Using the Dell Diagnostics

When to Use the Dell Diagnostics

Whenever a major component or device in your computer does not function properly, you may have a component failure. If you are experiencing a problem with your Dell™ computer, perform the checks in "Solving Problems" and run the Dell Diagnostics *before* you call Dell for technical assistance. Running the Dell Diagnostics may help you to resolve the problem yourself quickly without having to contact Dell for assistance.

If you are experienced with computers and know what component(s) you need to test, select the appropriate diagnostic test group(s) or subtest(s). If you are unsure about how to begin diagnosing a problem, see "Starting the Dell Diagnostics."

Features of the Dell Diagnostics

The Dell Diagnostics helps you to check your computer hardware without any additional equipment and without destroying any data. By using the diagnostics, you can have confidence in the operation of your computer. If you find a problem that you cannot solve by yourself, the diagnostic tests can provide you with important information you need when talking to Dell's service and support personnel.

NOTICE: Use the Dell Diagnostics to test only your Dell computer. Using this program with other computers may cause incorrect computer responses or result in error messages.

The diagnostic test groups or subtests also have the following features:

- Options that let you perform express, extended, or custom tests on one or all devices
- An option that allows you to select tests based on a symptom of the problem you are having
- An option that allows you to choose the number of times a test group or subtest is repeated
- The ability to display test results
- Options to temporarily suspend testing if an error is detected, or to terminate testing
- Extensive online Help that describes the tests and devices
- Status messages that inform you whether test groups or subtests were completed successfully
- Error messages that appear if any problems are detected

Starting the Dell Diagnostics

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

NOTE: If your computer cannot display a screen image, contact Dell.

1. Shut down the computer.
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.

NOTE: If you cannot see anything on your display, you can hold down the mute button and press the power button (instead of F12) to begin the Dell Diagnostics. You do not need to highlight **Diagnostics** and press <Enter>. The computer automatically runs the Pre-boot System Assessment.

4. Turn on the computer. When the DELL™ logo appears, press <F12> 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.
5. When the boot device list appears, highlight **Diagnostics** and press <Enter>.

   The computer begins to run the Pre-boot System Assessment, a series of embedded diagnostics that perform initial testing on your system board, keyboard, hard drive, and display.

   - During the assessment, answer any questions that appear.
   - If a component failure is detected, the computer stops and beeps. To stop the assessment and reboot to the operating system, press <N>; to continue to the next test, press <Y>; to retest the component that failed, press <R>.
   - If failures are detected during the Pre-boot System Assessment, write down the error code(s) and contact Dell before continuing on to the Dell Diagnostics.
   - If you receive a message stating that no Diagnostics utility partition has been found, follow the instructions on the screen to run the Dell Diagnostics from your *Drivers and Utilities* CD.

   If the Pre-boot System Assessment completes successfully, you receive the message `Booting Dell Diagnostic Utility Partition. Press any key to continue.`

6. Press any key to start the Dell Diagnostics from the Diagnostics utility partition on your hard drive.
7. After the Dell Diagnostics loads and the **Main Menu** screen appears, click the button for the option you want.

NOTE: The Service Tag for your computer is located in the title bar of each screen.

Option	Function
Express Test	**Performs a quick test of devices. The test typically takes 10 to 20 minutes and requires no interaction on your part. Run Express Test first to increase the**

	possibility of tracing the problem quickly.
Extended Test	**Performs a thorough check of devices. The test typically takes 1 hour or more and requires you to answer questions periodically.**
Custom Test	**Tests a specific device. You can customize the tests to be run.**
Symptom Tree	**Allows you to select tests based on a symptom of the problem you are experiencing. The option lists the most common symptoms.**

8. If a problem is encountered during a test, a message appears, displaying the error code and a description of the problem. Write down the error code and problem description and follow the instructions on the screen. If you cannot resolve the error condition, contact Dell.

9. 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 problem description.
Help	Describes the test and may indicate requirements for running the test.
Configuration	Displays your hardware configuration for the selected device. The Dell Diagnostics obtains your configuration information for all devices from the system setup program, memory, and various internal tests and displays the information in the device list in the left pane of the screen. The device list may not display the names of all the components installed on your computer or all devices attached to your computer.
Parameters	Allows you to customize the test by changing the test settings.

10. When you have finished running a test, close the screen to return to the **Main Menu** screen. To exit the Dell Diagnostics and reboot the computer, close the **Main Menu** screen.

Cleaning Your Computer

Computer and Keyboard

1. Shut down your computer, disconnect any attached devices, and disconnect them from their electrical outlets.
2. Remove any installed batteries.
3. Gently use a vacuum cleaner with a brush attachment to remove dust from the slots and holes on your computer and between the keys on the keyboard.

NOTICE: To avoid damaging the computer or display, do not spray cleaning solution directly onto the display. Only use products specifically designed for cleaning LCDs, and follow the instructions that are included with the product.

4. Moisten a soft, lint-free cloth with water or an LCD cleaner, and wipe the computer and keyboard. Do not allow water from the cloth to seep between the touch pad and the surrounding palm rest.

Display

NOTICE: To avoid damaging the computer or display, do not spray cleaning solution directly onto the display. Only use products specifically designed for cleaning LCDs, and follow the instructions that are included with the product.

1. Shut down your computer, disconnect any attached devices, and disconnect them from their electrical outlets.
2. Remove any installed batteries.
3. Moisten a soft, lint-free cloth with water or an LCD cleaner, and wipe the display until it is clean.

Touch Pad

1. Shut down your computer, disconnect any attached devices, and disconnect them from their electrical outlets.
2. Remove any installed batteries.
3. Moisten a soft, lint-free cloth with water, and stroke 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.

Floppy Drive

Use only a commercially available cleaning kit to clean your floppy drive. Such kits contain pretreated floppy disks to remove contaminants that accumulate during typical operation.

Optical Media

NOTICE: Always use compressed air to clean the lens in the drive, and follow the instructions that are included with the compressed air. Never touch the lens in the drive.

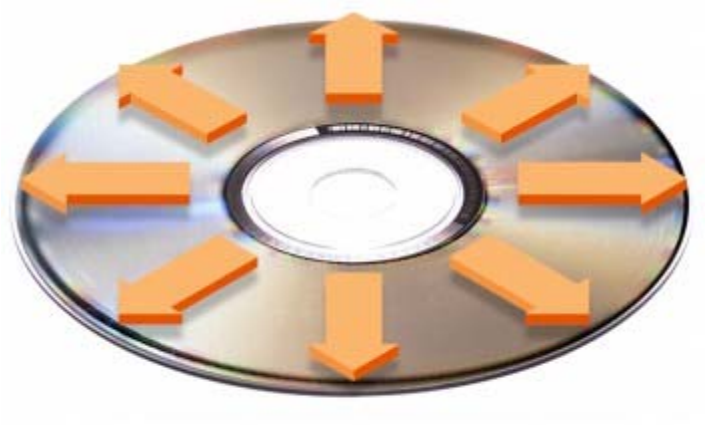
If you notice problems, such as skipping, with the playback quality of your CDs or DVDs, try cleaning the discs.

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

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

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

You can also purchase commercial products that clean discs and provide some protection from dust, fingerprints, and scratches. Cleaning products for CDs are safe to use on DVDs.



Reinstalling Software

Reinstalling Drivers and Utilities

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

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

To reinstall drivers for optional devices such as wireless communications and DVD drives, you may need the CD and documentation that came with those devices.

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

To reinstall a driver or utility from your *Drivers and Utilities* CD:

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

   In most cases, the CD starts running automatically. If it does not, start Microsoft® 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).

   A welcome screen appears.
4. Click **Next**. The CD automatically scans your hardware to detect drivers and utilities used by your computer.

   After the CD completes the hardware scan, you can also 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.

5. Click the link of a specific driver or utility to display information about the driver or utility that you want to install.
6. 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 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 for Windows XP

NOTE: If you are reinstalling an infrared-sensor driver, you must first enable the infrared sensor in the system setup program before continuing with the driver installation.

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

Using the Windows XP Device Driver Rollback

If you install a new device driver that causes system instability, you can use the Windows XP Device Driver Rollback to replace the new device driver with the previously installed version of the device driver. If you cannot reinstall your previous driver by using the Device Driver Rollback process, then use System Restore to return your operating system to its previous operating state before you installed the new device driver. To use Device Driver Rollback:

1. Click the **Start** button and right-click **My Computer**.
2. Click **Properties**.
3. Click the **Hardware** tab and click **Device Manager**.

4. In the **Device Manager** window, right-click the device for which the new driver was installed and then click **Properties**.
5. Click the **Drivers** tab.
6. Click **Roll Back Driver**.

Manually Reinstalling Drivers for Windows 2000

NOTE: If you are reinstalling an infrared driver, you must first enable the infrared sensor in the system setup program before continuing with the driver installation.

1. After extracting the driver files to your hard drive as described previously, click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Hardware** tab.
4. Click **Device Manager**.
5. Double-click the type of device for which you are installing the driver (for example, **Modems** or **Infrared devices**).
6. Double-click the name of the device.
7. Click the **Driver** tab and click **Update Driver**.
8. Click **Next**.
9. Ensure that **Search for a suitable driver for my device (recommended)** is selected, and then click **Next**.
10. Ensure that the **Specify a location** check box is checked and that all other check boxes are unchecked, and click **Next**.
11. Click **Browse** to browse to the location to which you previously extracted the driver files.
12. When the name of the appropriate driver appears, click **Next**.
13. Click **Finish** and restart your computer.

Resolving Software and Hardware Incompatibilities

In the Microsoft® Windows® XP and Windows 2000 operating systems, IRQ conflicts occur if a device either is not detected during the operating system setup or is detected but incorrectly configured. See the following subsection that corresponds to your operating system to check for IRQ conflicts on your computer.

Windows XP

1. Click the **Start** button and click **Control Panel**.
2. Click **Performance and Maintenance** and click **System**.

3. Click the **Hardware** tab and click **Device Manager**.
4. In the **Device Manager** list, check for conflicts with the other devices.

   Conflicts are indicated by a yellow exclamation point (!) beside the conflicting device or a red X if the device has been disabled.

5. Double-click any conflicting device listed to bring up the **Properties** window so that you can determine what needs to be reconfigured or removed from the Device Manager.
6. Resolve these conflicts before checking specific devices.
7. Double-click the malfunctioning device type in the **Device Manager** list.
8. Double-click the icon for the specific device in the expanded list.

   The **Properties** window appears.

   If an IRQ conflict exists, the **Device status** area in the **Properties** window reports what other devices are sharing the device's IRQ.

9. Resolve any IRQ conflicts.

You can also use the Windows XP Hardware Troubleshooter. To use the troubleshooter, click the **Start** button and click **Help and Support**. Type `hardware troubleshooter` in the **Search** field, and then click the arrow to start the search. Click **Hardware Troubleshooter** in the **Search Results** list. In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer** and click **Next**.

Windows 2000

1. Click the **Start** button, point to **Settings**, and then click **Control Panel**.
2. Double-click the **System** icon.
3. Click the **Hardware** tab.
4. Click **Device Manager**.
5. Click **View** and click **Resources by connection**.
6. Double-click **Interrupt request (IRQ)** to view the IRQ assignments.

   Conflicts are indicated by a yellow exclamation point (!) beside the conflicting device or a red X if the device has been disabled.

7. Double-click any conflicting device listed to bring up the **Properties** window so that you can determine what needs to be reconfigured or removed from the Device Manager. Resolve these conflicts before checking specific devices.
8. Double-click the malfunctioning device type in the **Device Manager** list.
9. Double-click the icon for the specific device in the expanded list.

   The **Properties** window appears.

   If an IRQ conflict exists, the **Device status** area in the **Properties** window reports what other devices are sharing the device's IRQ.

10. Resolve any IRQ conflicts.

You can also use the Windows 2000 Hardware Troubleshooter. To use the troubleshooter, click the **Start** button and click **Help**. Click **Troubleshooting and Maintenance** on the **Contents** tab, click **Windows 2000 troubleshooters**, and then click **Hardware**. In the **Hardware Troubleshooter** list, click **I need to resolve a hardware conflict on my computer**, and then click **Next**.

Using Microsoft® Windows® System Restore

The Microsoft Windows XP operating system provides a System Restore feature that allows you to return your computer to an earlier operating state if changes to the computer's hardware, software (including new hardware or program installations), or system settings have left the computer in an undesirable operating state. You can also undo the last *system restore*.

System Restore automatically creates system checkpoints. You can also manually create your own checkpoints by creating *restore points*. To limit the amount of hard disk space used, older restore points will be automatically purged.

To resolve an operating system problem, you can use System Restore from Safe Mode or Normal Mode to return your computer to an earlier operating state.

System Restore does not cause you to lose personal files stored in the **My Documents** folder, data files, or e-mail messages after restoring the computer to an earlier time. If you restore the computer to an operating state that existed before you installed a program, the program's data files are not lost, but you must reinstall the actual program again.

NOTICE: It is important to make regular backups of your data files. System Restore does not monitor changes to or recover your data files. If the original data on the hard disk is accidentally erased or overwritten, or if it becomes inaccessible because of a hard disk malfunction, use your backup files to recover the lost or damaged data.

System Restore is enabled on your new computer. However, if you reinstall Windows XP with less than 200 MB of free hard-disk space available, System Restore is automatically disabled. Before you use System Restore, confirm that it is enabled:

1. Click the **Start** button and click **Control Panel**.
2. Click the **Performance and Maintenance**.
3. Click **System**.
4. Click the **System Restore** tab.
5. Ensure that **Turn off System Restore** is not checked.

Creating a Restore Point

In Windows XP, you can either use the System Restore Wizard or manually create a restore point.

Using the System Restore Wizard

To use the System Restore Wizard, click the **Start** button, click **Help and Support**, click **System Restore**,

and then follow the instructions in the **System Restore Wizard** window. You can also create and name a restore point if you are logged on as the computer administrator or a user with administrator rights.

Manually Creating a Restore Point

1. Click the **Start** button, point to **All Programs**→ **Accessories**→ **System Tools**, and then click **System Restore**.
2. Click **Create a restore point**.
3. Click **Next**.
4. Type a name for the new restore point in the **Restore point description** field.

   The present date and time are automatically added to the description of the new restore point.
5. Click **Create**.
6. Click **OK.**

Restoring the Computer to an Earlier Operating State

If problems occur after installing a device driver, first try using Device Driver Rollback. If Device Driver Rollback does not resolve the problem, then use System Restore.

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

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

   The **Select a Restore Point** screen provides a calendar that allows you to see and select restore points. All calendar dates with available restore points appear in bold.
4. Select a restore point and click **Next**.

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

NOTICE: Save and close all open files and exit all open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.

5. Click **Next**.

   In Windows XP, the **Restoration Complete** screen appears after System Restore finishes collecting data, and then the computer automatically restarts.
6. After the computer restarts, click **OK**.

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

Undoing the Last System Restore

NOTICE: Save and close all open files and exit all open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.

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

NOTICE: Save and close all open files and exit all open programs. Do not alter, open, or delete any files or programs until the system restoration is complete.

3. Click **Next**.

   The **System Restore** screen appears, and then the computer automatically restarts.
4. After the computer restarts, click **OK**.

Reinstalling Windows® XP

Before reinstalling the Microsoft® Windows XP operating system to correct a problem, try correcting the problem by using Windows System Restore.

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

1. Insert the *Operating System* CD.
2. Shut down the computer, and then turn on the computer.
3. Press any key when the `Press any key to boot from CD` message appears on the screen.
4. When the **Windows XP Setup** screen appears, press <Enter> to select **To set up Windows now**.
5. Read the information in the **License Agreement** window, and then press <F8> on your keyboard to agree with the license information.
6. If your computer already has Windows XP installed and you want to recover your current Windows XP data, type `r` to select the repair option, and then go to step 15.

   If you want to install a new copy of Windows XP, press <Esc> to select the fresh copy option and then press <Enter> on the next screen to select the highlighted partition (recommended). Then follow the instructions on the screen.

   The **Windows XP Setup** screen appears and Windows XP begins to copy files and install the device

drivers. The computer automatically restarts multiple times before it requires additional input.

7. When the **Welcome to Microsoft** screen appears, click the green arrow icon at the bottom of the screen to continue. Then follow the instructions on the screen to finish the installation.
8. When the **Regional Settings** screen appears, select the settings for your locale and click **Next**.
9. Enter your name and organization in the **Personalize Your Software** screen and click **Next**.
10. *If you are reinstalling Windows XP Home Edition*, enter a name for your computer when the **Computer Name** window appear and click **Next**.

    If you are reinstalling Windows XP Professional, enter a name for your computer and a password when the **Computer Name and Administrator Password** window appears and click **Next**.
11. If you have a modem installed, the **Modem Dialing Information** screen appears. Enter the requested information and click **Next**.
12. Enter the date, time, and time zone in the **Date and Time Settings** window and click **Next**.
13. If your computer has a network adapter, select the appropriate network settings. If your computer does not have a network adapter, you do not see this option.

    Windows XP begins to install its components and configure the computer. The computer automatically restarts.
14. When the **Welcome to Microsoft** screen appears, click the green arrow icon at the bottom of the screen to continue. Then follow the instructions on the screen to complete the installation.
15. Remove the CD from the drive.
16. Reinstall the appropriate drivers.
17. Reinstall your virus protection software.

Reinstalling Windows 2000

NOTICE: The *Operating System* CD provides options for reinstalling the Windows 2000 operating system. The options can potentially overwrite files installed by Dell and possibly affect programs installed on your hard drive. Therefore, do not reinstall your operating system unless instructed to do so by a Dell technical support representative.

1. Turn on the computer, and enter the system setup program as directed by a Dell technical support representative or as follows:
    a. Shut down the computer.
    b. Before the computer boots into Windows, press <F2> to enter the system setup program.
    c. Press <Alt><P> to move to the **Boot** menu.
    d. In the system setup program **Boot** menu, follow the instructions on the screen to change the boot sequence so that the CD or DVD drive boots first. Then insert the *Operating System* CD into the drive.

e. Press <Esc> to save your changes and exit the system setup program.

f. Press any key to boot the computer from the CD.

2. When the **Windows 2000 Setup** window appears, ensure that **To setup Win2000 now, press ENTER** is highlighted. Then press <Enter>.

3. Read the information in the **License Agreement** window and press <F8> to continue.

4. When the **Windows 2000 Professional Setup** window appears, press the arrow keys to select the Windows 2000 partition option that you want. Then press the key for the partition option you chose.

5. When the **Windows 2000 Professional Setup** window reappears, press the arrow keys to select the type of file system that you want Windows 2000 to use, and then press<Enter>.

6. Press <Enter> again to restart your computer.

7. Click **Next** when the **Welcome to the Windows 2000 Setup Wizard** window appears.

8. When the **Regional Settings** window appears, select your region, and then click **Next**.

9. Enter your name and organization in the **Personalize Your Software** window and click **Next**.

10. Enter the Windows product key, which is printed on the Microsoft label on your computer. Then click **Next**.

11. When the **Computer Name and Administrator Password** window appears, enter a name for your computer and a password, if desired. Then click **Next**.

12. Enter the date and time in the **Date and Time Settings** window and click **Next**.

    Windows 2000 installs components and configures the computer.

13. When the **Completing the Windows 2000 Setup Wizard** window appears, remove the CD from the drive and click **Finish**.

    The computer automatically restarts.

Enabling Hibernate Mode

1. Click the **Start** button, point to **Settings** and click **Control Panel**.

2. Double-click the **Power Management** icon.

3. Click the **Hibernate** tab.

4. Ensure that **Enable hibernate support** is selected and click **Apply**.

5. Click **OK** to close the Control Panel.

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 "Shutting Down Your Computer."
- You have read the safety information in your *System Information Guide.*

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 floppy disk or CD

Shutting Down Your Computer

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

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

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.

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

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

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

1. Ensure that the work surface is flat and clean to prevent the computer cover from being scratched.
2. Shut down the computer.
3. Ensure that the computer and any attached devices are turned off. If your computer and attached devices did not automatically turn off when you shut down your computer, press and hold the power button for 4 seconds.
4. 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 it from the network wall jack.

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

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

7. Remove any installed PC Cards from the PC Card slot.
8. Close the display and turn the computer upside down on a flat work surface.

NOTICE: To avoid damaging the system board, you must remove the main battery before you service the computer.

9. Slide and hold the battery-bay latch release on the bottom of the computer, and then remove the battery from the bay.
10. Remove any installed modules, including a second battery, if installed.
11. Remove the hard drive.

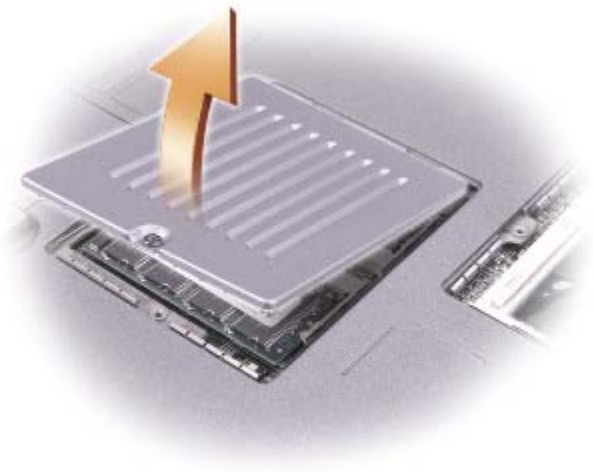
Memory

You can increase your computer memory by installing memory modules on the system board. See "Specifications" for information on the memory supported by your computer. Be sure to add only memory modules that are intended for your computer.

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

CAUTION: Before working inside your Dell™ computer, read the safety instructions in your *System Information Guide*.

1. Turn the computer over, remove the screw from the memory module cover, and lift the cover.



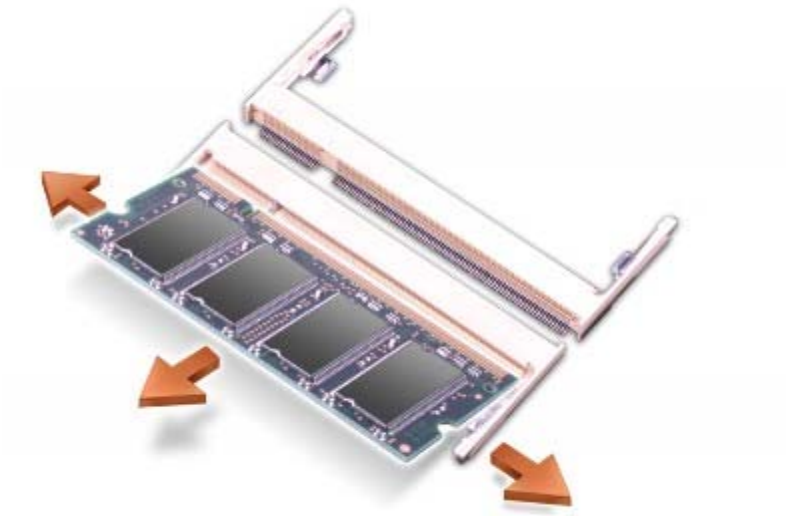
NOTICE: To prevent damage to the memory module connector, do not use tools to spread the inner metal tabs that secure the memory module.

2. If you are replacing a memory module, remove the existing module.

NOTICE: Handle memory modules by their edges, and do not touch the components on a 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.



NOTICE: If you need to install memory modules in two connectors, install a memory module in the connector labeled "JDIM (DIMMA)" before you install a module in the connector labeled "JDIM2 (DIMMB)."

3. Ground yourself and install the new memory module:
   a. Align the notch in the module with the slot in the center of the connector.
   b. Slide the edge of the module firmly into the connector, and rotate the module down until you feel a click. If you do not feel the click, remove the module and reinstall it.

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

4. Replace the cover and screw.

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.

5. Insert the battery into the battery bay, or connect the AC adapter to your computer and an electrical outlet.
6. Turn on the computer.

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

Keyboard

CAUTION: Before performing the following procedures, read the safety instructions in your *System 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. Turn the computer top-side up and open it.

1	display
2	center control cover
3	palm rest

2. Remove the center control cover:

   a. Open the display all the way (180 degrees) so that it lies flat against your work surface.

   b. Starting on the right side of the computer, use a plastic scribe to pry up the center control cover. Lift it away from the computer, and lay it aside.

1	center control cover

3. Remove the keyboard:

    a. Remove the two M2.5 x 6-mm screws across the top of the keyboard.

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

    b. Rotate the keyboard up and slide it forward.

    c. Hold the keyboard up and slightly forward to allow access to the keyboard connector.

    d. Pull up on the keyboard connector tab to disconnect the keyboard connector from the system board.

1	M2.5 x 6-mm screws (2)
2	keyboard tabs
3	palm rest

NOTE: When you replace the keyboard, ensure that the keyboard tabs are completely in place to avoid scratching the palm rest.

Bluetooth™

If you ordered a Bluetooth card with your computer, the card is already installed.

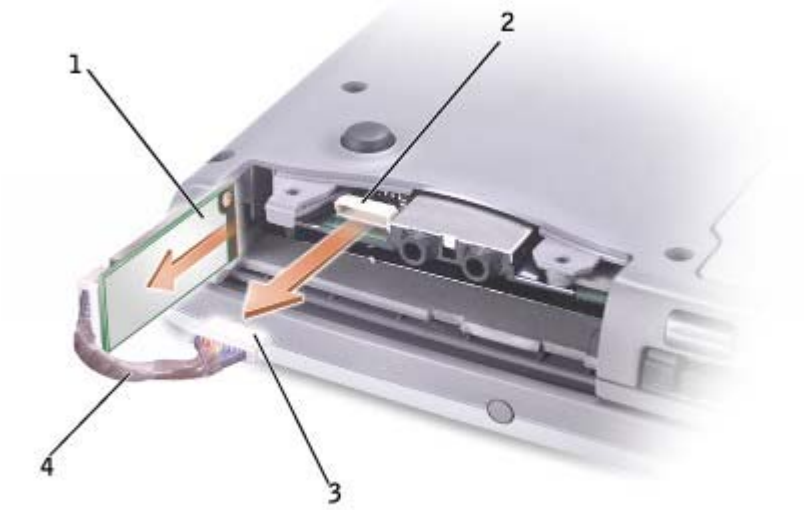
CAUTION: Before working inside your computer, read the safety instructions in your *System Information Guide*.

1. Ensure that the work surface is flat and clean to prevent scratching the computer cover.
2. Save and close any open files, exit any open programs, and then shut down the computer.
3. If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.
4. Disconnect the computer from the electrical outlet.
5. Wait 10 to 20 seconds, and then disconnect any attached devices.
6. Remove any installed PC Cards, batteries, and module bay devices.

NOTICE: Handle components and cards by their edges, and avoid touching pins and contacts. Ground yourself by touching a metal connector on the back of the computer. Continue to ground yourself periodically during this procedure.

7. Remove the Hard Drive.

8. Pull the Bluetooth card connector out of the system board connector.
9. Pull the cable to remove the Bluetooth card from the computer.



1	Bluetooth card
2	system board connector
3	Bluetooth card connector
4	cable

NOTE: When replacing the Bluetooth card, ensure the Bluetooth cable is routed correctly so that you do not damage the cable when you install the hard drive.

Mini PCI Card

CAUTION: FCC rules strictly prohibit users from installing 5-GHz (802.11a,802.11a/b, 802.11a/b/g) Wireless LAN Mini PCI cards. Under no circumstances should the user install such a device. Only trained Dell service personnel are authorized to install a 5-GHz Wireless LAN Mini PCI card.

If you are removing and/or installing a 2.4-GHz (802.11b, 802.11b/g) Mini PCI card, follow the instructions noted below. Only products approved for use in your portable computer may be installed. Approved Mini PCI cards may be purchased only from Dell.

NOTE: 2.4-GHz Wireless LAN PC Cards may be removed and installed by the user.

If you ordered a Mini PCI card at the same time that you ordered your computer, the card is already installed.

NOTE: Handle components and cards by their edges, and avoid touching pins and contacts.

CAUTION: Before working inside your computer, read the safety instructions in your *System*

***Information Guide*.**

1. Turn the computer over, and remove the screw from the Mini PCI card cover.

2. Place your finger under the cover at the indentation, and lift and slide the cover open.

3. If a Mini PCI card is not already installed, go to step 6. If you are replacing a Mini PCI card, remove the existing card:

    a. Disconnect the Mini PCI card from any attached cables.

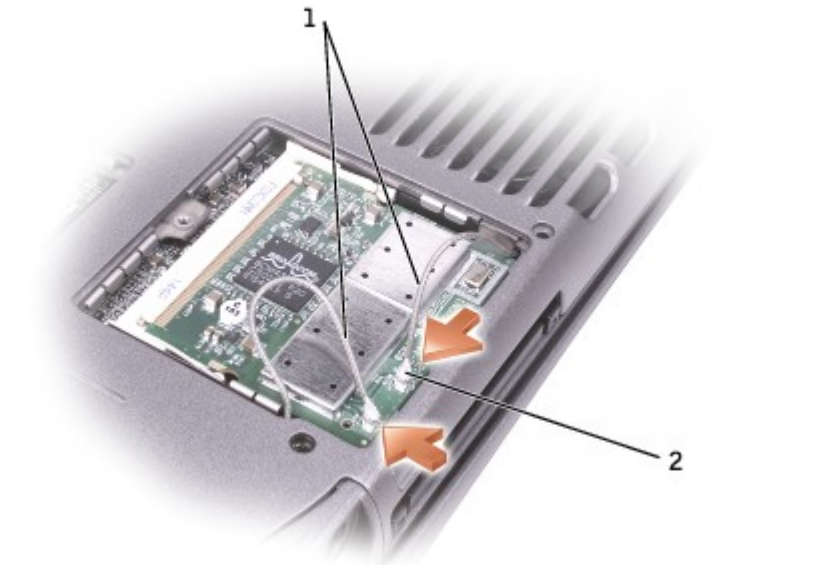
    b. Release the Mini PCI card by spreading the metal securing tabs until the card pops up slightly.

    c. Lift the Mini PCI card out of its connector.

4. Align the new Mini PCI card with the connector at a 45-degree angle, and press the Mini PCI card into the connector.

5. Connect the antenna cables from the Mini PCI card to the antenna connectors on the computer.

NOTICE: The connectors are keyed for correct insertion; do not force the connections.



1	antenna connectors on card (2)
2	antenna cables (2)

6. Lower the Mini PCI card toward the inner tabs to approximately a 20-degree angle.
7. Continue lowering the Mini PCI card until it snaps into the inner tabs of the connector.
8. Replace the cover.

Hard Drive

NOTICE: To prevent data loss, shut down 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.

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, read the safety instructions in your *System Information Guide*.

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

1. Turn the computer over. Use a small screwdriver to loosen the captive hard drive screw.

1	captive screws

2. Turn the computer over so that it is upright.

NOTICE: You cannot remove your hard drive unless you open your display first.

3. Open the display approximately 2.54 cm (1 in).

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

4. Pull the hard drive cover out of the computer.
5. Remove the new drive from its packaging.

   Save the original packaging for use when storing or shipping the hard drive.

NOTICE: You cannot replace your hard drive unless you open your display first.

6. Ensure that the display is open approximately 2.54 cm (1 inch).

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

7. Press the hard drive cover into the bay until it is fully seated in the bay.
8. Turn the computer over. Use a small screwdriver to tighten the screw.
9. Use the *Operating System* CD to install the operating system for your computer.
10. Use the *Drivers and Utilities* CD to install the drivers and utilities for your computer.

Connecting a Television to the Computer

Your computer has an S-video TV-out connector that enables you to connect the computer to a television. Using a commercially available S-video cable or composite video cable, you can connect the computer to a television in one of two ways:

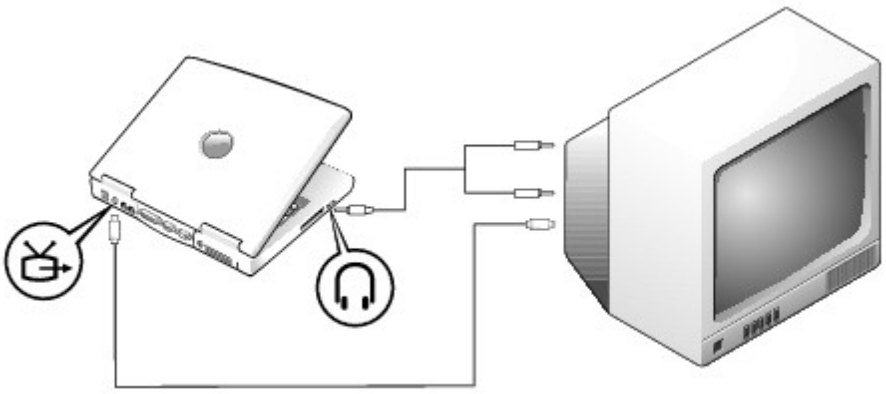
- S-video (for a television with S-video input)
- Composite video (for a television with only a composite video input; also uses a composite TV-out adapter cable)

NOTE: Diagrams for each connection combination appear at the beginning of each subsection to help you determine which method you should use.

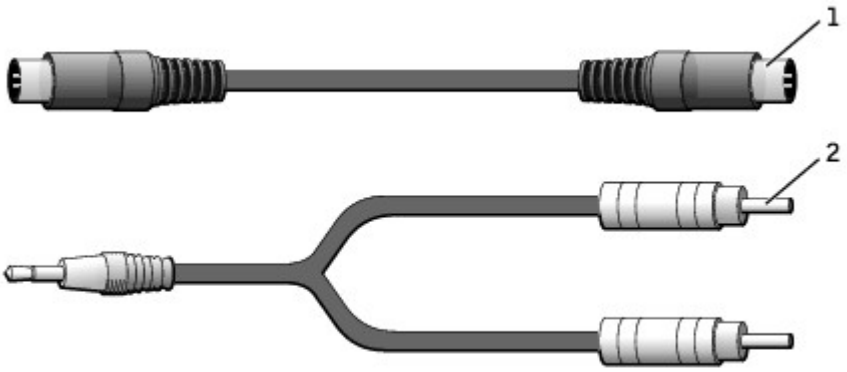
The audio connector on the side of the computer enables you to connect the computer to your television or audio device, using a commercially available audio cable.

When you complete the cable connection, see "Enabling the Display Settings for a Television" to ensure that the computer recognizes and works properly with the television.

S-Video Connection

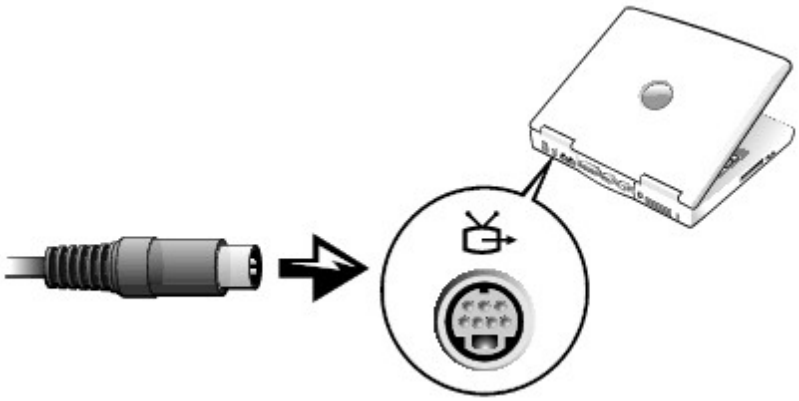


Before you begin, ensure that you have the following cables:

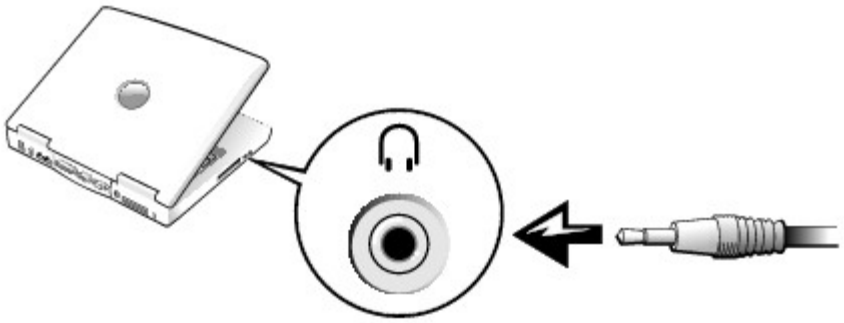


1	S-video cable
2	audio cable

1. Shut down the computer and the television and/or audio device you want to connect.
2. Plug one end of the S-video cable in to the S-video connector on the computer.

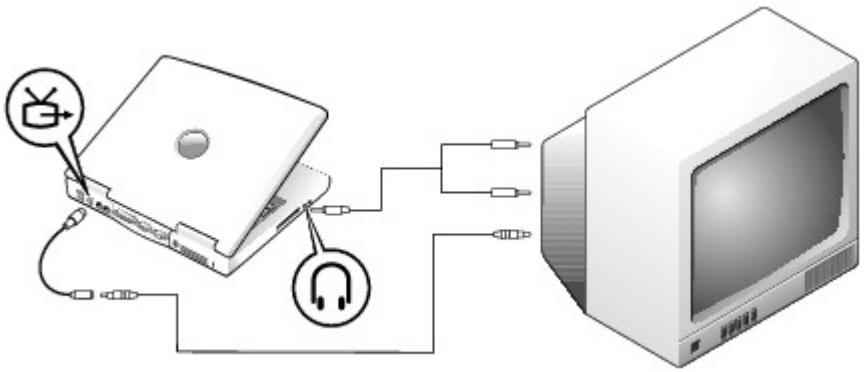


3. Plug the other end of the S-video cable in to your television.
4. Plug the single-connector end of the audio cable in to the headphone connector on your computer.

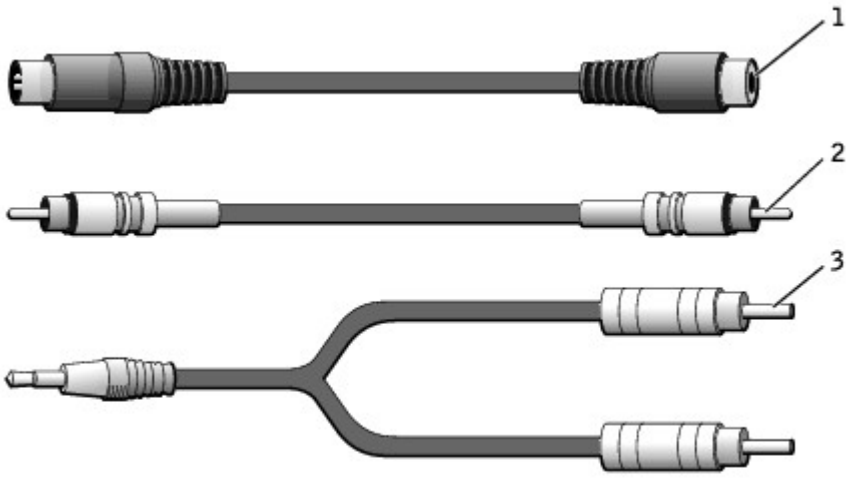


5. Plug the two RCA connectors on the other end of the audio cable in to the audio input connectors on your television or audio device.
6. Turn on the television, turn on any audio device you connected, and then turn on the computer.
7. See "Enabling the Display Settings for a Television" to ensure that the computer recognizes and works properly with the television.

Composite Video Connection

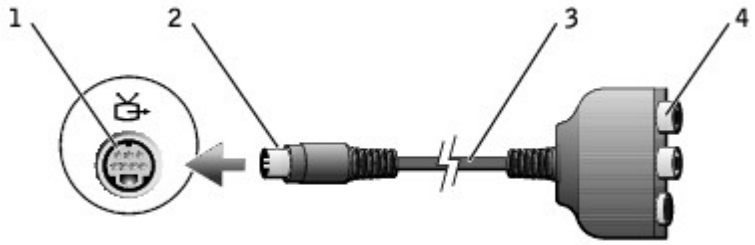


To connect the computer to a television that has a composite video input only, use a composite TV-out adapter cable available from Dell. Before you begin, ensure that you have the following cables:



1	composite TV-out adapter cable
2	composite video cable
3	audio cable

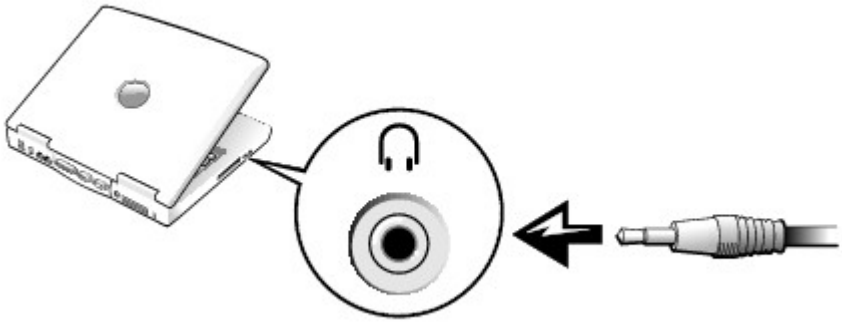
1. Turn off the computer and the television and/or audio device you want to connect.
2. Connect the composite TV-out adapter cable to the S-video TV-out connector on the computer.



1	S-video TV-out connector
2	S-video connector
3	composite TV-out adapter cable
4	composite video connector

3. Plug one end of the composite video cable in to the composite video connector on the composite TV-out adapter cable.

4. Plug the other end of the composite video cable in to the composite video connector on the television.
5. Plug the single-connector end of the audio cable in to 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 television or audio device.

Enabling the Display Settings for a Television

Intel UMA Integrated Video Controller

NOTE: Ensure that you properly connect the television before you enable the display settings.

1. Open the **Control Panel** window.

   In Microsoft® Windows® XP, click the **Start** button and click the **Control Panel** icon. Under **Pick a Category**, click **Appearance and Themes**.

   In Windows 2000, click the **Start** button, point to **Settings**, and then click **Control Panel**.

2. Double-click the **Display** icon, click the **Settings** tab, and then click **Advanced**.
3. Click the **Intel (R) Extreme Graphics** tab.
4. Click the **Graphic Properties** button.
5. If you want to use only a television without using the computer display or any other display options:
   a. In the new window, click **Television** so that a red check mark appears over the television icon.
   b. Ensure that the settings are correct.

6. If you want to use a television and the computer display at the same time:

    a. In the new window, click **Intel (R) Dual Display Clone** and ensure that one of the devices listed is a television.

    b. Click **Device Settings**.

    c. In the new window, ensure that the display resolution settings are correct.

7. Click **Apply** to view the new settings.

Using the 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, see your Microsoft® Windows® *Help* or the Windows Help and Support Center.

You can use the system setup program as follows:

- To set or change user-selectable features—for example, your 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.

NOTICE: Unless you are an expert computer user or are directed to do so by Dell technical support, do not change the settings for this program. 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 Windows logo appears, continue to wait until you see the Windows desktop. Then shut down your computer and try again.

System Setup Screens

The system setup screens display the current setup information and settings for your computer. On each

screen, the system setup options are listed at the left of the screen. 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.

The screens display such information as:

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

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 using the **Boot Order** page of the system setup program.

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**
- **CD/DVD/CD-RW 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 up-arrow key or down-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 key. Enabled items appear as white and display a small triangle to their 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.
2. Connect the computer to an electrical outlet.
3. 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.
4. 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 normal boot order is restored.

Changing Printer Modes

Set the **Parallel Mode** option according to the type of printer or device connected to the parallel connector. To determine the correct mode to use, see the documentation that came with the device.

Setting **Parallel Mode** to **Disabled** disables the parallel port and the port's LPT address, freeing its interrupt for another device to use.

Changing COM Ports

Serial Port allows you to map the serial port COM address or disable the serial port and its address, freeing its interrupt for another device to use.

Enabling the Infrared Sensor

1. Enter the system setup program:
   a. Turn on your computer.
   b. Press <F2> when the DELL logo appears.
2. Press <Alt><P> until you locate **Infrared Data Port** under **Basic Device Configuration**.
3. Press the down-arrow key to highlight **Disabled** next to **Infrared Data Port**.
4. Press the right-arrow key to change the setting to a COM port.

   Ensure that the COM port that you select is different from the COM port assigned to the serial connector.

5. Press the down-arrow key to select **Infrared Mode**, and press the right-arrow key to change the

setting to **Fast IR** or **Slow IR**.

It is recommended that you use **Fast IR**. If the infrared device cannot communicate with your computer, turn off the computer and repeat steps 1 through 5 to change the setting to **Slow IR**.

6. Press <Esc> to save the changes and exit the system setup program.

   If you are prompted to restart your computer, click **Yes**.

7. Follow the instructions on the screen while the infrared sensor driver is being installed.

8. At the end of the installation process, click **Yes** to restart the computer.

After you enable the infrared sensor, you can use it to establish a link to an infrared device. To set up and use an infrared device, see the infrared device documentation and Windows *Help*.

Getting Help

Technical Assistance

If you need help with a technical problem, Dell is ready to assist you.

⚠ **CAUTION: If you need to remove the computer covers, first disconnect the computer power and modem cables from all electrical outlets.**

1. Complete the procedures in "Solving Problems."
2. Run the Dell Diagnostics.
3. Make a copy of the Diagnostics Checklist and fill it out.
4. Use Dell's extensive suite of online services available at Dell Support (**support.dell.com**) for help with installation and troubleshooting procedures.
5. If the preceding steps have not resolved the problem, contact Dell.

NOTE: Call technical support from a telephone near or at the computer so that technical support 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 technical support service, see "Technical Support Service."

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.

Online Services

You can access Dell Support at **support.dell.com**. Select your region on the **WELCOME TO DELL SUPPORT** page, and fill in the requested details to access help tools and information.

You can contact Dell electronically using the following addresses:

- World Wide Web

  www.dell.com/

  www.dell.com/ap/ (for Asian/Pacific countries only)

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

  www.dell.com/la/ (for Latin American countries)

- Anonymous file transfer protocol (FTP)

  ftp.dell.com/

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

- Electronic Support Service

  mobile_support@us.dell.com

  support@us.dell.com

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

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

- Electronic Quote Service

  sales@dell.com

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

- Electronic Information Service

  info@dell.com

AutoTech Service

Dell's automated technical support service—AutoTech—provides recorded answers to the questions most frequently asked by Dell customers about their portable and desktop computers.

When you call AutoTech, use your touch-tone telephone to select the subjects that correspond to your questions.

The AutoTech service is available 24 hours a day, 7 days a week. You can also access this service through the technical support service. For the telephone number to call, see the contact numbers for your region.

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, see the contact numbers for your region.

Technical Support Service

Dell's technical support service is available 24 hours a day, 7 days a week, to answer your questions about Dell hardware. Our technical support staff uses computer-based diagnostics to provide fast, accurate answers.

To contact Dell's technical support service, see "Technical Assistance" and then call the number for your country as listed in "Contacting 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, see the contact numbers for your region.

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 to speak to a sales specialist, see the contact numbers for your region.

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, see the contact numbers for your region.

2. Include a copy of the invoice and a letter describing the reason for the return.
3. Include a copy of the Diagnostics Checklist indicating the tests you have run and any error messages reported by the Dell Diagnostics.
4. Include any accessories that belong with the item(s) being returned (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.

Remember to fill out the Diagnostics Checklist. If possible, turn on your computer before you call Dell for technical assistance and call from a telephone at or near the computer. You may be asked to type some commands at the keyboard, relay detailed information during operations, or try other troubleshooting steps possible only at the computer itself. Ensure that the computer documentation is available.

CAUTION: Before working inside your computer, read the safety instructions in your *System Information Guide*.

Diagnostics Checklist
Name:
Date:
Address:
Phone number:
Service tag (bar code on the back of the computer):
Express Service Code:
Return Material Authorization Number (if provided by Dell support technician):
Operating system and version:
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

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

- **www.dell.com**
- **support.dell.com** (technical support)
- **premiersupport.dell.com** (technical support for educational, government, healthcare, and medium/large business customers, including Premier, Platinum, and Gold customers)

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

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

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

Country (City) International Access Code Country Code City Code	Department Name or Service Area, Website and E-Mail Address	Area Codes, Local Numbers, and Toll-Free Numbers
Anguilla	General Support	toll-free: 800-335-0031
Antigua and Barbuda	General Support	1-800-805-5924
Argentina (Buenos Aires) International Access Code: **00** Country Code: **54** City Code: **11**	Website: **www.dell.com.ar**	
	Tech Support and Customer Care	toll-free: 0-800-444-0733
	Sales	0-810-444-3355
	Tech Support Fax	11 4515 7139
	Customer Care Fax	11 4515 7138
Aruba	General Support	toll-free: 800-1578
Australia (Sydney) International Access Code: **0011** Country Code: **61** City Code: **2**	E-mail (Australia): au_tech_support@dell.com	
	E-mail (New Zealand): nz_tech_support@dell.com	
	Home and Small Business	1-300-65-55-33
	Government and Business	toll-free: 1-800-633-559
	Preferred Accounts Division (PAD)	toll-free: 1-800-060-889
	Customer Care	toll-free: 1-800-819-339
	Corporate Sales	toll-free: 1-800-808-385
	Transaction Sales	toll-free: 1-800-808-312
	Fax	toll-free: 1-800-818-341
Austria (Vienna) International Access Code: **900** Country Code: **43** City Code: **1**	Website: **support.euro.dell.com**	
	E-mail: tech_support_central_europe@dell.com	
	Home/Small Business Sales	0820 240 530 00
	Home/Small Business Fax	0820 240 530 49
	Home/Small Business Customer Care	0820 240 530 14

	Preferred Accounts/Corporate Customer Care	0820 240 530 16
	Home/Small Business Technical Support	0820 240 530 14
	Preferred Accounts/Corporate Technical Support	0660 8779
	Switchboard	0820 240 530 00
Bahamas	General Support	toll-free: 1-866-278-6818
Barbados	General Support	1-800-534-3066
Belgium (Brussels) International Access Code: **00** Country Code: **32** City Code: **2**	Website: **support.euro.dell.com**	
	E-mail: tech_be@dell.com	
	E-mail for French Speaking Customers: **support.euro.dell.com/be/fr/emaildell/**	
	Technical Support	02 481 92 88
	Customer Care	02 481 91 19
	Corporate Sales	02 481 91 00
	Fax	02 481 92 99
	Switchboard	02 481 91 00
Bermuda	General Support	1-800-342-0671
Bolivia	General Support	toll-free: 800-10-0238
Brazil International Access Code: **00** Country Code: **55** City Code: **51**	Website: **www.dell.com/br**	
	Customer Support, Technical Support	0800 90 3355
	Tech Support Fax	51 481 5470
	Customer Care Fax	51 481 5480
	Sales	0800 90 3390
British Virgin Islands	General Support	toll-free: 1-866-278-6820
Brunei Country Code: **673**	Customer Technical Support (Penang, Malaysia)	604 633 4966
	Customer Service (Penang, Malaysia)	604 633 4949
	Transaction Sales (Penang, Malaysia)	604 633 4955
Canada (North York, Ontario) International Access Code: **011**	Online Order Status: **www.dell.ca/ostatus**	
	AutoTech (automated technical support)	toll-free: 1-800-247-9362
	TechFax	toll-free: 1-800-950-1329
	Customer Care (Home Sales/Small Business)	toll-free: 1-800-847-4096
	Customer Care (med./large business, government)	toll-free: 1-800-326-9463
	Technical Support (Home Sales/Small Business)	toll-free: 1-800-847-4096
	Technical Support (med./large bus., government)	toll-free: 1-800-387-5757
	Sales (Home Sales/Small Business)	toll-free: 1-800-387-5752
	Sales (med./large bus., government)	toll-free: 1-800-387-5755
	Spare Parts Sales & Extended Service Sales	1 866 440 3355

Cayman Islands	General Support	1-800-805-7541
Chile (Santiago) Country Code: **56** City Code: **2**	Sales, Customer Support, and Technical Support	toll-free: 1230-020-4823
China (Xiamen) Country Code: **86** City Code: **592**	Tech Support website: **support.ap.dell.com/china**	
	Tech Support E-mail: cn_support@dell.com	
	Tech Support Fax	818 1350
	Home and Small Business Technical Support	toll-free: 800 858 2437
	Corporate Accounts Technical Support	toll-free: 800 858 2333
	Customer Experience	toll-free: 800 858 2060
	Home and Small Business	toll-free: 800 858 2222
	Preferred Accounts Division	toll-free: 800 858 2062
	Large Corporate Accounts GCP	toll-free: 800 858 2055
	Large Corporate Accounts Key Accounts	toll-free: 800 858 2628
	Large Corporate Accounts North	toll-free: 800 858 2999
	Large Corporate Accounts North Government and Education	toll-free: 800 858 2955
	Large Corporate Accounts East	toll-free: 800 858 2020
	Large Corporate Accounts East Government and Education	toll-free: 800 858 2669
	Large Corporate Accounts Queue Team	toll-free: 800 858 2572
	Large Corporate Accounts South	toll-free: 800 858 2355
	Large Corporate Accounts West	toll-free: 800 858 2811
	Large Corporate Accounts Spare Parts	toll-free: 800 858 2621
Colombia	General Support	980-9-15-3978
Costa Rica	General Support	0800-012-0435
Czech Republic (Prague) International Access Code: **00** Country Code: **420** City Code: **2**	Website: **support.euro.dell.com**	
	E-mail: czech_dell@dell.com	
	Technical Support	02 2186 27 27
	Customer Care	02 2186 27 11
	Fax	02 2186 27 14
	TechFax	02 2186 27 28
	Switchboard	02 2186 27 11
Denmark (Copenhagen) International Access Code: **00**	Website: **support.euro.dell.com**	
	E-mail Support (portable computers): den_nbk_support@dell.com	
	E-mail Support (desktop computers):	

Country Code: **45**	den_support@dell.com	
	E-mail Support (servers): Nordic_server_support@dell.com	
	Technical Support	7023 0182
	Customer Care (Relational)	7023 0184
	Home/Small Business Customer Care	3287 5505
	Switchboard (Relational)	3287 1200
	Fax Switchboard (Relational)	3287 1201
	Switchboard (Home/Small Business)	3287 5000
	Fax Switchboard (Home/Small Business)	3287 5001
Dominica	General Support	toll-free: 1-866-278-6821
Dominican Republic	General Support	1-800-148-0530
Ecuador	General Support	toll-free: 999-119
El Salvador	General Support	01-899-753-0777
Finland (Helsinki) International Access Code: **990** Country Code: **358** City Code: **9**	Website: **support.euro.dell.com**	
	E-mail: fin_support@dell.com	
	E-mail Support (servers): Nordic_support@dell.com	
	Technical Support	09 253 313 60
	Technical Support Fax	09 253 313 81
	Relational Customer Care	09 253 313 38
	Home/Small Business Customer Care	09 693 791 94
	Fax	09 253 313 99
	Switchboard	09 253 313 00
France (Paris) (Montpellier) International Access Code: **00** Country Code: **33** City Codes: **(1) (4)**	Website: **support.euro.dell.com**	
	E-mail: **support.euro.dell.com/fr/fr/emaildell/**	
	Home and Small Business	
	Technical Support	0825 387 270
	Customer Care	0825 823 833
	Switchboard	0825 004 700
	Switchboard (calls from outside of France)	04 99 75 40 00
	Sales	0825 004 700
	Fax	0825 004 701
	Fax (calls from outside of France)	04 99 75 40 01
	Corporate	
	Technical Support	0825 004 719
	Customer Care	0825 338 339
	Switchboard	01 55 94 71 00

	Sales	01 55 94 71 00
	Fax	01 55 94 71 01
Germany (Langen) International Access Code: **00** Country Code: **49** City Code: **6103**	Website: **support.euro.dell.com**	
	E-mail: tech_support_central_europe@dell.com	
	Technical Support	06103 766-7200
	Home/Small Business Customer Care	0180-5-224400
	Global Segment Customer Care	06103 766-9570
	Preferred Accounts Customer Care	06103 766-9420
	Large Accounts Customer Care	06103 766-9560
	Public Accounts Customer Care	06103 766-9555
	Switchboard	06103 766-7000
Greece International Access Code: 00 Country Code: 30	Website: **support.euro.dell.com**	
	E-mail: support.euro.dell.com/gr/en/emaildell/	
	Technical Support	080044149518
	Gold Technical Support	08844140083
	Switchboard	2108129800
	Sales	2108129800
	Fax	2108129812
Grenada	General Support	toll-free: 1-866-540-3355
Guatemala	General Support	1-800-999-0136
Guyana	General Support	toll-free: 1-877-270-4609
Hong Kong International Access Code: **001** Country Code: **852**	Website: **support.ap.dell.com**	
	E-mail: ap_support@dell.com	
	Technical Support (Dimension™ and Inspiron™)	296 93188
	Technical Support (OptiPlex™, Latitude™, and Dell Precision™)	296 93191
	Customer Service (non-technical, post-sales issues)	800 93 8291
	Transaction Sales	toll-free: 800 96 4109
	Large Corporate Accounts HK	toll-free: 800 96 4108
	Large Corporate Accounts GCP HK	toll-free: 800 90 3708
India	Technical Support	1600 33 8045
	Sales	1600 33 8044
Ireland (Cherrywood) International Access Code: **16** Country Code: **353**	Website: **support.euro.dell.com**	
	E-mail: dell_direct_support@dell.com	
	Ireland Technical Support	1850 543 543
	U.K. Technical Support (dial within U.K. only)	0870 908 0800
	Home User Customer Care	01 204 4014

City Code: **1**	Small Business Customer Care	01 204 4014
	U.K. Customer Care (dial within U.K. only)	0870 906 0010
	Corporate Customer Care	1850 200 982
	Corporate Customer Care (dial within U.K. only)	0870 907 4499
	Ireland Sales	01 204 4444
	U.K. Sales (dial within U.K. only)	0870 907 4000
	Fax/SalesFax	01 204 0103
	Switchboard	01 204 4444
Italy (Milan) International Access Code: **00** Country Code: **39** City Code: **02**	Website: **support.euro.dell.com**	
	E-mail: **support.euro.dell.com/it/it/emaildell/**	
	Home and Small Business	
	Technical Support	02 577 826 90
	Customer Care	02 696 821 14
	Fax	02 696 821 13
	Switchboard	02 696 821 12
	Corporate	
	Technical Support	02 577 826 90
	Customer Care	02 577 825 55
	Fax	02 575 035 30
	Switchboard	02 577 821
Jamaica	General Support (dial from within Jamaica only)	1-800-682-3639
Japan (Kawasaki) International Access Code: **001** Country Code: **81** City Code: **44**	Website: **support.jp.dell.com**	
	Technical Support (servers)	toll-free: 0120-198-498
	Technical Support outside of Japan (servers)	81-44-556-4162
	Technical Support (Dimension™ and Inspiron™)	toll-free: 0120-198-226
	Technical Support outside of Japan (Dimension and Inspiron)	81-44-520-1435
	Technical Support (Dell Precision™, OptiPlex™, and Latitude™)	toll-free:0120-198-433
	Technical Support outside of Japan (Dell Precision, OptiPlex, and Latitude)	81-44-556-3894
	Faxbox Service	044-556-3490
	24-Hour Automated Order Service	044-556-3801
	Customer Care	044-556-4240
	Business Sales Division (up to 400 employees)	044-556-1465
	Preferred Accounts Division Sales (over 400 employees)	044-556-3433
	Large Corporate Accounts Sales (over 3500 employees)	044-556-3430

	Public Sales (government agencies, educational institutions, and medical institutions)	044-556-1469
	Global Segment Japan	044-556-3469
	Individual User	044-556-1760
	Switchboard	044-556-4300
Korea (Seoul) International Access Code: **001** Country Code: **82** City Code: **2**	Technical Support	toll-free: 080-200-3800
	Sales	toll-free: 080-200-3600
	Customer Service (Seoul, Korea)	toll-free: 080-200-3800
	Customer Service (Penang, Malaysia)	604 633 4949
	Fax	2194-6202
	Switchboard	2194-6000
Latin America	Customer Technical Support (Austin, Texas, U.S.A.)	512 728-4093
	Customer Service (Austin, Texas, U.S.A.)	512 728-3619
	Fax (Technical Support and Customer Service) (Austin, Texas, U.S.A.)	512 728-3883
	Sales (Austin, Texas, U.S.A.)	512 728-4397
	SalesFax (Austin, Texas, U.S.A.)	512 728-4600 or 512 728-3772
Luxembourg International Access Code: **00** Country Code: **352**	Website: **support.euro.dell.com**	
	E-mail: tech_be@dell.com	
	Technical Support (Brussels, Belgium)	3420808075
	Home/Small Business Sales (Brussels, Belgium)	toll-free: 080016884
	Corporate Sales (Brussels, Belgium)	02 481 91 00
	Customer Care (Brussels, Belgium)	02 481 91 19
	Fax (Brussels, Belgium)	02 481 92 99
	Switchboard (Brussels, Belgium)	02 481 91 00
Macao Country Code: **853**	Technical Support	toll-free: 0800 582
	Customer Service (Penang, Malaysia)	604 633 4949
	Transaction Sales	toll-free: 0800 581
Malaysia (Penang) International Access Code: **00** Country Code: **60** City Code: **4**	Technical Support	toll-free: 1 800 888 298
	Customer Service	04 633 4949
	Transaction Sales	toll-free: 1 800 888 202
	Corporate Sales	toll-free: 1 800 888 213
Mexico International Access	Customer Technical Support	001-877-384-8979 or 001-877-269-3383

Code: **00** Country Code: **52**	Sales	50-81-8800 or 01-800-888-3355
	Customer Service	001-877-384-8979 or 001-877-269-3383
	Main	50-81-8800 or 01-800-888-3355
Montserrat	General Support	toll-free: 1-866-278-6822
Netherlands Antilles	General Support	001-800-882-1519
Netherlands (Amsterdam) International Access Code: **00** Country Code: **31** City Code: **20**	Website: **support.euro.dell.com** E-mail (Technical Support): (Enterprise): nl_server_support@dell.com (Latitude): nl_latitude_support@dell.com (Inspiron): nl_inspiron_support@dell.com (Dimension): nl_dimension_support@dell.com (OptiPlex): nl_optiplex_support@dell.com (Dell Precision): nl_workstation_support@dell.com	
	Technical Support	020 674 45 00
	Technical Support Fax	020 674 47 66
	Home/Small Business Customer Care	020 674 42 00
	Relational Customer Care	020 674 4325
	Home/Small Business Sales	020 674 55 00
	Relational Sales	020 674 50 00
	Home/Small Business Sales Fax	020 674 47 75
	Relational Sales Fax	020 674 47 50
	Switchboard	020 674 50 00
	Switchboard Fax	020 674 47 50
New Zealand International Access Code: **00** Country Code: **64**	E-mail (New Zealand): nz_tech_support@dell.com	
	E-mail (Australia): au_tech_support@dell.com	
	Home and Small Business	0800 446 255
	Government and Business	0800 444 617
	Sales	0800 441 567
	Fax	0800 441 566
Nicaragua	General Support	001-800-220-1006

Norway (Lysaker) International Access Code: **00** Country Code: **47**	Website: **support.euro.dell.com**	
	E-mail Support (portable computers): nor_nbk_support@dell.com	
	E-mail Support (desktop computers): nor_support@dell.com	
	E-mail Support (servers): nordic_server_support@dell.com	
	Technical Support	671 16882
	Relational Customer Care	671 17514
	Home/Small Business Customer Care	23162298
	Switchboard	671 16800
	Fax Switchboard	671 16865
Panama	General Support	001-800-507-0962
Peru	General Support	0800-50-669
Poland (Warsaw) International Access Code: **011** Country Code: **48** City Code: **22**	Website: **support.euro.dell.com**	
	E-mail: pl_support@dell.com	
	Customer Service Phone	57 95 700
	Customer Care	57 95 999
	Sales	57 95 999
	Customer Service Fax	57 95 806
	Reception Desk Fax	57 95 998
	Switchboard	57 95 999
Portugal International Access Code: **00** Country Code: **351**	Website: **support.euro.dell.com**	
	E-mail: **support.euro.dell.com/pt/en/emaildell/**	
	Technical Support	707200149
	Customer Care	800 300 413
	Sales	800 300 410 or 800 300 411 or 800 300 412 or 21 422 07 10
	Fax	21 424 01 12
Puerto Rico	General Support	1-800-805-7545
St. Kitts and Nevis	General Support	toll-free: 1-877-441-4731
St. Lucia	General Support	1-800-882-1521
St. Vincent and the Grenadines	General Support	toll-free: 1-877-270-4609
Singapore	Technical Support	toll-free: 800 6011 051

(Singapore) International Access Code: **005** Country Code: **65**	Customer Service (Penang, Malaysia)	604 633 4949
	Transaction Sales	toll-free: 800 6011 054
	Corporate Sales	toll-free: 800 6011 053
South Africa (Johannesburg) International Access Code: **09/091** Country Code: **27** City Code: **11**	Website: **support.euro.dell.com**	
	E-mail: dell_za_support@dell.com	
	Technical Support	011 709 7710
	Customer Care	011 709 7707
	Sales	011 709 7700
	Fax	011 706 0495
	Switchboard	011 709 7700
Southeast Asian and Pacific Countries	Customer Technical Support, Customer Service, and Sales (Penang, Malaysia)	604 633 4810
Spain (Madrid) International Access Code: **00** Country Code: **34** City Code: **91**	Website: **support.euro.dell.com**	
	E-mail: **support.euro.dell.com/es/es/emaildell/**	
	Home and Small Business	
	Technical Support	902 100 130
	Customer Care	902 118 540
	Sales	902 118 541
	Switchboard	902 118 541
	Fax	902 118 539
	Corporate	
	Technical Support	902 100 130
	Customer Care	902 118 546
	Switchboard	91 722 92 00
	Fax	91 722 95 83
Sweden (Upplands Vasby) International Access Code: **00** Country Code: **46** City Code: **8**	Website: **support.euro.dell.com**	
	E-mail: swe_support@dell.com	
	E-mail Support for Latitude and Inspiron: Swe-nbk_kats@dell.com	
	E-mail Support for OptiPlex: Swe_kats@dell.com	
	E-mail Support for Servers: Nordic_server_support@dell.com	
	Technical Support	08 590 05 199
	Relational Customer Care	08 590 05 642
	Home/Small Business Customer Care	08 587 70 527
	Employee Purchase Program (EPP) Support	20 140 14 44

	Fax Technical Support	08 590 05 594
	Sales	08 590 05 185
Switzerland (Geneva) International Access Code: **00** Country Code: **41** City Code: **22**	Website: **support.euro.dell.com**	
	E-mail: swisstech@dell.com	
	E-mail for French-speaking HSB and Corporate Customers: **support.euro.dell.com/ch/fr/emaildell/**	
	Technical Support (Home and Small Business)	0844 811 411
	Technical Support (Corporate)	0844 822 844
	Customer Care (Home and Small Business)	0848 802 202
	Customer Care (Corporate)	0848 821 721
	Fax	022 799 01 90
	Switchboard	022 799 01 01
Taiwan International Access Code: **002** Country Code: **886**	Technical Support (portable and desktop computers)	toll-free: 00801 86 1011
	Technical Support (servers)	toll-free: 0080 60 1256
	Transaction Sales	toll-free: 0080 651 228 or 0800 33 556
	Corporate Sales	toll-free: 0080 651 227 or 0800 33 555
Thailand International Access Code: **001** Country Code: **66**	Technical Support	toll-free: 0880 060 07
	Customer Service (Penang, Malaysia)	604 633 4949
	Sales	toll-free: 0880 060 09
Trinidad/Tobago	General Support	1-800-805-8035
Turks and Caicos Islands	General Support	toll-free: 1-866-540-3355
U.K. (Bracknell) International Access Code: **00** Country Code: **44** City Code: **1344**	Website: **support.euro.dell.com**	
	Customer Care website: **support.euro.dell.com/uk/en/ECare/Form/Home.asp**	
	E-mail: dell_direct_support@dell.com	
	Technical Support (Corporate/Preferred Accounts/PAD [1000+ employees])	0870 908 0500
	Technical Support (direct/PAD and general)	0870 908 0800
	Global Accounts Customer Care	01344 373 186
	Home and Small Business Customer Care	0870 906 0010
	Corporate Customer Care	01344 373 185

	Preferred Accounts (500–5000 employees) Customer Care	0870 906 0010
	Central Government Customer Care	01344 373 193
	Local Government & Education Customer Care	01344 373 199
	Health Customer Care	01344 373 194
	Home and Small Business Sales	0870 907 4000
	Corporate/Public Sector Sales	01344 860 456
Uruguay	General Support	toll-free: 000-413-598-2521
U.S.A. (Austin, Texas) International Access Code: **011** Country Code: **1**	Automated Order-Status Service	toll-free: 1-800-433-9014
	AutoTech (portable and desktop computers)	toll-free: 1-800-247-9362
	Consumer (Home and Home Office)	
	Technical Support	toll-free: 1-800-624-9896
	Customer Service	toll-free: 1-800-624-9897
	DellNet™ Service and Support	toll-free: 1-877-Dellnet (1-877-335-5638)
	Employee Purchase Program (EPP) Customers	toll-free: 1-800-695-8133
	Financial Services website: **www.dellfinancialservices.com**	
	Financial Services (lease/loans)	toll-free: 1-877-577-3355
	Financial Services (Dell Preferred Accounts [DPA])	toll-free: 1-800-283-2210
	Business	
	Customer Service and Technical Support	toll-free: 1-800-822-8965
	Employee Purchase Program (EPP) Customers	toll-free: 1-800-695-8133
	Projectors Technical Support	toll-free: 1-877-459-7298
	Public (government, education, and healthcare)	
	Customer Service and Technical Support	toll-free: 1-800-456-3355
	Employee Purchase Program (EPP) Customers	toll-free: 1-800-234-1490
	Dell Sales	toll-free: 1-800-289-3355 or toll-free: 1-800-879-3355
	Dell Outlet Store (Dell refurbished computers)	toll-free: 1-888-798-7561
	Software and Peripherals Sales	toll-free: 1-800-671-3355
	Spare Parts Sales	toll-free: 1-800-357-3355
	Extended Service and Warranty Sales	toll-free: 1-800-247-4618
	Fax	toll-free: 1-800-727-8320
	Dell Services for the Deaf, Hard-of-Hearing, or Speech-Impaired	toll-free: 1-877-DELLTTY (1-877-335-5889)

U.S. Virgin Islands	General Support	1-877-673-3355
Venezuela	General Support	8001-3605

Specifications

Microprocessor	
Microprocessor type	Intel® Centrino™ Mobile Technology or Intel® Pentium® M Processor
L1 cache	64 KB (internal); 32-KB instruction and 32-KB write-back data
L2 cache	1 MB
External bus frequency	400 MHz, source synchronous processor system bus

System Information	
Data bus width	64 bits
DRAM bus width	64 bits
Microprocessor address bus width	32 bits
Flash EPROM	1MB
PCI bus	32 bits

PC Card	
CardBus controller	PCI4510 CardBus controller
PC Card connector	supports one Type I or Type II card
Cards supported	3.3 V and 5 V
PC Card connector size	68 pins
Data width (maximum)	PCMCIA 16 bits CardBus 32 bits

Memory	
Minimum speed requirement	266 MHz
Memory module connector	two user-accessible DDR SDRAM connectors
Memory module capacities	128 MB, 256 MB, 512 MB, and 1024MB
Memory type	2.5V DDR SDRAM
Standard memory	128 MB
Maximum memory	2 GB

Ports and Connectors	
Serial	9-pin connector; 16550C-compatible,

	16-byte buffer connector
Parallel	25-hole connector; unidirectional, bidirectional, or ECP
Video	15-hole connector
Audio	microphone miniconnector, stereo headphones/speakers miniconnector
USB	two 4-pin USB 2.0–compliant connectors
Infrared sensor	sensor compatible with IrDA Standard 1.1 (Fast IR) and IrDA Standard 1.0 (Slow IR)
S-video TV-out	7-pin mini-DIN connector (optional S-video to composite video adapter cable)
Mini PCI	Type IIIA Mini PCI card slot
Modem	RJ-11 port
Network adapter	RJ-45 port
IEEE 1394	4-pin serial connector

Communications	
Modem:	
Type	v.92 56K MDC
Controller	softmodem
Interface	internal AC'97 bus
Network adapter	10/100 Ethernet LAN on system board
Wireless	internal Mini PCI Wi-Fi wireless support; Bluetooth™ (optional, available at point of sale only)

Video	
Video type	Intel UMA Integrated
Video controller	Intel 855GME Integrated chip set
Video memory	1 MB with Intel DVMT up to 32 MB (with 128 MB of system memory) or 64 MB (with 256 MB or more of system memory)
LCD interface	LVDS

Audio	
Audio type	compatible with Soundblaster and Microsoft® Windows® Sound

	System
Audio controller	Intel AC'97
Stereo conversion	20-bit (stereo digital-to-analog), 18-bit (stereo analog-to-digital)
Interfaces:	
Internal	AC'97
External	microphone miniconnector, stereo headphones/speakers miniconnector
Speaker	two 4-ohm speakers
Internal speaker amplifier	2-W channel into 4 ohms
Volume controls	keyboard shortcuts or program menus

Display	
Type (active-matrix TFT)	XGA
Dimensions:	
Height	228.1 mm (9 inches)
Width	304.1 mm (12 inches)
Diagonal	380.1 mm (15 inches)
Maximum resolutions	1024 x 768 at 16.8 million colors
Response time (typical)	25-ms rise (maximum), 35-ms fall (maximum)
Refresh rate	60 Hz
Operating angle	0° (closed) to 180°
Viewing angles:	
Horizontal	±60°
Vertical	±45°
Pixel pitch	0.2172 x 0.2172 mm
Power Consumption:	
Panel with backlight (typical)	4.6 W
Controls	brightness can be controlled through keyboard shortcuts

Keyboard	
Number of keys	87 (U.S. and Canada); 88 (Europe); 91 (Japan)
Key travel	2.7 mm ± 0.3 mm (0.11 inch ± 0.016 inch)
Key spacing	19.05 mm ± 0.3 mm (0.75 inch ±

	0.012 inch)
Layout	QWERTY/AZERTY/Kanji

Touch Pad	
X/Y position resolution (graphics table mode)	240 cpi
Size:	
Width	64.88-mm (2.55-inch) sensor-active area
Height	48.88-mm (1.92-inch) rectangle

Battery	
Type	6-cell "smart" lithium ion (48 WHr) 4-cell "smart" lithium ion (32 WHr)
Dimensions:	
Depth	77.5 mm (3.05 inches)
Height	19.5 mm (0.76 inch)
Width	123.4 mm (4.86 inches)
Weight	0.32 kg (0.7 lb) (6-cell battery) 0.23 kg (0.52 lb) (4-cell battery)
Voltage	11.1 VDC (6-cell battery) 14.8 VDC (4-cell battery)
Charge time with computer off (approximate)	1 hour for 80 percent charge
Operating time	approximately 3 to 4 hours (6-cell battery); approximately 2 to 2.5 hours (4-cell battery); can be significantly reduced under certain power-intensive conditions
Life span (approximate)	300 discharge/charge cycles
Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	–20° to 65°C (–4° to 149°F)

AC Adapter	
Input voltage	90–264 VAC
Input current (maximum)	1.7 A
Input frequency	47–63 Hz
Output current	3.34A (65 W) 4.62A (90 W)
Output power	65 W or 90 W

Rated output voltage	19.5 VDC
Dimensions:	
Height	28.2mm (1.11 inches) (65 W) 34.2mm (1.35 inches) (90 W)
Width	57.9mm (2.28 inches) (65 W) 60.8mm (2.39 inches) (90 W)
Depth	137.2mm (5.40 inches) (65 W) 153.4mm (6.04 inches) (90 W)
Weight (with cables)	0.4 kg (1 lb) (90 W) 0.3 kg (.69 lb) (65 W)
Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)

Computer Dimensions and Weight	
Height	35.5 mm (1.40 inches)
Width	338.4 mm (13.32 inches)
Depth	273 mm (10.75 inches)
Weight:	
With travel module and standard battery	2.49 kg (5.49 lb)
With CD drive and standard battery	2.70 kg (5.94 lb)

Computer Environmental	
Temperature range:	
Operating	0° to 35°C (32° to 95°F)
Storage	–40° to 65°C (–40° to 149°F)
Relative humidity (maximum):	
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	1.30 GRMS
Maximum shock (measured with hard drive in head-parked position and a 2-ms half-sine pulse):	
Operating	122 G
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)

Appendix

Macrovision Product Notice

This product incorporates copyright protection technology that is protected by method claims of certain U.S. patents and other intellectual property rights owned by Macrovision Corporation and other rights owners. Use of this copyright protection technology must be authorized by Macrovision Corporation, and is intended for home and other limited viewing uses only unless otherwise authorized by Macrovision Corporation. Reverse engineering or disassembly is prohibited.

Ergonomic Computing Habits

CAUTION: Improper or prolonged keyboard use may result in injury.

CAUTION: Viewing the display or external monitor screen for extended periods of time may result in eye strain.

For comfort and efficiency, observe the following ergonomic guidelines when setting up and using your computer workstation:

- Position your computer directly in front of you as you work.
- Adjust the tilt of the computer's display, its contrast and/or brightness settings, and the lighting around you (such as overhead lights, desk lamps, and the curtains or blinds on nearby windows) to minimize reflections and glare on the display.
- When using an external monitor with your computer, set the monitor at a comfortable viewing distance (usually 450 to 610 millimeters [18 to 24 inches] from your eyes). Make sure the monitor screen is at eye level or slightly lower when you are sitting in front of the monitor.
- Use a chair that provides good lower-back support.
- Keep your forearms horizontal with your wrists in a neutral, comfortable position while using the keyboard, touch pad, track stick, or external mouse.
- Always use the palm rest with the keyboard, touch pad, or track stick. Leave space to rest your hands when using an external mouse.
- Let your upper arms hang naturally at your sides.

- Ensure that your feet are resting flat on the floor.
- When sitting, make sure the weight of your legs is on your feet and not on the front of your chair seat. Adjust your chair's height or use a footrest, if necessary, to maintain proper posture.
- Vary your work activities. Try to organize your work so that you do not have to type for extended periods of time. When you stop typing, try to do things that use both hands.

For more information about ergonomic computing habits, see the BSR/HFES 100 standard, which can be purchased on the Human Factors and Ergonomics Society (HFES) website at:
www.hfes.org/publications/HFES100.html

References:

1. American National Standards Institute. *ANSI/HFES 100: American National Standards for Human Factors Engineering of Visual Display Terminal Workstations*. Santa Monica, CA: Human Factors Society, Inc., 1988.

2. Human Factors and Ergonomics Society. *BSR/HFES 100 Draft standard for trial use: Human Factors Engineering of Computer Workstations*. Santa Monica, CA: Human Factors and Ergonomics Society, 2002.

3. International Organization for Standardization (ISO). *ISO 9241 Ergonomics requirements for office work with visual display terminals (VDTs)*. Geneva, Switzerland: International Organization for Standardization, 1992.

Regulatory Notices

Electromagnetic Interference (EMI) is any signal or emission, radiated in free space or conducted along power or signal leads, that endangers the functioning of a radio navigation or other safety service or seriously degrades, obstructs, or repeatedly interrupts a licensed radio communications service. Radio communications services include but are not limited to AM/FM commercial broadcast, television, cellular services, radar, air-traffic control, pager, and Personal Communication Services (PCS). These licensed services, along with unintentional radiators such as digital devices, including computers, contribute to the electromagnetic environment.

Electromagnetic Compatibility (EMC) is the ability of items of electronic equipment to function properly together in the electronic environment. While this computer has been designed and determined to be compliant with regulatory agency limits for EMI, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference with radio communications services, 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 computer with respect to the receiver.
- Move the computer away from the receiver.
- Plug the computer into a different outlet so that the computer and the receiver are on different branch circuits.

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

Dell™ computers are designed, tested, and classified for their intended electromagnetic environment. These electromagnetic environment classifications generally refer to the following harmonized definitions:

- Class A is typically for business or industrial environments.
- Class B is typically for residential environments.

Information Technology Equipment (ITE), including devices, expansion cards, printers, input/output (I/O) devices, monitors, and so on, that are integrated into or connected to the computer should match the electromagnetic environment classification of the computer.

A Notice About Shielded Signal Cables: Use only shielded cables for connecting devices to any Dell device to reduce the possibility of interference with radio communications services. Using shielded cables ensures that you maintain the appropriate EMC classification for the intended environment. For parallel printers, a cable is available from Dell. If you prefer, you can order a cable from Dell on the World Wide Web at accessories.us.dell.com/sna/category.asp?category_id=4117.

Most Dell computers are classified for Class B environments. However, the inclusion of certain options can change the rating of some configurations to Class A. To determine the electromagnetic classification for your computer or device, see the following sections specific for each regulatory agency. Each section provides country-specific EMC/EMI or product safety information.

FCC Notices (U.S. Only)

Most Dell computers are classified by the Federal Communications Commission (FCC) as Class B digital devices. To determine which classification applies to your computer, examine all FCC registration labels located on the bottom, side, or back panel of your computer, on card-mounting brackets, and on the cards themselves. If any one of the labels carries a Class A rating, your entire computer is considered to be a Class A digital device. If *all* labels carry an FCC Class B rating as distinguished by either an FCC ID number or the FCC logo, ( ), your computer is considered to be a Class B digital device.

Once you have determined your computer's FCC classification, read the appropriate FCC notice. Note that FCC regulations provide that changes or modifications not expressly approved by Dell could void your authority to operate this equipment.

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

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

Class A

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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 harmful interference with radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case you will be required to correct the interference at your own expense.

Class B

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. These limits are designed to provide reasonable protection against harmful interference in a residential installation. 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 communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to 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 or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/television technician for help.

FCC Identification Information

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

- Model number: PP10L
- Company name:

  Dell Inc.
  One Dell Way
  Round Rock, Texas 78682 USA
  512-338-4400

Modem Regulatory Information

This equipment complies with Part 68 of the FCC Rules. On the bottom of your computer is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for your equipment. If requested, you must provide this information to the telephone company.

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in the devices not ringing in response to an incoming call. In most areas, the sum of all the RENs on your telephone line should be less than five to ensure proper service from the telephone company. To be certain of the number of devices that you may connect to a line, as determined by the total RENs, contact your local telephone company.

The registration jack Universal Service Order Code (USOC) used by this equipment is RJ-11C. An FCC compliant telephone cord and modular plug is provided with this equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack that is Part 68 compliant.

This equipment cannot be used on public coin-phone service provided by the telephone company. Connection to party line service is subject to state tariffs.

There are no user serviceable parts on the modem contained in your computer.

If your telephone equipment causes harm to the telephone network, the telephone company will notify you in advance that service may be temporarily discontinued. If advance notice is not practical, the telephone company will notify you as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations, or procedures that could affect the operation of this equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If you experience trouble with this telephone equipment, see "Getting Help" in your computer's

troubleshooting documentation or, for some computers, the section titled "Contacting Dell" in your computer's online guide to find the appropriate telephone number for obtaining customer assistance. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

Fax Branding

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including fax machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent, identification of the business, other entity, or individual sending the message, and the telephone number of the sending machine or such business, other entity, or individual. The telephone number provided may not be a 900 number or any other number for which charges exceed local or long-distance transmission charges.

IC Notice (Canada Only)

Most Dell computers (and other Dell digital apparatus) are classified by the Industry Canada (IC) Interference-Causing Equipment Standard #3 (ICES-003) as Class B digital devices. To determine which classification (Class A or B) applies to your computer (or other Dell digital apparatus), examine all registration labels located on the bottom, side, or the back panel of your computer (or other digital apparatus). A statement in the form of "IC Class A ICES-003" or "IC Class B ICES-003" will be located on one of these labels. Note that Industry Canada regulations provide that changes or modifications not expressly approved by Dell could void your authority to operate this equipment.

This Class B (or Class A, if so indicated on the registration label) digital apparatus meets the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe B (ou Classe A, si ainsi indiqué sur l'étiquette

Modem Regulatory Information

The IC label identifies certified equipment. This certification means that the equipment meets telecommunications network protective, operational, and safety requirements as prescribed in the appropriate Terminal Equipment Technical Requirements document(s). The IC label does not guarantee that the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alteration made by a user to this equipment, or equipment malfunctions, may give the telephone communications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection, that the electrical ground connections of the power utility, telephone lines, and internal metallic water-pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

NOTICE: Users should not attempt to make such connections themselves. Contact the appropriate electric inspection authority, or electrician, as appropriate.

NOTE: The REN assigned to each terminal device provides an indication of the maximum number of

terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed the number five.

The REN for the internal modem as stated on the IC regulatory label located on the bottom of the computer is 0.6 B.

The following information is provided in compliance with IC regulations:

Dell Inc.
One Dell Way
Round Rock, TX 78682 USA
512-338-4400

CE Notice (European Union)

Marking by the symbol CE indicates compliance of this Dell computer to the EMC Directive and the Low Voltage Directive of the European Union. Such marking is indicative that this Dell system meets the following technical standards:

- EN 55022 — "Information Technology Equipment — Radio Disturbance Characteristics — Limits and Methods of Measurement."
- EN 55024 — "Information Technology Equipment - Immunity Characteristics - Limits and Methods of Measurement."
- EN 61000-3-2 — "Electromagnetic Compatibility (EMC) - Part 3: Limits - Section 2: Limits for Harmonic Current Emissions (Equipment Input Current Up to and Including 16 A Per Phase)."
- EN 61000-3-3 — "Electromagnetic Compatibility (EMC) - Part 3: Limits - Section 3: Limitation of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment With Rated Current Up to and Including 16 A."
- EN 60950 — "Safety of Information Technology Equipment."

NOTE: EN 55022 emissions requirements provide for two classifications:

- Class A is for typical commercial areas.
- Class B is for typical domestic areas.

RF INTERFERENCE WARNING: This is a Class A product. In a domestic environment this product may cause radio frequency (RF) interference, in which case the user may be required to take adequate measures.

This Dell device is classified for use in a typical Class B domestic environment.

A "Declaration of Conformity" in accordance with the preceding directives and standards has been made and is on file at Dell Inc. Products Europe BV, Limerick, Ireland.

CE Mark Notice

This equipment complies with the essential requirements of the European Union Directive 1999/5/EC.

Cet équipement est conforme aux principales caractéristiques définies dans la Directive européenne RTTE 1999/5/CE.

Die Geräte erfüllen die grundlegenden Anforderungen der RTTE-Richtlinie (1999/5/EG).

Questa apparecchiatura é conforme ai requisiti essenziali della Direttiva Europea R&TTE 1999/5/CE.

Este equipo cumple los requisitos principales de la Directiva 1999/5/CE de la UE, "Equipos de Terminales de Radio y Telecomunicaciones".

Este equipamento cumpre os requisitos essenciais da Directiva 1999/5/CE do Parlamento Europeu e do Conselho (Directiva RTT).

Ο εξοπλισμός αυτός πληροί τις βασικές απαιτήσεις της κοινοτικής οδηγίας EU R&TTE 1999/5/ΕΚ.

Deze apparatuur voldoet aan de noodzakelijke vereisten van EU-richtlijn betreffende radioapparatuur en telecommunicatie-eindapparatuur 1999/5/EG.

Dette udstyr opfylder de Væsentlige krav i EU's direktiv 1999/5/EC om Radio- og teleterminaludstyr.

Dette utstyret er i overensstemmelse med hovedkravene i R&TTE-direktivet (1999/5/EC) fra EU.

Utrustningen uppfyller kraven för EU-direktivet 1999/5/EC om ansluten teleutrustning och ömsesidigt erkännande av utrustningens överensstämmelse (R&TTE).

Tämä laite vastaa EU:n radio- ja telepäätelaitedirektiivin (EU R&TTE Directive 1999/5/EC) vaatimuksia.

New Zealand Telecom Warnings

General

"The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services."

"This equipment does not fully meet Telecom impedance requirements. Performance limitations may occur when used in conjunction with some parts of the network. Telecom will accept no responsibility should difficulties arise in such circumstances."

"This equipment shall not be set up to make automatic calls to the Telecom `111' Emergence Service."

"If a charge for local calls is unacceptable, the `Dial' button should NOT be used for local calls. Only the 7-digits of the local number should be dialed from your telephone. DO NOT dial the area code digit or the `0' prefix."

"This equipment may not provide for the effective hand-over of a call to another device connected to the same line."

Important Notice

"Under power failure conditions, this telephone may not operate. Please ensure that a separate telephone, not dependent on local power, is available for emergency use."

"Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PC) associated with this device. The associated equipment shall be set to operate within the following limits for compliance with Telecom's Specification:

1. There shall be no more than 10 call attempts to the same number within any 30-minute period for any single manual call initiation, and the equipment shall go on-hook for a period of not less than 30 seconds between the end of one attempt and the beginning of the next attempt.

2. Where automatic calls are made to different numbers, the equipment shall go on-line for a period of not less than 5 seconds between the end of one attempt and the beginning of the next attempt.

3. The equipment shall be set to ensure that calls are answered between 3 and 30 seconds of receipt of ringing."

"All persons using this device for recording telephone conversations shall comply with New Zealand law. This requires that at least one party to the conversation is to be aware that it is being recorded. In addition, the Principles enumerated in the Privacy Act of 1993 shall be complied with in respect to the nature of the personal information collected, the purpose for its collection, how it is used and what is disclosed to any other party."

Simplified Chinese Class A Warning Notice (China Only)

On Class A systems, the following warning will appear near the regulatory label:

Warning: This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

声明

此为A级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

EN 55022 Compliance (Czech Republic Only)

This device belongs to Class B devices as described in EN 55022, unless it is specifically stated that it is a Class A device on the specification label. The following applies to devices in Class A of EN 55022 (radius of protection up to 30 meters). The user of the device is

Pokud není na typovém štitku počítače uvedeno, že spadá do třídy A podle EN 55022, spadá automatickz do třídy B podle EN 55022. Pro zařízení zařazená do třídy A (ochranné pásmo 30m) podle EN 55022 platí následující. Dojde-li k rušení telekomunikačních nebo jinych zařízení, je uživatel povinen provést taková opatření, aby rušení odstranil.

VCCI Notice (Japan Only)

Most Dell computers are classified by the Voluntary Control Council for Interference (VCCI) as Class B information technology equipment (ITE). However, the inclusion of certain options can change the rating of some configurations to Class A. ITE, including devices, expansion cards, printers, input/output (I/O) devices, monitors, and so on, integrated into or connected to the computer should match the electromagnetic environment classification (Class A or B) of the computer.

To determine which classification applies to your computer, examine the regulatory labels/markings located on the bottom, side, or back panel of your computer. Once you have determined your computer's VCCI classification, read the appropriate VCCI notice (see "VCCI Class A ITE Regulatory Mark" or "VCCI Class B ITE Regulatory Mark").

Class A ITE

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラス A 情報技術装置です。
この装置を家庭環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な
対策を講ずるよう要求されることがあります。

This is a Class A product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used in a domestic environment, radio disturbance may arise. When such trouble occurs, the user may be required to take corrective actions.

VCCI Class A ITE Regulatory Mark

If the regulatory label includes the following marking, your computer is a Class A product: VCCI

Class B ITE

この装置は、情報処理装置等電波障害自主規制協議会(VCCI)の基準に基づくクラス B 情報技術装置です。
この装置は家庭環境で使用することを目的としていますが、ラジオやテレビジョン受信機に近接して使用
されると、受信障害を引き起こすことがあります。取扱説明書に従って正しい取り扱いをしてください。

This is a Class B product based on the standard of the Voluntary Control Council for Interference (VCCI) for information technology equipment. If this equipment is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

VCCI Class B ITE Regulatory Mark

If the regulatory label includes the following marking, your computer is a Class B product:

MIC Notice (Republic of Korea Only)

To determine which classification (Class A or B) applies to your computer (or other Dell digital device), examine the Republic of Korean Ministry of Information and Communications (MIC) registration labels located on your computer (or other Dell digital device). The MIC label may be located separately from the other regulatory marking applied to your product. Line two of the label identifies the emissions class for the product—"(A)" for Class A products or "(B)" for Class B products.

NOTE: MIC emissions requirements provide for two classifications:

- Class A devices are for business purposes.
- Class B devices are for nonbusiness purposes.

Class A Device

기 종 별	사 용 자 안 내 문
A급 기기 (업무용 정보통신기기)	이 기기는 업무용으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이 점을 주의하시기 바라며 만약 잘못 판매 또는 구입하였을 때에는 가정용으로 교환하시기 바랍니다.

Please note that this device has been approved for business purposes with regard to electromagnetic interference. If you find that this device is not suitable for your use, you may exchange it for a nonbusiness-purpose device.

MIC Class A Regulatory Label

If the regulatory label includes the following marking, your computer is a Class A product:

1. 기기의 명칭(모델명):
2. 인증번호:(A)
3. 인증받은 자의 상호:
4. 제조년월일:
5. 제조자/제조국가:

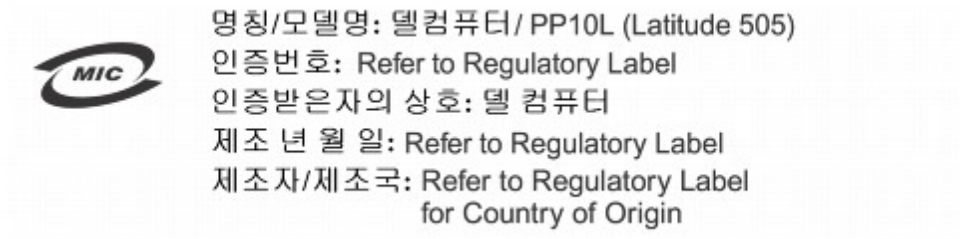
Class B Device

기 종 별	사 용 자 안 내 문
B급 기기 (가정용 정보통신기기)	이 기기는 가정용으로 전자파적합등록을 한 기기로서 주거지역에서는 물론 모든 지역에서 사용할 수 있습니다.

Please note that this device has been approved for nonbusiness purposes and may be used in any environment, including residential areas.

MIC Class B Regulatory Label

If the regulatory label includes the following marking, your computer is a Class B product:



Polish Center for Testing and Certification Notice

The equipment should draw power from a socket with an attached protection circuit (a 3-prong socket). All equipment that works together (computer, monitor, printer, and so on) should have the same power supply source.

The phasing conductor of the room's electrical installation should have a reserve short-circuit protection device in the form of a fuse with a nominal value no larger than 16 amperes (A).

To completely switch off the equipment, the power supply cable must be removed from the power supply socket, which should be located near the equipment and easily accessible.

A protection mark "B" confirms that the equipment is in compliance with the protection usage requirements of standard PN-EN 55022.

Wymagania Polskiego Centrum Badań i Certyfikacji

Urządzenie powinno być zasilane z gniazda z przyłączonym obwodem ochronnym (gniazdo z kołkiem). Współpracujące ze sobą urządzenia (komputer, monitor, drukarka) powinny być zasilane z tego samego źródła.

Instalacja elektryczna pomieszczenia powinna zawierać w przewodzie fazowym rezerwową ochronę przed zwarciami, w postaci bezpiecznika o wartości znamionowej nie większej niż 16A (amperów).

W celu całkowitego wyłączenia urządzenia z sieci zasilania, należy wyjąć wtyczkę kabla zasilającego z gniazdka, które powinno znajdować się w pobliżu urządzenia i być łatwo dostępne. Znak bezpieczeństwa "B" potwierdza zgodność urządzenia z wymaganiami bezpieczeństwa użytkowania zawartymi w *PN-EN 60950:2000 i PN-EN 55022:2000*.

Jezeli na tabliczce znamionowej umieszczono informacje, ze urzadzenie jest klasy A, to oznacza, ze urzadzenie w srodowisku mieszkalnym moze powodowac zaklócenia radioelektryczne. W takich przypadkach mozna zadac od jego uzytkownika zastosowania odpowiednich srodków zaradczych.

Pozostałe instrukcje bezpieczeństwa

- Nie należy używać wtyczek adapterowych lub usuwać kołka obwodu ochronnego z wtyczki. Jeżeli konieczne jest użycie przedłużacza to należy użyć przedłużacza 3-żyłowego z prawidłowo połączonym przewodem ochronnym.
- System komputerowy należy zabezpieczyć przed nagłymi, chwilowymi wzrostami lub spadkami napięcia, używając eliminatora przepięć, urządzenia dopasowującego lub bezzakłóceniowego źródła zasilania.
- Należy upewnić się, aby nic nie leżało na kablach systemu komputerowego, oraz aby kable nie były umieszczone w miejscu, gdzie można byłoby na nie nadeptywać lub potykać się o nie.
- Nie należy rozlewać napojów ani innych płynów na system komputerowy.
- Nie należy wpychać żadnych przedmiotów do otworów systemu komputerowego, gdyż może to spowodować pożar lub porażenie prądem, poprzez zwarcie elementów wewnętrznych.
- System komputerowy powinien znajdować się z dala od grzejników i źródel ciepła. Ponadto, nie należy blokować otworów wentylacyjnych. Należy unikać kładzenia luźnych papierów pod komputer oraz umieszczania komputera w ciasnym miejscu bez możliwości cyrkulacji powietrza wokół niego.

BSMI Notice (Taiwan Only)

If you find a  or  mark on the regulatory label on the bottom, side, or back panel of your computer, the following section is applicable:

BSMI通告（僅限於台灣）

大多數的 Dell 電腦系統被 BSMI（經濟部標準檢驗局）劃分爲乙類數位裝置。但是，使用某些選件會使有些組態的等級變成甲類。若要確定您的電腦系統適用等級，請檢查所有位於電腦底部或背面板、擴充卡安裝托架，以及擴充卡上的 BSMI 註冊標籤。如果其中有一甲類標籤，即表示您的系統爲甲類數位裝置。如果只有 BSMI 的檢磁號碼標籤，則表示您的系統爲乙類數位裝置。

一旦確定了系統的 BSMI 等級，請閱讀相關的 BSMI 通告。請注意，BSMI通告規定凡是未經 Dell Computer Corporation 明確批准的擅自變更或修改，將導致您失去此設備的使用權。

此裝置符合 BSMI（經濟部標準檢驗局）的規定，使用時須符合以下兩項條件：

- 此裝置不會產生有害干擾。
- 此裝置必須能接受所接收到的干擾，包括可能導致無法正常作業的干擾。

甲類

此設備經測試證明符合 BSMI（經濟部標準檢驗局）之甲類數位裝置的限制規定。這些限制的目的是爲了在商業環境中使用此設備時，能提供合理的保護以防止有害的干擾。此設備會產生、使用並散發射頻能量；如果未遵照製造廠商的指導手冊來安裝和使用，可能會干擾無線電通訊。請勿在住宅區使用此設備。

警告使用者：
這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，
在這種情況下，使用者會被要求采取某些適當的對策。

乙類

此設備經測試證明符合 BSMI（經濟部標準檢驗局）之乙類數位裝置的限制規定。這些限制的目的是爲了在住宅區安裝時，能防止有害的干擾，提供合理的保護。此設備會產生、使用並散發射頻能量；如果未遵照製造廠商的指導手冊來安裝和使用，可能會干擾無線電通訊。但是，這並不保證在個別的安裝中不會產生干擾。您可以透過關閉和開啓此設備來判斷它是否會對廣播和電視收訊造成干擾；如果確實如此，我們建議您嘗試以下列一種或多種方法來排除干擾：

- 重新調整天線的接收方向或重新放置接收天線。
- 增加設備與接收器的距離。
- 將設備連接至不同的插座，使設備與接收器連接在不同的電路上。
- 請向經銷商或有經驗的無線電／電視技術人員查詢，以獲得幫助。

NOM Information (Mexico Only)

The following information is provided on the device(s) described in this document in compliance with the requirements of the official Mexican standards (NOM):

Exporter:	Dell Inc. One Dell Way Round Rock, TX 78682
Importer:	Dell Computer de México, S.A. de C.V. Paseo de la Reforma 2620 - 11° Piso Col. Lomas Altas 11950 México, D.F.
Ship to:	Dell Computer de México, S.A. de C.V. al Cuidado de Kuehne & Nagel de México S. de R.L. Avenida Soles No. 55 Col. Peñon de los Baños 15520 México, D.F.
Model number:	PP10L
Supply voltage:	100–240 VAC

Frequency:	50–60 Hz
Current Consumption:	1.5 A
Output voltage:	19.5 VDC
Output current:	4.62 A

ENERGY STAR® Compliance

Certain configurations of Dell computers comply with the requirements set forth by the Environmental Protection Agency (EPA) for energy-efficient computers. If the front panel of your computer bears the ENERGY STAR® Emblem, your original configuration complies with these requirements and all ENERGY STAR® power management features of the computer are enabled.

NOTE: Any Dell computer bearing the ENERGY STAR® Emblem is certified to comply with EPA ENERGY STAR® requirements as configured when shipped by Dell. Any changes you make to this configuration (such as installing additional expansion cards or drives) may increase the computer's power consumption beyond the limits set by the EPA's ENERGY STAR® Computers program.

ENERGY STAR® Emblem

The EPA's ENERGY STAR® Computers program is a joint effort between the EPA and computer manufacturers to reduce air pollution by promoting energy-efficient computer products. The EPA estimates that use of ENERGY STAR® computer products can save computer users up to two billion dollars annually in electricity costs. In turn, this reduction in electricity usage can reduce emissions of carbon dioxide, the gas primarily responsible for the greenhouse effect, and sulfur dioxide and nitrogen oxides, the primary causes of acid rain.

You can also help reduce electricity usage and its side effects by turning off your computer when it is not in use for extended periods of time, particularly at night and on weekends.

Warranty and Return Policy

Dell Inc. ("Dell") manufactures its hardware products from parts and components that are new or equivalent to new in accordance with industry-standard practices. For information about the Dell™ warranty for your computer, see the *System Information Guide* or separate paper warranty document that shipped with your computer.

Glossary

A B C D E F G H I K L M N O P R S T U V W X Z

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.

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

APR — advanced port replicator — A docking device that allows you to conveniently use a monitor, keyboard, mouse, and other devices with your portable 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

backup — A copy of a program or data file on a floppy disk, CD, or hard drive. As a precaution, back up the data files from your hard drive regularly.

battery — An internal power source used to operate portable computers when not connected to an AC adapter and an electrical outlet.

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 holds a charge while powering 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 the settings have on the computer, do not change the settings for this program. Also referred to as the *system setup program*.

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

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

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

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

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

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

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

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

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

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

C

C — Celsius — A temperature measurement system 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 microprocessor operations.

L1 cache — Primary cache stored inside the microprocessor.

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

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

CD — compact disc — An optical form of storage media, typically used for audio and software programs.

CD drive — A drive that uses optical technology to read data from CDs.

CD player — The software used to play music CDs. The CD player displays a window with buttons that you use to play a CD.

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

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

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

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

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

COA — Certificate of Authenticity — The Windows alpha-numeric code located on a sticker on your computer. You may need the COA to complete the operating system setup or reinstallation. 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 microprocessor and memory or between the microprocessor 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.

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

device driver — See *driver*.

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 microprocessor.

docking device — See *APR*.

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

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

access to the resources.

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

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

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

dual 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 — digital versatile disc — A disc usually used to store movies. DVDs are double-sided, whereas CDs are single-sided. DVD drives read most CD media as well.

DVD drive — A drive that uses optical technology to read data from DVDs and CDs.

DVD player — The software used to watch DVD movies. The DVD player displays a window with buttons that you use to watch a movie.

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 — A 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; the DVI adapter works through the computer's integrated graphics.

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.

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*.

NOTE: If your computer has two PC Card connectors, always install extended PC Cards in the top connector.

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

NOTICE: Always remove an extended PC Card before packing the computer or traveling. If something strikes the exposed end of the PC Card, the system board may be damaged.

F

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

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.

floppy drive — A disk drive that can read and write to floppy disks.

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 microprocessor 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 microprocessors, 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 microprocessors that helps dissipate heat.

help file — A file that contains descriptive or instructional information about a product. Some help files are associated with a particular program, such as *Help* in Microsoft Word. Other help files function as stand-alone reference sources. Help files typically have a filename extension of **.hlp** or **.chm**.

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.

HTML — hypertext markup language — A set of codes inserted into an Internet web page intended for display on an Internet browser.

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

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 — Industry Canada — The Canadian regulatory body responsible for regulating emissions from electronic equipment, much as the FCC does in the United States.

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 microprocessor to communicate with that device.

IRQ — interrupt request — An electronic pathway assigned to a specific device so that the device can communicate with the microprocessor. 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.

keyboard shortcut — A command requiring you to press multiple keys at the same time. Also referred to as a *key combination*.

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 microprocessor.

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 microprocessor 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 microprocessors, buses, and interfaces are often measured in MHz.

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

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

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

monitor — The high-resolution TV-like device that displays computer output.

mouse — A pointing device that controls the movement of the cursor on your screen. Typically you roll the mouse over a hard, flat surface to move the pointer or cursor on your screen.

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 microprocessor and devices such as video, drives, and networks.

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

PIN — personal identification number — A sequence of numerals and/or letters used to restrict unauthorized access to computer networks and other secure systems.

PIO — programmed input/output — A method of transferring data between two devices through the microprocessor 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.

program — Any software that processes data for you, including spreadsheet, word processor, database, and

game packages. Programs require an operating system to run.

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 system of two or more drives working together for performance and fault tolerance. RAID drives are typically used on servers and high-end PCs.

The three most common RAID levels are 0, 3, and 5:

- Level 0: Provides data striping but no redundancy. Level 0 improves performance but does not provide fault tolerance.
- Level 3: Same as Level 0, but also reserves one dedicated drive for error correction data, providing good performance and some level of fault tolerance.
- Level 5: Provides data striping at the byte level and also stripe error correction information, resulting in excellent performance and good fault tolerance.

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.

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

S

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.

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

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 program.

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.

shutdown — The process of closing windows and exiting programs, exiting the operating system, and turning off your computer. You can lose data if you turn off your computer before completing a shutdown.

smart card — A card that is embedded with a microprocessor and a memory chip. Smart cards can be used to authenticate a user on computers equipped for smart cards.

software — Anything that can be stored electronically, such as computer files or programs.

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.

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 program — 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.

system tray — See *notification area*.

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.

U

UPS — uninterruptible power supply — A backup power source used when the electrical power fails or drops to an unacceptable voltage level. A UPS keeps a computer running for a limited amount of time when there is no electrical power. UPS systems typically provide surge suppression and may also provide voltage regulation. Small UPS systems provide battery power for a few minutes to enable you to shut down your computer.

USB — universal serial bus — A hardware interface for a low-speed device such as a USB-compatible keyboard, mouse, joystick, scanner, set of speakers, printer, broadband devices (DSL and cable modems), imaging devices, or storage devices. Devices are plugged directly in to a 4-pin socket on your computer or in to a multi-port hub that plugs in to your computer. USB devices can be connected and disconnected while the computer is turned on, and they can also be daisy-chained together.

UTP — unshielded twisted pair — Describes a type of cable used in most telephone networks and some computer networks. Pairs of unshielded wires are twisted to protect against electromagnetic interference, rather than relying on a metal sheath around each pair of wires to protect against interference.

UXGA — ultra extended graphics array — A video standard for video cards and controllers that supports

resolutions up to 1600 x 1200.

V

video controller — The circuitry on a video card or on the system board (in computers with an integrated video controller) that provides the video capabilities—in combination with the monitor—for your computer.

video memory — Memory that consists of memory chips dedicated to video functions. Video memory is usually faster than system memory. The amount of video memory installed primarily influences the number of colors that a program can display.

video mode — A mode that describes how text and graphics are displayed on a monitor. Graphics-based software, such as Windows operating systems, displays in video modes that can be defined as *x* horizontal pixels by *y* vertical pixels by *z* colors. Character-based software, such as text editors, displays in video modes that can be defined as *x* columns by *y* rows of characters.

video resolution — See *resolution*.

virus — A program that is designed to inconvenience you or to destroy data stored on your computer. A virus program moves from one computer to another through an infected disk, software downloaded from the Internet, or e-mail attachments. When an infected program starts, its embedded virus also starts.

A common type of virus is a boot virus, which is stored in the boot sectors of a floppy disk. If the floppy disk is left in the drive when the computer is shut down and then turned on, the computer is infected when it reads the boot sectors of the floppy disk expecting to find the operating system. If the computer is infected, the boot virus may replicate itself onto all the floppy disks that are read or written in that computer until the virus is eradicated.

V — volt — The measurement of electric potential or electromotive force. One V appears across a resistance of 1 ohm when a current of 1 ampere flows through that resistance.

W

W — watt — The measurement of electrical power. One W is 1 ampere of current flowing at 1 volt.

WHr — watt-hour — A unit of measure commonly used to indicate the approximate capacity of a battery. For example, a 66-WHr battery can supply 66 W of power for 1 hour or 33 W for 2 hours.

wallpaper — The background pattern or picture on the Windows desktop. Change your wallpaper through the Windows Control Panel. You can also scan in your favorite picture and make it wallpaper.

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.

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.