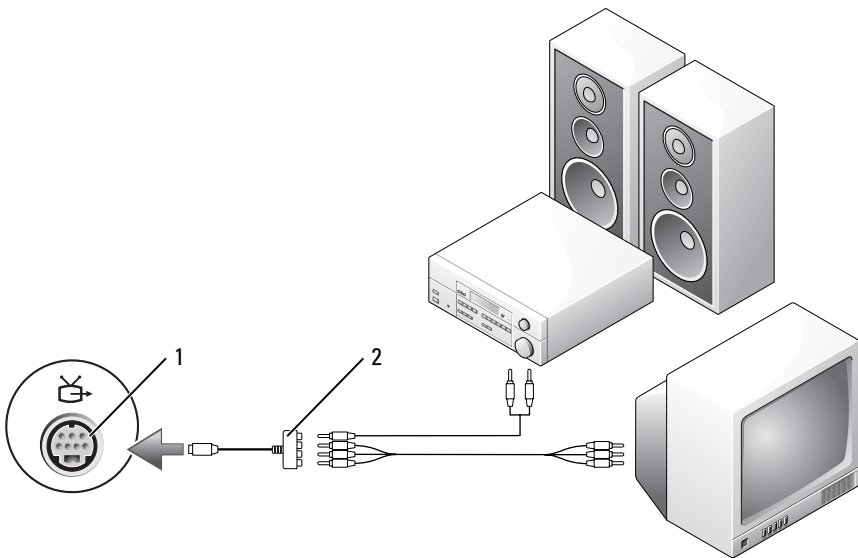


1 component video adapter

2 component video cable

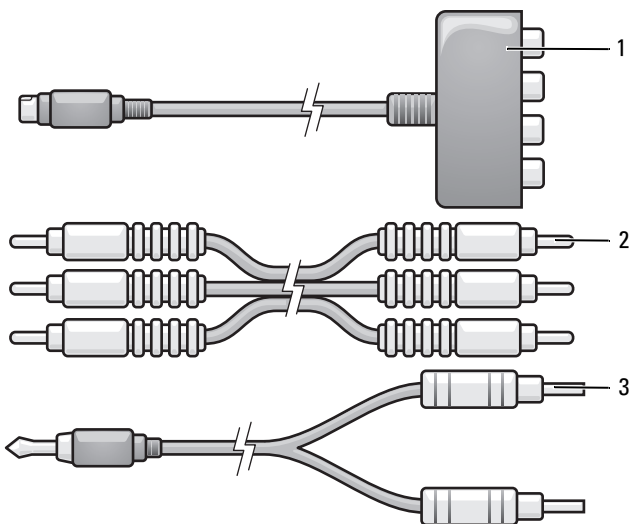
- 4 Plug all three connectors from the other end of the component video cable into the component video-input connectors on the TV. Make sure that the red, green, and blue colors of the cable match the colors of the TV input connectors.
- 5 Plug the single-connector end of the audio cable into the headphone connector on the computer.
- 6 Plug the two RCA connectors on the other end of the audio cable into the audio input connectors on your TV or audio device.
- 7 Turn on the TV, turn on any audio device that you connected (if applicable), and then turn on the computer.
- 8 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

Component Video and S/PDIF Digital Audio



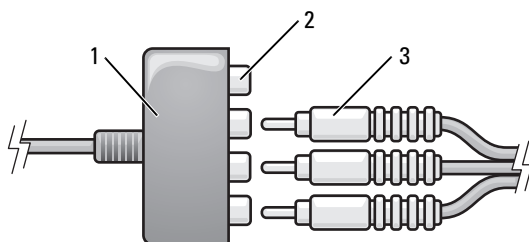
1 S-video TV-out connector

2 component video adapter

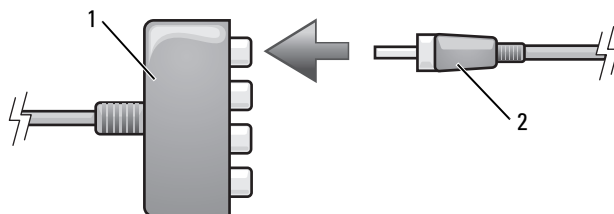


- 1 component video adapter 2 component video cable
3 standard audio cable

- 1 Turn off the computer and the TV and/or audio device that you want to connect.
- 2 Connect the component video adapter to the S-video TV-out connector on the computer.
- 3 Plug all three ends of the component video cable into the component video-output connectors on the component video adapter. Make sure that the red, green, and blue colors of the cable match the corresponding adapter ports.



- 1 component video adapter
- 2 component video-output connector
- 3 component video cable
- 4 Plug all three connectors from the other end of the component video cable into the component video-input connectors on the TV. Make sure that the red, green, and blue colors of the cable match the colors of the TV input connectors.
- 5 Plug one end of the S/PDIF digital audio cable into the S/PDIF audio connector on the component video adapter.



- 1 component video adapter
- 2 S/PDIF digital audio cable
- 6 Plug the other end of the digital audio cable into the S/PDIF input connector on your TV or other audio device.
- 7 Turn on the TV, turn on any audio device that you connected (if applicable), and then turn on the computer.
- 8 See "Enabling the Display Settings for a TV" on page 85 to ensure that the computer recognizes and works properly with the TV.

Enabling S/PDIF Digital Audio

If your computer has a DVD drive, you can enable digital audio for DVD playback.

- 1 Launch the **Cyberlink PowerDVD** application.
- 2 Insert a DVD into the DVD drive.
If the DVD begins playing, click the stop button.
- 3 Click the **Settings** option.
- 4 Click the **DVD** option.

- 5 Click the **DVD Audio Setting** icon.
- 6 Click the arrows beside the **Speaker Configuration** setting to scroll through the options, and select the **SPDIF** option.
- 7 Click the **Back** button once, and then click the **Back** button again to return to the main menu screen.

Enabling S/PDIF in the Windows Audio Driver

- 1 Double-click the speaker icon in the Windows notification area.
- 2 Click the **Options** menu and then click **Advanced Controls**.
- 3 Click **Advanced**.
- 4 Click **S/PDIF Interface**.
- 5 Click **Close**.
- 6 Click **OK**.

Setting Up the Cyberlink (CL) Headphones




NOTE: The CL headphone feature is available only if your computer has a DVD drive.

If your computer has a DVD drive, you can enable digital audio for DVD playback.

- 1 Launch the **Cyberlink PowerDVD** program.
- 2 Insert a DVD into the DVD drive.
If the DVD begins playing, click the stop button.
- 3 Click the **Settings** option.
- 4 Click the **DVD** option.
- 5 Click the **DVD Audio Setting** icon.
- 6 Click the arrows beside the **Speaker Configuration** setting to scroll through the options, and select the **Headphones** option.
- 7 Click the arrows beside the **Audio listening mode** setting to scroll through the options, and select the **CL Headphone** option.
- 8 Click the arrows beside the **Dynamic range compression** option to select the most suitable option.


- 9 Click the **Back** button once, and then click the **Back** button again to return to the main menu screen.

Enabling the Display Settings for a TV

 **NOTE:** To ensure that the display options appear correctly, connect the TV to the computer before you enable the display settings.


Microsoft Windows XP



- 1 Click the **Start** button, point to **Settings**, and then click **Control Panel**.
- 2 Double-click **Display** and click the **Settings** tab.
- 3 Click **Advanced**.
- 4 Click the tab for your video card.

 **NOTE:** To determine the type of video card installed in your computer, see the Windows Help and Support Center. To access the Help and Support Center, click **Start**→**Help and Support**. Under **Pick a Task**, click **Use Tools to view your computer information and diagnose problems**. Then, under **My Computer Information**, select **Hardware**.

- 5 In the display devices section, select the appropriate option for using either a single display or multiple displays, ensuring that the display settings are correct for your selection.

Microsoft Windows Vista

- 1 Click the Windows Vista Start button , click **Control Panel**, and then click **Appearance and Personalization**.
- 2 Under **Personalization**, click **Adjust Screen Resolution**.
The **Display Properties** window appears.
- 3 Click **Advanced**.
- 4 Click the tab for your video card.

 **NOTE:** To determine the type of video card installed in your computer, see the Windows Help and Support Center. To access the Help and Support Center in Windows Vista, click the Windows Vista Start button  →**Help and Support**. Under **Pick a Task**, click **Use Tools to view your computer information and diagnose problems**. Then, under **My Computer Information**, select **Hardware**.

- 5 In the display devices section, select the appropriate option for using either a single display or multiple displays, ensuring that the display settings are correct for your selection.

Setting Up and Using Networks

Setting up a computer network provides connectivity between your computer and the Internet, another computer, or a network. For example, with a network set up in a home or small office you can print to a shared printer, access drives and files on another computer, browse other networks, or access the Internet. You can set up a local area network (LAN) using a network or broadband modem cable or set up a wireless LAN (WLAN).

The Microsoft® Windows® XP and Microsoft Windows Vista® operating systems provide wizards to help guide you through the process of networking computers. For more information about Networking, see "Windows Help and Support Center" on page 20.

Connecting a Network or Broadband Modem Cable

Before you connect your computer to a network, the computer must have a network adapter installed and a network cable connected to it.

To connect a network cable:

- 1 Connect the network cable to the network adapter connector on the back of your computer.



NOTE: Insert the cable connector until it clicks into place, and then gently pull the cable to ensure that it is securely attached.

- 2 Connect the other end of the network cable to a network connection device or a network wall connector.




NOTE: Do not use a network cable with a telephone wall connector.




Setting Up a Network in the Microsoft® Windows® XP Operating System

- 1 Click Start→All Programs→Accessories→Communications→Network Setup Wizard→Next→Checklist for creating a network.

 **NOTE:** Selecting the connection method labeled **This computer connects directly to the Internet** enables the integrated firewall provided with Windows XP Service Pack 2 (SP2).

- 2 Complete the checklist.
- 3 Return to the Network Setup Wizard and follow the instructions in the wizard.

Setting Up a Network in the Microsoft Windows Vista[®] Operating System

- 1 Click the Windows Vista Start button, , and then click **Connect To**→ **Set up a connection or network**.
- 2 Select an option under **Choose a connection option**.
- 3 Click **Next**, and then follow the instructions in the wizard.

Wireless Local Area Network (WLAN)

A WLAN is a series of interconnected computers that communicate with each other over the air waves rather than through a network cable connected to each computer. In a WLAN, a radio communications device called an access point or wireless router connects network computers and provides Internet, or network, access. The access point or wireless router and the wireless network card in the computer communicate by broadcasting data from their antennas over the air waves.

What You Need to Establish a WLAN Connection

Before you can set up a WLAN, you need:

- High-speed (broadband) Internet access (such as cable or DSL)
- A broadband modem that is connected and working
- A wireless router or access point
- A wireless network card for each computer that you want to connect to your WLAN
- Network cable with the network (RJ-45) connector

Checking Your Wireless Network Card

Depending on what you selected when you purchased your computer, the computer has a variety of configurations. To confirm that your computer has a wireless network card and to determine the type of card, use one of the following:


- The **Start** button and the **Connect To** option
- The order confirmation for your computer

Start Button and Connect To Option

In *Microsoft Windows XP*, click **Start**→**Connect To**→**Show all connections**.



NOTE: If your computer is set to the **Classic Start** menu option, click **Start**→**Settings**→**Network Connections** to view your network connections.

In *Microsoft Windows Vista*, click the Windows Vista Start button, , and then click **Connect To**→**View network computers and devices**.

If Wireless Network Connection does not appear under LAN or High-Speed Internet, you may not have a wireless network card.

If Wireless Network Connection appears, you have a wireless network card. To view detailed information about the wireless network card:

- 1 Right-click **Wireless Network Connection**.
- 2 Click **Properties**.

The **Wireless Network Connection Properties** window appears. The wireless network card's name and model number are listed on the **General** tab.




NOTE: If **Wireless Network Connection** does not appear, you may not have a wireless network card.

The Order Confirmation for Your Computer

The order confirmation that you received when you ordered your computer lists the hardware and software that shipped with your computer.

Setting Up a New WLAN Using a Wireless Router and a Broadband Modem

- 1 Contact your Internet service provider (ISP) to obtain specific information about the connection requirements for your broadband modem.
- 2 Ensure that you have wired Internet access through your broadband modem before you attempt to set up a wireless Internet connection (see "Connecting a Network or Broadband Modem Cable" on page 87).
- 3 Install any software required for your wireless router. Your wireless router may have been shipped with an installation CD. Installation CDs usually contain installation and troubleshooting information. Install the required software according to the instructions provided by the router manufacturer.

- 4 Shut down your computer and any other wireless-enabled computers in the vicinity through the Windows Vista Start button, , or menu.
- 5 Disconnect your broadband modem power cable from the electrical outlet.
- 6 Disconnect the network cable from the computer and the modem.
- 7 Disconnect the AC adapter cable from your wireless router to ensure that there is no power connected to the router.



NOTE: Wait for a minimum of 5 minutes after disconnecting your broadband modem before you continue with the network setup.

- 8 Insert a network cable into the network (RJ-45) connector on the unpowered broadband modem.
- 9 Connect the other end of the network cable into the Internet network (RJ-45) connector on the unpowered wireless router.
- 10 Ensure that no network or USB cables, other than the network cable connecting the modem and the wireless router, are connected to the broadband modem.



NOTE: Restart your wireless equipment in the order described below to prevent a potential connection failure.

- 11 Turn on *only* your broadband modem and wait for at least 2 minutes for the broadband modem to stabilize. After 2 minutes, proceed to step 12.
- 12 Turn on your wireless router and wait for at least 2 minutes for the wireless router to stabilize. After 2 minutes, proceed to the step 13.
- 13 Start your computer and wait until the boot process completes.
- 14 See the documentation that came with your wireless router to do the following in order to set up the wireless router:
 - Establish communication between your computer and your wireless router.
 - Configure your wireless router to communicate with your broadband router.
 - Find out your wireless router's broadcast name. The technical term for the name of your router's broadcast name is Service Set Identifier (SSID) or network name.
- 15 If necessary, configure your wireless network card to connect to the wireless network (see "Connecting to a WLAN" on page 92).

Connecting to a WLAN



NOTE: Before you connect to a WLAN, ensure that you have followed the instructions in "Wireless Local Area Network (WLAN)" on page 89.



NOTE: The following networking instructions do not apply to internal cards with Bluetooth® wireless technology or cellular products.

This section provides general procedures for connecting to a network using wireless technology. Specific network names and configuration details vary. See "Wireless Local Area Network (WLAN)" on page 89 for more information about how to prepare for connecting your computer to a WLAN.

Your wireless network card requires specific software and drivers for connecting to a network. The software is already installed.



NOTE: If the software is removed or corrupted, follow the instructions in the user documentation for your wireless network card. Verify the type of wireless network card installed in your computer and then search for that name on the Dell™ Support website at support.dell.com. For information on the type of wireless network card that is installed in your computer, see "Checking Your Wireless Network Card" on page 89.

Determining the Wireless Network Device Manager

Depending on the software installed on your computer, different wireless configuration utilities may manage your network devices:

- Your wireless network card's client utility
- The Windows XP or Windows Vista operating system

Windows XP

To determine which wireless configuration utility is managing your wireless network card:


- 1 Click **Start**→**Settings**→**Control Panel**→**Network Connections**.
- 2 Right-click the **Wireless Network Connection** icon, and then click **View Available Wireless Networks**.

If the **Choose a wireless network** window states **Windows cannot configure this connection**, the wireless network card's client utility is managing the wireless network card.

If the **Choose a wireless network** window states **Click an item in the list below to connect to a wireless network in range or to get more information**, the Windows XP operating system is managing the wireless network card.

Windows Vista

To determine which wireless configuration utility is managing your wireless network card in Windows Vista:

- 1 Click the Windows Vista Start button, , and then click **Connect To**→**Connect To**→**Manage wireless networks**.
- 2 Double-click a profile to open the wireless network properties screen.

For specific information about the wireless configuration utility installed on your computer, see your wireless network documentation in the Windows Help and Support Center (see "Windows Help and Support Center" on page 20).

Completing the Connection to the WLAN

When you turn on your computer and a network (for which your computer is not configured) is detected in the area, a pop-up appears near the network icon in the notification area (in the lower-right corner of the Windows desktop).

Follow the instructions provided in any utility prompts that appear on your screen.

Once you have configured your computer for the wireless network that you selected, another pop-up notifies you that your computer is connected to that network.

Thereafter, whenever you log on to your computer within the range of the wireless network that you selected, the same pop-up notifies you of the wireless network connection.



NOTE: If you select a secure network, you must enter a WEP or WPA key when prompted. Network security settings are unique to your network. Dell cannot provide this information.



NOTE: Your computer can take up to 1 minute to connect to the network.

Enabling/Disabling the Wireless Network Card



NOTE: If you are unable to connect to a wireless network, ensure that you have all the components for establishing a WLAN (see "What You Need to Establish a WLAN Connection" on page 89), and then verify that your wireless network card is enabled by pressing <Fn><F2>.

You can turn your computer's wireless networking function on and off by pressing the <Fn><F2> key combination.

Monitoring the Status of the Wireless Network Card Through Dell QuickSet

The wireless activity indicator provides you with an easy way to monitor the status of your computer's wireless devices. To turn the wireless activity indicator on or off, click the QuickSet icon in the taskbar and select **Hotkey Popups**. If **Wireless Activity Indicator Off** is not checked, the indicator is on. If **Wireless Activity Indicator Off** is checked, the indicator is off.

The wireless activity indicator displays whether your computer's integrated wireless devices are enabled or disabled. When you turn the wireless networking function on or off, the wireless activity indicator changes to display the status.

For more information about the Dell QuickSet wireless activity indicator, right-click the QuickSet icon in the taskbar and select **Help**.

Mobile Broadband / Wireless Wide Area Network (WWAN)

A Mobile Broadband network, also known as a Wireless Wide Area Network (WWAN), is a high-speed digital cellular network that provides Internet access over a much wider geographical area than a WLAN, which typically covers only from 100 to 1000 feet. Your computer can maintain Mobile Broadband network access as long as the computer is within a cellular-data coverage zone. Contact your service provider for coverage of a high-speed digital cellular network.



NOTE: Even if you are able to make a call from your cellular phone in a specific geographical location, that location may not necessarily be within a cellular-data coverage zone.

What You Need to Establish a Mobile Broadband Network Connection



NOTE: You can use a Mobile Broadband ExpressCard to establish a Mobile Broadband network connection.

To set up a Mobile Broadband network connection, you need:

- A Mobile Broadband ExpressCard



NOTE: For instructions on using ExpressCards, see "Using Cards" on page 99.

- An activated Mobile Broadband ExpressCard or activated Subscriber Identity Module (SIM) for your service provider
- The Dell Mobile Broadband Card Utility (already installed on your computer if you purchased the card when you purchased your computer, or on the CD that accompanied your card if purchased separately from your computer)

If the utility is corrupted or deleted from your computer, see the Dell Mobile Broadband Card Utility user's guide for instructions. The user's guide is available through the Windows Help and Support Center (see "Windows Help and Support Center" on page 20) or on the CD that accompanied your card if you purchased it separately from your computer.

Checking Your Dell Mobile Broadband Card


Depending on what you selected when you purchased your computer, the computer has a variety of configurations. To determine your computer configuration, see one of the following:

- Your order confirmation
- Microsoft Windows Help and Support Center


To check your Mobile Broadband card in the Windows Help and Support Center:


- 1 Click **Start**→**Help and Support**→**Use Tools** to view your computer information and diagnose problems.
- 2 Under **Tools**, click **My Computer Information**→**Find information about the hardware installed on this computer**.

On the **My Computer Information - Hardware** screen, you can view the type of Mobile Broadband card installed in your computer as well as other hardware components.


 **NOTE:** The Mobile Broadband card is listed under **Modems**.


Connecting to a Mobile Broadband Network

 **NOTE:** These instructions only apply to Mobile Broadband ExpressCards. They do not apply to internal cards with wireless technology.

 **NOTE:** Before you connect to the Internet, you must activate Mobile Broadband service through your cellular service provider. For instructions and for additional information about using the Dell Mobile Broadband Card Utility, see the user's guide available through the Windows Help and Support Center see "Windows Help and Support Center" on page 20. The user's guide is also available on the Dell Support website at support.dell.com and on the CD included with your Mobile Broadband card if you purchased the card separately from your computer.

Use the Dell Mobile Broadband Card Utility to establish and manage a Mobile Broadband network connection to the Internet:

- 1 Click the Dell Mobile Broadband Card Utility icon  on the Windows desktop, to run the utility.
- 2 Click **Connect**.

 **NOTE:** The **Connect** button changes to the **Disconnect** button.

- 3 Follow the instructions on the screen to manage the network connection with the utility.


Or

- 1 Click **Start**→**All Programs**→**Dell Wireless**.
- 2 Click **Dell Wireless Broadband** and follow the instructions on the screen.

Microsoft® Windows® Firewall

Windows Firewall provides basic protection from unauthorized access to your computer while it is connected to the Internet. Windows Firewall is automatically enabled when you run the Network Setup Wizard.

When Windows Firewall is enabled for a network connection, the firewall icon appears with a red background in the **Network Connections** section of the Control Panel.

 **NOTE:** Enabling Windows Firewall does not reduce the need for virus-checking software.

For more information, click **Start**→**Control Panel**→**Security**→**Windows Firewall**, or see "Windows Help and Support Center" on page 20.

Using Cards

ExpressCards

ExpressCards provide additional memory, wired and wireless communications, multimedia and security features. ExpressCards support two form factors:

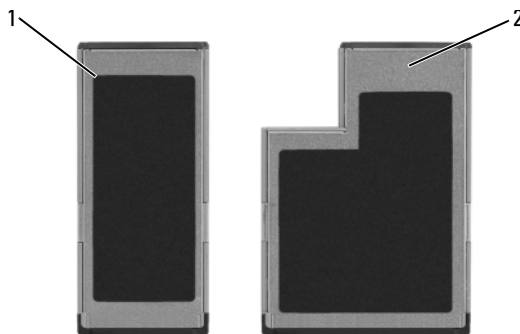
- ExpressCard/34 (34 mm wide)
- ExpressCard/54 (54 mm wide in an L-shape with a 34 mm connector)

The 34 mm card fits into both the 34 mm and 54 mm card slots. The 54 mm card only fits into a 54 mm card slot.

See "Specifications" on page 241 for information on supported ExpressCards.



NOTE: An ExpressCard is not a bootable device.



1 Express Card/34

2 ExpressCard/54

ExpressCard Blanks


Your computer shipped with a plastic blank installed in the ExpressCard slot. Blanks protect unused slots from dust and other particles. Save the blank for use when no ExpressCard is installed in the slot; blanks from other computers may not fit your computer.

Remove the blank before installing an ExpressCard. To remove the blank, see "Removing an ExpressCard or Blank" on page 101.

Installing an ExpressCard

You can install an ExpressCard while the computer is running. The computer automatically detects the card.

ExpressCards are generally marked with a symbol (such as a triangle or an arrow) or a label to indicate which end to insert into the slot. The cards are keyed to prevent incorrect insertion. If card orientation is not clear, see the documentation that came with the card.

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

To install an ExpressCard:

- 1 Hold the card with the top side of the card facing up.
- 2 Slide the card into the slot until the card is completely seated in its connector.

If you encounter too much resistance, do not force the card. Check the card orientation and try again.



1 release button

2 ExpressCard

The computer recognizes the ExpressCard and automatically loads the appropriate device driver. If the configuration program tells you to load the manufacturer's drivers, use the floppy disk or CD that came with the ExpressCard.

Removing an ExpressCard or Blank

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

Press the latch and remove the card or blank. For some latches, you must press the latch twice: once to pop the latch out, and then a second time to pop the card out.

Save a blank to use when no ExpressCard is installed in a slot. Blanks protect unused slots from dust and other particles.



1 release button

2 ExpressCard

Smart Cards

About Smart Cards

Smart cards are portable credit-card shaped devices with internal integrated circuits. The top surface of the smart card usually contains an embedded processor under the gold contact pad. The combination of the small size and integrated circuits make smart cards valuable tools for security, data storage, and special programs. Using smart cards can improve system security by combining something a user has (the smart card) with something only the user should know (a PIN) to provide more secure user-authentication than passwords alone.

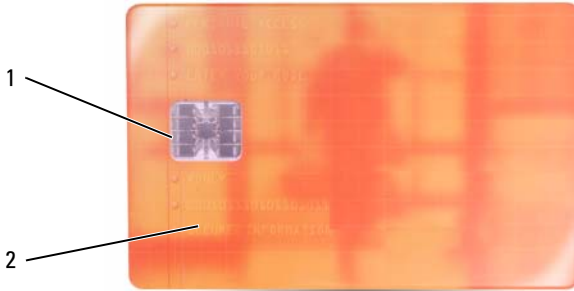
For more information about how to secure your computer, see "Securing Your Computer" on page 105.

Installing a Smart Card

You can install a smart card in the computer while the computer is running. The computer automatically detects the card.

To install a smart card:

- 1 Hold the card so that the gold contact pad is facing upward and pointing toward the smart card slot.



1 gold contact pad

2 smart card (top)

- 2 Slide the smart card into the smart card slot until the card is completely seated in its connector. The smart card will protrude approximately 1/2 inch from the slot.

If you encounter too much resistance, do not force the card. Check the card orientation and try again.




- 1 smart card slot
- 3 ExpressCard slot


- 2 smart card

Securing Your Computer


Security Cable Lock


 **NOTE:** Your computer does not ship with a security cable lock.

A security cable lock is a commercially available antitheft device. To use the lock, attach it to the security cable slot on your Dell™ computer. For more information, see the instructions included with the device.

 **NOTICE:** Before you buy an antitheft device, ensure that it will work with the security cable slot on your computer.

Smart Cards and Fingerprint Readers

 **NOTE:** For information on how to secure your computer while traveling, see "Traveling With Your Computer" on page 229.


 **NOTE:** The smart card feature may not be available on your computer.

Smart cards are portable credit-card shaped devices with internal integrated circuits. Using smart cards can improve system security by combining something a user has (the smart card) with something only the user should know (a PIN) to provide more secure user-authentication than passwords alone. See "Using Cards" on page 99 for more information.

A fingerprint reader is a strip sensor located on a peripheral device for your computer. When you slide your finger over the reader, it uses your unique fingerprint to authenticate your user identity and help keep your Dell™ computer secure.


Passwords


About Passwords

 **NOTE:** Passwords are disabled when you receive your computer.

A primary password, an administrator password, and a hard drive password all prevent unauthorized access to your computer in different ways. The following table identifies types and features of passwords available on your computer.

Type of Password	Features
Primary (or System)	<ul style="list-style-type: none">• Protects the computer from unauthorized access
Administrator	<ul style="list-style-type: none">• Gives system administrators or service technicians access to computers for repair or reconfiguration• Allows you to restrict access to system setup in the same way a primary password restricts access to the computer• Can be used instead of the primary password
Hard drive	<ul style="list-style-type: none">• Helps protect the data on your hard drive or external hard drive (if one is being used) from unauthorized access

 **NOTE:** Some hard drives do not support hard drive passwords.

 **NOTICE:** Passwords provide a high level of security for data in your computer or hard drive. However, they are not foolproof. If you require more security, obtain and use additional forms of protection, such as smart cards, data encryption programs, or PC Cards with encryption features.

When using passwords, observe the following guidelines:

- Choose passwords that you can remember, but not ones that are easy to guess. For example, do not use the names of family members or pets for passwords.
- It is recommended that you do not write down passwords. If you do write it down, however, ensure that the password is stored in a secure place.
- Do not share passwords with other people.
- Ensure that people are not watching you when you type your password(s).


If you forget any of your passwords, contact Dell (see "Contacting Dell" on page 239). For your protection, Dell technical support staff will ask you for proof of your identity to ensure that only an authorized person can use the computer.

Using a Primary Password

The primary password allows you to protect the computer from unauthorized access.

When you first start your computer, you must assign a primary password at the prompt.

If you do not enter a password within 2 minutes, the computer returns to its previous operating state.

 **NOTICE:** If you disable the administrator password, the primary password is also disabled.

To add or change passwords, access **User Accounts** from the **Control Panel**.

If you have assigned an administrator password, you can use it instead of the primary password. The computer does not specifically prompt you for the administrator password.


Using an Administrator Password

The administrator password is designed to give system administrators or service technicians access to computers for repair or reconfiguration. The administrators or technicians can assign identical administrator passwords to groups of computers, allowing you to assign a unique primary password.

To set or change administrator passwords, access **User Accounts** from the **Control Panel**.

When you set an administrator password, the **Configure Setup** option becomes available in system setup. The **Configure Setup** option allows you to restrict access to system setup in the same way that a primary password restricts access to the computer.

The administrator password can be used instead of the primary password. Whenever you are prompted to enter the primary password, you can enter the administrator password.

 **NOTICE:** If you disable the administrator password, the primary password is also disabled.



NOTE: The administrator password provides access to the computer, but it does not provide access to the hard drive when a hard drive password is assigned.

If you forget the primary password and do not have an administrator password assigned, or if you have both a primary and an administrator password assigned but forget them both, contact your system administrator or contact Dell. See "Contacting Dell" on page 239.

Using a Hard Drive Password

The hard drive password helps protect the data on your hard drive from unauthorized access. You can also assign a password for an external hard drive (if one is being used) that can be the same as or different from the password for the primary hard drive.

To assign or change a hard drive password, enter system setup. See "System Setup Program" on page 137.

After assigning a hard drive password, you must enter it each time you turn on the computer and each time you restore the computer to normal operation from standby mode.

If the hard drive password is enabled, you must enter it each time you turn on the computer: A message appears asking for the hard drive password.


To continue, enter your password (with no more than eight characters) and press <Enter>.

If you do not enter a password within 2 minutes, the computer returns to its previous operating state.

If you enter the wrong password, a message tells you that the password is invalid. Press <Enter> to try again.


If you do not enter the correct password in three attempts, the computer tries to start from another bootable device if the **Boot First Device** option in system setup is set to allow start-up from another device. If the **Boot First Device** option is not set to allow the computer to start from another device, the computer returns to the operating state it was in when you turned it on.

If the hard drive password, the external hard-drive password, and the primary password are the same, the computer prompts you only for the primary password. If the hard drive password is different from the primary password, the computer prompts you for both. Two different passwords provide greater security.


 **NOTE:** The administrator password provides access to the computer, but it does not provide access to the hard drive when a hard drive password is assigned.

Trusted Platform Module (TPM)

 **NOTE:** Computers shipping into China are not equipped with the TPM feature.


 **NOTE:** The TPM feature supports encryption only if the operating system supports TPM. For more information, see the TPM software documentation and the help files that came with the software.

TPM is a hardware-based security feature that can be used to create and manage computer-generated encryption keys. When combined with security software, the TPM enhances existing network and computer security by enabling features such as file protection capabilities and protected e-mail. The TPM feature is enabled through a system setup option.

 **NOTICE:** To secure your TPM data and encryption keys, follow the backup procedures documented in the *Broadcom Secure Foundation Getting Started Guide*. In the event of these backups being incomplete, lost, or damaged, Dell will be unable to assist in the recovery of encrypted data.

Enabling the TPM Feature

- 1 Enable the TPM software:
 - a Restart the computer and press <F2> during the Power On Self Test to enter the system setup program.
 - b Select **Security**→**TPM Security** and press <Enter>.
 - c Under **TPM Security**, select **On**.
 - d Press <Esc> to exit the setup program.
 - e If prompted, click **Save/Exit**.
- 2 Activate the TPM setup program:
 - a Restart the computer and press <F2> during the Power On Self Test to enter the system setup program.
 - b Select **Security**→**TPM Activation** and press <Enter>.
 - c Under **TPM Activation**, select **Activate** and press <Enter>.

 **NOTE:** You only need to activate the program once.

- d Once the process is complete, the computer either restarts automatically or prompts you to restart your computer.

Security Management Software

The security management software is designed to utilize four different features to help you secure your computer:

- Log-in management
- Pre-boot authentication (using a fingerprint reader, smart card, or password)
- Encryption
- Private information management

Activating the Security Management Software



NOTE: You must first enable the TPM in order for the security management software to have full functionality.

- 1 Enable the TPM feature (see "Enabling the TPM Feature" on page 109).
- 2 Load the security management software:
 - a Turn on (or restart) your computer.
 - b When the DELL™ logo appears, press <F2> immediately. If you wait too long and the Windows logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again.
 - c In the drop-down menu, select **Wave EMBASSY Trust Suite** and press <Enter> to create the icons for the software components on the computer desktop.
 - d Press <Esc> to exit the setup program.
 - e If prompted, click **Save/Exit**.

Using the Security Management Software

For information about how to use the software and the different security features, see the *Getting Started Guide* for the software:

Click **Start**→**All Programs**→**Wave EMBASSY Trust Suite**→**Getting Started Guide**.

Computer Tracking Software

Computer tracking software may enable you to locate your computer if it is lost or stolen. The software is optional and may be purchased when you order your Dell™ computer, or you can contact your Dell sales representative for information about this security feature.



NOTE: Computer tracking software may not be available in certain countries.



NOTE: If you have computer tracking software and your computer is lost or stolen, you must contact the company that provides the tracking service to report the missing computer.

If Your Computer Is Lost or Stolen

- Call a law enforcement agency to report the lost or stolen computer. Include the Service Tag in your description of the computer. Ask that a case number be assigned and write down the number, along with the name, address, and phone number of the law enforcement agency. If possible, obtain the name of the investigating officer.



NOTE: If you know where the computer was lost or stolen, call a law enforcement agency in that area. If you do not know, call a law enforcement agency where you live.

- If the computer belongs to a company, notify the security office of the company.
- Contact Dell customer service to report the missing computer. Provide the computer Service Tag, the case number, and the name, address, and phone number of the law enforcement agency to which you reported the missing computer. If possible, give the name of the investigating officer.

The Dell customer service representative will log your report under the computer Service Tag and record the computer as missing or stolen. If someone calls Dell for technical assistance and gives your Service Tag, the computer is identified automatically as missing or stolen. The representative will attempt to get the phone number and address of the caller. Dell will then contact the law enforcement agency to which you reported the missing computer.

Alert Standard Format (ASF)

Alert Standard Format (ASF) is a Distributed Management Task Force (DMTF) management standard that specifies "pre-operating system" or "operating system absent" alerting techniques. The standard is designed to generate an alert on potential security and fault conditions when the operating system is in a sleep state or the system is turned off. ASF is designed to supersede previous operating system-absent alerting technologies.

Your computer supports the following ASF alerts and remote capabilities:


Alert	Description
Chassis Intrusion - Physical Security Violation/Chassis Intrusion - Physical Security Violation Event Cleared	The docking device has been opened and the PCI slot has been compromised.
Failure to Boot to BIOS	The BIOS did not complete loading upon initiation.
System Password Violation	The system password is invalid (alert occurs after three failed attempts).
Entity Presence	Periodic heartbeats have been transmitted to verify system presence.

For more information about Dell's ASF implementation, see *ASF for Dell Portable Computers* and the *ASF Administrator's Guide for Dell Portable Computers*, which are available on the Dell Support website at support.dell.com.

Cleaning Your Computer

 **CAUTION:** Before you begin any of the procedures in this section, follow the safety instructions 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 can of compressed air to remove dust from between the keys on the keyboard and to remove any dirt or lint from the display.

Touch Pad


- 1 Shut down and turn off your computer.
- 2 Disconnect any attached devices from the computer and from their electrical outlets.
- 3 Remove any installed batteries.
- 4 Moisten a soft, lint-free cloth with water, and wipe it gently across the surface of the touch pad. Do not allow water from the cloth to seep between the touch pad and the surrounding palm rest.

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 product. 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 avoid 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 also safe to use on DVDs.

Troubleshooting

Dell Diagnostics


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

When to Use the Dell Diagnostics

If you experience a problem with your computer, perform the checks in Lockups and Software Problems (see "Lockups and Software Problems" on page 125) and run the Dell Diagnostics before you contact Dell for technical assistance.

It is recommended that you print these procedures before you begin.


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


 **NOTE:** The *Drivers and Utilities* media is optional and may not ship with your computer.

Start the Dell Diagnostics from your hard drive or from the *Drivers and Utilities* media.

Starting the Dell Diagnostics From Your Hard Drive

The Dell Diagnostics is located on a hidden diagnostic utility partition on your hard drive.

 **NOTE:** If your computer does not display a screen image, see "Contacting Dell" on page 239 .


 **NOTE:** If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.

- 1 Ensure that the computer is connected to an electrical outlet that is known to be working properly.


- 2 Turn on (or restart) your computer.
- 3 Start the Dell Diagnostics in one of the following two ways:

 **NOTE:** 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 and try again.

- When the DELL™ logo appears, press <F12> immediately. Select **Diagnostics** from the boot menu and press <Enter>.

 **NOTE:** Before attempting the following option, the computer must be powered down completely.

- Press and hold the <Fn> key while powering the computer on.

 **NOTE:** If you see a message stating that no diagnostics utility partition has been found, run the Dell Diagnostics from the *Drivers and Utilities* media.

The computer runs the Pre-boot System Assessment (PSA), a series of initial tests of your system board, keyboard, display, memory, hard drive, etc.

- During the assessment, answer any questions that appear.
- If failures are detected during the Pre-boot System Assessment, write down the error code(s) and see "Contacting Dell" on page 239.


If the Pre-boot System Assessment completes successfully, the following message appears: "Booting Dell Diagnostic Utility Partition. Press any key to continue."


- 4 Press any key to start the Dell Diagnostics from the diagnostics utility partition on your hard drive.

Starting the Dell Diagnostics From the Drivers and Utilities Media

- 1 Insert the *Drivers and Utilities* media.
- 2 Shut down and restart the computer.

When the DELL logo appears, press <F12> immediately.


 **NOTE:** 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 and try again.

 **NOTE:** The next steps change the boot sequence for one time only. On the next start-up, the computer boots according to the devices specified in the system setup program.

- 3 When the boot device list appears, highlight **CD/DVD/CD-RW** and press <Enter>.
- 4 Select the **Boot from CD-ROM** option from the menu that appears and press <Enter>.
- 5 Type 1 to start the *Resource CD* menu and press <Enter> to proceed.
- 6 Select **Run the 32 Bit Dell Diagnostics** from the numbered list. If multiple versions are listed, select the version appropriate for your computer.
- 7 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.

 **NOTE:** It is recommended that you select **Test System** to run a complete test on your computer.

Option	Function
Test Memory	Run the stand-alone memory test
Test System	Run System Diagnostics
Exit	Exit the Diagnostics

- 2 After you have selected the **Test System** option from the main menu, the following menu appears:

 **NOTE:** It is recommended that you select **Extended Test** from the menu below to run a more thorough check of devices in the computer.

Option	Function
Express Test	Performs a quick test of devices in the system. This typically can take 10 to 20 minutes.

Option	Function <i>(continued)</i>
Extended Test	Performs a thorough check of devices in the system. This typically can take an hour or more.
Custom Test	Use to test a specific device or customize the tests to be run.
Symptom Tree	This option allows you to select tests based on a symptom of the problem you are having. This option lists the most common symptoms.

- 3 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 see "Contacting Dell" on page 239.



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.

- 4 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.

Tab	Function <i>(continued)</i>
Configuration	<p>Displays your hardware configuration for the selected device.</p> <p>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.</p>
Parameters	Allows you to customize the test by changing the test settings.

- 5 When the tests are complete, 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.
- 6 Remove the *Drivers and Utilities* media.

Solving Problems


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/uninstalled.
- 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 support personnel diagnose and fix the problem(s).
- If an error message occurs in a program, see the program's documentation.



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.

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 COIN-CELL 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 coin-cell battery (see "Replacing the Coin-Cell Battery" on page 191). If the battery still does not work properly, contact Dell (see "Contacting Dell" on page 239).

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

Windows XP:

- Click **Start** and click **My Computer**.

Windows Vista®:

- Click the Windows Vista Start button  and click **Computer**.

If the 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 disc to eliminate the possibility that the original drive is defective.
- Insert a bootable floppy disk and restart the computer.

CLEAN THE DRIVE OR DISK — See "Cleaning Your Computer" on page 113.

CHECK THE CABLE CONNECTIONS

RUN THE HARDWARE TROUBLESHOOTER — See "Troubleshooting Software and Hardware Problems" on page 145.

RUN THE DELL DIAGNOSTICS — See "Dell Diagnostics" on page 115.

Optical drive problems



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



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 — See "Sound and Speaker Problems" on page 130.

Problems writing to an optical drive



CLOSE OTHER PROGRAMS — The optical drive must receive a steady stream of data during the writing process. If the stream is interrupted, an error occurs. Try closing all programs before you write to the optical.

TURN OFF STANDBY MODE IN WINDOWS BEFORE WRITING TO A DISC

Windows XP

If are using Windows XP, see "Configuring Power Management Settings" on page 48 or search for the keyword *standby* in Windows Help and Support for information on power management modes.

Windows Vista

If you are using Windows Vista, click the **Power**  icon in the notification area to display the **Power** icon flyout window and under **Select a Power Plan**, click **High Performance Plan**. The system will not go to sleep while it is plugged in, so you can finish burning your disc. After you have finished burning your disc, click the **Power**  icon and select your preferred power plan again.

Hard drive problems

RUN CHECK DISK

Windows XP:

- 1 Click **Start** and click **My Computer**.
- 2 Right-click **Local Disk C:**.
- 3 Click **Properties**→**Tools**→**Check Now**.
- 4 Click **Scan for and attempt recovery of bad sectors** and click **Start**.

Windows Vista:

- 1 Click **Start**  and click **Computer**.
- 2 Right-click **Local Disk C:**.
- 3 Click **Properties**→**Tools**→**Check Now**.

The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to continue the desired action.

- 4 Follow the instructions on the screen.

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.



NOTE: Do not plug a telephone cable into the network adapter connector (see "Pin Assignments for I/O Connectors" on page 223).

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

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

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 hear 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, then 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, 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 meters (10 feet) or more in length, try a shorter one.


RUN THE MODEM DIAGNOSTIC TOOL

Windows XP:

- 1 Click **Start**→**All Programs**→**Modem Helper**.

- 2 Follow the instructions on the screen to identify and resolve modem problems. Modem Helper is not available on certain computers.

Windows Vista:


- 1 Click **Start**  → **All Programs** → **Modem Diagnostic Tool**.
- 2 Follow the instructions on the screen to identify and resolve modem problems. Modem diagnostics are not available on all computers.

VERIFY THAT THE MODEM IS COMMUNICATING WITH WINDOWS

Windows XP:

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

Windows Vista:

- 1 Click **Start**  → **Control Panel** → **Hardware and Sound** → **Phone and Modem Options** → **Modems**.
- 2 Click the COM port for your modem → **Properties** → **Diagnostics** → **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



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

If the error 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:


Windows XP:

- 1 Click **Start** → **Control Panel** → **Add or Remove Programs** → **Programs and Features**.
- 2 Select the program you want to remove.

3 Click **Uninstall**.

4 See the program documentation for installation instructions.

Windows Vista:

1 Click **Start**  → **Control Panel** → **Programs** → **Programs and Features**.

2 Select the program you want to remove.

3 Click **Uninstall**.

4 See the program documentation for installation instructions.

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, CD, or DVD.

NON-SYSTEM DISK ERROR — Remove the floppy disk from the floppy 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 may 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 239).

IEEE 1394 Device Problems

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

 **NOTE:** Your computer supports only IEEE 1394a standard.

ENSURE THAT THE CABLE FOR THE IEEE 1394 DEVICE IS PROPERLY INSERTED INTO THE DEVICE AND INTO THE CONNECTOR ON THE COMPUTER

ENSURE THAT THE IEEE 1394 DEVICE IS ENABLED IN SYSTEM SETUP — See "Commonly Used Options" on page 138.

ENSURE THAT THE IEEE 1394 DEVICE IS RECOGNIZED BY WINDOWS —

Windows XP:

1 Click **Start** and click **Control Panel**.

2 Under **Pick a Category**, click **Performance and Maintenance** → **System** → **System Properties** → **Hardware** → **Device Manager**.

Windows Vista:

1 Click **Start**  → **Control Panel** → **Hardware and Sound**.

2 Click **Device Manager**.

If your IEEE 1394 device is listed, Windows recognizes the device.

IF YOU HAVE PROBLEMS WITH A DELL IEEE 1394 DEVICE — Contact Dell (see "Contacting Dell" on page 239).

IF YOU HAVE PROBLEMS WITH AN IEEE 1394 DEVICE NOT PROVIDED BY DELL — Contact the IEEE 1394 device manufacturer.

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

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

The computer stops responding



NOTICE: You may 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), and then restart your computer.

A program stops responding

END THE PROGRAM

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

A program crashes repeatedly



NOTE: Most software includes installation instructions in its documentation or on a floppy disk, CD, or DVD.

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

A program is designed for an earlier Windows operating system

RUN THE PROGRAM COMPATIBILITY WIZARD


Windows XP:

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

- 1 Click **Start** → **All Programs** → **Accessories** → **Program Compatibility Wizard** → **Next**.
- 2 Follow the instructions on the screen.

Windows Vista:

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

- 1 Click **Start**  → **Control Panel** → **Programs** → **Use an older program with this version of Windows**.
- 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), and 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, CDs, OR DVDs

SAVE AND CLOSE ANY OPEN FILES OR PROGRAMS AND SHUT DOWN YOUR

COMPUTER THROUGH THE START MENU

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 "Replacing the Memory Module(s)" on page 163).
- Reseat the memory modules (see "Memory" on page 161) to ensure that your computer is successfully communicating with the memory.
- Run the Dell Diagnostics (see "Dell Diagnostics" on page 115).

IF YOU EXPERIENCE OTHER MEMORY PROBLEMS —

- Reseat the memory modules (see "Memory" on page 161) to ensure that your computer is successfully communicating with the memory.
- Ensure that you are following the memory installation guidelines (see "Replacing the Memory Module(s)" on page 163).
- Ensure that the memory you are using is supported by your computer. For more information about the type of memory supported by your computer, see "Memory" on page 161.
- Run the Dell Diagnostics (see "Dell Diagnostics" on page 115).

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 the network connector on the back of the computer and the network jack.


CHECK THE NETWORK LIGHTS ON THE BACK OF THE COMPUTER — If the link integrity light is off (see "Power Lights" on page 134), no network communication is occurring. Replace the network cable.

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 "Troubleshooting Software and Hardware Problems" on page 145.

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 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 in the power connector on the back of the computer and the electrical outlet.
- Bypass power strips, power extension cables, and other power protection devices to verify that the computer turns on properly.
- Ensure that any power strips being used are plugged into an electrical outlet and are turned on.
- Ensure that the electrical outlet is working by testing it with another device, such as a lamp.).

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

- Ensure that the voltage selection switch is set to match the AC power at your location (if applicable).

Ensure that all components and cables are properly installed and securely connected to the system board (see "System Board" on page 212).

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

- Ensure that the processor power cable is securely connected to the system board power connector (POWER2) (see "System Board" on page 212).
- Remove and then reinstall all memory modules (see "Memory" on page 161).
- Remove and then reinstall any expansion cards, including graphics cards (see "Removing an ExpressCard or Blank" on page 101).

ELIMINATE INTERFERENCE — Some possible causes of interference are:

- Power, keyboard, and mouse extension cables
- Too many devices connected to the same 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.


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

Windows XP:

- 1 Click Start→Control Panel→Printers and Other Hardware→View installed printers or fax printers.
- 2 If the printer is listed, right-click the printer icon.
- 3 Click Properties→Ports. For a parallel printer, ensure that the **Print to the following port(s)**: setting is **LPT1 (Printer Port)**. For a USB printer, ensure that the **Print to the following port(s)**: setting is **USB**.

Windows Vista:

- 1 Click Start  →Control Panel→Hardware and Sound→Printer.
- 2 If the printer is listed, right-click the printer icon.
- 3 Click Properties and click Ports.
- 4 Adjust the settings, as needed.

REINSTALL THE PRINTER DRIVER — See the printer documentation for information on reinstalling the printer driver.

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 the scanner has a locking tab or button).

RESTART THE COMPUTER AND TRY THE SCANNER AGAIN

CHECK THE CABLE CONNECTIONS


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

VERIFY THAT THE SCANNER IS RECOGNIZED BY MICROSOFT WINDOWS

Windows XP:

- 1 Click **Start** → **Control Panel** → **Printers and Other Hardware** → **Scanners and Cameras**.
- 2 If your scanner is listed, Windows recognizes the scanner.

Windows Vista:


- 1 Click **Start**  → **Control Panel** → **Hardware and Sound** → **Scanners and Cameras**.
- 2 If the 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 MP3 and other media players may override the Windows volume setting. Always check to ensure that the volume on the media player(s) has not been turned 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 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.

RUN THE SPEAKER DIAGNOSTICS

REINSTALL THE SOUND DRIVER — See "Reinstalling Drivers and Utilities" on page 142.

RUN THE HARDWARE TROUBLESHOOTER — See "Troubleshooting Software and Hardware Problems" on page 145.

No sound from headphones

CHECK THE HEADPHONE CABLE CONNECTION — Ensure that the headphone cable is securely inserted into the headphone connector (see "Right Side View" on page 30).

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.

Touch Pad or Mouse Problems

CHECK THE TOUCH PAD SETTINGS —

- 1 Click Start→Control Panel→Printers and Other Hardware→Mouse.
- 2 Try adjusting the settings.

CHECK THE MOUSE CABLE — Shut down the computer. Disconnect the mouse cable, check it for damage, and firmly reconnect the cable.

If you are using a mouse extension cable, disconnect it and connect the mouse directly to the computer.

TO VERIFY THAT THE PROBLEM IS WITH THE MOUSE, CHECK THE TOUCH PAD —

- 1 Shut down the computer.
- 2 Disconnect the mouse.

- 3 Turn on the computer.
- 4 At the Windows desktop, use the touch pad to move the cursor around, select an icon, and open it.

If the touch pad operates correctly, the mouse may be defective.

CHECK THE SYSTEM SETUP PROGRAM SETTINGS — Verify that the system setup program lists the correct device for the pointing device option. (The computer automatically recognizes a USB mouse without making any setting adjustments.) For more information on using the system setup program, see "System Setup Program" on page 137.

TEST THE MOUSE CONTROLLER — To test the mouse controller (which affects pointer movement) and the operation of the touch pad or mouse buttons, run the Mouse test in the **Pointing Devices** test group in the Dell Diagnostics (see "Dell Diagnostics" on page 115).

REINSTALL THE TOUCH PAD DRIVER — See "Reinstalling Drivers and Utilities" on page 142.

Video and Monitor Problems



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



NOTICE: If your computer came with a PCI graphics card installed, removal of the card is not necessary when installing additional graphics cards; however, the card is required for troubleshooting purposes. If you remove the card, store it in a safe and secure location. For information about your graphics card, go to support.dell.com.

The screen is blank



NOTE: For troubleshooting procedures, see the monitor's documentation.

The screen is difficult to read

CHECK THE MONITOR CABLE CONNECTION

- Ensure that the monitor cable is connected as shown on the setup diagram for your computer.
- Remove any video extension cables and connect the monitor directly to the computer.
- Swap the computer and monitor power cables to determine if the monitor's power cable is defective.
- Check the connectors 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 lit or blinking, the monitor has power.
- If the power light is off, firmly press the button to ensure that the monitor is turned on.
- If the power light is blinking, press a key on the keyboard or move the mouse to resume normal operation.

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

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 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

Windows XP:

- 1 Click **Start**→**Control Panel**→**Appearance and Themes**.
- 2 Click the area you want to change or click the **Display** icon.
- 3 Try different settings for **Color quality** and **Screen resolution**.

Windows Vista:

- 1 Click **Start**  →**Control Panel**→**Hardware and Sound**→**Personalization**→**Display Settings**.
- 2 Adjust **Resolution** and **Colors** settings, as needed.

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.

If only part of the display is readable

CONNECT AN EXTERNAL MONITOR

- 1 Shut down your computer and connect an external monitor to the computer.
- 2 Turn on the computer and the monitor and adjust the monitor brightness and contrast controls.

If the external monitor works, the computer display or video controller may be defective. Contact Dell (see "Contacting Dell" on page 239).

Power Lights

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

The power button light located on the front of the computer illuminates and blinks or remains solid to indicate different states:


- 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.
 - 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.
- 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.
 - Ensure that the processor power cable is securely connected to the system board (see "System Board" on page 212).
- If the power light is steady amber, a device may be malfunctioning or incorrectly installed.
 - Remove and then reinstall the memory modules (see "Memory" on page 161).
 - Remove and then reinstall any cards (see "Using Cards" on page 99).

- 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

System Setup Program

Overview



NOTE: Your operating system may automatically configure most of the options available in the system setup program, thus overriding options that you set through the system setup program. (An exception is the **External Hot Key** option, which you can disable or enable only through the system setup program.) For more information on configuring features for your operating system, access the Help and Support Center. To access the Help and Support Center in Microsoft® Windows® XP, click **Start→Help and Support**. In Windows Vista®, click the Windows Vista Start button  →**Help and Support**.


You can use the system setup program as follows:

- To set or change user-selectable features—for example, your computer password
- To verify information about the computer's current configuration, such as the amount of system memory

After you set up the computer, run the system setup program to familiarize yourself with your system configuration information and optional settings. You may want to write down the information for future reference.

The system setup screens display the current setup information and settings for your computer, such as:


- System configuration
- Boot order
- Boot (start-up) configuration and docking-device configuration settings
- Basic device-configuration settings
- System security and hard-drive password settings

-  **NOTE:** Unless you are an expert computer user or are directed to do so by Dell technical support, do not change the system setup settings. Certain changes might make your computer work incorrectly.

Viewing the System Setup Screens

- 1 Turn on (or restart) your computer.
- 2 When the DELL™ logo appears, press <F2> immediately. If you wait too long and the Microsoft® Windows® logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again.

System Setup Screens

-  **NOTE:** For information about a specific item on a system setup screen, highlight the item and see the **Help** area on the screen.

On each screen, the system setup options are listed at the left. To the right of each option is the setting or value for that option. You can change settings that appear as white type on the screen. Options or values that you cannot change (because they are determined by the computer) appear less bright.


The upper-right corner of the screen displays help information for the currently highlighted option; the lower-right corner displays information about the computer. System-setup key functions are listed across the bottom of the screen.

Commonly Used Options

Certain options require that you reboot the computer for new settings to take effect.

Changing the Boot Sequence

The *boot sequence*, or *boot order*, tells the computer where to look to find the software needed to start the operating system. You can control the boot sequence and enable/disable devices using the **Boot Order** page of the system setup program.

-  **NOTE:** To change the boot sequence on a one-time-only basis, see "Performing a One-Time Boot" on page 139.

The **Boot Order** page displays a general list of the bootable devices that may be installed in your computer, including but not limited to the following:

- **Diskette Drive**
- **Modular bay HDD**
- **Internal HDD**
- **Optical Drive**

During the boot routine, the computer starts at the top of the list and scans each enabled device for the operating system start-up files. When the computer finds the files, it stops searching and starts the operating system.

To control the boot devices, select (highlight) a device by pressing the down-arrow or up-arrow key, and then enable or disable the device or change its order in the list.

- To enable or disable a device, highlight the item and press the space bar. Enabled items appear as white and display a small triangle to the left; disabled items appear blue or dimmed without a triangle.
- To reorder a device in the list, highlight the device and then press <u> or <d> (not case-sensitive) to move the highlighted device up or down.

Boot sequence changes take effect as soon as you save the changes and exit the system setup program.

Performing a One-Time Boot

You can set a one-time-only boot sequence without entering the system setup program. (You can also use this procedure to boot the Dell Diagnostics on the diagnostics utility partition on your hard drive.)

- 1** Shut down the computer through the **Start** menu.
- 2** If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.
- 3** Connect the computer to an electrical outlet.
- 4** Turn on the computer. When the DELL logo appears, press <F12> immediately.

If you wait too long and the Windows logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again.

- 5 When the boot device list appears, highlight the device from which you want to boot and press <Enter>.

The computer boots to the selected device.

The next time you reboot the computer, the previous boot order is restored.

Reinstalling Software

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.



NOTICE: The *Drivers and Utilities* media may contain drivers for operating systems that are not on your computer. Ensure that you are installing software appropriate for your operating system.

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.

Microsoft® Windows® XP

- 1 Click Start→Control Panel.

- 2 Under **Pick a Category**, click **Performance and Maintenance**, and click **System**.
- 3 In the **System Properties** window, click the **Hardware** tab, and click **Device Manager**.

Microsoft Windows Vista®

- 1 Click the Windows Vista Start button, , and right-click **Computer**.
- 2 Click **Properties**→**Device Manager**.



NOTE: The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to continue.

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 (see "Reinstalling Drivers and Utilities" on page 142).

Reinstalling Drivers and Utilities



NOTICE: The Dell Support website at support.dell.com and your *Drivers and Utilities* media provide approved drivers for Dell™ computers. If you install drivers obtained from other sources, your computer might not work correctly.


Using Windows Device Driver Rollback

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

Windows XP:

- 1 Click **Start**→**My Computer**→**Properties**→**Hardware**→**Device Manager**.
- 2 Right-click the device for which the new driver was installed and click **Properties**.
- 3 Click the **Drivers** tab→**Roll Back Driver**.

Windows Vista:

- 1 Click the Windows Vista start button, , and right-click **Computer**.
- 2 Click **Properties**→**Device Manager**.



NOTE: The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to enter the **Device Manager**.

- 3 Right-click the device for which the new driver was installed and click **Properties**.
- 4 Click the **Drivers** tab→**Roll Back Driver**.

If Device Driver Rollback does not resolve the problem, then use System Restore (See "Enabling System Restore" on page 147) to return your computer to the operating state that existed before you installed the new driver.

Using the Drivers and Utilities Media

If using Device Driver Rollback or System Restore (See "Enabling System Restore" on page 147) does not resolve the problem, then reinstall the driver from the *Drivers and Utilities* media.

- 1 Save and close any open files, and exit any open programs.
- 2 Insert the *Drivers and Utilities* media.

In most cases, the CD starts running automatically. If it does not, start Windows Explorer, click your CD drive directory to display the CD contents, and then double-click the **autorcd.exe** file. The first time that you run the CD, it might prompt you to install setup files. Click **OK**, and follow the instructions on the screen to continue.

- 3 From the **Language** drop-down menu in the toolbar, select your preferred language for the driver or utility (if available).
- 4 At the welcome screen, click **Next** and wait for the CD to complete the hardware scan
- 5 To detect other drivers and utilities, under **Search Criteria**, select the appropriate categories from the **System Model**, **Operating System**, and **Topic** drop-down menus.

A link or links appear(s) for the specific drivers and utilities used by your computer.

- 6 Click the link of a specific driver or utility to display information about the driver or utility that you want to install.

- 7 Click the **Install** button (if present) to begin installing the driver or utility. At the welcome screen, follow the screen prompts to complete the installation.

If no **Install** button is present, automatic installation is not an option. For installation instructions, either see the appropriate instructions in the following subsections, or click **Extract**, follow the extracting instructions, and then read the readme file.

If instructed to navigate to the driver files, click the CD directory on the driver information window to display the files associated with that driver.

Manually Reinstalling Drivers




NOTE: If you are reinstalling an infrared sensor driver, you must first enable the infrared sensor in system setup (see "System Setup Program" on page 137) before continuing with the driver installation.

After extracting the driver files to your hard drive as described in the previous section:

Windows XP:

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

Windows Vista:

- 1 Click the Windows Vista Start button, , and right-click **Computer**.
- 2 Click **Properties**→**Device Manager**.



NOTE: The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to enter the Device Manager.

- 3 Double-click the type of device for which you are installing the driver (for example, **Audio** or **Video**).
- 4 Double-click the name of the device for which you are installing the driver.
- 5 Click the **Driver** tab→**Update Driver**→**Browse my computer for driver software**.
- 6 Click **Browse** and browse to the location to which you previously copied the driver files.
- 7 When the name of the appropriate driver appears, click the name of the driver→**OK**→**Next**.
- 8 Click **Finish** and restart your computer.

Troubleshooting Software and Hardware Problems


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 start the Hardware Troubleshooter:

Windows XP:

- 1 Click **Start**→**Help and Support**.
- 2 Type `hardware troubleshooter` in the search field and press <Enter> to start the search.
- 3 In the **Fix a Problem** section, click **Hardware Troubleshooter**.
- 4 In the **Hardware Troubleshooter** list, select the option that best describes the problem and click **Next** to follow the remaining troubleshooting steps.

Windows Vista:

- 1 Click the Windows Vista Start button, , and click **Help and Support**.
- 2 Type `hardware troubleshooter` in the search field and press <Enter> to start the search.
- 3 In the search results, select the option that best describes the problem and follow the remaining troubleshooting steps.

Restoring Your Operating System

You can restore your operating system in the following ways:

- 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 (available in Windows XP) and Dell Factory Image Restore (available in Windows Vista) returns your hard drive to the operating state it was in when you purchased the computer. Both permanently delete all data on the hard drive and remove any programs installed after you received the computer. Use Dell PC Restore or Dell Factory Image Restore only if System Restore did not resolve your operating system problem.
- If you received an *Operating System* disc with your computer, you can use it to restore your operating system. However, using the *Operating System* disc also deletes all data on the hard drive. Use the disc *only* if System Restore did not resolve your operating system problem.

Using Microsoft® Windows® System Restore

The Windows operating systems provide a System Restore option which allows 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. Any changes that System Restore makes to your computer are completely reversible.



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.

Starting System Restore


Windows XP:




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 **Start**→**All Programs**→**Accessories**→**System Tools**→**System Restore**.
- 2 Click either **Restore my computer to an earlier time** or **Create a restore point**.
- 3 Click **Next** and follow the remaining on-screen prompts.

Windows Vista:


- 1 Click the Windows Vista Start button, , and click **Help and Support**.
- 2 In the search box, type **System Restore** and press <Enter>.

 **NOTE:** The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to continue the desired action.

- 3 Click **Next** and follow the remaining prompts on the screen.

In the event that System Restore did not resolve the issue, you may undo the last system restore.


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.


Windows XP:

- 1 Click **Start**→**All Programs**→**Accessories**→**System Tools**→**System Restore**.
- 2 Click **Undo my last restoration** and click **Next**.

Windows Vista:

- 1 Click the Windows Vista Start button , and click **Help and Support**.
- 2 In the search box, type **System Restore** and press <Enter>.
- 3 Click **Undo my last restoration** and click **Next**.

Enabling System Restore

 **NOTE:** Windows Vista does not disable System Restore; regardless of low disk space. Therefore, the steps below apply only to Windows XP.

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 **Start**→**Control Panel**→**Performance and Maintenance**→**System**.
 - 2 Click the **System Restore** tab and ensure that **Turn off System Restore** is unchecked.
- Use the disc *only* if System Restore did not resolve your operating system problem.

Using Microsoft Windows System Restore

The Windows operating systems provide a System Restore option which allows 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. Any changes that System Restore makes to your computer are completely reversible.



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.

Starting System Restore


Windows XP:



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 **Start**→**All Programs**→**Accessories**→**System Tools**→**System Restore**.
- 2 Click either **Restore my computer to an earlier time** or **Create a restore point**.
- 3 Click **Next** and follow the remaining on-screen prompts.

Windows Vista:

- 1 Click **Start** .
- 2 In the Start Search box, type **System Restore** and press <Enter>.



NOTE: The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to continue the desired action.

- 3 Click **Next** and follow the remaining prompts on the screen.

In the event that System Restore did not resolve the issue, you may undo the last system restore.

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.

Windows XP:

- 1 Click **Start**→**All Programs**→**Accessories**→**System Tools**→**System Restore**.
- 2 Click **Undo my last restoration** and click **Next**.

Windows Vista:

- 1 Click **Start** .
- 2 In the Start Search box, type **System Restore** and press <Enter>.
- 3 Click **Undo my last restoration** and click **Next**.

Enabling System Restore




NOTE: Windows Vista does not disable System Restore; regardless of low disk space. Therefore, the steps below apply only to Windows XP.


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 **Start**→**Control Panel**→**Performance and Maintenance**→**System**.
- 2 Click the **System Restore** tab and ensure that **Turn off System Restore** is unchecked.

Using Dell™ PC Restore and Dell Factory Image Restore

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

 **NOTE:** Dell PC Restore by Symantec and Dell Factory Image Restore may not be available in certain countries or on certain computers.

Use Dell PC Restore (Windows XP) or Dell Factory Image Restore (Windows Vista) only as the last method to restore your operating system. These options restore 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 or Factory Image Restore.

Windows XP: Dell PC Restore


Using 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**.

- 3 Click **Restore** and click **Confirm**.

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

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

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

- 5 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.

6 Click **Next**.

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

7 After the computer restarts, click **OK**.

Removing 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 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 operating system to its original state.

1 Log on to the computer as a local administrator.

2 In Microsoft 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 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 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 and restart the computer.

Windows Vista: Dell Factory Image Restore

- 1 Turn on the computer. When the Dell logo appears, press <F8> several times to access the Vista Advanced Boot Options Window.
- 2 Select **Repair Your Computer**.
The System Recovery Options window appears.
- 3 Select a keyboard layout and click **Next**.
- 4 To access the recovery options, log on as a local user. To access the command prompt, type `administrator` in the User name field, then click **OK**.
- 5 Click **Dell Factory Image Restore**.



NOTE: Depending upon your configuration, you may need to select **Dell Factory Tools**, then **Dell Factory Image Restore**.

The Dell Factory Image Restore welcome screen appears.

- 6 Click **Next**.

The Confirm Data Deletion screen appears.



NOTICE: If you do not want to proceed with Factory Image Restore, click **Cancel**.

- 7 Click the checkbox to confirm that you want to continue reformatting the hard drive and restoring the system software to the factory condition, then click **Next**.

The restore process begins and may take five or more minutes to complete. A message appears when the operating system and factory-installed applications have been restored to factory condition.


- 8 Click **Finish** to reboot the system.

Using the Operating System Media

Before You Begin


If you are considering reinstalling the Windows operating system to correct a problem with a newly installed driver, first try using Windows Device Driver Rollback. See "Using Windows Device Driver Rollback" on page 142. 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 "Enabling System Restore" on page 147.

 **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 , you need the following items:

- Dell™ *Operating System* media
- Dell *Drivers and Utilities* media

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


Reinstalling Windows XP or Windows Vista


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* media provides options for reinstalling Windows XP. The options can overwrite files and possibly affect programs that are 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* media.
- 3 Click **Exit** if the **Install Windows** message appears.
- 4 Restart the computer.

When the DELL logo appears, press <F12> immediately.

 **NOTE:** 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 and try again.

 **NOTE:** The next steps change the boot sequence for one time only. On the next start-up, the computer boots according to the devices specified in the system setup program.

- 5 When the boot device list appears, highlight **CD/DVD/CD-RW Drive** and press <Enter>.
- 6 Press any key to **Boot from CD-ROM**.
- 7 Follow the instructions on the screen to complete the installation.

Adding and Replacing Parts

Before You Begin

This section 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 155 and "Before Working Inside Your Computer" on page 156.
- 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
- Small plastic scribe
- Flash BIOS update program (see the Dell Support website at support.dell.com)

Turning Off Your Computer



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

- 1 Shut down the operating system:
 - a Save and close all open files and exit all open programs.

In the Microsoft® Windows® XP operating system, click **Start→Shut Down→Shut down**.

In the Microsoft® Windows Vista® operating system, click the Windows Vista Start button , click the arrow in the lower-right corner of the Start menu as shown below, and then click **Shut Down**.





The computer turns off after the operating system shutdown process is complete.


- 2 Ensure that the computer and all 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 about 4 seconds to turn them off.


Before Working Inside Your Computer


Use the following safety guidelines to help protect your computer from potential damage and to help to 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*.

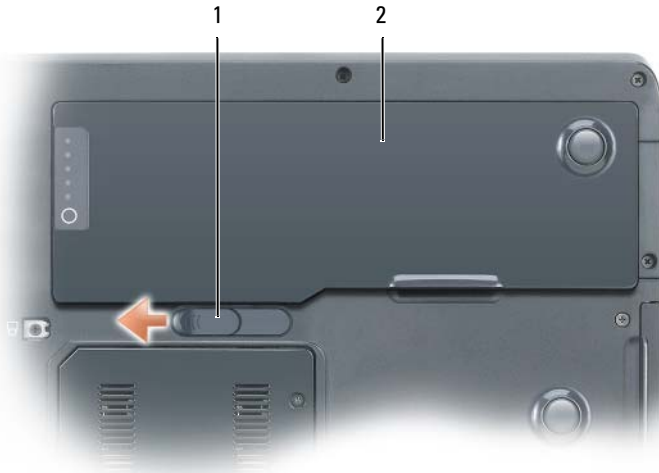
 **NOTICE:** Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.

 **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 pull-tab, not on the cable itself. Some cables have connectors 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 Ensure that the work surface is flat and clean to prevent the computer cover from being scratched.
- 2 Turn off your computer (see "Turning Off Your Computer" on page 155).
- 3 If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.
- ➡ **NOTICE:** To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.
- 4 Disconnect all telephone or network cables from the computer.
- ➡ **NOTICE:** To avoid damaging the system board, you must remove the main battery before you service the computer.
- 5 Disconnect your computer and all attached devices from their electrical outlets.
- 6 Close the display and turn the computer over on a flat work surface.



- 1 battery-bay latch release 2 main battery

- 7 Remove the main battery:
 - a Slide the battery-bay latch release on the bottom of the computer.

b Remove the battery from the battery bay.

8 Open the display.

9 Press the power button to ground the system board.



CAUTION: To guard against electrical shock, always unplug your computer from the electrical outlet before opening the display.



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 static electricity, which could harm internal components.

10 Remove any installed PC Cards from the PC Card slot.

11 Remove any installed modules, including a second battery, if installed.

12 Remove the hard drive (see "Removing the Hard Drive" on page 159).

Optical Drive

Your computer ships with a fixed optical drive installed.

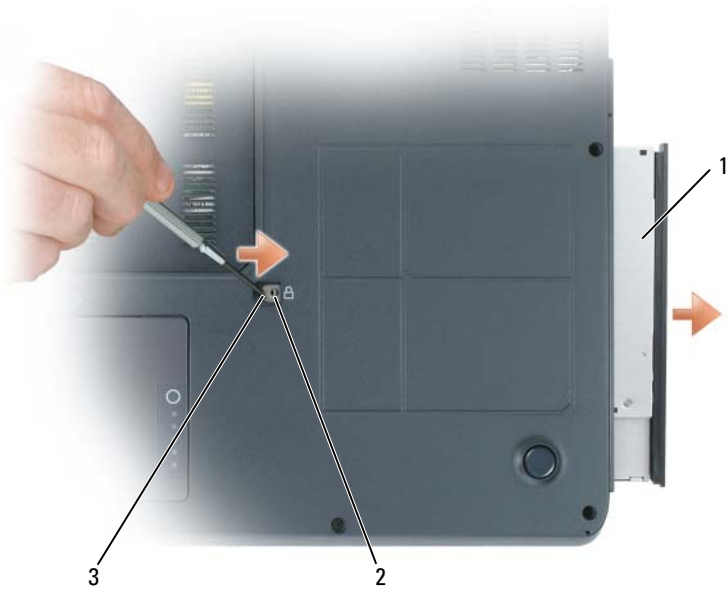


NOTICE: To help prevent damage to drives, store them in a safe, dry place when they are not installed in the computer. Avoid pressing down on them or placing heavy objects on top of them.

1 Follow the instructions in "Before Working Inside Your Computer" on page 156.

2 Turn the computer over and remove the M2.5 x 8-mm device security screw labeled with a lock icon ().




3 Insert a screwdriver into the indentation for the device security screw, push the notch on the metal tab and slide it towards the side of the computer to release the drive from the bay.



- 1 optical drive
- 2 indentation for M2.5 x 8-mm security screw
- 3 notch
- 4 Pull the drive out of the drive bay.

Hard Drive

Removing the Hard Drive

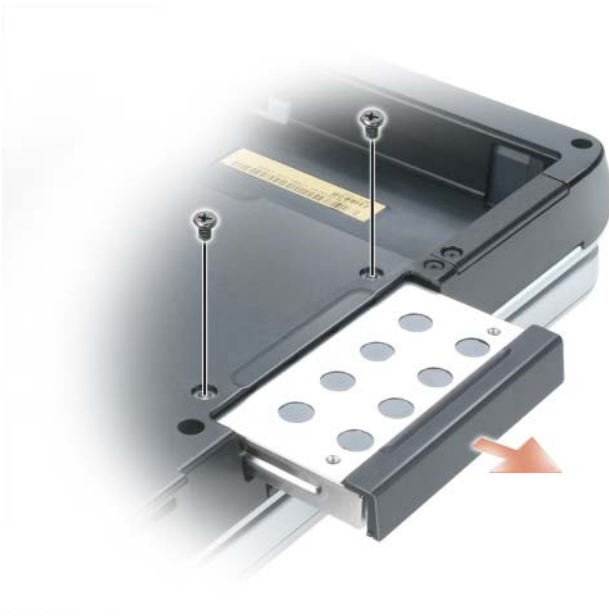
-  **CAUTION:** If you remove the hard drive from the computer when the drive is hot, *do not touch* the metal housing of the hard drive.
-  **CAUTION:** Before working inside your computer, follow the safety instructions located in the *Product Information Guide*.
-  **NOTICE:** To prevent data loss, turn off your computer before removing the hard drive. Do not remove the hard drive while the computer is on, in standby mode, or in hibernate mode.

➔ NOTICE: Hard drives are extremely fragile; even a slight bump can damage the drive.

📎 NOTE: Dell does not guarantee compatibility or provide support for hard drives from sources other than Dell.

To replace the hard drive in the hard drive bay:

- 1 Follow the procedures in "Before You Begin" on page 155.
- 2 Turn the computer over, and remove the two M3 x 3-mm hard drive screws.



➔ NOTICE: When the hard drive is not in the computer, store it in protective antistatic packaging. See "Protecting Against Electrostatic Discharge" in the *Product Information Guide*.

- 3 Slide the hard drive out of the computer.
- 4 Remove the new drive from its packaging. Save the original packaging for storing or shipping the hard drive.

Replacing the Hard Drive



NOTICE: Use firm and even pressure to slide the drive into place. If you use excessive force, you may damage the connector.

- 1 Slide the hard drive into the bay until it is fully seated.
- 2 Replace and tighten the screws.
- 3 Use the *Operating System* media to install the operating system for your computer.
- 4 Use the *Drivers and Utilities* media to install the drivers and utilities for your computer.

Memory

Removing the Memory Module(s)

You can increase your computer memory by installing memory modules on the system board. See "Specifications" on page 241 for information on the memory supported by your computer. Install only memory modules that are intended for your computer.

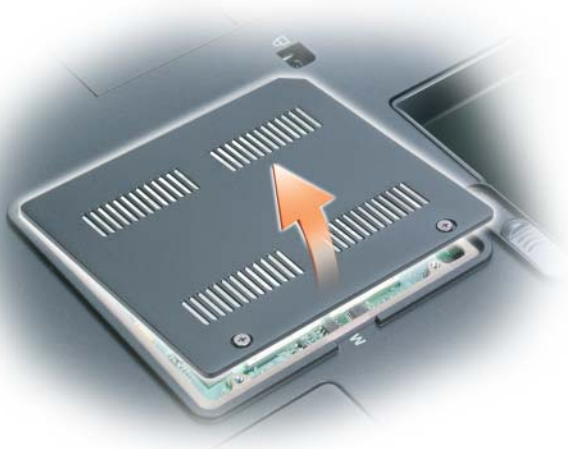


NOTE: Memory modules purchased from Dell are covered under your computer warranty.

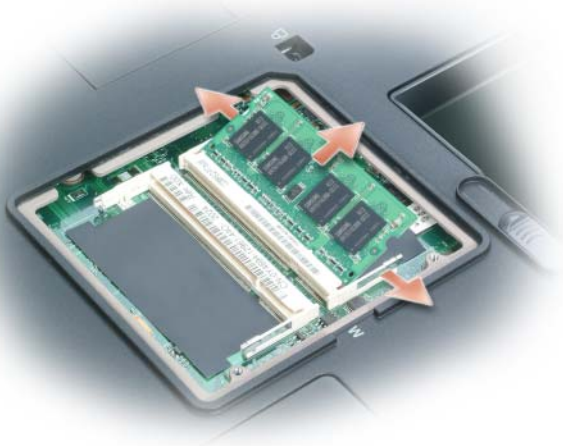


CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

- 1 Follow the procedures in "Before You Begin" on page 155.
- 2 Turn the computer over, loosen the two captive screws on the memory module cover, and remove the cover



- ➔ NOTICE:** To prevent damage to the memory module connector, do not use tools to spread the memory-module securing clips.
- 3** If you are replacing a memory module, remove the existing module:
- a** Use your fingertips to carefully spread apart the securing clips on each end of the memory module connector until the module pops up.
 - b** Remove the module from the connector at a 45-degree angle.



1 memory module

2 securing clips (2)

Replacing the Memory Module(s)



NOTE: For optimal performance, identical memory modules should be used in each connector.

1 Ground yourself and install the new memory module:



NOTE: If a memory module is not installed properly, the computer may not boot properly. No error message indicates this failure..

- a Align the notch in the module edge connector with the tab in the connector slot.
- b Slide the module firmly into the slot at a 45-degree angle, and rotate the module down until it clicks into place. If you do not feel the click, remove the module and reinstall it.



2 Replace the memory module cover and tighten the captive screws.


➔ **NOTICE:** If the memory module cover is difficult to close, remove the module and reinstall it. Forcing the cover to close may damage your computer.

3 Insert the battery into the battery bay, or connect the AC adapter to your computer and an electrical outlet.

4 Turn on the computer.

As the computer boots, it detects the additional memory and automatically updates the system configuration information.

To confirm the amount of memory installed in the computer:

- In the *Microsoft® Windows® XP* operating system, right-click the **My Computer** icon on your desktop. Click **Properties**→**General**.
- In the *Microsoft Windows Vista®* operating system, click the Windows Vista Start button, , and right-click **Computer**→**Properties**.

Modem

Removing the Modem

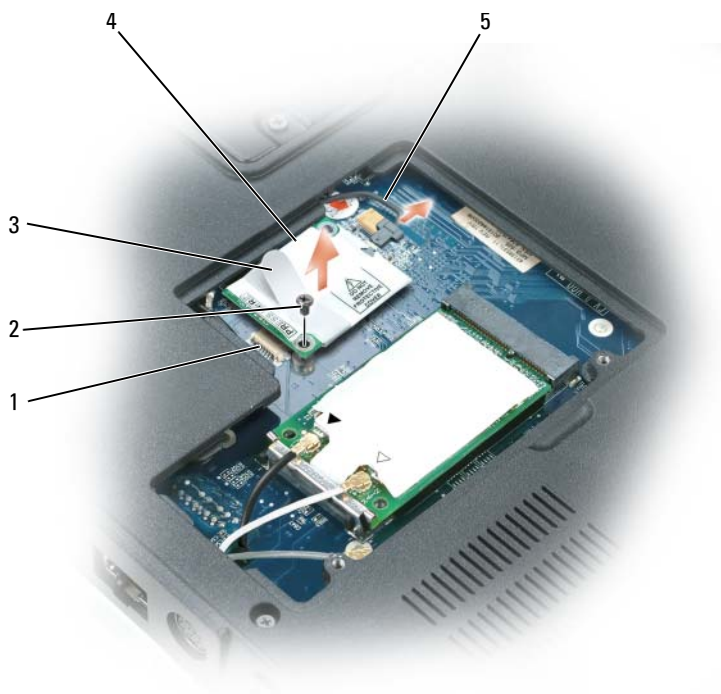
If you ordered the optional modem at the same time you ordered your computer, the modem is already installed.

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

- 1 Follow the procedures in "Before Working Inside Your Computer" on page 156.
- 2 Turn the computer over, and loosen the two captive screws on the modem cover.
- 3 Remove the cover from the computer.



- 4 If a modem is not already installed, go to step 5. If you are replacing a modem, remove the existing modem:
 - a Remove the screws securing the modem to the system board, and set them aside.
 - b Pull straight up on the attached pull-tab to lift the modem out of its connector on the system board, and disconnect the modem cable.



- | | | | |
|---|------------------------|---|-----------------|
| 1 | system board connector | 2 | M2 x 3-mm screw |
| 3 | pull-tab | 4 | modem |
| 5 | modem cable | | |

➔ NOTICE: Do not disconnect the modem cable from the system board.

Replacing the Modem

- 1 Connect the modem cable to the modem.

➔ NOTICE: The connectors are keyed to ensure correct insertion. If you feel resistance, check the connectors and realign the card.

- 2 Align the modem with the screw holes and press the modem into the connector on the system board.
- 3 Install the screws to secure the modem to the system board.

- 4 Replace the cover.

Mini Card



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



NOTICE: To prevent damage to the system board, remove the main battery before you service the computer.




NOTE: Depending on your system, the Mini Card may be located under the keyboard or under a cover on the bottom of your system.

- 1 Follow the procedures in "Before Working Inside Your Computer" on page 156.
- 2 Turn the computer over and loosen the captive screws from the mini-card/modem cover.
- 3 Place your finger under the cover at the indentation, and lift the cover to remove it.



4 Ground yourself by touching one of the metal connectors on the back of the computer.

 **NOTE:** If you leave the area, ground yourself again when you return to the computer.

5 If a mini-cmini-cardard is not already installed, go to step 6. If you are replacing a mini-card, remove the existing card:

a Disconnect the antenna cables from the mini-card.



1 antenna connectors (2)

2 mini-card

3 mini-card connector

 **NOTE:** Depending on the type of Mini Card you have, not all cables may be in use.

b Release the mini-card by pushing the metal securing clips toward the back of the computer until the card pops up slightly.

c Lift the mini-card out of its connector.



1 securing clips (2)

2 mini-card

➔ **NOTICE:** The connectors are keyed to ensure correct insertion. If you feel resistance, check the connectors and realign the card.

6 Install the replacement mini-card:

- a Align the mini-card with the connector at a 45-degree angle, and press the mini-card down into the securing clips until the card clicks into place.




- 1 securing clips (2)
- 3 mini-card connector

- 2 antenna connectors (2)

➔ **NOTICE:** To avoid damaging the mini-card, never place cables under the card.

- b Connect the antenna cables to the antenna connectors on the mini-card by matching the color of the cable to the color of the triangle above the connector. Connect the main antenna cable (white) to the antenna connector with the white triangle. Connect the auxiliary

antenna cable (black) to the antenna connector with the black triangle.


 **NOTE:** If your computer has a gray cable, connect it to the connector with the gray triangle, if one is available on your card.



7 Replace the mini-card/modem cover.

Internal Card With Bluetooth[®] Wireless Technology

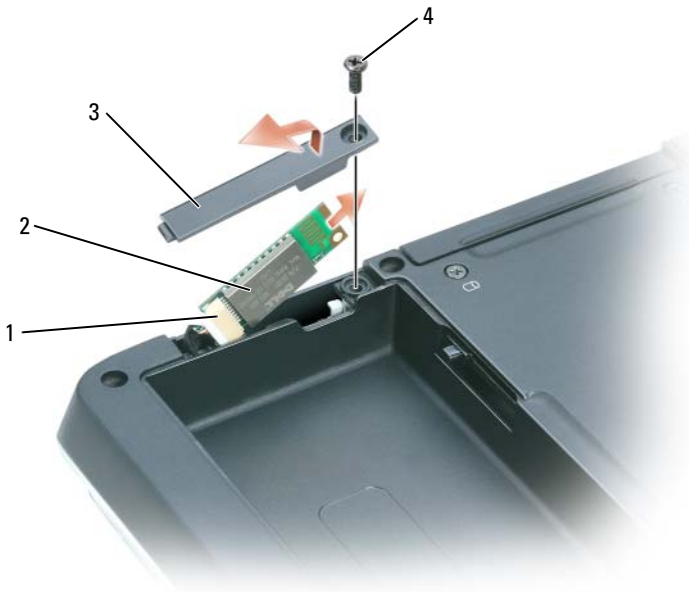
 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

➔ NOTICE: To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

📎 NOTE: If you ordered an internal card with Bluetooth wireless technology with your computer, the card is already installed.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the M2.5 x 8-mm screw and remove the card cover from the computer.
- 3 Pull the card out of the compartment so that you can disconnect the card from its cable and remove it from the computer.



1 card connector






2 internal card with Bluetooth wireless technology

3 card door

4 M2.5 x 8-mm screw

Hinge Cover

Removing the Hinge Cover

-  **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.
-  **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.
-  **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.
-  **NOTICE:** The hinge cover is fragile and can be damaged if extreme force is used. Be careful when removing the hinge cover.
 - 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
-  **NOTICE:** To help avoid damage to the hinge cover, ensure that it is snapped securely into place before you rotate the display open to 180 degrees.
 - 2 Open the display all the way (180 degrees) so that it lies flat against your work surface.
 - 3 Using a small plastic scribe, insert the scribe on the right side to gently pry the hinge cover loose.
 - 4 Pulling up from right to left, remove the hinge cover.



1 hinge cover

Replacing the Hinge Cover

With the display open all the way (180 degrees) so that it lies flat against the work surface, snap the cover back into place, starting from left to right.

Keyboard

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➡ NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

➡ NOTICE: To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the two M2.5 x 5-mm screws at the top of the keyboard.

➔ NOTICE: The key caps on the keyboard are fragile, easily dislodged, and time-consuming to replace. Be careful when removing and handling the keyboard.

- 4 Lift the keyboard and hold it up and slightly forward to provide access to the keyboard connector.
- 5 To disconnect the keyboard cable from the keyboard connector on the system board, rotate the keyboard connector latch toward the front of the computer.
- 6 Pull the keyboard cable to slide it out of the keyboard connector on the system board.
- 7 Remove the keyboard.



1 keyboard

3 keyboard cable

5 tabs

2 M2.5 x 5-mm screws (2)


4 keyboard connector latch

Display

 **CAUTION:** Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.


Removing the Display Assembly

 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Turn the computer over and loosen the two captive screws on the mini-card cover.

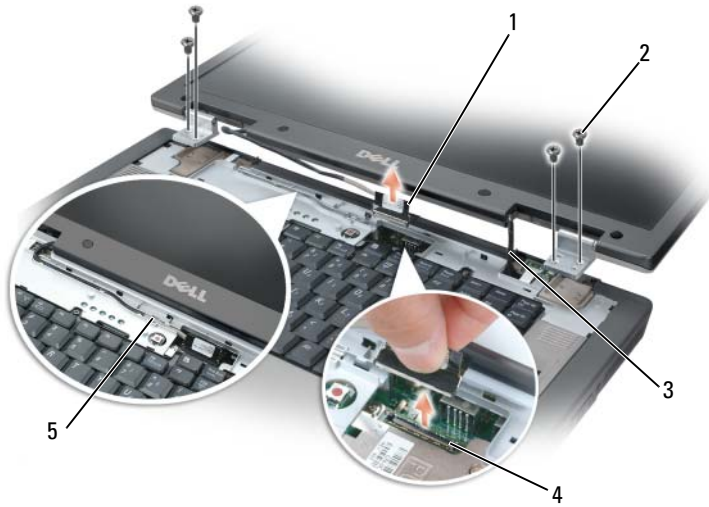


 **NOTE:** You must detach the mini-card antennas (see step 3) before you can remove the display assembly. If a mini-card is installed, disconnect the antenna cables from the card. If one is not installed, detach the antenna cables from their secured location.

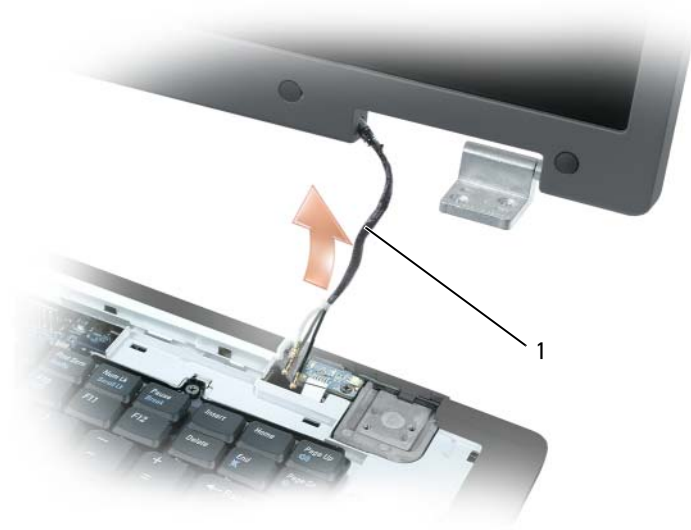
- 3 Disconnect the antenna cables from the mini-card, if applicable.




- 4 Turn the computer top-side up.
- 5 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 6 Use the pull-tab to disconnect the display cable from the system board, and then lift up and disengage the display cable from the cable channel.
- 7 Remove the four M2.5 x 5-mm screws (two on each side) that connect the display to the computer base.



- 1 keyboard
- 2 M2 x 5-mm screws (4)
- 3 mini-card antenna cables (2)
- 4 display cable connector on system board
- 5 display cable in cable channel



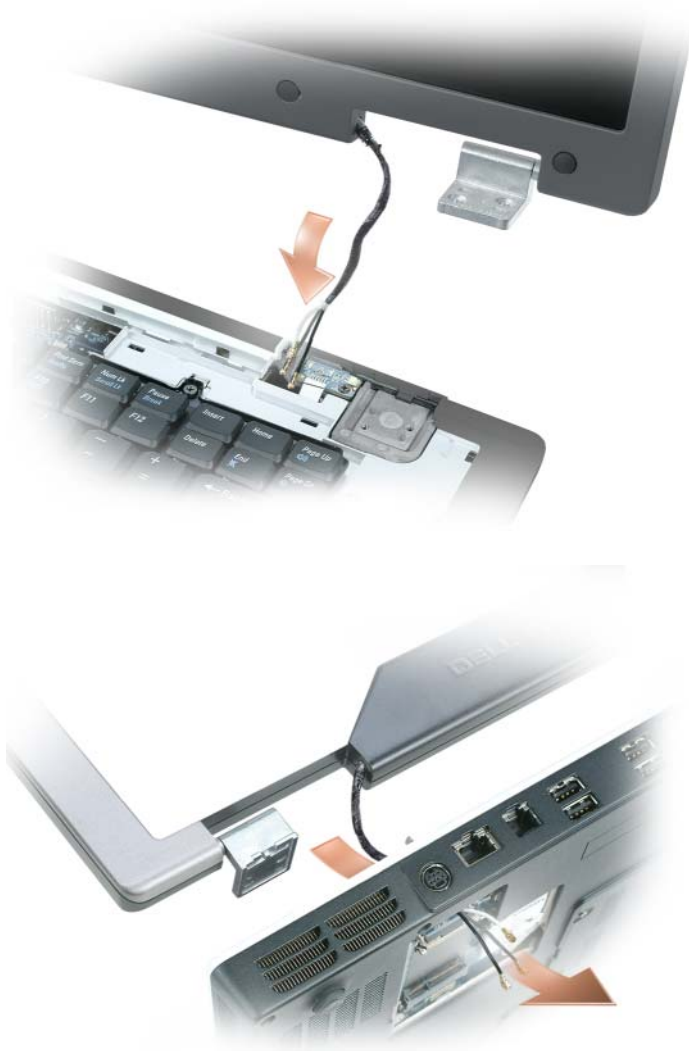
1 mini-card antenna cables

 **NOTE:** When removing the display assembly, carefully unthread the mini-card antenna cables through the computer base and ensure that the plastic protectors—if present—remain on the individual cables.

8 Lift the display assembly away from the computer.

Replacing the Display Assembly

1 Thread the mini-card antenna cables back through the hole in the base of the computer so that they are accessible from the bottom of the computer.



- 2 Align the display assembly over the screw holes in the base of the computer.



NOTE: The left hinge assembly has a small tab that you must first insert underneath the edge of the palm rest.



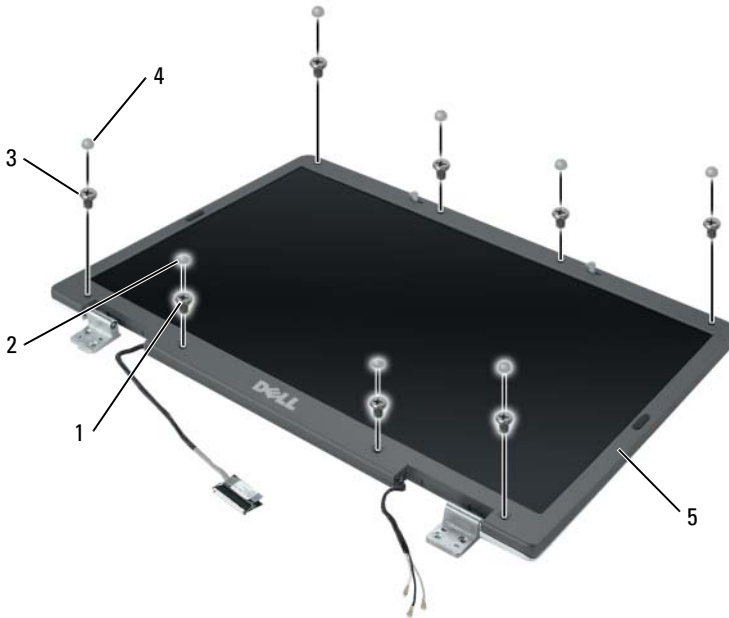
1 tab

- 3 Replace the four M2.5 x 5-mm screws.
- 4 Connect the display cable to the system board.
- 5 Reroute the display cable into the cable channel.
- 6 Replace the hinge cover (see "Replacing the Hinge Cover" on page 174).
- 7 If a mini-card is installed, connect the antenna cables to the card (see "Mini Card" on page 167). If one is not installed, tuck the antenna cables into their secured location.
- 8 Replace the mini-card cover.

Display Bezel



CAUTION: Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.



- | | | | |
|---|--|---|---|
| 1 | shoulder screws (4), two at the top and two at the bottom) | 2 | screw covers (2) |
| 3 | M2.5 x 5-mm screws (4), one on each corner) | 4 | rubber screw-covers/display bumpers (6) |
| 5 | display bezel | | |

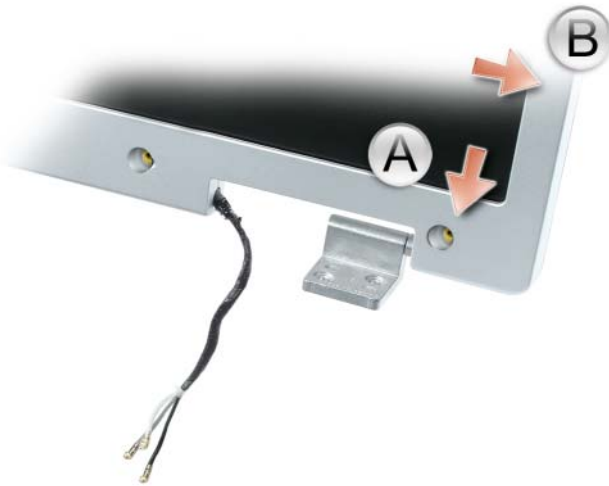
Removing the Display Bezel

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➡ NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the display assembly (see "Removing the Display Assembly" on page 176).

- 3 Remove the six rubber screw-covers/display bumpers.
- 4 Remove the two screw covers and the four shoulder screws.
- 5 Remove the four M2.5 x 5-mm screws at the corners of the bezel.
- ➡ **NOTICE:** Removal of the bezel from the display back cover requires extreme care to avoid damage to the bezel.
- 6 Use your fingers to separate the bezel from the display back cover by pulling the lower-right corner of the bezel down toward the bottom edge (A) of the display assembly to clear the tab on the bottom of the lower-right corner. Then pull the bezel toward the right side of the display assembly to clear the tab on the side (B) of the lower-right corner.





1 display back cover

2 tabs

- 7** Repeat step 6 for the lower-left corner of the bezel. Then use your fingers to release the snaps around the rest of the bezel and lift it away from the display panel.



1 display bezel

2 display panel

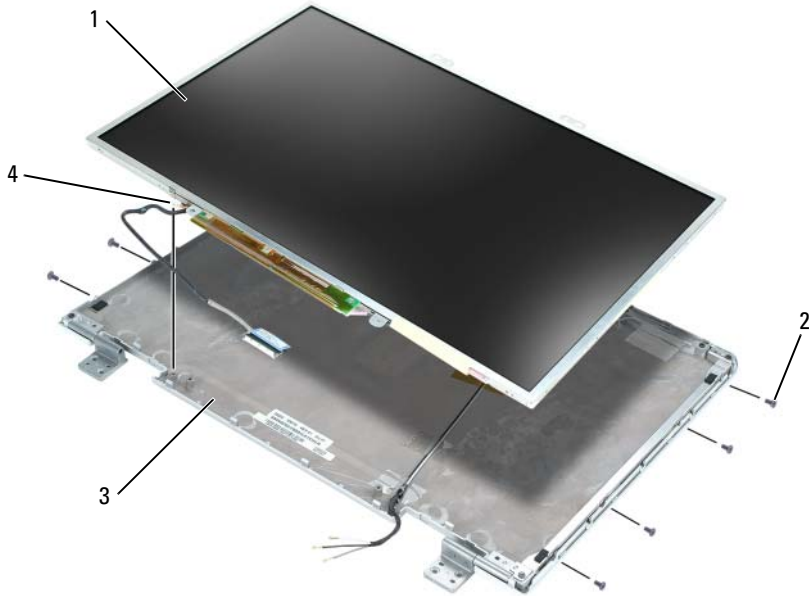
Replacing the Display Bezel

- 1 Starting at any corner, use your fingers to gently snap the bezel into place to secure it to the display panel.
- 2 Replace the four M2.5 x 5-mm screws on the corners of the bezel.
- 3 Replace the four shoulder screws and two screw covers.
- 4 Replace the six rubber screw-cover/display bumpers around the bezel.

Display Panel

! **CAUTION:** Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.

Removing the Display Panel



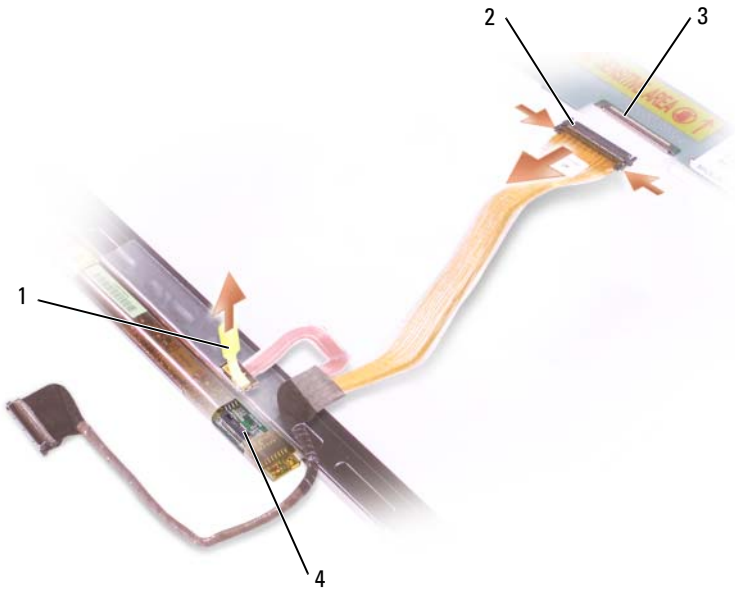
- | | | | |
|---|--------------------|---|----------------------------------|
| 1 | display panel | 2 | M2 x 3-mm screws (8) |
| 3 | display back cover | 4 | grounding wire and captive screw |

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➡ NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by touching an unpainted metal surface on the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 3 Remove the display bezel (see "Removing the Display Bezel" on page 182).
- 4 Loosen the captive ground screw that attaches the display-panel ground wire to the display back cover.

- 5 Remove the eight M2 x 3-mm screws (four on each side of the display panel).
- 6 Lift the display panel out of the display back cover.
- 7 Press in both sides of the top flex-cable connector, and pull the top flex-cable connector away from the display connector.
- 8 Use the pull-tab to disconnect the bottom flex-cable connector from the inverter connector.



- | | | | |
|---|---|---|--------------------------|
| 1 | pull-tab on bottom flex-cable connector | 2 | top flex-cable connector |
| 3 | display cable connector | 4 | inverter connector |

Replacing the Display Panel

- 1 Reconnect the top display-cable connector to the top flex-cable connector.
- 2 Reconnect the bottom flex-cable connector to the inverter connector.
- 3 Replace the display panel inside the display back cover.

- 4 Tighten the captive screw that attaches the display-panel ground wire to the display back cover.
- 5 Replace the eight M2 x 3-mm screws (four on each side) around the display panel.
- 6 Replace the display bezel (see "Replacing the Display Bezel" on page 185).

Display Latch



CAUTION: Only trained service technicians are authorized to *remove* or *replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.

Removing the Display Latch

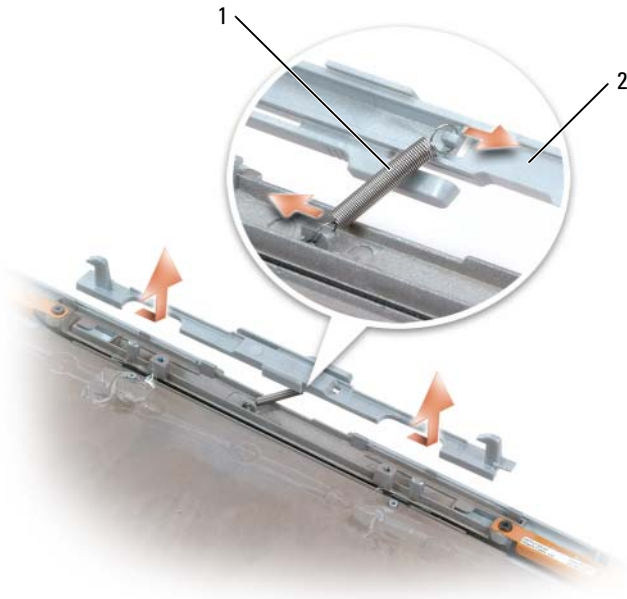


CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.



NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by touching an unpainted metal surface on the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 3 Remove the display bezel (see "Removing the Display Bezel" on page 182).
- 4 Slide the latch to the right and gently lift.
- 5 Remove the spring that attaches the latch to the display panel.



1 spring

2 display latch

Replacing the Display Latch

- 1 Replace the spring that attaches the latch to the display panel.
- 2 Align the latch with the display panel and slide the latch to the left to secure it into place.

Coin-Cell Battery

Removing the Coin-Cell Battery

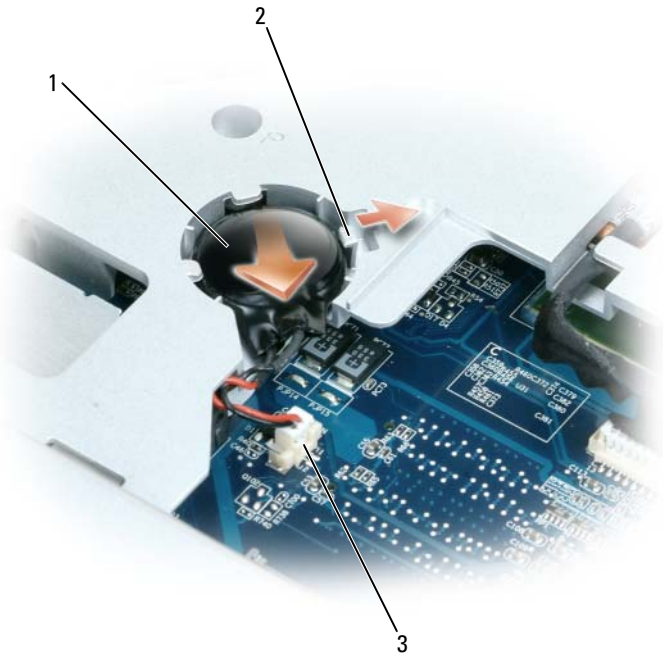
! **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➡ **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

➔ NOTICE: To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the keyboard (see "Keyboard" on page 174).
- 4 Remove the existing coin-cell battery:
 - a Disconnect the battery cable connector from the system board.
 - b Press the release latch on the side of the coin-cell battery compartment, and lift up the battery.

📎 NOTE: You may experience slight resistance when you lift the battery because of an adhesive underneath the battery that holds it in place.



- 1 coin-cell battery
- 2 release latch
- 3 battery cable connector


Replacing the Coin-Cell Battery

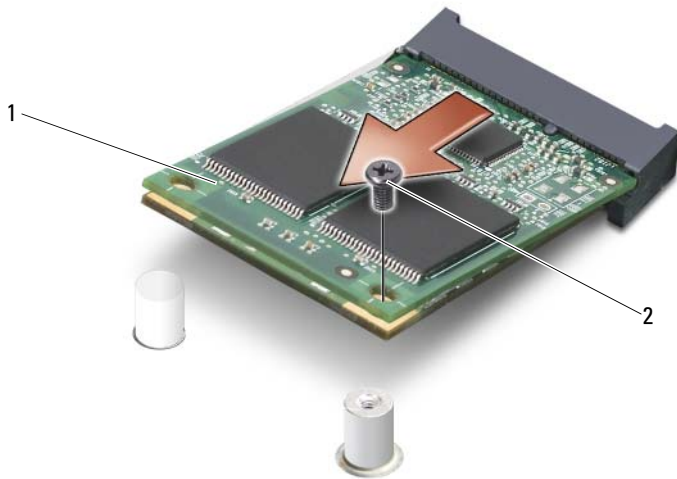
- 1 Install the replacement battery:
 - a With the positive side up, insert the battery at a 30-degree angle under the release latch, and then push the battery into place.
 - b Connect the battery cable to the connector on the system board.
- 2 Replace the keyboard (see "Keyboard" on page 174).
- 3 Replace the hinge cover (see "Replacing the Hinge Cover" on page 174).

Flash Cache Module

The Flash Cache Module (FCM) is an internal flash drive that helps improve the performance of your computer. If you ordered an FCM with your computer, the card is already installed.

Removing the FCM

-  **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.
- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
 - 2 Remove the optical drive (see "Optical Drive" on page 158).
 - 3 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
 - 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
 - 5 Remove the keyboard (see "Keyboard" on page 174).
 - 6 Release the M2.5 x 5-mm screw from the top of the flash card module, which is located on top of the system board.
 - 7 Remove the FCM.



1 FCM

2 screw

Replacing the FCM

- 1 Align the flash card module with the top of the system board and gently snap it into place.
- 2 Replace the M2.5 x 5-mm screw on the top of the flash card module.
- 3 Replace the display assembly (see "Replacing the Display Assembly" on page 179).
- 4 Replace the keyboard (see "Keyboard" on page 174).
- 5 Replace the hinge cover (see "Replacing the Hinge Cover" on page 174).
- 6 Replace the optical drive (see "Optical Drive" on page 158).

Palm Rest

⚠ CAUTION: Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.

Removing the Palm Rest

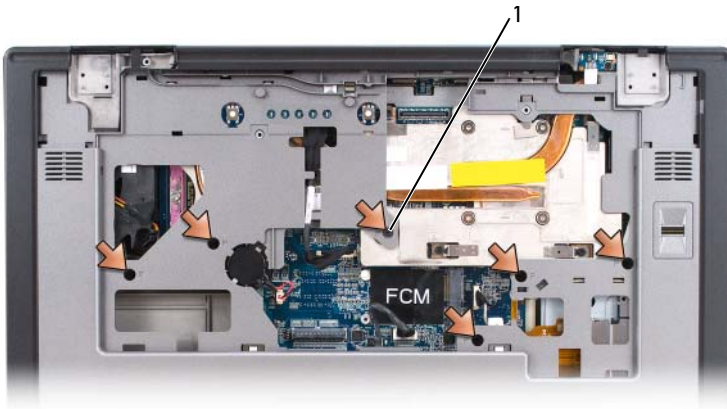
⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➡ NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.


➡ NOTICE: To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the optical drive (see "Optical Drive" on page 158).
- 3 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the keyboard (see "Keyboard" on page 174).
- 6 Remove the six M2.5 x 5-mm screws labeled "P" from the top side of the palm rest.

📎 NOTE: The screw locations may vary slightly from the image shown below.



1 M2.5 x 5-mm screws (6)

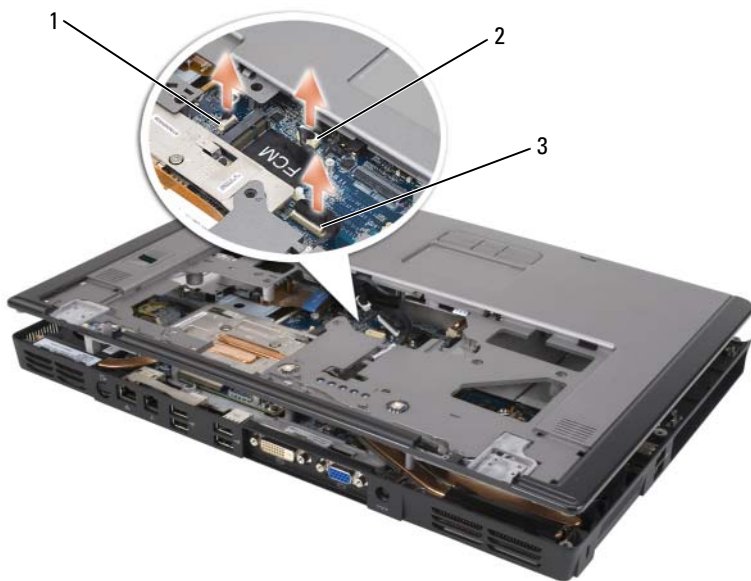
 **NOTE:** If you are installing a new palm rest, remove the coin-cell battery from the old palm rest so that you can install it on the new palm rest. If you are removing the palm rest only to access other computer components, you do not need to remove the coin-cell battery from the palm rest.

- 7 Remove the coin-cell battery, if appropriate (see "Removing the Coin-Cell Battery" on page 189).
- 8 Turn the computer over and remove the 12 M2.5 x 8-mm screws from the bottom of the computer.



1 M2.5 x 8-mm screws (12)

- 9 Turn the computer top-side up and disconnect the touch-pad connector from the system board.



- 1 biometric reader connector
- 2 touch-pad connector
- 3 LED board connector

- 10 Disconnect the LED board connector.
- 11 Lift the palm rest and remove it from the computer.

Replacing the Palm Rest

- 1 Align the palm rest with the base and gently snap the palm rest into place.
- 2 Reconnect the touch-pad connector to the system board.
- 3 Reconnect the LED board connector to the system board.
- 4 Replace the coin-cell battery (see "Replacing the Coin-Cell Battery" on page 191).
- 5 Replace the six M2.5 x 5-mm screws on the top side of the palm rest.
- 6 Turn the computer over, and replace the 12 M2.5 x 8-mm screws on the bottom of the computer.

- 7 Replace the display assembly (see "Replacing the Display Assembly" on page 179).
- 8 Replace the keyboard (see "Keyboard" on page 174).
- 9 Replace the hinge cover (see "Replacing the Hinge Cover" on page 174).

Speakers

Removing the Speakers




CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

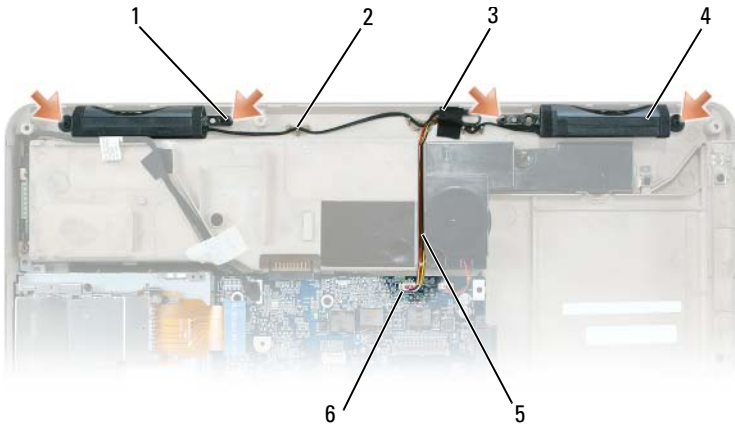


NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.



NOTICE: To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the display assembly (see "Replacing the Display Assembly" on page 179).
- 4 Remove the keyboard (see "Keyboard" on page 174).
- 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).
- 6  **NOTICE:** Handle the speakers with care to help prevent damage to them.
- 6 Disconnect the speaker cable connector from the connector on the system board.
- 7 Lift the tape that secures the speaker cables to the computer base, and disengage the cables from the cable guides.
- 8 Remove the four M2.5 x 5-mm screws from the speakers (two on each speaker).
- 9 Remove the speakers.



- | | | | |
|---|------------------------|---|---------------------------|
| 1 | M2.5 x 5-mm screws (4) | 2 | cable guides |
| 3 | tape | 4 | speakers (2) |
| 5 | speaker cable | 6 | connector or system board |


Replacing the Speakers


- 1 Connect the speaker cable connector to the connector on the system board.
- 2 Align the speakers on the screw holes for securing the speakers to the computer base.
- 3 Replace the four M2.5 x 5-mm screws to secure the speakers in place (two on each speaker).
- 4 Re-route the speaker cables into the cable guides, and re-adhere the tape to secure the speaker cables in place on the computer base.

USB Port Board

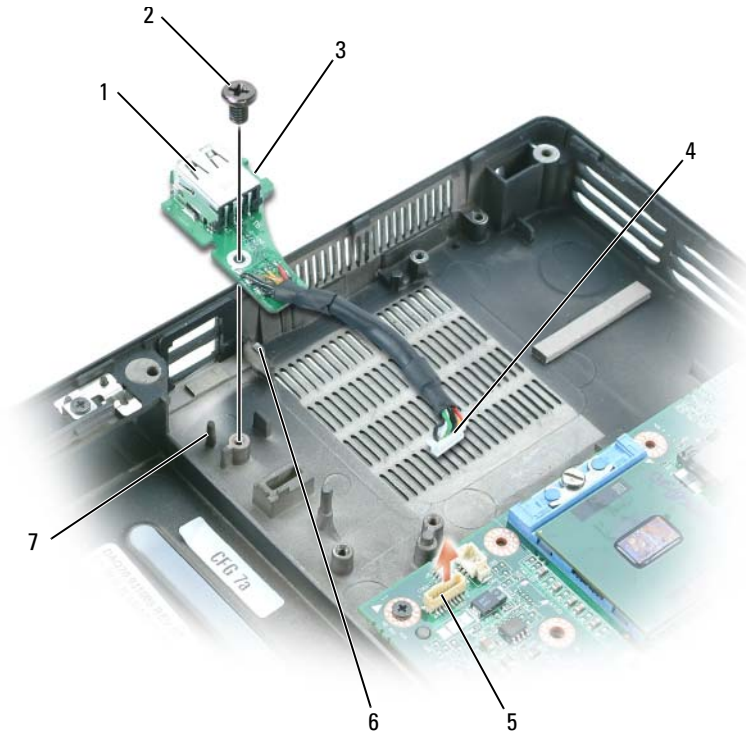
Removing the USB Port Board

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the keyboard (see "Keyboard" on page 174).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).
- 6 Disconnect the USB-port-board cable connector from the system board.
- 7 Remove the M2.5 x 5-mm screw, and lift the board out of the computer.



- | | | | |
|---|------------------------|---|----------------------------|
| 1 | USB port board | 2 | M2.5 x 5-mm screw |
| 3 | notch | 4 | USB-port-5 board connector |
| 5 | system board connector | 6 | tab |
| 7 | pin | | |

Replacing the USB Port Board

- 1 Insert the notch on the USB port board under the small tab on the computer base and the other side of the board over the pin.
- 2 Replace the M2.5 x 5-mm screw.
- 3 Reconnect the cable to the system board.
- 4 Replace the palm rest (see "Replacing the Palm Rest" on page 195).



- 5 Replace the display assembly (see "Replacing the Display Assembly" on page 179).
- 6 Replace the keyboard (see "Keyboard" on page 174).
- 7 Replace the hinge cover (see "Replacing the Hinge Cover" on page 174).

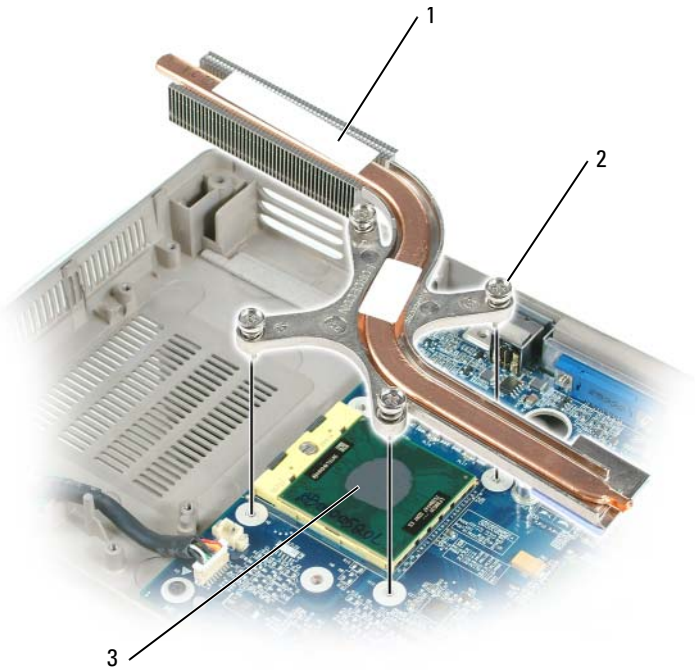
Processor Thermal-Cooling Assembly

 **CAUTION:** Only trained service technicians are authorized to *remove* or *replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.

Removing the Processor Thermal-Cooling Assembly


 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

-  **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.
 -  **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.
- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
 - 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
 - 3 Remove the keyboard (see "Keyboard" on page 174).
 - 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
 - 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).
 - 6 Loosen, in consecutive order, the four captive screws, labeled "1" through "4," that secure the processor thermal-cooling assembly to the system board.
 - 7 Lift the processor thermal-cooling assembly and remove it from the system board.




- 1 processor thermal-cooling
- 2 captive screws (4)
- 3 thermal pad

Replacing the Processor Thermal-Cooling Assembly

- 1 Place a new thermal pad on the part of the thermal-cooling assembly that will cover the new processor:
 - a Remove the backing from the new thermal pad, taking care not to tear the pad.
 - b Place the pad's adhesive-side against the part of the thermal-cooling assembly that will cover the new processor, and press it into place.
-  **NOTE:** If you are replacing the thermal-cooling assembly without removing and replacing a new processor, it is not necessary to clean the surface of the processor.
- 2 Place the processor thermal-cooling assembly over the processor.


- 3 Tighten the four captive screws, labeled "1" through "4," in consecutive order.


Processor Module


 **CAUTION:** Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.


Removing the Processor Module

 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.


 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

 **NOTICE:** Do not touch the processor die. Press and hold the processor down on the substrate on which the die is mounted while turning the cam screw to prevent intermittent contact between the cam screw and processor.

 **NOTICE:** To avoid damage to the processor, hold the screwdriver so that it is perpendicular to the processor when turning the cam screw.

 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the keyboard (see "Keyboard" on page 174).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).

 **NOTICE:** To ensure maximum cooling for the processor, do not touch the heat transfer areas on the processor thermal-cooling assembly. The oils in your skin reduce the heat transfer capability of the thermal pads.

6 Remove the processor thermal-cooling assembly (see "Removing the Processor Thermal-Cooling Assembly" on page 200).

➔ NOTICE: When removing the processor module, pull the module straight up. Be careful not to bend the pins on the processor module.

7 To loosen the ZIF socket, use a small, flat-blade screwdriver and rotate the ZIF-socket cam screw counterclockwise until it comes to the cam stop.



1 ZIF-socket cam screw





2 pin-1 corner of microprocessor

3 ZIF socket

✎ NOTE: The ZIF-socket cam screw secures the processor to the system board. Take note of the arrow on the ZIF-socket cam screw, which indicates the direction to turn the cam screw.


8 Lift the processor module from the ZIF socket.

Replacing the Processor Module

-  **NOTICE:** Ensure that the cam lock is in the fully open position before seating the processor module. Seating the processor module properly in the ZIF socket does not require force.
-  **NOTICE:** A processor module that is not properly seated can result in an intermittent connection or permanent damage to the processor and ZIF socket.
 - 1 Align the pin-1 corner of the processor module with the pin-1 corner of the ZIF socket, and insert the processor module.
-  **NOTE:** The pin-1 corner of the processor module has a triangle that aligns with the triangle on the pin-1 corner of the ZIF socket.
-  **NOTICE:** You must position the processor module correctly in the ZIF socket to avoid permanent damage to the module and the socket.

When the processor module is correctly seated, all four corners are aligned at the same height. If one or more corners of the module are higher than the others, the module is not seated correctly.

- 2 Tighten the ZIF socket by turning the cam screw clockwise to secure the processor module to the system board.

 **NOTE:** When you replace the processor thermal-cooling assembly, be sure to place a new thermal pad on the part of the thermal-cooling assembly that covers the processor.


- 3 Replace the processor thermal-cooling assembly (see "Replacing the Processor Thermal-Cooling Assembly" on page 201).
- 4 Perform the steps in "Removing the Processor Module" on page 202 in reverse order, beginning with step 5.


Video Card/Thermal-Cooling Assembly

 **CAUTION:** Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.


Removing the Video Card/Thermal-Cooling Assembly

 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.


 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

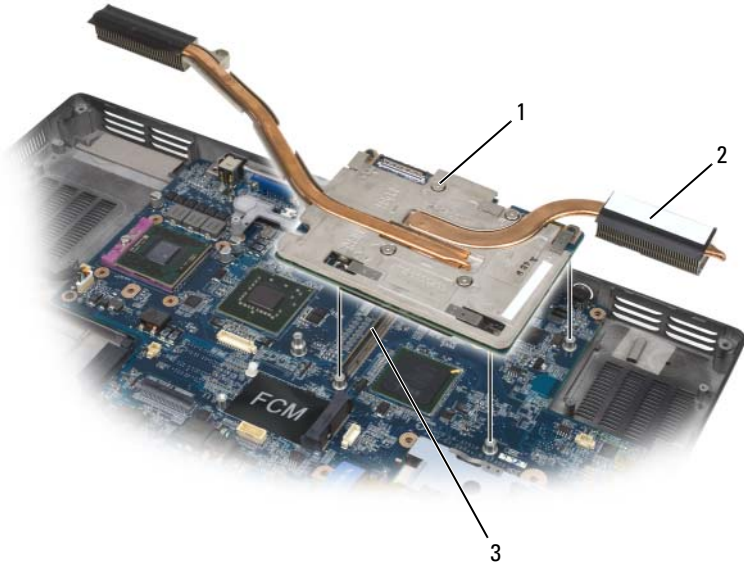
 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the keyboard (see "Keyboard" on page 174).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).

 **NOTE:** Remove the video card/thermal-cooling assembly as a single unit. Do not separate the thermal-cooling assembly from the video card.

- 6 Loosen the four captive screws on the video card/thermal-cooling assembly.
- 7 Lift the video card/thermal-cooling assembly from the system board.

 **NOTE:** The appearance of the video card/thermal-cooling assembly may vary, depending on your computer configuration.



- 1 captive screws
- 2 video card/thermal-cooling assembly
- 3 system board connector

Replacing the Video Card/Thermal-Cooling Assembly

- 1 Carefully align the video card/thermal-cooling assembly over the connector on the system board and press down.


 **NOTE:** The video card/thermal-cooling assembly is labeled "PUSH HERE."


- 2 Tighten the four captive screws on the video card/thermal-cooling assembly.

System Fan(s)

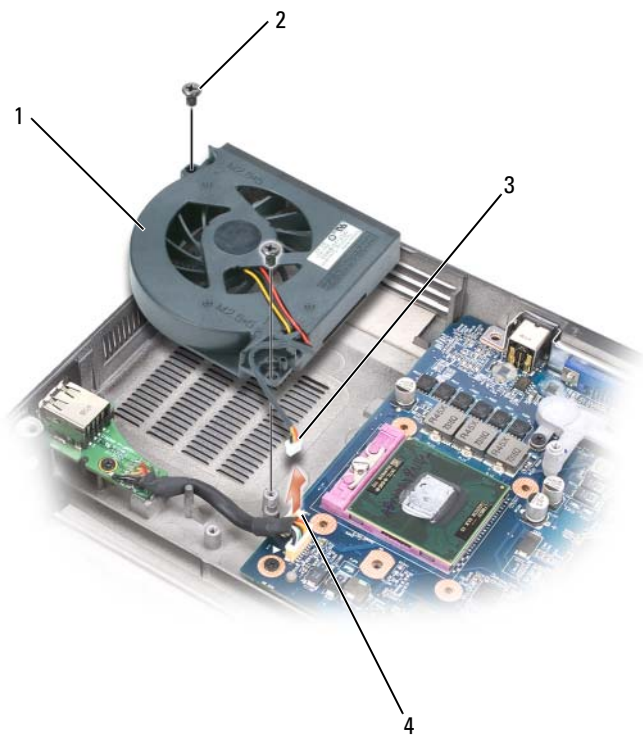
Removing the System Fan(s)

 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

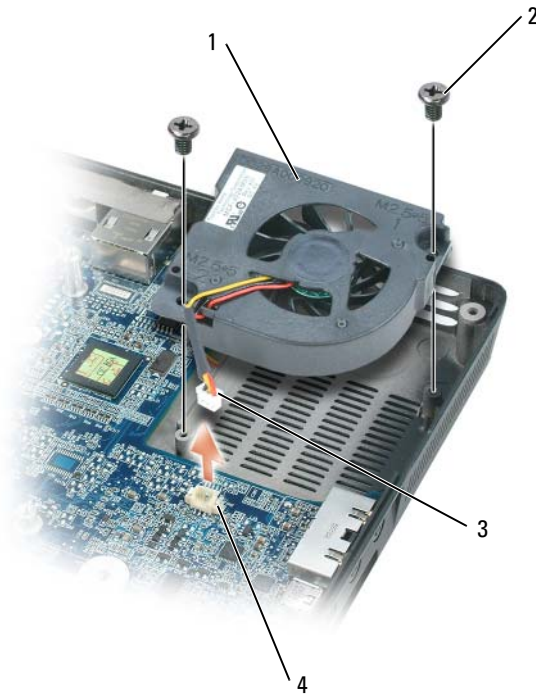
 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 3 Remove the keyboard (see "Keyboard" on page 174).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the palm rest (see "Removing the Palm Rest" on page 193).
- 6 Remove the two M2.5 x 5-mm screws from the fan(s), and then remove the connector(s) that connect the fan(s) to the system board.
- 7 Lift the fan(s) out of the computer.



- | | | | |
|---|--|---|----------------------------------|
| 1 | fan for processor/thermal - cooling assembly | 2 | M2.5 x 5-mm screws (2) |
| 3 | fan cable | 4 | fan-cable system board connector |



- | | | | |
|---|---|---|----------------------------------|
| 1 | fan for video card/thermal - cooling assembly, if installed | 2 | M2.5 x 5-mm screws (2) |
| 3 | fan cable | 4 | fan-cable system board connector |

Replacing the System Fan(s)

- 1 Carefully align the system fan over the system board and press down.
- 2 Tighten the two M2.5 x 5-mm screws on the system fan

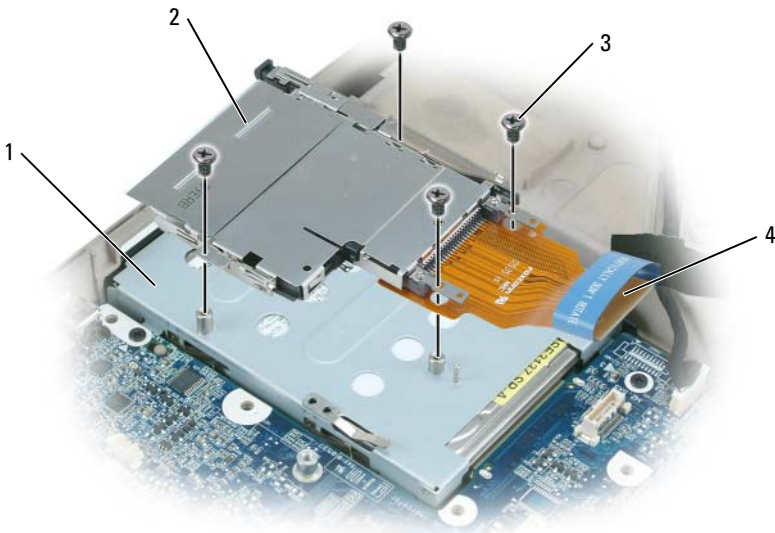
ExpressCard Cage

! **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

➔ **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

➔ **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the hard drive (see "Removing the Hard Drive" on page 159).
- 3 Remove the optical drive (see "Optical Drive" on page 158).
- 4 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 5 Remove the keyboard (see "Keyboard" on page 174).
- 6 Remove the display assembly (see "Replacing the Display Assembly" on page 179).
- 7 Remove the palm rest (see "Removing the Palm Rest" on page 193).
- 8 Disconnect the ExpressCard connector from the system board.





- | | | | |
|---|-----------------------|---|-----------------------|
| 1 | hard drive bay | 2 | ExpressCard cage |
| 3 | M 2 x 3-mm screws (4) | 4 | ExpressCard connector |
- 9 Remove the four M2 x 3-mm screws that attach the ExpressCard cage to the top of the hard drive bay.

Smart Card Reader

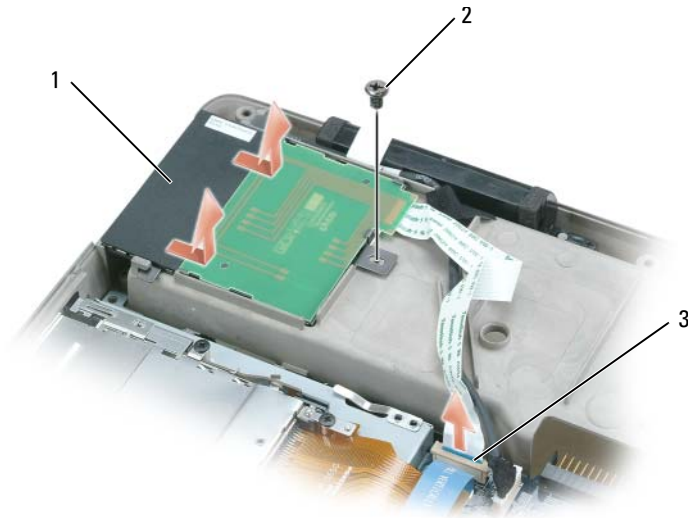
Removing the Smart Card Reader

 **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
- 2 Remove the optical drive (see "Optical Drive" on page 158).
- 3 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
- 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
- 5 Remove the keyboard (see "Keyboard" on page 174).
- 6 Remove the palm rest (see "Palm Rest" on page 192).
- 7 Remove the smart-card reader screw.
- 8 Remove the smart-card reader connector from the system board.
- 9 To remove the smart card reader, pry up the reader by the metal screw plate and pull up and lift out from underneath the side notches at a 30 degree angle.



- 1 smart card reader
- 2 smart-card reader screw
- 3 smart-card reader connector on system board

Replacing the Smart Card Reader


- 1 Carefully align the smart card reader over the smart card reader connector on the system board and press it into place beneath the side notches.
- 2 Tighten the smart-card reader screw.


System Board

⚠ CAUTION: Only trained service technicians are authorized to *remove or replace* the component covered by the following procedure. See your *Product Information Guide* for complete information about safety precautions, working inside the computer, and protecting against electrostatic discharge.


Removing the System Board

⚠ CAUTION: Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.

 **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.

 **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.

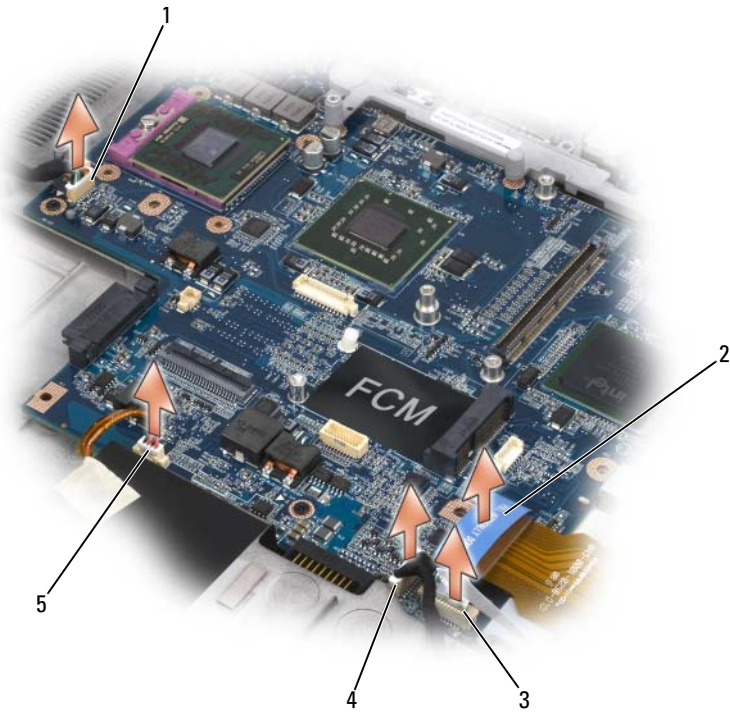
The system board's BIOS chip contains the Service Tag, which is also visible on a barcode label on the bottom of the computer. The replacement kit for the system board includes a CD that provides a utility for transferring the Service Tag to the replacement system board.

- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
 - 2 Remove the hard drive (see "Removing the Hard Drive" on page 159).
 - 3 Remove the optical drive (see "Optical Drive" on page 158).
 - 4 Remove the memory module(s) (see "Removing the Memory Module(s)" on page 161).
 - 5 Remove the modem (see "Removing the Modem" on page 165).
 - 6 Remove the mini-card (see "Mini Card" on page 167).
 - 7 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
 - 8 Remove the keyboard (see "Keyboard" on page 174).
 - 9 Remove the display assembly (see "Removing the Display Assembly" on page 176).
 - 10 Remove the palm rest (see "Removing the Palm Rest" on page 193).
-  **NOTE:** It is not required but is highly recommended that you remove the system fan(s) (see "System Fan(s)" on page 206) to allow easier access to the system board.
- 11 Disconnect the ExpressCard connector from the connector on the system board.



1 ExpressCard connector

2 ExpressCard connector on system board



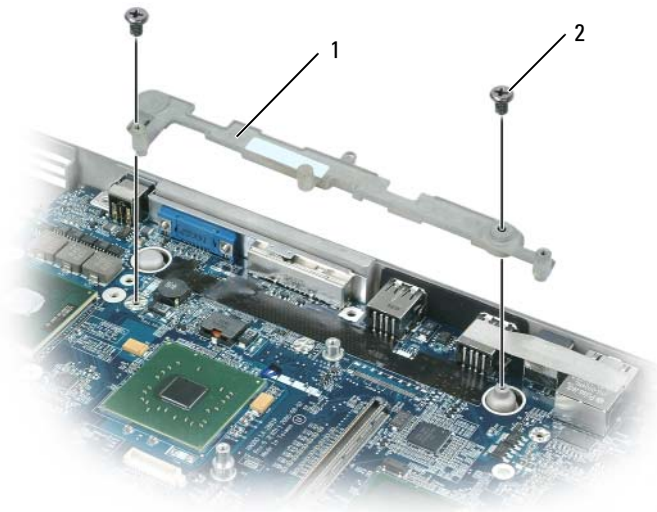
- | | | | |
|---|-----------------------------|---|---|
| 1 | USB port-board connector | 2 | ExpressCard connector |
| 3 | smart-card reader connector | 4 | internal card with Bluetooth® wireless technology connector |
| 5 | speaker connector | | |

- 12 Disconnect the smart-card reader connector from the system board.
- 13 Disconnect the speaker connector from the system board.
- 14 Disconnect the connector for the internal card with Bluetooth® wireless technology from the system board.
- 15 Disconnect the subwoofer connector from the system board.
- 16 Disconnect the USB-port-board connector from the system board.
- 17 Disconnect the fan connector(s) from the system board.

- 18** Remove the video card/thermal-cooling assembly, if present (see "Removing the Video Card/Thermal-Cooling Assembly" on page 204).

NOTE: Remove the video card/thermal-cooling assembly as a single unit. Do not separate the thermal-cooling unit (heat sink) from the video card.

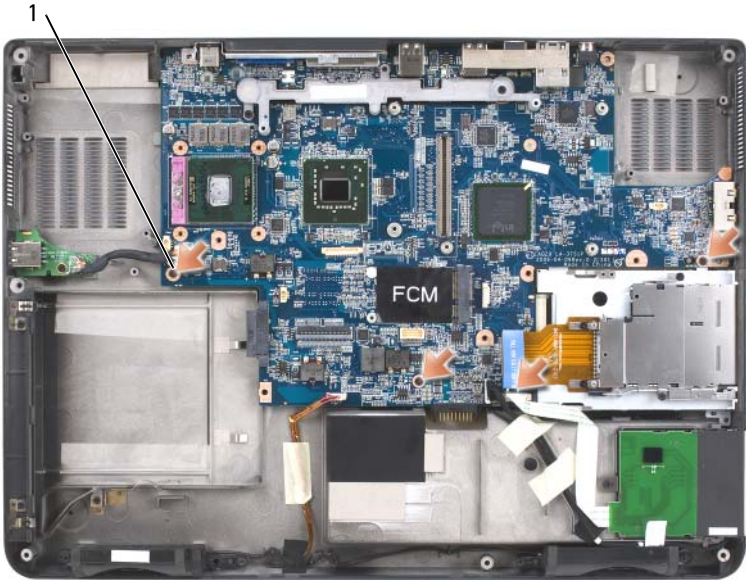
- 19** Remove the processor thermal-cooling assembly (see "Removing the Processor Thermal-Cooling Assembly" on page 200).
- 20** Remove the processor (see "Removing the Processor Module" on page 202).
- 21** Remove the docking frame:



1 docking frame

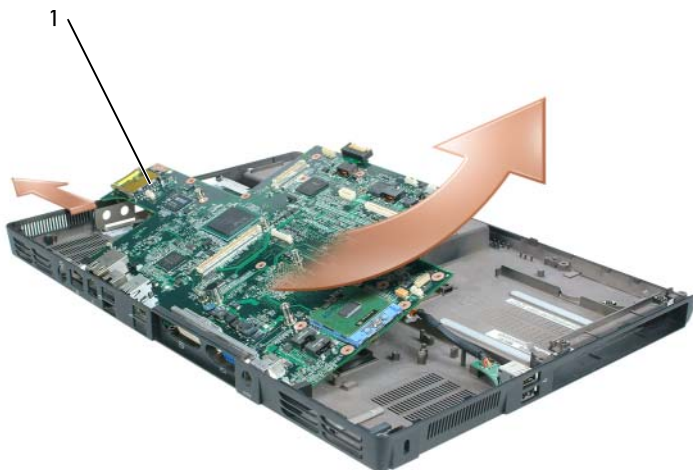
2 docking frame screws (2)

- a** Remove the two docking-frame screws.
- b** Lift the docking frame away from the system board.
- 22** Remove the four M2.5 x 5-mm screws from the system board.



1 system board M2.5 x 5-mm screws (4)

- 23** Remove the system board, slowly easing the connectors out of their access holes on the back and side of the computer base:
- a** With the back of the computer facing you, grasp the upper-right corner of the system board and lift it slightly.
 - b** Pull the system board assembly away from you toward the front of the computer and slightly to the right; at the same time, use your left hand to release the audio connectors by pulling the side of the computer base slightly to the left.



- 1 system board assembly

Replacing the System Board

- 1 Perform all of the steps in "Removing the System Board" on page 212 in reverse order.

➔ NOTICE: Before turning on the computer, replace all screws and ensure that no stray screws remain inside the computer. Failure to do so may result in damage to the computer.





- 2 Turn on the computer.

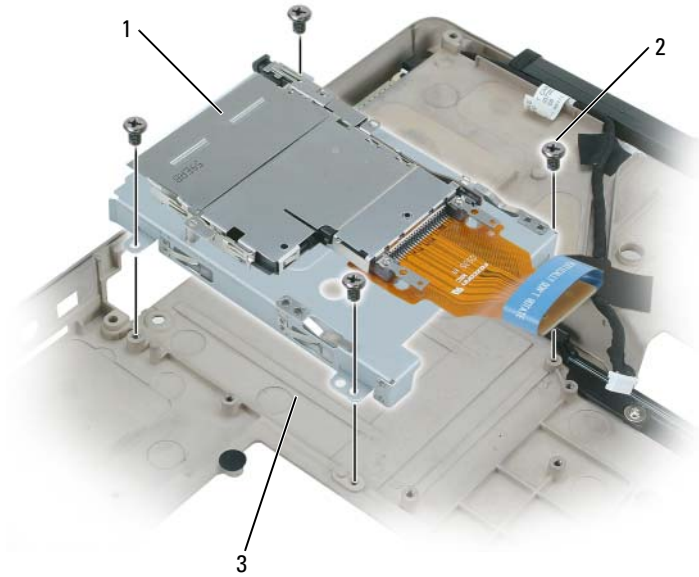
📎 NOTE: If you use a BIOS update program CD to flash the BIOS, press <F12> before inserting the CD so that you can set up the computer to boot from a CD this one time only. Otherwise, you must enter the system setup program to change the default boot order.

- 3 Insert the flash BIOS update program CD that accompanied the replacement system board into the optical drive. Follow the instructions that appear on the screen. See "Flashing the BIOS" on page 223 for further information.
- 4 Enter the system setup program to update the BIOS on the new system board with the computer Service Tag.

Battery Latch Assembly

Removing the Battery Latch Assembly

-  **CAUTION:** Before you begin the following procedure, follow the safety instructions in the *Product Information Guide*.
-  **NOTICE:** To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface (such as the back panel) on the computer.
-  **NOTICE:** To help prevent damage to the system board, remove the main battery (see "Before Working Inside Your Computer" on page 156) before working inside the computer.
- 1 Follow the instructions in "Before Working Inside Your Computer" on page 156.
 - 2 Remove the hinge cover (see "Removing the Hinge Cover" on page 173).
 - 3 Remove the keyboard (see "Keyboard" on page 174).
 - 4 Remove the display assembly (see "Removing the Display Assembly" on page 176).
 - 5 Remove the palm rest (see "Replacing the Palm Rest" on page 195).
 - 6 Remove the system board (see "Removing the System Board" on page 212).
 - 7 Remove the hard drive bay by removing the four M2 x 3-mm screws, and lifting out the bay.
 **NOTE:** You can remove the hard drive bay without removing the ExpressCard cage from the hard drive bay.

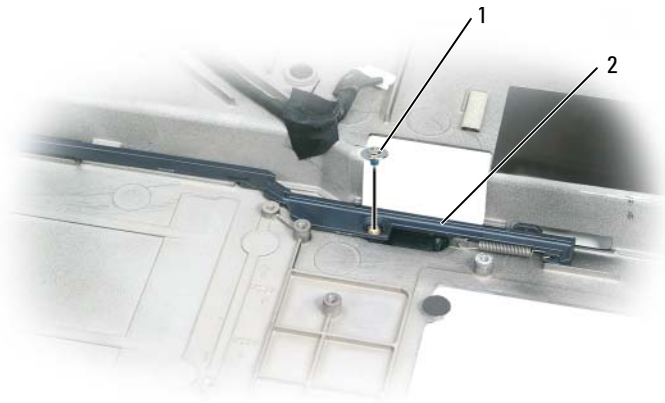


- 1 ExpressCard cage
- 3 hard drive bay

- 2 M2.5 x 5-mm screws (4)

8 Remove the screw in the battery latch assembly.

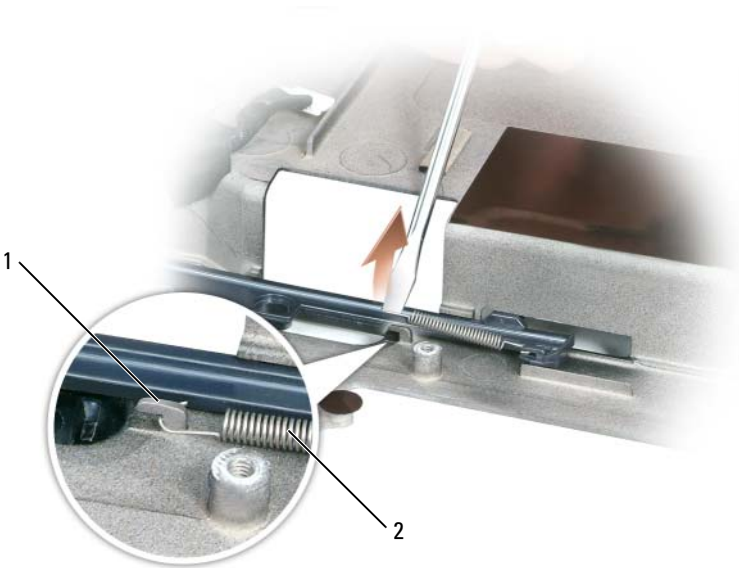
When you remove the screw, the battery latch release on the bottom of the computer will also be removed.



1 screw

2 battery latch assembly

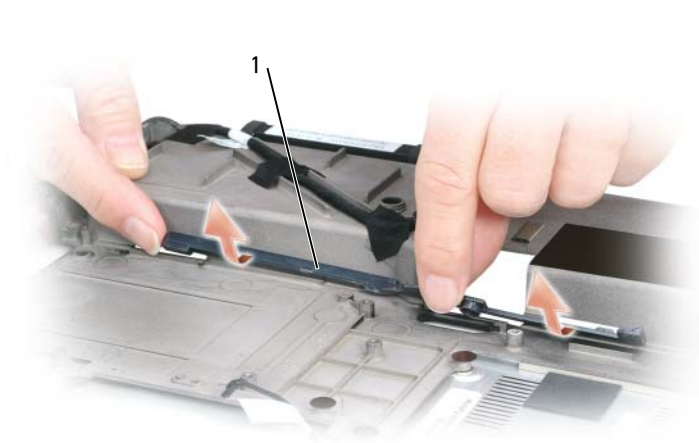
- 9** Remove the spring from the hook on the computer base by lifting it up and away with a screwdriver or a plastic scribe.



1 hook

2 spring

- 10** Remove the plastic battery-latch assembly by twisting the assembly slightly and lifting it out of the channel and away from the computer base.



1 battery latch assembly

Replacing the Battery Latch Assembly

- 1** Insert the latch assembly into the channel on the computer base, and press it into place.
- 2** Using a small screwdriver, hook the spring over the hook on the computer base.
- 3** Place the battery latch release under the computer base, line it up with the hole in the base, and then replace the screw in the assembly.
Ensure that the newly installed latch moves smoothly and freely when pushed and released.
- 4** Replace the hard drive bay and reinsert the four M2 x 3-mm screws.
- 5** Replace the system board and the four M2.5 x 5 screws.

- 6 Replace in reverse order the other components that you removed in "Removing the Battery Latch Assembly" on page 219.

Flashing the BIOS

➡ **NOTICE:** Plug the AC adapter into a known good power source to prevent a loss of power. Failure to do so may cause system damage.

- 1 Ensure that the AC adapter is plugged in and that the main battery is installed properly.

📎 **NOTE:** If you use a BIOS update program CD to flash the BIOS, press <F12> before inserting the CD so that you can set up the computer to boot from a CD this one time only. Otherwise, you must enter the system setup program to change the default boot order.

- 2 Insert the BIOS update program CD, and turn on the computer.

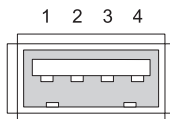
➡ **NOTICE:** Do not interrupt this process once it begins. Doing so may cause system damage.

Follow the instructions that appear on the screen. The computer continues to boot and updates the new BIOS. When the flash update is complete, the computer will automatically reboot.

- 3 Press <F2> during POST to enter the system setup program.
- 4 Press <Alt> and <f> to reset the computer defaults.
- 5 Press <Esc>, select **Save changes and reboot**, and press <Enter> to save configuration changes.
- 6 Remove the flash BIOS update program CD from the drive and restart the computer.

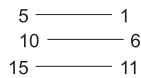
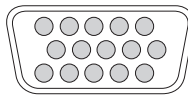
Pin Assignments for I/O Connectors

USB Connector



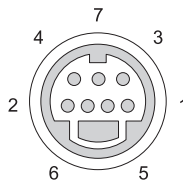
Pin	Signal
1	USB5V+
2	USBP-
3	USBP+
4	GND

Video Connector



Pin	Signal	Pin	Signal
1	CRT_R	9	5V+
2	CRT_G	10	GND
3	CRT_B	11	MONITOR_DETECT-
4	NC	12	DDC_DATA
5	GND	13	CRT_HS
6	GND	14	CRT_VS
7	GND	15	DDC_CLK
8	GND		

S-Video TV-Out Connector

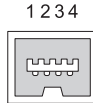


S-Video

Pin	Signal
1	GND
2	GND
3	DLUMA-L
4	DCRMA-L

Composite Video

Pin	Signal
5	NC
6	DCMPS-L
7	GND

IEEE 1394 Connector

Pin	Signal
1	TPB-
2	TPB+
3	TPA-
4	TPA+

Dell™ QuickSet



NOTE: This feature may not be available on your computer.

Dell™ QuickSet provides you with easy access to configure or view the following types of settings:

- Network connectivity
- Power management
- Display
- System information

Depending on what you want to do in Dell™ QuickSet, you can start it by either *clicking*, *double-clicking*, or *right-clicking* the QuickSet icon in the Microsoft® Windows® taskbar. The taskbar is located in the lower-right corner of your screen.

For more information about QuickSet, right-click the QuickSet icon and select **Help**.

Traveling With Your Computer

Identifying Your Computer

- Attach a name tag or business card to the computer.
- Write down your Service Tag and store it in a safe place away from the computer or carrying case. Use the Service Tag if you need to report a loss or theft to law enforcement officials and to Dell.
- Create a file on the Microsoft® Windows® desktop called **if_found**. Place information such as your name, address, and phone number in this file.
- Contact your credit card company and ask if it offers coded identification tags.

Packing the Computer

- Remove any external devices attached to the computer and store them in a safe place. Remove any cables attached to installed cards, and remove any extended cards. See "Using Cards" on page 99.
- To make the computer as light as possible, replace any devices installed in the module bay with the Dell TravelLite™ module.
- Fully charge the main battery and any spare batteries that you plan to carry with you.
- Shut down the computer.
- Disconnect the AC adapter.
- ➡ **NOTICE:** When the display is closed, extraneous items on the keyboard or palm rest could damage the display.
- Remove any extraneous items, such as paper clips, pens, and paper, from the keyboard and palm rest and close the display.

- Use the optional Dell™ carrying case to pack the computer and its accessories together safely.
- Avoid packing the computer with items such as shaving cream, colognes, perfumes, or food.
- ➔ **NOTICE:** If the computer has been exposed to extreme temperatures, allow it to acclimate to room temperature for 1 hour before turning it on.
- Protect the computer, the batteries, and the hard drive from hazards such as extreme temperatures and overexposure to sunlight, dirt, dust, or liquids.
- Pack the computer so that it does not slide around in the trunk of your car or in an overhead storage compartment.

Travel Tips

- ➔ **NOTICE:** Do not move the computer while using the optical drive to prevent loss of data.
- ➔ **NOTICE:** Do not check the computer as baggage.
 - Consider disabling wireless activity on your computer to maximize battery operating time. To disable wireless activity, press <Fn><F2>.
 - Consider changing your power management options to maximize battery operating time. See "Conserving Battery Power" on page 46.
 - If you are traveling internationally, carry proof of ownership—or of your right to use the computer if it is company-owned—to speed your passage through customs. Investigate the customs regulations of the countries you plan to visit, and consider acquiring an international carnet (also known as a *merchandise passport*) from your government.
 - Find out what type of electrical outlets are used in the countries you will visit, and have appropriate power adapters.
 - Check with your credit card company for information about the kinds of emergency travel assistance it offers to users of portable computers.


Traveling by Air

- ➔ **NOTICE:** Do not walk the computer through a metal detector. Send the computer through an X-ray machine or have it hand-inspected.

- Ensure that you have a charged battery available in case you are asked to turn on the computer.
- Prior to entering the airplane, verify that using a computer is permitted. Some airlines forbid the use of electronic devices during flight. All airlines forbid the use of electronic devices during takeoff and landing.

Getting Help


Obtaining Assistance

 **CAUTION:** If you need to remove the computer cover, first disconnect the computer power and modem cables from all electrical outlets.

If you experience a problem with your computer, you can complete the following steps to diagnose and troubleshoot the problem:

- 1 See "Troubleshooting" on page 115 for information and procedures that pertain to the problem your computer is experiencing.
- 2 See "Dell Diagnostics" on page 115 for procedures on how to run Dell Diagnostics.
- 3 Fill out the "Diagnostics Checklist" on page 238.
- 4 Use Dell's extensive suite of online services available at Dell Support (support.dell.com) for help with installation and troubleshooting procedures. See "Online Services" on page 234 for a more extensive list of Dell Support online.
- 5 If the preceding steps have not resolved the problem, see "Contacting Dell" on page 239.

 **NOTE:** Call Dell Support from a telephone near or at the computer so that the support staff can assist you with any necessary procedures.

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

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

For instructions on using the Dell Support, see "Technical Support and Customer Service" on page 234.



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

Technical Support and Customer Service

Dell's support service is available to answer your questions about Dell™ hardware. Our support staff uses computer-based diagnostics to provide fast, accurate answers.

To contact Dell's support service, see "Before You Call" on page 236, and then see the contact information for your region or go to support.dell.com.

DellConnect

DellConnect is a simple online access tool that allows a Dell service and support associate to access your computer through a broadband connection, diagnose your problem and repair it all under your supervision. For more information, go to support.dell.com and click DellConnect.

Online Services

You can learn about Dell products and services on the following websites:

www.dell.com

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

www.dell.com/jp (Japan only)

www.euro.dell.com (Europe only)

www.dell.com/la (Latin American and Caribbean countries)

www.dell.ca (Canada only)

You can access Dell Support through the following websites and e-mail addresses:

- Dell Support websites
support.dell.com
support.jp.dell.com (Japan only)
support.euro.dell.com (Europe only)
- Dell Support e-mail addresses

mobile_support@us.dell.com

support@us.dell.com

la-techsupport@dell.com (Latin America and Caribbean countries only)

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

- Dell Marketing and Sales e-mail addresses
apmarketing@dell.com (Asian/Pacific countries only)
sales_canada@dell.com (Canada only)

- Anonymous file transfer protocol (FTP)

ftp.dell.com

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

AutoTech Service

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

When you call AutoTech, use your touch-tone telephone to select the subjects that correspond to your questions. For the telephone number to call for your region, see "Contacting Dell" on page 239.

Automated Order-Status Service

To check on the status of any Dell products that you have ordered, you can go to **support.dell.com**, or you can call the automated order-status service. A recording prompts you for the information needed to locate and report on your order. For the telephone number to call for your region, see "Contacting Dell" on page 239 Dell.

Problems With Your Order

If you have a problem with your order, such as missing parts, wrong parts, or incorrect billing, contact Dell for customer assistance. Have your invoice or packing slip handy when you call. For the telephone number to call for your region, see "Contacting Dell" on page 239.

Product Information

If you need information about additional products available from Dell, or if you would like to place an order, visit the Dell website at www.dell.com. For the telephone number to call for your region or to speak to a sales specialist, see the "Contacting Dell" on page 239.

Returning Items for Warranty Repair or Credit

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

- 1 Call Dell to obtain a Return Material Authorization Number, and write it clearly and prominently on the outside of the box.

For the telephone number to call for your region, see "Contacting Dell" on page 239.

- 2 Include a copy of the invoice and a letter describing the reason for the return.
- 3 Include a copy of the Diagnostics Checklist (see "Diagnostics Checklist" on page 238), indicating the tests that you have run and any error messages reported by the Dell Diagnostics (see "Dell Diagnostics" on page 115).
- 4 Include any accessories that belong with the item(s) being returned (power cables, software floppy disks, guides, and so on) if the return is for credit.
- 5 Pack the equipment to be returned in the original (or equivalent) packing materials.

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

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

Before You Call



NOTE: Have your Express Service Code ready when you call. The code helps Dell's automated-support telephone system direct your call more efficiently. You may also be asked for your Service Tag (located on the back or bottom of your computer).

Remember to fill out the Diagnostics Checklist (see "Diagnostics Checklist" on page 238). If possible, turn on your computer before you call Dell for assistance and call from a telephone at or near the computer. You may be asked to type some commands at the keyboard, relay detailed information during operations, or try other troubleshooting steps possible only at the computer itself. Ensure that the computer documentation is available.



CAUTION: Before working inside your computer, follow the safety instructions in your *Product Information Guide*.

Diagnostics Checklist

Name:

Date:

Address:

Phone number:

Service Tag (bar code on the back or bottom of the computer):

Express Service Code:

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

Operating system and version:

Devices:

Expansion cards:

Are you connected to a network? Yes No

Network, version, and network adapter:

Programs and versions:

See your operating system documentation to determine the contents of the system's start-up files. If the computer is connected to a printer, print each file. Otherwise, record the contents of each file before calling Dell.

Error message, beep code, or diagnostic code:

Description of problem and troubleshooting procedures you performed:

Contacting Dell

For customers in the United States, call 800-WWW-DELL (800-999-3355).



NOTE: If you do not have an active Internet connection, you can find contact information on your purchase invoice, packing slip, bill, or Dell product catalog.

Dell provides several online and telephone-based support and service options. Availability varies by country and product, and some services may not be available in your area. To contact Dell for sales, technical support, or customer service issues:

- 1 Visit support.dell.com.
- 2 Verify your country or region in the **Choose A Country/Region** drop-down menu at the bottom of the page.
- 3 Click **Contact Us** on the left side of the page.
- 4 Select the appropriate service or support link based on your need.
- 5 Choose the method of contacting Dell that is convenient for you.

Specifications



NOTE: Your computer comes in different configurations. To determine the configuration of your computer, see "Determining Your Computer's Configuration" on page 23.

Processor

Processor types	Intel® Core™ 2 Duo Processor Intel® Core™ 2 Duo Extreme Edition Processor
L1 cache	64 KB
L2 cache	6 MB shared, 2 MB or 4 MB
External bus frequency (front side bus)	800 MHz

System Information

System chip set	Mobile Intel PM965 Express
Data bus width	64 bits
DRAM bus width	dual channel bus
Processor address bus width	36 bits
Flash EPROM	2 MB
PCI bus (PCI-Express used for video controllers)	32 bits x16

ExpressCard

NOTE: The ExpressCard slot is designed only for ExpressCards. It does NOT support PC Cards (PCMCIA cards).

ExpressCard (continued)

ExpressCard connector	one ExpressCard slot (54 mm) 1.5 V and 3.3 V
Cards supported	ExpressCard/34 (34 mm) and ExpressCard/54 (54 mm)
ExpressCard connector size	26 pins

Memory

Memory module connector	two user-accessible SODIMM connectors
Memory module capacities	512 MB, 1 GB, 2 GB, and 4 GB
Add-in flash memory card	1 GB, Type 1 Mini-Card support limited to Microsoft Vista®
Memory type	1.8 V SODIMM DDR-II supports DDR-II 667 MHz up to 4 GB, w/36-bit addressing
Minimum memory	1 GB (via 2 x 512 MB SODIMMs)
Maximum memory	8 GB (via 2 x 2 GB SODIMMs)

NOTE: In order to obtain dual-channel bandwidth capability, both memory slots must be populated with the same size memory modules.

5-in-1 media memory card reader

5-in-1 media memory card controller	Ricoh R5C833
5-in-1 media memory card connector	5-in-1 combo card connector
Cards supported	MS MS Pro SD/SDIO MMC xD CD Type I/II & IBM Microdrive through ExpressCard adapter

Ports and Connectors

Audio	microphone-in connector, stereo headphones/speakers connector
Mini-Card	2 type 111A Mini-Card slots
IEEE 1394a	4-pin mini, nonpowered connector
Modem	RJ-11 port
Network adapter	RJ-45 port
S-video TV-out	7-pin mini-DIN connector (optional S-video to composite video adapter cable; optional S-video to component video adapter cable)
USB	six 4-pin USB 2.0-compliant connectors
Video	15-pin connector
DVI-D (Digital Video Interface)	24-pin connector

Communications

Modem:	
Type	V.92 Data/Fax 56K MDC
Controller	softmodem
Interface	internal HDA (High Definition Audio) bus
Network adapter	10/100/1000 Ethernet LAN on system board
Wireless	internal PCI-e Mini-Card WLAN support; internal card with Bluetooth® wireless technology

Video

NOTE: Your computer comes in different configurations with different video controller cards. To determine the configuration of your computer, see "Determining Your Computer's Configuration" on page 23.

video type	128-bit memory interface
data bus	PCI Express
video controller	NVIDIA Quadro FX 1600M 256MB

Video (continued)

video memory	256 MB, additional system memory will be used through TurboCache.
LCD interface	LVDS
TV support	NTSC or PAL in S-video and composite modes

Audio

Audio type	High Definition Audio (HDA) codec
Stereo conversion	24-bit (analog-to-digital and digital-to-analog)
Interfaces:	
Internal	HDA bus
External	stereo microphone-in/Line-in connector, stereo headphones/speakers connector
Speaker	stereo 2W per channel main speakers
Internal speaker amplifier	2W per channel main amplifier
Volume controls	keyboard shortcuts, program menus, media control buttons
Audio controller	IDT STAC9205 codec

Display

Type (active-matrix TFT)	WXGA+; WUXGA
Overall Mechanical Dimensions:	
Height	245.0 mm (9.64 inches)
Width	383.0 mm (15 inches)
Diagonal	454.5 mm (17.9 inches)
Maximum resolutions:	
WXGA+	1440 x 900 at 16.7 million colors
WUXGA	1920 x 1200 at 16.7 million colors
Refresh rate	60 Hz

Display (continued)

Operating angle	0° (closed) to 180°
Viewing angle (typical):	
Horizontal	±40° (WXGA+) ±60° (WUXGA)
Vertical	+15°/-30° (WXGA+) +40°/-50° (WUXGA)
Pixel pitch:	
WXGA+	0.255 mm (17-inch display)
WUXGA	0.191 mm (17-inch display)
Power consumption (panel with backlight) (typical):	7.54 W
Controls	brightness can be controlled through keyboard shortcuts

Keyboard

Number of keys	87 (U.S. and Canada); 88 (Europe); 91 (Japan)
Layout	<u>Q</u> WERTY/AZERTY/Kanji

Touch Pad

X/Y position resolution (graphics table mode)	240 cpi
Size:	
Width	73.0-mm (2.88-inch) sensor-active area
Height	42.9-mm (1.69-inch) rectangle

Battery

Type	9-cell "smart" lithium ion(484g)
Dimensions:	
Depth	88.5 mm (3.48 inches)

Battery (continued)

Height	21.5 mm (0.83 inches)
Width	139.0 mm (5.47 inches)
Weight	0.484 kg (9 cell)
Voltage	10.8 VDC
Charge time (approximate):	
Computer off	2 hours (at 100% in 2 hours) 1 hour (at 80% in 1 hour)
Operating time	Battery operating time varies depending on operating conditions and can be significantly reduced under certain power-intensive conditions. See "Power Problems" on page 128. See "Using a Battery" on page 43 for more information on battery life.
Life span (approximate)	300 discharge/charge cycles
Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	-40° to 65°C (-40° to 149°F)

AC Adapter

NOTE: For optimum system performance, always use a 130-Watt adapter. Using less powerful AC adapters may cause you to receive a **Warning** message and may also cause your computer to experience a degradation in performance.

Input voltage	90–264 VAC
Input current (maximum)	2.5 A
Input frequency	47–63 Hz
Output current	7.7 A (maximum at 4-second pulse); 6.7 A (continuous)
Output power	130 Watt
Rated output voltage	19.5 VDC
Dimensions:	

AC Adapter (continued)

Height	36 mm (1.35 inches)
Width	65 mm (2.39 inches)
Depth	169.5 mm (6.04 inches)
Weight (with cables)	0.76 kg (1.68 lb)
Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	-40° to 65°C (-40° to 149°F)

Physical

Height	41.5 mm (1.6 inches)
Width	394 mm (15.5 inches)
Depth	288 mm (11.3 inches)
Weight (with 9-cell battery):	
With optical drive	3.96 kg (8.7 lb)

Environmental

Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	-40° to 65°C (-40° to 149°F)
Relative humidity:	
Operating	10% to 90% (noncondensing)
Storage	5% to 95% (noncondensing)
Maximum vibration (using a random-vibration spectrum that simulates user environment):	
Operating	0.66 GRMS
Storage	1.3 GRMS
Maximum shock (measured with a 2-ms half-sine pulse):	
Operating	143 G

Environmental (continued)

Storage	163 G
Altitude (maximum):	
Operating	-15.2 to 3048 m (-50 to 10,000 ft)
Storage	-15.2 to 10,668 m (-50 to 35,000 ft)
Airborne contaminant level	G2 or lower as defined by ISA-S71.04-1985

Appendix

Macrovision Product Notice

This product incorporates copyright protection technology that is protected by U.S. patents and other intellectual property rights. Use of this copyright protection technology must be authorized by Macrovision, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.


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 Precision™ M6300
- Model number: PP05XA
- 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*.

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.

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.

Blu-ray Disc™ (BD)— An optical storage technology offering storage capacity of up to 50 GB, full 1080p video resolution (HDTV required), and as many as 7.1 channels

of native, uncompressed surround sound. BD-R is a recordable Blu-ray Disc that can be written to once. BD-RE is a Blu-ray Disc that can be erased and re-recorded multiple times.

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 media — A CD, DVD, or floppy 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, DVD, or floppy disk available. Your *Drivers and Utilities* media is an example of bootable media.

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.

CMOS — A type of electronic circuit. Computers use a small amount of battery-powered CMOS memory to hold date, time, and system setup options.

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 — provides port replication, cable management, and security features to adapt your notebook to a desktop workspace.

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 — A 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.

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.

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 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).

travel module — A plastic device designed to fit inside the module bay of a portable computer to reduce the weight of the computer.

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.

U

UAC — user account control— Microsoft Windows Vista® security feature that, when enabled, provides an added layer of security between user accounts and access to operating system settings.

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.

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.

