User Guide

Product notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Go to http://www.microsoft.com for details.

To access the latest user guide, go to http://www.hp.com/support, and select your country. Select **Drivers & Downloads**, and then follow the on-screen instructions.

Software terms

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a full refund subject to the refund policy of your seller.

For any further information or to request a full refund of the price of the computer, please contact your seller.

Safety warning notice

⚠ **WARNING!**   To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to come into contact with the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Table of contents

1 Starting right

This computer is a powerful tool designed to enhance your work and entertainment. Read this chapter to learn about best practices after you set up your computer, fun things to do with your computer, and where to find additional HP resources.

Visit the HP Apps Store

The HP Apps Store offers a wide choice of popular games, entertainment and music apps, productivity apps, and apps exclusive to HP that you can download to the Start screen. The selection is updated regularly and includes regional content and country-specific offers. Be sure to check the HP Apps Store frequently for new and updated features.

IMPORTANT: You must be connected to the Internet to access the HP Apps Store.

To view and download an app:

1. From the Start screen, select the **Store** app.

2. Select **HP picks** to view all the available apps.

3. Select the app you want to download, and then follow the on-screen instructions. When the download is complete, the app appears on the All apps screen.

Best practices

After you set up and register the computer, we recommend the following steps to get the most out of your smart investment:

- If you haven't already done so, connect to a wired or wireless network. See details in .

- Become familiar with the computer hardware and software. For more information, see and .

- Update or purchase antivirus software. See .

- Back up your hard drive by creating recovery discs or a recovery flash drive. See .

Fun things to do

- You know that you can watch a YouTube video on the computer. But did you know that you can also connect your computer to a TV or gaming console? For more information, see .

- You know that you can listen to music on the computer. But did you know that you can also stream live radio to the computer and listen to music or talk radio from all over the world? See .

- Experience music the way the artist intended, with deep controlled bass and clear, pure sound. See Using Beats Audio on page 24.

- Use the TouchPad and the new Windows® touch gestures for smooth control of images and pages of text. See Using the TouchPad and gestures on page 28.

More HP resources

You have already used *Setup Instructions* to turn on the computer and locate this guide. To locate resources that provide product details, how-to information, and more, use this table.

Resource	Contents
Setup Instructions	● Overview of computer setup and features
Help and Support To access Help and Support, from the Start screen, type `help`, and then from the Search window, select **Help and Support**. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.	● A broad range of how-to information and troubleshooting tips
Worldwide support To get support in your language, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.	● Online chat with an HP technician ● Support telephone numbers ● HP service center locations
Safety & Comfort Guide To access this guide: 1. From the Start screen, type `support`, and then select the **HP Support Assistant** app. 2. Select **My computer**, and then select **User guides**. – or – Go to http://www.hp.com/ergo.	● Proper workstation setup ● Guidelines for posture and work habits that increase your comfort and decrease your risk of injury ● Electrical and mechanical safety information
Regulatory, Safety and Environmental Notices To access this guide: ▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.	● Important regulatory notices, including proper battery disposal information
Limited Warranty* To access this guide: 1. From the Start screen, type `support`, and then select the **HP Support Assistant** app. 2. Select **My computer**, and then select **Warranty and services**. – or – Go to http://www.hp.com/go/orderdocuments.	● Specific warranty information about this computer

*You can find the expressly provided HP Limited Warranty applicable to your product located with the user guides on your computer and/or on the CD/DVD provided in the box. In some countries/regions, HP may provide a printed HP Limited Warranty in the box. For countries/regions where the warranty is not provided in printed format, you may request a printed copy from http://www.hp.com/go/orderdocuments or write to:

- **North America**: Hewlett-Packard, MS POD, 11311 Chinden Blvd., Boise, ID 83714, USA

- **Europe, Middle East, Africa**: Hewlett-Packard, POD, Via G. Di Vittorio, 9, 20063, Cernusco s/Naviglio (MI), Italy

- **Asia Pacific**: Hewlett-Packard, POD, P.O. Box 200, Alexandra Post Office, Singapore 911507

Resource	Contents
When you request a printed copy of your warranty, please include your product number, warranty period (found on your service label), name, and postal address.	

IMPORTANT: Do NOT return your HP product to the addresses above. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

2 Getting to know your computer

Finding your hardware and software information

Locating hardware

To find out what hardware is installed on your computer:

1. From the Start screen, type `control panel`, and then select **Control Panel**.

2. Select **System and Security**, select **System**, and then click **Device Manager** in the left column.

   A list displays all the devices installed on your computer.

To find out information about system hardware components and the system BIOS version number, press fn+esc.

Locating software

To find out what software is installed on your computer:

▲ From the Start screen, click the down arrow in the lower-left corner of the screen.

Right side

Component		Description
(1)	Hard drive light	● Blinking white: The hard drive is being accessed. ● Amber: HP 3D DriveGuard has temporarily parked the hard drive. **NOTE:** For information about HP 3D DriveGuard, see Using HP 3D DriveGuard (select models only) on page 48.
(2)	Memory card reader	Reads optional memory cards that store, manage, share, or access information. To insert a card: Hold the card label-side up, with connectors facing the slot, insert the card into the slot, and then push in on the card until it is firmly seated. To remove a card: Press in on the card it until it pops out.
(3)	USB 3.0 ports (2)	Each USB 3.0 port connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(4)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(5)	RJ-45 (network) jack/status lights	Connects a network cable. ● White: The network is connected. ● Amber: Activity is occurring on the network.
(6)	AC adapter light	● On: The AC adapter is connected and the battery is charged. ● Off: The computer is using battery power.
(7)	Power connector	Connects an AC adapter.
(8)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left side

Component		Description
(1)	Power button	● When the computer is off, press the button to turn on the computer.
		● When the computer is on, press the button briefly to initiate Sleep.
		● When the computer is in the Sleep state, press the button briefly to exit Sleep.
		● When the computer is in Hibernation, press the button briefly to exit Hibernation.
		CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.
		If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
		To learn more about your power settings, see your power options. From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications.
(2)	Vents (2)	Enable airflow to cool internal components.
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(4)	Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices.
		WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this guide, from the Start screen, type `support`, and then select the **HP Support Assistant** app.
		NOTE: When a device is connected to the jack, the computer speakers are disabled.

Component		Description
		NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(5) — +	Volume button	Controls speaker volume. To decrease speaker volume, press the **–** edge of the button. To increase speaker volume, press the **+** edge of the button.

Display
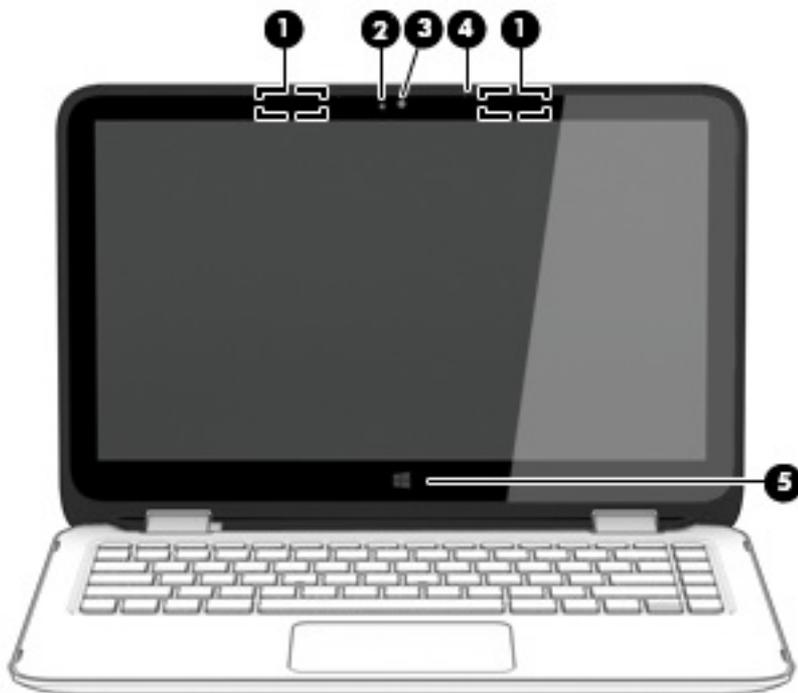
Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	Webcam light	On: The webcam is in use.
(3)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video. To use the webcam, from the Start screen, type `camera`, and then select **Camera** from the list of applications.
(4)	Internal microphone	Records sound.
(5)	Windows button	Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows button again will return you to the previous screen.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access this guide, from the Start screen, type `support,` and then select the **HP Support Assistant** app.

Display modes

Your computer has a hinge that allows you to rotate the display 360 degrees. This allows you to use your computer in three modes: productivity mode, entertainment mode, or tablet mode.

Mode	Description
Productivity mode	To use the notebook in productivity mode, raise the display until you can view the display (about 90 to 100 degrees).
Entertainment mode	To use your notebook in entertainment mode, raise the display, and then rotate it backward to a stand position (about 315 degrees). You can rest the notebook on the computer bottom or stand it on the front edges.
	NOTE: The Touchpad and keyboard functions are locked during this mode.
Tablet mode	To use your notebook as a tablet, raise the display, and then rotate it backward until it is flush with the computer bottom (360 degrees).
	NOTE: The Touchpad and keyboard functions are locked during this mode.

Top

TouchPad
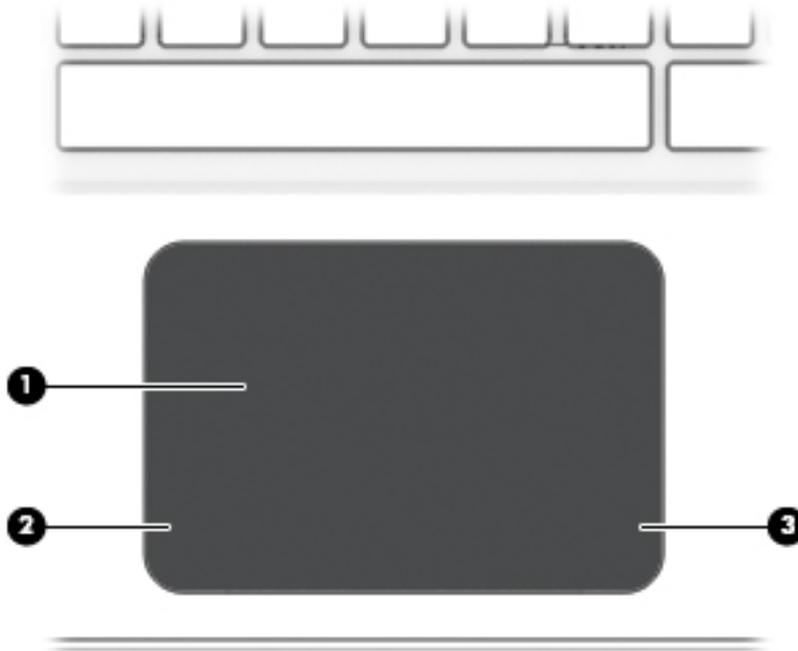
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen. **NOTE:** The TouchPad also supports edge-swipe gestures. For more information, see Edge swipes on page 31.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights

Component		Description
(1)	Power light	- On: The computer is on. - Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. - Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(3)	Mute light	- Amber: Computer sound is off. - Off: Computer sound is on.

Buttons and speakers

Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer.
		• When the computer is on, press the button briefly to initiate Sleep.
		• When the computer is in the Sleep state, press the button briefly to exit Sleep.
		• When the computer is in Hibernation, press the button briefly to exit Hibernation.
		CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.
		If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
		To learn more about your power settings, see your power options. From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications.
(2)	Speakers (2)	Produce sound.

Keys

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the b key or the esc key.
(3)	Windows key	Returns you to the Start screen from an open app or the Windows desktop.
		NOTE: Pressing the Windows key again will return you to the previous screen.
(4)	Action keys	Execute frequently used system functions.

Bottom
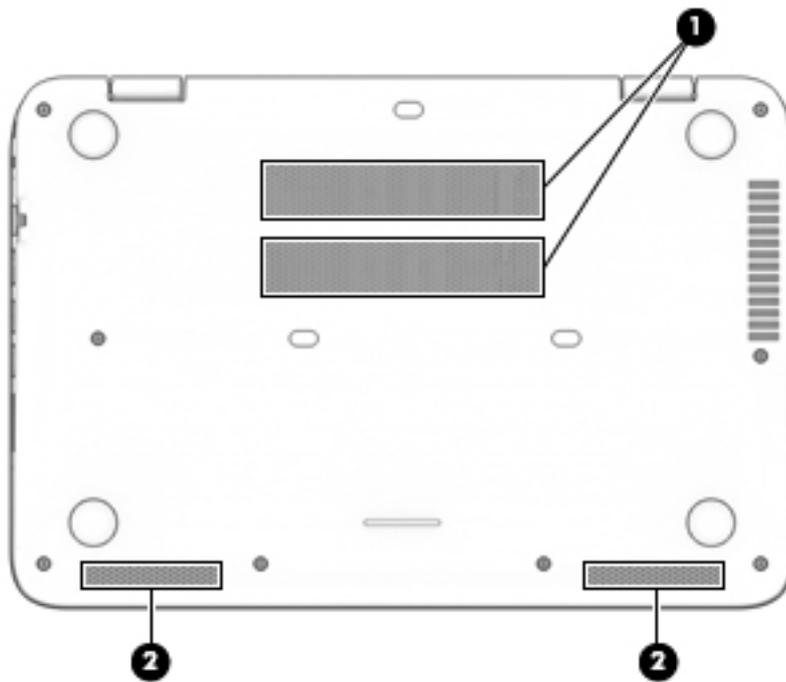
Component		Description
(1)	Vents (2)	Enable airflow to cool internal components.
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	Speakers (2)	Produce sound.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

IMPORTANT: All labels described in this section will be located in one of 3 places depending on your computer model: affixed to the bottom of the computer, located in the battery bay, or under the service door.

● Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

Your service label will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.

Component	
(1)	Serial number
(2)	Product number
(3)	Warranty period
(4)	Model number (select models only)

- Microsoft® Certificate of Authenticity label (select models only prior to Windows 8)—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. HP platforms preinstalled with Windows 8 or Windows 8.1 do not have the physical label, but have a Digital Product Key electronically installed.

  NOTE: This Digital Product Key is automatically recognized and activated by Microsoft Operating Systems on a reinstall of the Windows 8 or Windows 8.1 operating system with HP-approved recovery methods.

- Regulatory label(s)—Provide(s) regulatory information about the computer.

- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Connecting to a network

Your computer can travel with you wherever you go. But even at home, you can explore the globe and access information from millions of websites using your computer and a wired or wireless network connection. This chapter will help you get connected to that world.

Connecting to a wireless network

Wireless technology transfers data across radio waves instead of wires. Your computer may be equipped with one or more of the following wireless devices:

- Wireless local area network (WLAN) device—Connects the computer to wireless local area networks (commonly referred to as Wi-Fi networks, wireless LANs, or WLANs) in corporate offices, your home, and public places such as airports, restaurants, coffee shops, hotels, and universities. In a WLAN, the mobile wireless device in your computer communicates with a wireless router or a wireless access point.

- Bluetooth® device (select models only)—Creates a personal area network (PAN) to connect to other Bluetooth-enabled devices such as computers, phones, printers, headsets, speakers, and cameras. In a PAN, each device communicates directly with other devices, and devices must be relatively close together—typically within 10 meters (approximately 33 feet) of each other.

For more information about wireless technology, see the information and website links provided in Help and Support. From the Start screen, type help, and then select **Help and Support**.

Using the wireless controls

You can control the wireless devices in your computer using these features:

- Wireless button, wireless switch, wireless key, or airplane mode key (all referred to in this chapter as the wireless button)
- Operating system controls

Using the wireless button

The computer has a wireless button and one or more wireless devices depending on the model.

Because the wireless devices are enabled at the factory, you can use the wireless button to turn on or turn off the wireless devices simultaneously.

Using operating system controls

The Network and Sharing Center allows you to set up a connection or network, connect to a network, and diagnose and repair network problems.

To use operating system controls:

1. From the Start screen, type control panel, and then select **Control Panel**.

2. Select **Network and Internet**, and then select **Network and Sharing Center**.

For more information, from the Start screen, type help, and then select **Help and Support**.

Sharing data and drives and accessing software

When your computer is part of a network, you are not limited to using only the information that is stored in your computer. Network computers can exchange software and data with each other.

NOTE: When a disc like a DVD movie or game is copy-protected, it cannot be shared.

To share folders or content on the same network:

1. From the Windows desktop, open **File Explorer**.

2. From **This PC**, click a folder with content you want to share. Select **Share** from the navigation bar at the top of the window, and then click **Specific people**.

3. Type a name in the **File Sharing** box, and then click **Add**.

4. Click **Share** and then follow the on-screen instructions.

To share drives on the same network:

1. From the Windows desktop, right-click the network status icon in the notification area, at the far right of the taskbar.

2. Select **Open Network and Sharing Center**.

3. Under **View your active networks**, select an active network.

4. Select **Change advanced sharing settings** to set sharing options for privacy, network discovery, file and printer sharing or other network options.

Using a WLAN

With a WLAN device, you can access a wireless local area network (WLAN), which is composed of other computers and accessories that are linked by a wireless router or a wireless access point.

NOTE: The terms *wireless router* and *wireless access point* are often used interchangeably.

- A large-scale WLAN, such as a corporate or public WLAN, typically uses wireless access points that can accommodate a large number of computers and accessories and can separate critical network functions.

- A home or small office WLAN typically uses a wireless router, which allows several wireless and wired computers to share an Internet connection, a printer, and files without requiring additional pieces of hardware or software.

To use the WLAN device in your computer, you must connect to a WLAN infrastructure (provided through a service provider or a public or corporate network).

Using an Internet service provider

When you are setting up Internet access in your home, you must establish an account with an Internet service provider (ISP). To purchase Internet service and a modem, contact a local ISP. The ISP will help set up the modem, install a network cable to connect your wireless router to the modem, and test the Internet service.

NOTE: Your ISP will give you a user ID and a password to use for Internet access. Record this information and store it in a safe place.

Setting up a WLAN

To set up a WLAN and connect to the Internet, you need the following equipment:

- A broadband modem (either DSL or cable) **(1)** and high-speed Internet service purchased from an Internet service provider

- A wireless router **(2)** (purchased separately)

- A wireless computer **(3)**

NOTE: Some modems have a built-in wireless router. Check with your ISP to determine what type of modem you have.

The illustration below shows an example of a wireless network installation that is connected to the Internet.
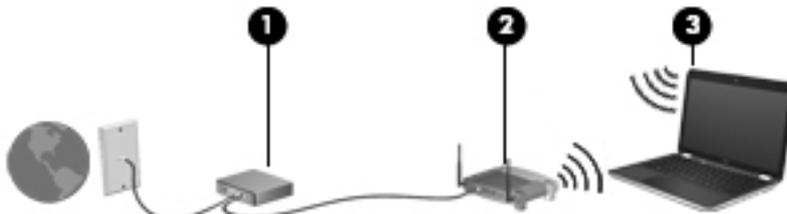
As your network grows, additional wireless and wired computers can be connected to the network to access the Internet.

For help in setting up your WLAN, see the information provided by your router manufacturer or your ISP.

Configuring a wireless router

For help in configuring a wireless router, see the information provided by your router manufacturer or your ISP.

NOTE: It is recommended that you initially connect your new wireless computer to the router by using the network cable provided with the router. When the computer successfully connects to the Internet, disconnect the cable, and access the Internet through your wireless network.

Protecting your WLAN

When you set up a WLAN or access an existing WLAN, always enable security features to protect your network from unauthorized access. WLANs in public areas (hotspots) like coffee shops and airports may not provide any security. If you are concerned about the security of your computer when connected to a hotspot, limit your network activities to email that is not confidential and basic Internet surfing.

Wireless radio signals travel outside the network, so other WLAN devices can pick up unprotected signals. Take the following precautions to protect your WLAN:

- Use a firewall.

  A firewall checks information and requests that are sent to your network, and discards any suspicious items. Firewalls are available in both software and hardware. Some networks use a combination of both types.

- Use wireless encryption.

Wireless encryption uses security settings to encrypt and decrypt data that is transmitted over the network. For more information, from the Start screen, type help, and then select **Help and Support**.

Connecting to a WLAN

To connect to the WLAN, follow these steps:

1. Be sure that the WLAN device is on.

2. From the Start screen, point to the far-right upper or lower corner of the screen to display the charms.

3. Select **Settings**, and then click the network status icon.

4. Select your WLAN from the list.

5. Click **Connect**.

    If the WLAN is a security-enabled WLAN, you are prompted to enter a security code. Type the code, and then click **Sign in** to complete the connection.

    NOTE: If no WLANs are listed, you may be out of range of a wireless router or access point.

    NOTE: If you do not see the WLAN you want to connect to, from the Windows desktop, right-click the network status icon, and then select **Open Network and Sharing Center**. Click **Set up a new connection or network**. A list of options is displayed, allowing you to manually search for and connect to a network or to create a new network connection.

6. Follow the on-screen instructions to complete the connection.

After the connection is made, place the mouse pointer over the network status icon in the notification area, at the far right of the taskbar, to verify the name and status of the connection.

NOTE: The functional range (how far your wireless signals travel) depends on WLAN implementation, router manufacturer, and interference from other electronic devices or structural barriers such as walls and floors.

Using Bluetooth wireless devices (select models only)

A Bluetooth device provides short-range wireless communications that replace the physical cable connections that traditionally link electronic devices such as the following:

- Computers (desktop, notebook, PDA)

- Phones (cellular, cordless, smart phone)

- Imaging devices (printer, camera)

- Audio devices (headset, speakers)

- Mouse

Bluetooth devices provide peer-to-peer capability that allows you to set up a PAN of Bluetooth devices. For information about configuring and using Bluetooth devices, see the Bluetooth software Help.

Connecting to a wired network

Connecting to a local area network (LAN)

Use a LAN connection if you want to connect the computer directly to a router in your home (instead of working wirelessly), or if you want to connect to an existing network at your office.

Connecting to a LAN requires an 8-pin, RJ-45 (network) cable.

To connect the network cable, follow these steps:

1. Plug the network cable into the network jack **(1)** on the computer.

2. Plug the other end of the network cable into a network wall jack **(2)** or router.

    NOTE: If the network cable contains noise suppression circuitry **(3)**, which prevents interference from TV and radio reception, orient the circuitry end of the cable toward the computer.
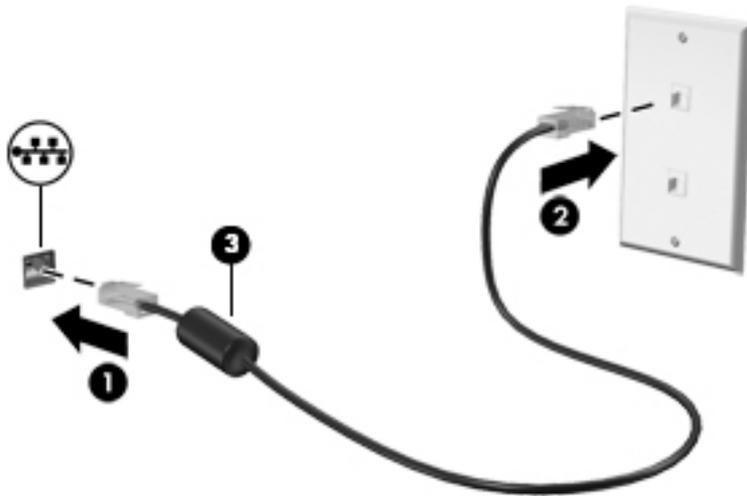
4   Enjoying entertainment features

Use your HP computer as an entertainment hub to socialize via the webcam, enjoy and manage your music, and download and watch movies. Or, to make your computer an even more powerful entertainment center, connect external devices like a monitor, projector, or TV, or speakers and headphones.

Multimedia features

Here are some of the entertainment features on your computer.

Component		Description
(1)	Webcam light	On: The webcam is in use.
(2)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
		From the Start screen, type `camera`, and then select **Camera** from the list of applications.
(3)	Internal microphone	Records sound.
(4)	RJ-45 (network) jack/lights	Connects a network cable.
		● White (right): The network is connected.

Component		Description
		● Amber (left): Activity is occurring on the network.
(5)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(6)	USB 3.0 ports (2)	Each USB 3.0 port connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(7)	Memory card reader	Reads optional memory cards that store, manage, share, or access information. To insert a card: Hold the card label-side up, with connectors facing the slot, insert the card into the slot, and then push in on the card until it is firmly seated. To remove a card: Press in on the card it until it pops out.
(8)	Speakers (2)	Produce sound.
(9)	Volume button	Controls speaker volume. ● To increase speaker volume, press the **+** edge of the button. ● To decrease speaker volume, press the **–** edge of the button.
(10)	Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this guide, from the Start screen, type `support`, and then select the **HP Support Assistant** app. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(11)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.

Using the webcam

The computer has an integrated webcam that records video and captures photographs. Some models may allow you to video conference and chat online using streaming video.

▲ To start the webcam, from the Start screen, type `camera`, and then select **Camera** from the list of applications.

For details about using the webcam, go to Help and Support. From the Start screen, type `help`, and then select **Help and Support**.

Using audio

On your computer, you can play music CDs, download and listen to music, stream audio content from the web (including radio), record audio, or mix audio and video to create multimedia. To enhance your listening enjoyment, attach external audio devices such as speakers or headphones.

Connecting speakers

You can attach wired speakers to your computer by connecting them to a USB port or to the audio-out (headphone) jack on your computer.

To connect wireless speakers to your computer, follow the device manufacturer's instructions. To connect high-definition speakers to the computer, see Setting up HDMI audio on page 26. Before connecting speakers, lower the volume setting.

Connecting headphones and microphones

You can connect wired headphones or headsets to the audio-out (headphone)/audio-in (microphone) jack on your computer. Many headsets with integrated microphones are commercially available.

To connect *wireless* headphones or headsets to your computer, follow the device manufacturer's instructions.

⚠ **WARNING!** To reduce the risk of personal injury, lower the volume setting before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*. To access this guide, from the Start screen, type `support`, and then select the **HP Support Assistant** app.

Using Beats Audio

Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound. You can experience Beats Audio through the computer's internal speakers, through external speakers connected to a USB port, or through Beats Audio headphones connected to the headphone jack.

Accessing Beats Audio Control Panel

Use Beats Audio Control Panel to view and manually control audio and bass settings.

▲ From Start screen, type `c`, select **Control Panel**, select **Hardware and Sound**, and then select **Beats Audio Control Panel**.

Enabling and disabling Beats Audio

▲ To enable or disable Beats Audio, press the fn key in combination with the b key.

Testing your audio features

To check the audio functions on your computer, follow these steps:

1. From the Start screen, type `control panel`, and then select **Control Panel**.

2. Select **Hardware and Sound**, and then select **Sound**.

3. When the Sound window opens, select the **Sounds** tab. Under **Program Events**, select any sound event, such as a beep or alarm, and then click **Test**.

   You should hear sound through the speakers or through connected headphones.

To check the recording functions on your computer, follow these steps:

1. From the Start screen, type `sound`, and then select **Sound Recorder**.

2. Click **Start Recording** and speak into the microphone.

3. Save the file to your desktop.

4. Open a multimedia program and play the recording.

To confirm or change the audio settings on your computer, follow these steps:

1. From the Start screen, type `control panel`, and then select **Control Panel**.

2. Select **Hardware and Sound**, and then select **Sound**.

Using video

Your computer is a powerful video device that enables you to watch streaming video from your favorite websites and download video and movies to watch on your computer when you are not connected to a network.

To enhance your viewing enjoyment, use one of the video ports on the computer to connect an external monitor, projector, or TV. Your computer has a high-definition multimedia interface (HDMI) port, which allows you to connect a high-definition monitor or TV.

IMPORTANT: Be sure that the external device is connected to the correct port on the computer, using the correct cable. Check the device manufacturer's instructions.

Connecting video devices by using an HDMI cable

NOTE: To connect an HDMI device to your computer, you need an HDMI cable, sold separately.

To see the computer screen image on a high-definition TV or monitor, connect the high-definition device according to the following instructions.

1. Connect one end of the HDMI cable to the HDMI port on the computer.
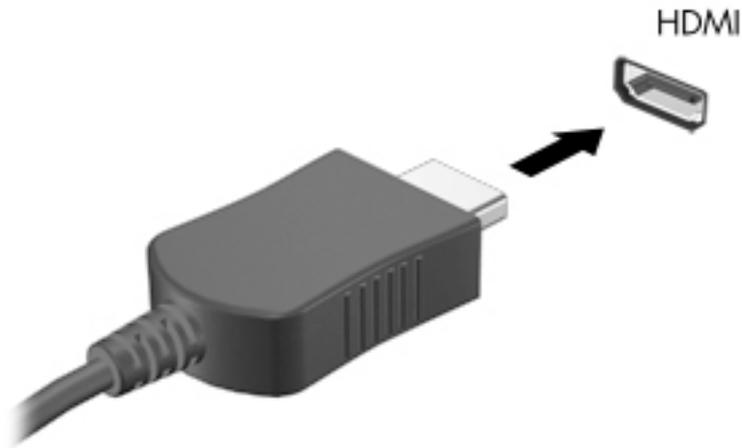
2. Connect the other end of the cable to the high-definition TV or monitor.

3. Press f4 to alternate the computer screen image between 4 display states:

- **PC screen only:** View the screen image on the computer only.

- **Duplicate:** View the screen image simultaneously on both the computer and the external device.

- **Extend:** View the screen image extended across both the computer and the external device.

- **Second screen only:** View the screen image on the external device only.

Each time you press f4, the display state changes.

> **NOTE:** For best results, especially if you choose the "Extend" option, adjust the screen resolution of the external device, as follows. From the Start screen, type `control panel`, and then select **Control Panel**. Select **Appearance and Personalization**. Under **Display**, select **Adjust screen resolution**.

Setting up HDMI audio

HDMI is the only video interface that supports high-definition video and audio. After you connect an HDMI TV to the computer, you can then turn on HDMI audio by following these steps:

1. From the Windows desktop, right-click the **Speakers** icon in the notification area, at the far right of the taskbar, and then select **Playback devices**.

2. On the **Playback** tab, select the name of the digital output device.

3. Click **Set Default**, and then click **OK**.

To return the audio stream to the computer speakers:

1. From the Windows desktop, right-click the **Speakers** icon in the notification area, at the far right of the taskbar, and then click **Playback devices**.

2. On the Playback tab, click **Speakers**.

3. Click **Set Default**, and then click **OK**.

Discovering and connecting to Miracast-compatible wireless displays

To discover and connect to Miracast-compatible wireless displays without leaving your current apps, follow the steps below.

To open Miracast:

▲ Swipe from the right edge of the Start screen, tap **Devices**, tap **Project**, and then follow the on-screen instructions.

– or –

Point to the upper-right or lower-right corner of the Start screen to display the charms, click **Devices**, click **Project**, and then follow the on-screen instructions.

5   Navigating the screen

You can navigate the computer screen in the following ways:

● Touch gestures

● Keyboard and mouse

Touch gestures can be used on your computer's TouchPad or on a touch screen.

NOTE: An external USB mouse (purchased separately) can be connected to one of the USB ports on the computer.

Select computer models have special action keys or hot key functions on the keyboard to perform routine tasks.

Using the TouchPad and gestures

The TouchPad allows you to navigate the computer screen and control the pointer by using simple finger movements. You can customize the touch gestures by changing settings, button configurations, click speed, and pointer options. You can also view demonstrations of TouchPad gestures.

From the Start screen, type `control panel`, select **Control Panel**, and then select **Hardware and Sound**. Under **Devices and Printers**, select **Mouse**.

TIP: Use the left and right buttons on the TouchPad as you would use the corresponding buttons on an external mouse.

NOTE: TouchPad gestures are not supported in all apps.

Tapping

To make an on-screen selection, use the tap function on the TouchPad.

● Point to an item on the screen, and then tap one finger on the TouchPad zone to make a selection. Double-tap an item to open it.

Scrolling

Scrolling is useful for moving up, down, or sideways on a page or image.

● Place two fingers slightly apart on the TouchPad zone and then drag them up, down, left, or right.
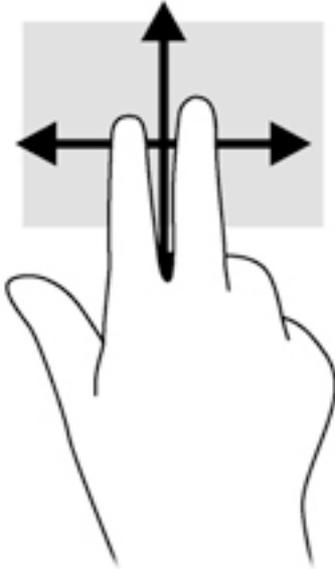
2-finger pinch zoom

2-finger pinch zoom allows you to zoom out or in on images or text.

● Zoom out by placing two fingers apart on the TouchPad zone and then moving your fingers together.

● Zoom in by placing two fingers together on the TouchPad zone and then moving your fingers apart.
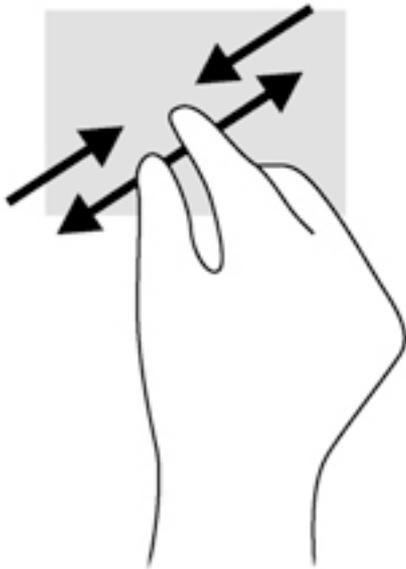
2-finger click

2-finger click allows you to make menu selections for an object on the screen.

NOTE: Using 2-finger click is the same action as using right-click with the mouse.

- Place two fingers on the TouchPad zone and press down to open the options menu for the selected object.
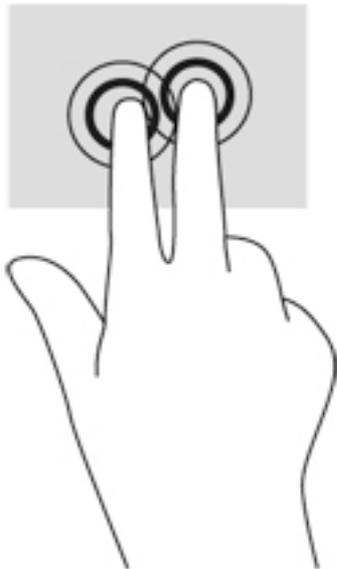
Rotating

Rotating allows you to turn items such as photos.

- Point to an object, and then anchor the forefinger of your left hand in the TouchPad zone. Using your right hand, slide your forefinger in a sweeping motion from 12 o'clock to 3 o'clock. To reverse the rotation, move your forefinger from 3 o'clock to 12 o'clock.

NOTE: Rotate is intended for specific apps where you can manipulate an object or image. Rotate may not be functional for all apps.
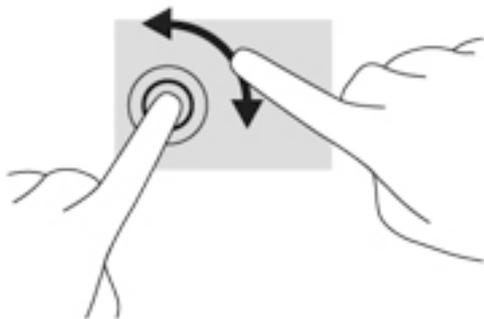
Edge swipes

Edge swipes allow you to perform tasks such as changing settings and finding or using apps.

Right-edge swipe

The right-edge swipe reveals the charms, which let you search, share, start apps, access devices, or change settings.

● Swipe your finger gently from the right edge to reveal the charms.
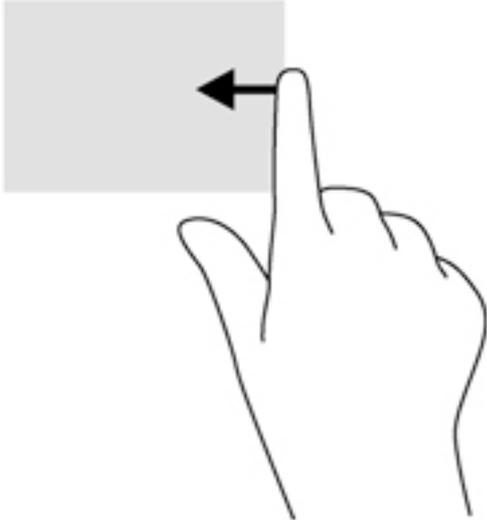
Left-edge swipe

The left-edge swipe accesses your recently opened apps so that you can switch between them quickly.

● Swipe your finger gently from the left edge of the TouchPad.

Top-edge swipe

The top-edge swipe displays app command options that allow you to customize apps.

IMPORTANT: When an app is active, the top-edge gesture varies depending on the app.

- Gently swipe your finger from the top edge to reveal the app command options.
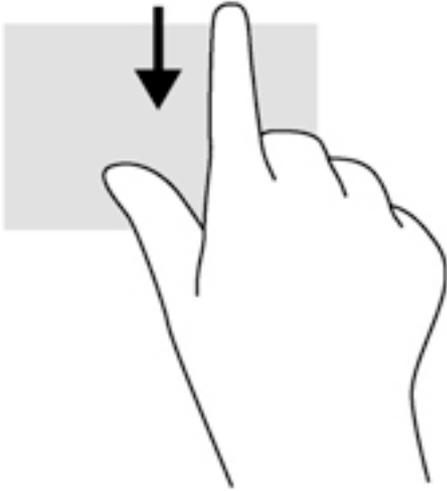
Using touch screen gestures

A touch screen computer allows you to control items on the screen directly with your fingers.

TIP: On touch screen computers, you can perform the gestures on the screen or on the TouchPad. You can also perform on-screen actions with the keyboard and mouse.

One-finger slide

The one-finger slide is mostly used to pan or scroll through lists and pages, but you can use it for other interactions, too, such as moving an object.

- To scroll across the screen, lightly slide one finger across the screen in the direction you want to move.

  NOTE: When many apps are displayed on the Start screen, you can slide your finger to move the screen left or right.

- To drag, press and hold an object, and then drag the object to move it.
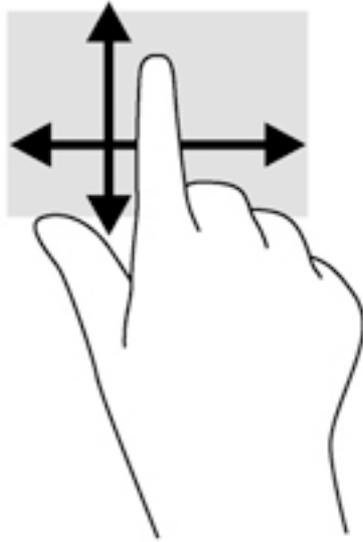
Tapping

To make an on-screen selection, use the tap function.

● Use one finger to tap an object on the screen to make a selection. Double-tap an item to open it.

Scrolling

Scrolling is useful for moving the pointer up, down, left, or right on a page or image.

● Place two fingers on the screen and then drag them in an up, down, left, or right motion.
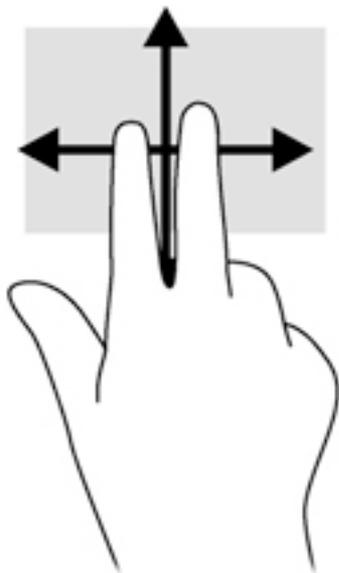
2-finger pinch zoom

2-finger pinch zoom allows you to zoom out or in on images or text.

- Zoom out by placing two fingers apart on the screen and then moving your fingers together.

- Zoom in by placing two fingers together on the screen and then moving your fingers apart.
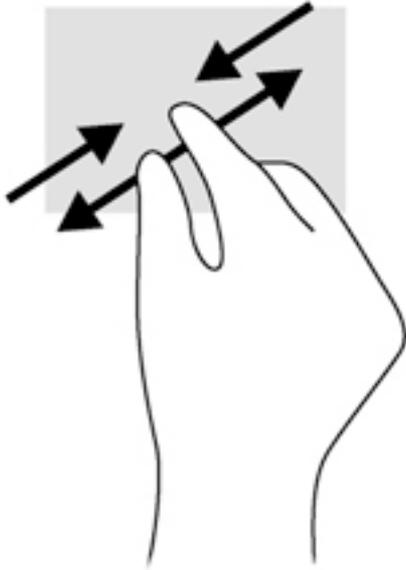
Rotating

Rotating allows you to turn items such as photos.

- Anchor the forefinger of your left hand on the object you want to rotate. Using your right hand, slide your forefinger around in a sweeping motion from 12 o'clock to 3 o'clock. To reverse the rotation, move your forefinger from 3 o'clock to 12 o'clock.

NOTE: Rotate is intended for specific apps where you can manipulate an object or image. Rotate may not be functional for all apps.
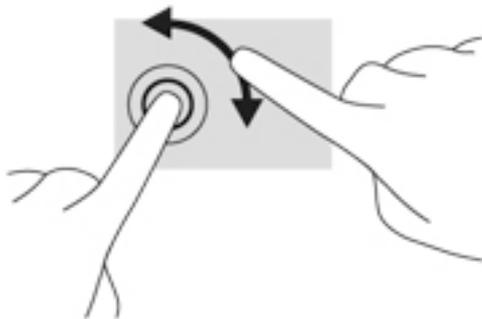
Edge swipes

With edge swipes you can perform tasks such as changing settings and finding or using apps.

Right-edge swipe

The right-edge swipe reveals the charms, which let you search, share, start apps, access devices, or change settings.

● Gently swipe your finger inward from the right edge of the display onto the screen to reveal the charms.
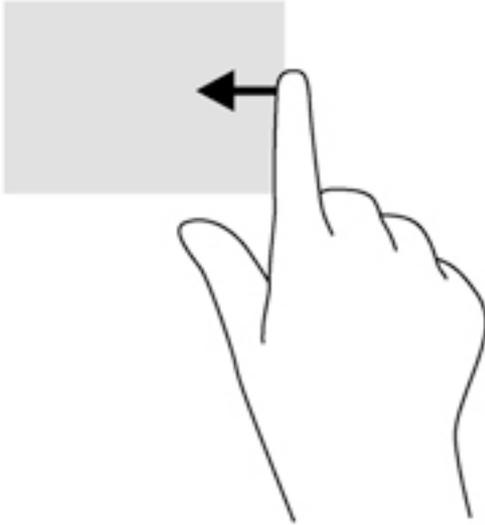
Left-edge swipe

The left-edge swipe reveals your open apps so that you can switch to them quickly.

● Gently swipe your finger inward from the left edge of the display to switch between apps. Without lifting your finger, swipe back toward the left edge to reveal all open apps.
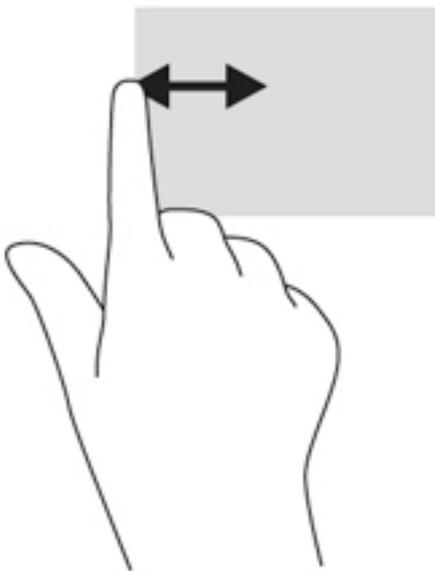
Top-edge swipe and bottom-edge swipe

The top-edge swipe or bottom-edge swipe displays app command options that allow you to customize apps.

IMPORTANT: When an app is open, the top-edge gesture varies depending on the app.

- Gently swipe your finger from the top edge or the bottom edge to reveal the app command options.
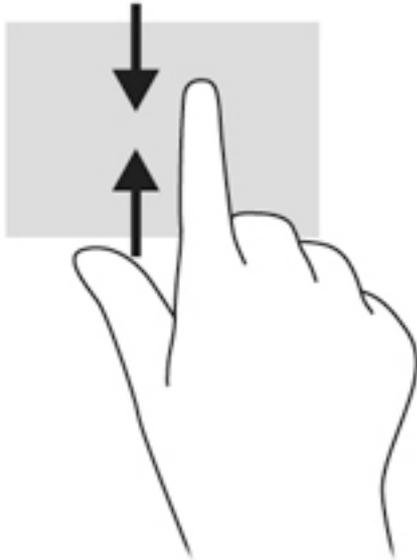
Using the keyboard and mouse

The keyboard and mouse allow you to type, select items, scroll and to perform the same functions as you do using touch gestures. The keyboard also allows you to use action keys and hot keys to perform specific functions.

TIP: The Windows key ⊞ on the keyboard allows you to quickly return to the Start screen from an open app or the Windows desktop. Pressing the Windows key again will return you to the previous screen.

NOTE: Depending on the country or region, your keyboard may have different keys and keyboard functions than those discussed in this section.

Using the keys

You can quickly access information or perform functions by using certain keys and key combinations.

Using the action keys

An action key performs an assigned function. The icon on each of the f1 through f4 keys and the f6 through f12 keys illustrates the assigned function for that key.

To use an action key function, press and hold the key.

CAUTION: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

The action key feature is enabled at the factory. You can disable this feature in Setup Utility (BIOS). See Using Setup Utility (BIOS) and HP PC Hardware Diagnostics (UEFI) on page 56 for instructions on opening Setup Utility (BIOS), and then follow the instructions at the bottom of the screen.

After you have disabled the action key feature, you can still perform each function by pressing the fn key in combination with the appropriate action key.

Icon	Key	Description
?	f1	Opens Help and Support, which provides tutorials, information about the Windows operating system and your computer, answers to questions, and updates to your computer. Help and Support also provides automated troubleshooting tools and access to support.
☀	f2	Decreases the screen brightness incrementally as long as you hold down the key.
☀	f3	Increases the screen brightness incrementally as long as you hold down the key.
▯□▮	f4	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display to a simultaneous display on both the computer and the monitor.
◀⊘	f6	Mutes or restores speaker sound.
◀−	f7	Decreases speaker volume incrementally as long as you hold down the key.
◀+	f8	Increases speaker volume incrementally as long as you hold down the key.
◀◀	f9	Plays the previous track of an audio CD or the previous section of a DVD or a BD.
▶❙❙	f10	Begins, pauses, or resumes playback of an audio CD, a DVD, or a BD.
▶▶❙	f11	Plays the next track of an audio CD or the next section of a DVD or a BD.
✈	f12	Turns the airplane mode and wireless feature on or off. NOTE: A wireless network must be set up before a wireless connection is possible.

Using Windows shortcut keys

Windows provides shortcuts so that you can perform actions quickly. Press the Windows key alone or in combination with a specific key to perform a designated action.

Using the hot keys

A hot key is a combination of the fn key and the esc key or the b key.

To use a hot key:

▲ Briefly press the fn key, and then briefly press the second key of the combination.

6 Managing power

Your computer can operate on either battery power or external power. When the computer is running on battery power only and an AC power source is not available to charge the battery, it is important to monitor and conserve the battery charge. Your computer supports an optimal power plan to manage how your computer uses and conserves power so that computer performance is balanced with power conservation.

Initiating Sleep and Hibernation

Microsoft® Windows has two power-saving states, Sleep and Hibernation.

- Sleep—The Sleep state is automatically initiated after a period of inactivity when running on battery power or on external power. Your work is saved to memory, allowing you to resume your work very quickly. You can also initiate Sleep manually. For more information, see Manually initiating and exiting Sleep on page 42.

- Hibernation—The Hibernation state is automatically initiated if the battery reaches a critical level. In the Hibernation state, your work is saved to a hibernation file and the computer powers down.

  NOTE: You can manually initiate Hibernation. See Manually initiating and exiting Sleep on page 42 and Manually initiating and exiting Hibernation (select models only) on page 42.

CAUTION: To reduce the risk of possible audio and video degradation, loss of audio or video playback functionality, or loss of information, do not initiate Sleep while reading from or writing to a disc or an external media card.

NOTE: You cannot initiate any type of networking connection or perform any computer functions while the computer is in the Sleep state or in Hibernation.

Manually initiating and exiting Sleep

You can initiate Sleep in any of the following ways:

- Close the display.

- From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms. Click **Settings**, click the **Power** icon, and then click **Sleep**.

To exit Sleep:

- Briefly press the power button.

- If the display is closed, open the display.

When the computer exits Sleep, the power lights turn on and your work returns to the screen.

> **NOTE:** If you have set a password to be required on wakeup, you must enter your Windows password before the computer will return to the screen.

Manually initiating and exiting Hibernation (select models only)

You can enable user-initiated Hibernation and change other power settings and timeouts using Power Options.

1. From the Start screen, type `power options`, then select **Power options**.

2. In the left pane, click **Choose what the power button does**.

3. Click **Change Settings that are currently unavailable**.

4. In the **When I press the power button** area, select **Hibernate**.

5. Click **Save changes**.

When the computer exits Hibernation, the power lights turn on and your work returns to the screen.

> **NOTE:** If you have set a password to be required on wakeup, you must enter your Windows password before your work will return to the screen.

Setting password protection on wakeup

To set the computer to prompt for a password when the computer exits Sleep or Hibernation, follow these steps:

1. From the Start screen, type `power options`, then select **Power options**.

2. In the left pane, click **Require a password on wakeup**.

3. Click **Change Settings that are currently unavailable**.

4. Click **Require a password (recommended)**.

> **NOTE:** If you need to create a user account password or change your current user account password, click **Create or change your user account password**, and then follow the on-screen instructions. If you do not need to create or change a user account password, go to step 5.

5. Click **Save changes**.

Using the power meter and power settings

The power meter is located on the Windows desktop. The power meter allows you to quickly access power settings and view the remaining battery charge.

- To reveal the percentage of remaining battery charge and the current power plan, on the Windows desktop, point over the power meter icon.

- To use Power Options, click the power meter icon and select an item from the list. From the Start screen, you can also type `power options`, and then select **Power Options**.

Different power meter icons indicate whether the computer is running on battery or external power. The icon also reveals a message if the battery has reached a low or critical battery level.

Running on battery power

When a charged battery is in the computer and the computer is not plugged into external power, the computer runs on battery power. If the computer has a charged battery installed and the AC adapter is disconnected from the computer, the computer automatically switches to battery power and the screen brightness decreases to conserve battery life. The battery in the computer slowly discharges when the computer is off and unplugged from external power.

Computer battery life varies, depending on power management settings, programs running on the computer, screen brightness, external devices connected to the computer, and other factors.

Factory-sealed battery

To monitor the status of your battery, or if the battery is no longer holding a charge, run Battery Check in Help and Support. To access battery information, from the Start screen, type `support`, select the **HP Support Assistant** app, and then select **Battery and performance**. If Battery Check indicates that your battery should be replaced, contact support.

The battery(ies) in this product cannot be easily replaced by users themselves. Removing or replacing the battery could affect your warranty coverage. If a battery is no longer holding a charge, contact support.

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal.

Finding battery information

To monitor the status of your battery, or if the battery is no longer holding a charge, run Battery Check in HP Support Assistant. To access battery information, from the Start screen, type `support`, select the **HP Support Assistant** app, and then select **Battery and performance**.

HP Support Assistant provides the following tools and information about the battery:

- Battery test

- Information about battery types, specifications, life cycles, and capacity

Conserving battery power

Tips for conserving battery power and maximizing battery life:

- Lower the brightness on the display.

- Select the **Power saver** setting in Power Options.

- Turn off wireless devices when you are not using them.

- Disconnect unused external devices that are not plugged into an external power source, such as an external hard drive connected to a USB port.

- Stop, disable, or remove any external media cards that you are not using.

- Before you leave your work, initiate Sleep or shut down the computer.

Identifying low battery levels

When a battery that is the sole power source for the computer reaches a low or critical battery level, the following behavior occurs:

- The power meter icon on the Windows desktop shows a low or critical battery notification.

  NOTE: For additional information about the power meter, see Using the power meter and power settings on page 43.

The computer takes the following actions for a critical battery level:

- If Hibernation is disabled and the computer is on or in the Sleep state, the computer remains briefly in the Sleep state, and then shuts down and loses any unsaved information.

- If Hibernation is enabled and the computer is on or in the Sleep state, the computer initiates Hibernation.

Resolving a low battery level

Resolving a low battery level when external power is available

- Connect an AC adapter.

- Connect an optional docking or expansion device.

- Connect an optional power adapter purchased as an accessory from HP.

Resolving a low battery level when no power source is available

Save your work and shut down the computer.

Resolving a low battery level when the computer cannot exit Hibernation

When the computer lacks sufficient power to exit Hibernation, follow these steps:

1. Connect the AC adapter to the computer and to external power.

2. Exit Hibernation by pressing the power button.

Running on external AC power

For information about connecting to AC power, refer to the *Setup Instructions* poster provided in the computer box.

The computer does not use battery power when the computer is connected to AC external power with an approved AC adapter or an optional docking/expansion device.

WARNING! To reduce potential safety issues, use only the AC adapter provided with the computer, a replacement AC adapter provided by HP, or a compatible AC adapter purchased from HP.

Connect the computer to external AC power under any of the following conditions:

WARNING! Do not charge the computer battery while you are onboard aircraft.

- When charging or calibrating a battery
- When installing or modifying system software
- When writing information to a disc (select models only)
- When running Disk Defragmenter on computers with internal hard drives
- When performing a backup or recovery

When you connect the computer to external AC power:

- The battery begins to charge.
- The screen brightness increases.
- The power meter icon on the Windows desktop changes appearance.

When you disconnect external AC power, the following events occur:

- The computer switches to battery power.
- The screen brightness automatically decreases to save battery life.
- The power meter icon on the Windows desktop changes appearance.

Troubleshooting power problems

Test the AC adapter if the computer exhibits any of the following symptoms when it is connected to AC power:

- The computer does not turn on.
- The display does not turn on.
- The power lights are off.

To test the AC adapter:

1. Shut down the computer.
2. Connect the AC adapter to the computer, and then plug it into an AC outlet.
3. Turn on the computer.

   - If the power lights turn *on*, the AC adapter is working properly.
   - If the power lights remain *off*, check the connection from the AC adapter to the computer and the connection from the AC adapter to the AC outlet to be sure that the connections are secure.
   - If the connections are secure and the power lights remain *off*, the AC adapter is not functioning and should be replaced.

Contact support for information about obtaining a replacement AC power adapter.

HP CoolSense

HP CoolSense ❄ automatically detects when the computer is not on a horizontal surface and adjusts performance and fan settings to keep the surface temperature of your computer at the optimum level of comfort.

When HP CoolSense is off, the position of the computer is not detected and the performance and fan options remain at the factory setting. As a result, the surface temperature of the computer might be higher than it would be with HP CoolSense on.

To turn CoolSense off or on, follow these steps:

▲ From the Start screen, type `coolsense`, and then select **HP CoolSense**.

Refreshing your software content with Intel Smart Connect Technology (select models only)

When the computer is in the Sleep state, Intel® Smart Connect Technology periodically causes the computer to exit Sleep. If a network connection is available, Smart Connect updates open apps such as your email inboxes, social network sites, and news pages and then returns the computer to the Sleep state. Smart Connect also syncs content that you have created offline, such as emails. When the computer exits Sleep, you have immediate access to your updated information.

▲ To enable this feature or manually adjust the settings, from the Start screen, type `smart`, and then select Intel® Smart Connect Technology.

Shutting down (turning off) the computer

⚠ **CAUTION:** Unsaved information is lost when the computer shuts down. Be sure to save your work before shutting down the computer.

The Shut down command closes all open programs, including the operating system, and then turns off the display and computer.

Shut down the computer under any of the following conditions:

- When you are connecting an external hardware device that does not connect to a USB or video port

- When the computer will be unused and disconnected from external power for an extended period

Although you can turn off the computer with the power button, the recommended procedure is to use the Windows Shut down command:

📝 **NOTE:** If the computer is in the Sleep state or in Hibernation, you must first exit Sleep or Hibernation before shutdown is possible by briefly pressing the power button.

1. Save your work and close all open programs.

2. From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms.

3. Click **Settings**, click the **Power** icon, and then click **Shut down**.

   – or –

Right-click the **Start** button in the lower-left corner of the screen, select **Shut down**, and then select **Shut down**.

If the computer is unresponsive and you are unable to use the preceding shutdown procedures, try the following emergency procedures in the sequence provided:

● Press ctrl+alt+delete, click the **Power** icon, and then select **Shut Down**.

● Press and hold the power button for at least 5 seconds.

● Disconnect the computer from external power.

7 Maintaining your computer

It is important to perform regular maintenance to keep your computer in optimal condition. This chapter provides information about improving the performance of your computer by running tools such as Disk Defragmenter and Disk Cleanup. It also provides information about updating your programs and drivers, instructions for cleaning your computer, and tips for traveling with your computer.

Improving performance

Everyone wants a fast computer and you can drastically improve the performance of your computer by performing regular maintenance tasks with tools such as Disk Defragmenter and Disk Cleanup. Also, as your computer gets older, you might consider installing larger drives and adding more memory.

Using HP 3D DriveGuard (select models only)

HP 3D DriveGuard protects a hard drive by parking the drive and halting data requests under either of the following conditions:

● You drop the computer.

● You move the computer with the display closed while the computer is running on battery power.

A short time after the end of one of these events, HP 3D DriveGuard returns the hard drive to normal operation.

NOTE: Because solid state drives (SSDs) lack moving parts, they do not require HP 3D DriveGuard protection.

NOTE: A hard drive in a primary hard drive bay or a secondary hard drive bay is protected by HP 3D DriveGuard. A hard drive installed in an optional docking device or connected to a USB port is not protected by HP 3D DriveGuard.

For more information, see the HP 3D DriveGuard software Help.

Identifying HP 3D DriveGuard status

The hard drive light on the computer changes color to show that the drive in a primary hard drive bay and/or the drive in a secondary hard drive bay (select models only) is parked. To determine whether a drive is currently protected or whether it is parked, view the icon on the Windows desktop in the notification area, at the far right of the taskbar, or in the Mobility Center.

Using Disk Defragmenter

As you use your computer over time, the files on the hard drive become fragmented. A fragmented drive means data on your drive is not contiguous (sequential) and, because of this, the hard drive works harder to locate files, thus slowing down the computer. Disk Defragmenter consolidates (or physically reorganizes) the fragmented files and folders on the hard drive so that the system can run more efficiently.

NOTE: It is not necessary to run Disk Defragmenter on solid-state drives.

After you start Disk Defragmenter, it works without supervision. However, depending on the size of your hard drive and the number of fragmented files, Disk Defragmenter may take more than an hour to complete.

HP recommends defragmenting your hard drive at least once a month. You may set Disk Defragmenter to run on a monthly schedule, but you can defragment your computer manually at any time.

To run Disk Defragmenter:

1. Connect the computer to AC power.

2. From the Start screen, type `disk`.

3. Follow the on-screen instructions.

For additional information, access the Disk Defragmenter software Help.

Using Disk Cleanup

Disk Cleanup searches the hard drive for unnecessary files that you can safely delete to free up disk space and help the computer run more efficiently.

To run Disk Cleanup:

1. From the Start screen, type `disk`, and then select **Uninstall apps to free up disk space**.

2. Follow the on-screen instructions.

Updating programs and drivers

HP recommends that you update your programs and drivers on a regular basis to the latest versions. Updates can resolve issues and bring new features and options to your computer. Technology is always changing, and updating programs and drivers allows your computer to run the latest technology available. For example, older graphics components might not work well with the most recent gaming software. Without the latest driver, you would not be getting the most out of your equipment.

Go to http://www.hp.com/support to download the latest versions of HP programs and drivers. In addition, register to receive automatic update notifications when they become available.

Cleaning your computer

Use the following products to safely clean your computer:

● Dimethyl benzyl ammonium chloride 0.3 percent maximum concentration (for example, disposable wipes, which come in a variety of brands).

● Alcohol-free glass-cleaning fluid

● Water with mild soap solution

● Dry microfiber cleaning cloth or a chamois (static-free cloth without oil)

● Static-free cloth wipes

⚠ **CAUTION:** Avoid strong cleaning solvents that can permanently damage your computer. If you are not sure that a cleaning product is safe for your computer, check the product contents to make sure that ingredients such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons are not included in the product.

Fibrous materials, such as paper towels, can scratch the computer. Over time, dirt particles and cleaning agents can get trapped in the scratches.

Cleaning procedures

Follow the procedures in this section to safely clean your computer.

⚠ **WARNING!** To prevent electric shock or damage to components, do not attempt to clean your computer while it is turned on.

- Turn off the computer.

- Disconnect AC power.

- Disconnect all powered external devices.

⚠ **CAUTION:** To prevent damage to internal components, do not spray cleaning agents or liquids directly on any computer surface. Liquids dripped on the surface can permanently damage internal components.

Cleaning the display (All-in-Ones or Notebooks)

Gently wipe the display using a soft, lint-free cloth moistened with an alcohol-free glass cleaner. Be sure that the display is dry before closing the display.

Cleaning the sides or cover

To clean the sides or cover, use a soft microfiber cloth or chamois moistened with one of the cleaning solutions listed previously or use an acceptable disposable wipe.

📝 **NOTE:** When cleaning the cover of the computer, use a circular motion to aid in removing dirt and debris.

Cleaning the TouchPad, keyboard, or mouse

⚠ **WARNING!** To reduce the risk of electric shock or damage to internal components, do not use a vacuum cleaner attachment to clean the keyboard. A vacuum cleaner can deposit household debris on the keyboard surface.

⚠ **CAUTION:** To prevent damage to internal components, do not allow liquids to drip between the keys.

- To clean the TouchPad, keyboard, or mouse, use a soft microfiber cloth or a chamois moistened with one of the cleaning solutions listed previously or use an acceptable disposable wipe.

- To prevent keys from sticking and to remove dust, lint, and particles from the keyboard, use a can of compressed air with a straw extension.

Traveling with or shipping your computer

If you have to travel with or ship your computer, here are some tips to keep in mind to keep your equipment safe.

- Prepare the computer for traveling or shipping:
  - Back up your information to an external drive.
  - Remove all discs and all external media cards, such as memory cards.

- ◦ Turn off and then disconnect all external devices.

- ◦ Shut down the computer.

● Take along a backup of your information. Keep the backup separate from the computer.

● When traveling by air, carry the computer as hand luggage; do not check it in with the rest of your luggage.

⚠ **CAUTION:** Avoid exposing a drive to magnetic fields. Security devices with magnetic fields include airport walk-through devices and security wands. Airport conveyer belts and similar security devices that check carry-on baggage use X-rays instead of magnetism and do not damage drives.

● If you plan to use the computer during a flight, listen for the in-flight announcement that tells you when you are allowed to use your computer. In-flight computer use is at the discretion of the airline.

● If you are shipping the computer or a drive, use suitable protective packaging and label the package "FRAGILE."

● If the computer has a wireless device installed, the use of these devices may be restricted in some environments. Such restrictions may apply aboard aircraft, in hospitals, near explosives, and in hazardous locations. If you are uncertain of the policy that applies to the use of a particular device, ask for authorization to use your computer before you turn it on.

● If you are traveling internationally, follow these suggestions:

- ◦ Check the computer-related customs regulations for each country or region on your itinerary.

- ◦ Check the power cord and adapter requirements for each location in which you plan to use the computer. Voltage, frequency, and plug configurations vary.

⚠ **WARNING!** To reduce the risk of electric shock, fire, or damage to the equipment, do not attempt to power the computer with a voltage converter kit sold for appliances.

8 Securing your computer and information

Computer security is essential for protecting the confidentiality, integrity, and availability of your information. Standard security solutions provided by the Windows operating system, HP applications, the non-Windows Setup Utility (BIOS), and other third-party software can help protect your computer from a variety of risks, such as viruses, worms, and other types of malicious code.

IMPORTANT: Some security features listed in this chapter may not be available on your computer.

Computer risk	Security feature
Unauthorized use of the computer	Power-on password
Computer viruses	Antivirus software
Unauthorized access to data	Firewall software
Unauthorized access to Setup Utility (BIOS) settings and other system identification information	Administrator password
Ongoing or future threats to the computer	Software updates
Unauthorized access to a Windows user account	User password
Unauthorized removal of the computer	Security cable lock

Using passwords

A password is a group of characters that you choose to secure your computer information and to protect online transactions. Several types of passwords can be set. For example, when you set up your computer for the first time, you were asked to create a user password to secure your computer. Additional passwords can be set in Windows or in the HP Setup Utility (BIOS) that is preinstalled on your computer.

You may find it helpful to use the same password for a Setup Utility (BIOS) feature and for a Windows security feature.

Use the following tips for creating and saving passwords:

- To reduce the risk of being locked out of the computer, record each password and store it in a secure place away from the computer. Do not store passwords in a file on the computer.

- When creating passwords, follow requirements set by the program.

- Change your passwords at least every three months.

- An ideal password is long and has letters, punctuation, symbols, and numbers.

- Before you send your computer for service, back up your files, delete confidential files, and then remove all password settings.

For additional information about Windows passwords, such as screen-saver passwords, from the Start screen, type `hp support assistant`, and then select the **HP Support Assistant** app.

Setting Windows passwords

Password	Function
User password	Protects access to a Windows user account.
Administrator password	Protects administrator-level access to computer contents. **NOTE:** This password cannot be used to access Setup Utility (BIOS) contents.

Setting Setup Utility (BIOS) passwords

Password	Function
Administrator password	● Must be entered each time you access Setup Utility (BIOS). ● If you forget your administrator password, you cannot access Setup Utility (BIOS). **NOTE:** The administrator password can be used in place of the power-on password. **NOTE:** Your administrator password is not interchangeable with an administrator password set in Windows, nor is it revealed as it is set, entered, changed, or deleted. **NOTE:** If you enter the power-on password at the first password check, you must enter the administrator password to access Setup Utility (BIOS).
Power-on password	● Must be entered each time you turn on or restart the computer. ● If you forget your power-on password, you cannot turn on or restart the computer. **NOTE:** The administrator password can be used in place of the power-on password. **NOTE:** A power-on password is not revealed as it is set, entered, changed, or deleted.

To set, change, or delete an administrator or power-on password in Setup Utility (BIOS):

1. To start Setup Utility (BIOS), turn on or restart the computer, quickly press esc, and then press f10.

2. Use the arrow keys to select **Security**, and then follow the on-screen instructions.

Your changes take effect when the computer restarts.

Using Internet security software

When you use your computer to access email, a network, or the Internet, you potentially expose your computer to computer viruses, spyware, and other online threats. To help protect your computer, Internet security software that includes antivirus and firewall features may be preinstalled on your computer as a trial offer. To provide ongoing protection against newly discovered viruses and other security risks, security software must be kept up to date. It is strongly recommended that you upgrade

the security software trial offer or purchase the software of your choice in order to fully protect your computer.

Using antivirus software

Computer viruses can disable programs, utilities, or the operating system, or cause them to function abnormally. Antivirus software can detect most viruses, destroy them, and in most cases, repair any damage they have caused.

To provide ongoing protection against newly discovered viruses, antivirus software must be kept up to date.

An antivirus program may be preinstalled on your computer. It is strongly recommended that you use the antivirus program of your choice in order to fully protect your computer.

For more information about computer viruses, from the Start screen, type `hp support assistant`, and then select the **HP Support Assistant** app.

Using firewall software

Firewalls are designed to prevent unauthorized access to a system or network. A firewall can be software you install on your computer and/or network, or it can be a combination of both hardware and software.

There are two types of firewalls to consider:

- Host-based firewalls—Software that protects only the computer it is installed on.

- Network-based firewalls—Installed between your DSL or cable modem and your home network to protect all the computers on the network.

When a firewall is installed on a system, all data sent to and from the system is monitored and compared with a set of user-defined security criteria. Any data that does not meet those criteria is blocked.

Installing software updates

HP, Microsoft Windows, and third-party software installed on your computer should be regularly updated to correct security problems and improve software performance. For more information, see Updating programs and drivers on page 49.

Installing critical security updates

⚠ **CAUTION:** Microsoft® sends out alerts regarding critical updates. To protect the computer from security breaches and computer viruses, install all critical updates from Microsoft as soon as you receive an alert.

You can choose whether updates are installed automatically. To change the settings, from the Start screen, type c, and then select **Control Panel**. Select **System and Security**, select **Windows Update**, select **Change settings**, and then follow the on-screen instructions.

Installing HP and third-party software updates

HP recommends that you regularly update the software and drivers that were originally installed on your computer. To download the latest versions, go to http://www.hp.com/support. At this location, you can also register to receive automatic update notifications when they become available.

If you have installed third-party software after you purchased your computer, regularly update the software. Software companies provide software updates to their products to correct security problems and improve functionality of the software.

Securing your wireless network

When you set up your wireless network, always enable security features. For more information, see Protecting your WLAN on page 19.

Backing up your software applications and information

Regularly back up your software applications and information to protect them from being permanently lost or damaged through a virus attack or a software or hardware failure. For more information, see Backing up, restoring, and recovering on page 59.

Using an optional security cable lock

A security cable lock, which is purchased separately, is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. Security cable locks are only one of several methods that should be employed as part of a complete security solution to help maximize theft protection.

The security cable slot on your computer may look slightly different from the illustration in this section. For the location of the security cable slot on your computer, see Getting to know your computer on page 5.

1. Loop the security cable lock around a secured object.

2. Insert the key (1) into the security cable lock (2).

3. Insert the security cable lock into the security cable slot on the computer (3), and then lock the security cable lock with the key.
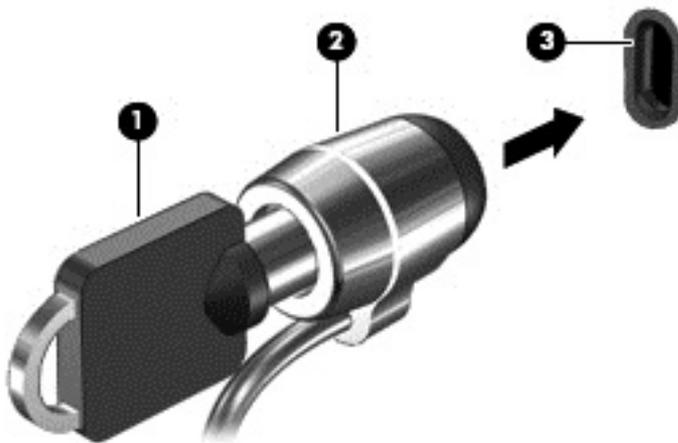
4. Remove the key and keep it in a safe place.

9 Using Setup Utility (BIOS) and HP PC Hardware Diagnostics (UEFI)

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

Starting Setup Utility (BIOS)

To start Setup Utility (BIOS), turn on or restart the computer, quickly press esc, and then press f10.

NOTE: Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

Most BIOS updates on the HP website are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named Readme.txt, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed by pressing fn+esc (if you are already in Windows) or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS) (see).

2. Use the arrow keys to select **Main**.

3. To exit Setup Utility (BIOS) without saving your changes, use the arrow keys to select **Exit**, select **Exit Discarding Changes**, and then press **enter**.

4. Select **Yes**.

Downloading a BIOS update

⚠ **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

1. From the Start screen, type `hp support assistant`, and then select the **HP Support Assistant** app.

2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

    a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

    b. Follow the on-screen instructions to download your selection to the hard drive.

        If the update is more recent than your BIOS, make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

📝 **NOTE:** If you connect your computer to a network, consult the network administrator before installing any software updates, especially system BIOS updates.

BIOS installation procedures vary. Follow any instructions that are revealed on the screen after the download is complete. If no instructions are revealed, follow these steps:

1. From the Start screen, type `file`, and then select **File Explorer**.

2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

    The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

📝 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs

outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

    The BIOS searches three places for the diagnostic tools, in the following order:

    a. Connected USB drive

        NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 58.

    b. Hard drive

    c. BIOS

2. When the diagnostic tool opens, use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

NOTE: If you need to stop a diagnostic test, press esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

1. Go to http://www.hp.com.

2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.

3. In the text box, enter the product name, and then click **Go**.

    – or –

    Click **Find Now** to let HP automatically detect your product.

4. Select your computer model, and then select your operating system.

5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

    – or –

    Click **Download**, and then select **Run**.

10 Backing up, restoring, and recovering

This chapter provides information about the following processes:

- Creating recovery media and backups
- Restoring and recovering your system

Creating recovery media and backups

1. After you successfully set up the computer, create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced.

   HP Recovery media you create will provide the following recovery options:

   - System Recovery—Reinstalls the original operating system and the programs that were installed at the factory.

   - Minimized Image Recovery—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.

   - Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

   See Creating HP Recovery media on page 59.

2. Use the Windows tools to create system restore points and create backups of personal information. For more information and steps, see Help and Support. From the Start screen, type `help`, and then select **Help and Support**.

Creating HP Recovery media

HP Recovery Manager is a software program that offers a way to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory, and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

- Only one set of HP Recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

- HP Recovery Manager examines the computer and determines the required storage capacity for the blank USB flash drive or the number of blank DVD discs that will be required.

- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or instead you can use a high-quality blank USB flash drive.

- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased

separately) to create recovery discs, or you can obtain recovery discs for your computer from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.

● Be sure that the computer is connected to AC power before you begin creating the recovery media.

● The creation process can take up to an hour or more. Do not interrupt the creation process.

● If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 61.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

● Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information and steps, see Help and Support. From the Start screen, type `help`, and then select **Help and Support**.

● If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.

● If you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition (select models only) or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

For more information, see Recovering using HP Recovery Manager on page 61.

● If you want to recover the computer's original factory partitioning and content, you can choose the System Recovery option from the HP Recovery partition (select models only) or use the HP Recovery media that you have created. For more information, see Recovering using HP Recovery Manager on page 61. If you have not already created recovery media, see Creating HP Recovery media on page 59.

- If you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media to restore the factory image to the replacement drive. For more information, see Recovering using HP Recovery Manager on page 61.

- If you wish to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select models only) on page 62.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you created or by using the HP Recovery partition (select models only). If you have not already created recovery media, see Creating HP Recovery media on page 59.

Using HP Recovery media, you can choose from one of the following recovery options:

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.

- Minimized Image Recovery (select models only)—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.

- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows System Recovery and Minimized Image Recovery.

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

- Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media on page 59.

- To use the Factory Reset option, you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media on page 59.

- If the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you wish to retain.

Using the HP Recovery partition (select models only)

The HP Recovery partition (select models only) allows you to perform a system recovery or minimized image recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can only be used if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. Press f11 while the computer boots.

   – or –

   Press and hold f11 as you press the power button.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media that you created, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 62.

3. Follow the on-screen instructions.

Changing the computer boot order

If computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media you created.

2. Restart the computer, quickly press esc, and then press f9 for boot options.

3. Select the optical drive or USB flash drive you want to boot from.

4. Follow the on-screen instructions.

Removing the HP Recovery partition (select models only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you can no longer use the Windows Refresh option or the Windows option to remove everything and reinstall Windows. In addition, you will not be able to perform System Recovery or Minimized Image Recovery from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media on page 59.

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

11 Specifications

Input power

The power information in this section may be helpful if you plan to travel internationally with the computer.

The computer operates on DC power, which can be supplied by an AC or a DC power source. The AC power source must be rated at 100–240 V, 50–60 Hz. Although the computer can be powered from a standalone DC power source, it should be powered only with an AC adapter or a DC power source supplied and approved by HP for use with this computer.

The computer can operate on DC power within the following specifications. Operating voltage and current varies by platform.

Input power	Rating
Operating voltage and current	19.5 V dc @ 2.31 A – 45 W
	19.5 V dc @ 3.33 A – 65W (select models only)
DC plug of external HP power supply	

> **NOTE:** This product is designed for IT power systems in Norway with phase-to-phase voltage not exceeding 240 V rms.

> **NOTE:** The computer operating voltage and current can be found on the system regulatory label.

Operating environment

Factor	Metric	U.S.
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	**10% to 90%**	10% to 90%
Nonoperating	**5% to 95%**	5% to 95%
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

12 Electrostatic Discharge

Electrostatic discharge is the release of static electricity when two objects come into contact—for example, the shock you receive when you walk across the carpet and touch a metal door knob.

A discharge of static electricity from fingers or other electrostatic conductors may damage electronic components. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

- If removal or installation instructions direct you to unplug the computer, first be sure that it is properly grounded, and then remove the cover.

- Keep components in their electrostatic-safe containers until you are ready to install them.

- Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

- Use nonmagnetic tools.

- Before handling components, discharge static electricity by touching an unpainted metal surface of the component.

- If you remove a component, place it in an electrostatic-safe container.

Index

Regulatory, Safety and Environmental Notices

User Guide

Table of contents

1 Regulatory notices

This guide provides country- and region-specific non-wireless and wireless regulatory notices and compliance information for the computer product. Some of these notices may not apply to your product.

One or more integrated wireless devices may be installed. In some environments, the use of wireless devices may be restricted. Such restrictions may apply on-board airplanes, in hospitals, near explosives, in hazardous locations, and so on. If you are uncertain of the policy that applies to the use of this product, ask for authorization to use it before you turn it on.

To identify a hardware device such as a wireless LAN (WLAN) network device, choose the procedure below that corresponds to the operating system running on your computer.

For Windows® XP Professional and Windows XP Home, follow these steps:

1. Select **Start > My Computer**.

2. If the left pane, select **View System Information > Hardware** tab **> Device Manager**.

For Windows Vista®, follow these steps:

1. Select **Start > Computer > System properties**.

2. In the left pane, click **Device Manager**.

For later Windows operating systems, such as Windows 7, follow these steps:

▲ Select **Start > Control Panel > System and Security > Device Manager**.

For non-Windows operating systems, follow the instructions provided by your operating system to identify a hardware device such as a wireless LAN (WLAN) network device.

Regulatory markings for your country or region may be located on the bottom of the product, either under the battery, under a user-removable door (or some other user-accessible location), or on the wireless or modem module.

To view the FCC IDs for any radio modules in your notebook (Bluetooth®, WLAN, or WWAN), follow these steps:

1. Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. Press f10 to enter BIOS Setup.

3. Select the **System Configuration** menu.

The FCC IDs are displayed at the bottom of the screen.

⚠ **CAUTION:** Devices not for sale or use in the United States may not have an FCC ID.

Federal Communications Commission notice

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 instructions, may cause harmful interference to 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, the user is 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 receiver.

- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.

- Consult the dealer or an experienced radio or television technician for help.

Modifications

The FCC requires the user to be notified that any changes or modifications made to this device that are not expressly approved by HP may void the user's authority to operate the equipment.

Cables

To maintain compliance with FCC Rules and Regulations, connections to this device must be made with shielded cables having metallic RFI/EMI connector hoods.

Declaration of Conformity for products marked with the FCC logo (United States only)

This device complies with Part 15 of the FCC Rules. Operation is subject to the following 2 conditions:

1. This device may not cause harmful interference.

2. This device must accept any interference received, including interference that may cause undesired operation.

If you have questions about the product that are *not* related to this declaration, write to

Hewlett-Packard Company

P. O. Box 692000, Mail Stop 530113

Houston, TX 77269-2000

For questions regarding this FCC declaration, write to

Hewlett-Packard Company

P. O. Box 692000, Mail Stop 510101

Houston, TX 77269-2000

or call HP at 281-514-3333

To identify your product, refer to the part, series, or model number located on the product.

Products with wireless LAN devices or HP Mobile Broadband Modules

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

WARNING! **Exposure to Radio Frequency Radiation** The radiated output power of this device is below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact is minimized during normal operation of tablet PCs and notebook computers.

During normal operation of tablet PCs and notebook computers with displays equal to or less than 12 inches: To avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antennas should not be less than 2.5 cm (1 inch). To identify the location of the wireless antennas, refer to the computer user guides. To access the user guides, select **Start > Help and Support > User Guides**.

During normal operation of notebook computers with displays greater than 12 inches: To avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antennas should not be less than 20 cm (8 inches), including when the computer display is closed. To identify the location of the wireless antennas, refer to the computer user guides. To access the user guides, select **Start > Help and Support > User Guides**.

CAUTION: When using IEEE 802.11a wireless LAN, this product is restricted to indoor use, due to its operation in the 5.15- to 5.25-GHz frequency range. The FCC requires this product to be used indoors for the frequency range of 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel mobile satellite systems. High-power radar is allocated as the primary user of the 5.25- to 5.35-GHz and 5.65- to 5.85-GHz bands. These radar stations can cause interference with and/or damage to this device.

Brazil notice

Este equipamento opera em caráter secundário, isto é, não tem direito a proteção contra interferência prejudicial, mesmo de estações do mesmo tipo, e não pode causar interferência a sistemas operando em caráter primário.

Este equipamento atende aos limites de Taxa de Absorção Específica referente à exposição a campos elétricos, magnéticos e eletromagnéticos de radiofreqüências adotados pela ANATEL.

Canada notices

This Class B digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations. If this device has WLAN or Bluetooth capability, the device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

⚠ **CAUTION:** When using IEEE 802.11a wireless LAN, this product is restricted to indoor use, due to its operation in the 5.15- to 5.25-GHz frequency range. Industry Canada requires this product to be used indoors for the frequency range of 5.15 GHz to 5.25 GHz to reduce the potential for harmful interference to co-channel mobile satellite systems. High-power radar is allocated as the primary user of the 5.25- to 5.35-GHz and 5.65- to 5.85-GHz bands. These radar stations can cause interference with and/or damage to this device.

The antennas for this device are not replaceable. Any attempt at user access will damage your computer.

Avis Canadien

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Regulatory notices

Products bearing the CE marking comply with the following EU Directives:

● Low Voltage Directive 2006/95/EC

● EMC Directive 2004/108/EC

● Ecodesign Directive 2009/125/EC where applicable

CE compliance of this product is valid if powered with the correct CE-marked AC adapter provided by HP.

If this product has wired and/or wireless telecommunications functionality, it also complies with the essential requirements of EU Directive R&TTE Directive 1999/5/EC.

Compliance with these directives implies conformity to applicable harmonized European standards (European Norms) that are listed in the EU Declaration of Conformity issued by HP for this product or product family and available (in English only) either within the product documentation or at the following Web site: www.hp.eu/certificates (type the product number in the search box).

The compliance is indicated by one of the following conformity markings placed on the product:

CE

For non-telecommunications products and for EU harmonized telecommunications products, such as Bluetooth®, within power class below 10 mW.

CE ⓘ

For EU non-harmonized telecommunications products (if applicable, a 4-digit notified body number is inserted between CE and ! (the exclamation mark).

Please refer to the regulatory label provided on the product.

The telecommunications functionality of this product may be used in the following EU and EFTA countries: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and United Kingdom.

The telephone connector (not available for all products) is intended for connection to analog telephone networks.

NOTE: For products with wireless LAN devices, some countries may have specific obligations or special requirements about the operation of wireless LAN networks such as indoor use only or restrictions of the channels available. Be sure that the country settings of the wireless network are correct.

In France, certain restrictions apply for the 2.4-GHz wireless LAN operation of this product. This product may be used indoors for the entire 2400-MHz to 2483.5-MHz frequency band (channels 1 to 13). For outdoor use, only the 2400-MHz to 2454-MHz frequency band (channels 1 to 7) may be used. For the latest requirements, see http://www.arcep.fr.

The point of contact for regulatory matters is Hewlett-Packard GmbH, Dept./MS: HQ-TRE, Herrenberger Strasse 140, 71034 Boeblingen, GERMANY.

Products with HP Mobile Broadband Modules

THIS DEVICE MEETS INTERNATIONAL GUIDELINES FOR EXPOSURE TO RADIO FREQUENCY RADIATION.

The HP Mobile Broadband Module in your notebook is a radio transmitter and receiver. The device is designed not to exceed the limits for exposure to radio frequency (RF) recommended by international guidelines (ICNIRP). These limits are part of comprehensive guidelines that establish permitted levels of RF radiation for the general population. The guidelines were developed by independent scientific organizations through periodic and thorough evaluation of scientific studies. The device also meets the European R&TTE directives, including the protection of the health and the safety of the user and any other person.

The exposure standard for mobile devices employs a unit of measurement known as the Specific Absorption Rate (SAR).* The SAR was obtained by testing the device at standard operating positions with the device transmitting at its highest certified power level in all tested frequency bands. The actual SAR of the device while operating can be well below the maximum value, because the device operates at multiple power levels and uses only the power required to reach the network.

When installed in the notebook computer, this device meets RF exposure guidelines when the antennas are positioned at a minimum distance from the body. In order to transmit data or messages, this device requires a quality connection to the network. In some cases, transmission of data or messages may be delayed until such a connection becomes available. Be sure that the recommended distance is observed until the transmission is complete.

*The non-FCC, international guidelines state that the SAR limit for mobile devices used by the public is 2.0 watts/kilogram (W/kg) averaged over 10 grams of body tissue. The guidelines incorporate a substantial margin of safety to give additional protection for the public and to account for any variations in measurements. SAR values may vary depending on national reporting requirements and the network band.

This equipment incorporates a radio transmitting device. In normal use, a separation distance of 20 cm ensures that radio frequency exposure levels comply with the Australian and New Zealand Standards.

Ergonomics notice

Germany

Mobile computers bearing the "GS" approval mark meet the ergonomic requirements and are suitable only for short-time use of VDU tasks. When a mobile computer is used for display work tasks where the Visual Display Unit (VDU) Directive 90/270/EEC is applicable, an adequate external keyboard is required. Depending on the application and task, an adequate external monitor may also be necessary to attain working conditions comparable to a workstation setup.

Ref: EK1-ITB 2000:2008

This device is intended for use at visual display workplaces in compliance with BildscharbV, only with external keyboard and adequate external monitor.

During mobile use with disadvantageous illumination conditions (e.g. direct sun light) reflections may occur which result in reduced readability.

Mobile Computer, welche das "GS" Zeichen tragen, entsprechen den ergonomischen Anforderungen und sind nur für kurzzeitige Benutzung von Bildschirmarbeitsaufgaben geeignet. Wird ein mobiler Computer für Bildschirmarbeitsaufgaben verwendet, wo die Richtlinie 90/270/EEG (Bildschirmarbeitsrichtlinie) anzuwenden ist, wird eine geeignete externe Tastatur notwendig. Abhängig von der Anwendung und der Aufgabe kann ein geeigneter externer Monitor erforderlich sein, um vergleichbare Arbeitsbedingungen zu einem stationären Arbeitsplatz zu erreichen.

Ref: EK1-ITB 2000:2008

Das Gerät ist für die Benutzung am Bildschirmarbeitsplatz gemäß BildscharbV nur mit externer Tastatur und geeignetem Monitor vorgesehen.

Bei mobiler Nutzung mit ungünstigen Lichtverhältnissen (z.B. direkte Sonneneinstrahlung) kann es zu Reflexionen und damit zu Einschränkungen der Lesbarkeit der dargestellten Zeichen kommen.

Japan notices

この装置は，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，この装置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下さい。　　　　ＶＣＣＩ－Ｂ

この機器の使用周波数帯では、電子レンジ等の産業・科学・医療用機器のほか
工場の製造ライン等で使用されている移動体識別用の構内無線局（免許を要する
無線局）及び特定小電力無線局（免許を要しない無線局）が運用されています。
1　この機器を使用する前に、近くで移動体識別用の構内無線局及び特定小電力
　無線局が運用されていないことを確認して下さい。
2　万一、この機器から移動体識別用の構内無線局に対して電波干渉の事例が発
　生した場合には、速やかに使用周波数を変更するか又は電波の発射を停止した
　上、下記連絡先にご連絡頂き、混信回避のための処置等（例えば、パーティシ
　ョンの設置など）についてご相談して下さい。
3　その他、この機器から移動体識別用の特定小電力無線局に対して電波干渉の
　事例が発生した場合など何かお困りのことが起きたときは、次の連絡先へお問
　い合わせ下さい。

連絡先：日本ヒューレット・パッカード株式会社　ＴＥＬ：０１２０－０１４１２１

5 GHz帯を使用する特定無線設備（802.11a相当）は屋内使用に限られて
います。この機器を屋外で使用することは電波法で禁じられています。

Wireless LAN 802.11b devices

2. 4DS 4

Wireless LAN 802.11g devices

2. 4OF 4

Bluetooth devices

2. 4 F H 1

Wireless LAN, Wireless WAN, and Bluetooth certification markings

This product contains certified radio equipment.

South Korea notice

B급 기기
(가정용 방송통신기기)

이 기기는 가정용(B급)으로 전자파적합등록을 한 기기로서 주로 가정에서 사용하는 것을 목적으로 하며, 모든 지역에서 사용할 수 있습니다.

Mexico notice

La operación de este equipo está sujeta a las siguientes dos condiciones: (1) este equipo puede que no cause interferencia y (2) este equipo debe aceptar cualquier interferencia, incluyendo interferencia que pueda ser causada por la operación no deseada.

Singapore wireless notice

Turn off any WWAN devices while you are onboard aircraft. The use of these devices onboard aircraft is illegal, may be dangerous to the operation of the aircraft, and may disrupt the cellular network. Failure to observe this instruction may lead to suspension or denial of cellular services to the offender, or legal action, or both.

Users are reminded to restrict the use of radio equipment in fuel depots, chemical plants, and where blasting operations are in progress.

As with other mobile radio transmitting equipment, users are advised that for satisfactory operation of the equipment and for the safety of personnel, no part of the human body should be allowed to come too close to the antennas during operation of the equipment.

This device has been designed to comply with applicable requirements for exposure to radio waves, based on scientific guidelines that include margins intended to assure the safety of all people, regardless of health and age. These radio wave exposure guidelines employ a unit of measurement known as the specific absorption rate (SAR). Tests for SAR are conducted using standardized methods, with the phone transmitting at its highest certified power level in all used frequency bands. The SAR data information is based on CENELEC's standards EN50360 and EN50361, which use the limit of 2 watts per kilogram, averaged over 10 grams of tissue.

Thailand WWAN wireless notice

This telecom equipment has complied with NTC regulations.

เครื่องโทรคมนาคมและอุปกรณ์นี้ มีความสอดคล้องตามข้อกำหนดของ กทช.

Taiwan notices

Wireless LAN 802.11a devices

在5.25G ~5.35G頻帶內操作之無線
資訊傳輸設備僅適於室內使用

Wireless LAN 802.11b devices

低功率電波輻射性電機管理辦法

第十二條 經型式認證合格之低功率射頻電機，非經許可，公司、
商號或使用者均不得擅自變更頻率、加大功率或變更原
設計之特性及功能。

第十四條 低功率射頻電機之使用不得影響飛航安全及干擾合法通
信；經發現有干擾現象時，應立即停用，並改善至無干
擾時方得繼續使用。
前項合法通信，指依電信規定作業之無線電信。低功率
射頻電機須忍受合法通信或工業、科學及醫療用電波輻
射性電機設備之干擾。

Airline travel notice

Use of electronic equipment onboard commercial aircraft is at the discretion of the airline.

User-replaceable battery notices

When a battery has reached the end of its useful life, do not dispose of the battery in general in household waste. Follow the local laws and regulations in your area for computer battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, refer to the HP Web site at http://www.hp.com/recycle.

For information about removing a user-replaceable battery, refer to the user guide included with the product.

ENERGY STAR compliance

As an ENERGY STAR Partner, Hewlett-Packard Company has followed the EPA's enhanced product qualification and certification process to ensure that the products marked with the ENERGY STAR logo are ENERGY STAR qualified per the applicable ENERGY STAR guidelines for energy efficiency. The following logo appears on all ENERGY STAR-qualified computers:

The ENERGY STAR program for computers was created by the EPA to promote energy efficiency and reduce air pollution through more energy-efficient equipment in homes, offices, and factories. One way that products achieve this goal is by using the Microsoft® Windows® power management feature to reduce power consumption when the product is not in use.

The power management feature allows the computer to initiate a low-power or "Sleep" mode after a period of user inactivity. When used with an external ENERGY STAR qualified monitor, this feature also supports similar power management features of the monitor. To take advantage of these potential energy savings, the power management feature has been preset to behave in the following ways when the system is operating on AC power:

●   Turn off the display after 15 minutes

●   Initiate Sleep after 30 minutes

The computer exits Sleep when the power/Sleep button is pressed. When the Wake On LAN (WOL) feature is enabled, the computer can also exit Sleep in response to a network signal.

Additional information on the potential energy and financial savings of the power management feature can be found on the EPA ENERGY STAR Power Management Web site at http://www.energystar.gov/powermanagement.

Additional information on the ENERGY STAR program and its environmental benefits are available on the EPA ENERGY STAR Web site at http://www.energystar.gov.

Laser compliance

WARNING! Use of controls or adjustments, or performance of procedures other than those specified in the laser product installation guide, may result in hazardous radiation exposure. To reduce the risk of exposure to hazardous radiation:

Do not try to open the module enclosure. There are no user-serviceable components inside.

Do not operate controls, make adjustments, or perform procedures to the laser device other than those specified in the laser product installation guide.

Allow only authorized service providers to repair the unit.

This product may be provided with an optical storage device (for example, a CD or DVD drive) and/or a fiber optic transceiver. Each of these devices that contain a laser is classified as a Class 1 Laser Product in accordance with IEC 60825-1 and meets the requirements for safety of that standard.

Each laser product complies with US FDA regulations of 21 CFR 1040.10 and 1040.11 or complies with those regulations except for deviations pursuant to Laser Notice No. 50 dated June 24, 2007.

Modem notices

WARNING! To reduce the risk of fire, electric shock, and injury to persons when using this device, always follow basic safety precautions, including the following:

Do not use this product near water—for example, near a bathtub, wash bowl, kitchen sink or laundry tub, in a wet basement, or near a swimming pool.

Avoid using this product during an electrical storm. There is a remote risk of electric shock from lightning.

Do not use this product to report a gas leak while in the vicinity of the leak.

Always disconnect the modem cable before opening the equipment enclosure or touching an uninsulated modem cable, jack, or internal component.

If this product was not provided with a telephone line cord, use only No. 26 AWG or larger telecommunication line cord.

Do not plug a modem or telephone cable into the RJ-45 (network) jack.

SAVE THESE INSTRUCTIONS

Telecommunications device approvals

The telecommunications device in the computer is approved for connection to the telephone network in the countries and regions whose approval markings are indicated on the product label located on the bottom of the computer or on the modem.

Refer to the user guide included with the product to ensure that the product is configured for the country or region in which the product is located. Selecting a country or region other than the one in which it is located may cause the modem to be configured in a way that violates the telecommunication regulations/laws of that country or region. In addition, the modem may not function properly if the correct country or region selection is not made. If, when you select a country or region, a message appears that states that the country or region is not supported, this means that the modem has not been approved for use in this country or region and thus should not be used.

U.S. modem statements

This equipment complies with Part 68 of the FCC Rules and the requirements adopted by the ACTA. On the bottom of the computer or on the modem is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXXX. Provide this information to the telephone company if you are requested to do so.

Applicable certification jack USOC = RJ11C. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. See installation instructions for details.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all locations, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

If this HP equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But, if advance notice isn't 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 to its facilities, equipment, operations, or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted telephone service.

If trouble is experienced with this equipment, call technical support. 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. You should perform repairs only to the equipment specifically discussed in the "Troubleshooting" section of the user guide, if one is provided.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission, or corporation commission for information.

If your home has specially wired alarm equipment connected to the telephone line, ensure that the installation of this HP equipment does not disable your alarm equipment. If you have questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including a fax machine, 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 and an identification of the business, other entity, or other 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).

In order to program this information into your fax machine, you should complete the steps outlined in the faxing software instructions.

U.S. modem declarations

Refer to the following modem vendor declarations for the modem device installed in your computer:
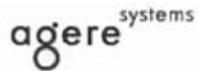
agere systems

Brad Grande
Technical Manager

1110 American Parkway NE
Lehigh Valley Central Campus
Allentown, PA 18109
Phone: 610-712-7853
bgrande@agere.com

Supplier's Declaration of Conformity

Reference Number: Delphi D40
Place of Issue: Allentown, PA, USA
Date of Issue: 21st July 2005

Agere Systems Inc. at 1110 American Parkway NE, Lehigh Valley Central Campus, Allentown, PA 18109
in the United States of America, hereby certifies that the Delphi Modem, bearing labelling
identification number **US: AGSMD01BDELPHI** complies with the Federal Communications
Commission's ("FCC") Rules and Regulations 47 CFR Part 68, and the Administrative Council on
Terminal Attachments ("ACTA")-adopted technical criteria TIA/EIA/IS-968-A-3, Telecommunications –
Telephone Terminal Equipment –Technical Requirements for Connection of Terminal Equipment
To the Telephone Network.

Brad Grand
Technical Manager

Brad Grande
Technical Manager

1110 American Parkway NE
Lehigh Valley Central Campus
Allentown, PA 18109
Phone: 610-712-7853
bgrande@agere.com

Supplier's Declaration of Conformity

Reference Number: Delphi D40 (revision AM5)
Place of Issue: Allentown, PA, USA
Date of Issue: 30th November 2006

Agere Systems Inc. at 1110 American Parkway NE, Lehigh Valley Central Campus, Allentown, PA 18109 in the United States of America, hereby certifies that the Modem, bearing labelling identification number **US: AGSMD01BDELPHI** complies with the Federal Communications Commission's ("FCC") Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments ("ACTA")-adopted technical criteria TIA/EIA/IS-968, 968-A, 968-A-1, 968-A-2 and 968-A-3 Telecommunications – Telephone Terminal Equipment –Technical Requirements for Connection of Terminal Equipment To the Telephone Network.

Brad Grand
Technical Manager

Canada modem statements

This equipment meets the applicable Industry Canada technical specifications.

The Ringer Equivalence Number, REN, is an indication of the maximum number of devices 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 devices does not exceed 5. The REN for this terminal equipment is 1.0.

Japan modem statements

If the computer does not have the Japanese certification mark on the bottom of the computer, refer to the appropriate certification marking below.

The Japanese certification mark for the V.92 56K Data/Fax Modem is below:

New Zealand modem statements

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 is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.

If this device is equipped with pulse dialing, note that there is no guarantee that Telecom lines will always continue to support pulse dialing.

Use of pulse dialing, when this equipment is connected to the same line as other equipment, may give rise to bell tinkle or noise and may also cause a false answer condition. Should such problems occur, the user should *not* contact the Telecom Faults Service.

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 Specifications:

a. There shall be no more than 10 call attempts to the same number within any 30-minute period for any single manual call initiation.

b. 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.

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

d. The equipment shall be set to ensure that calls are answered between 3 and 30 seconds of receipt of ringing (So set between 2 and 10).

Voice support

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 aware that it is being recorded. In addition, the Principles enumerated in the Privacy Act 1993 shall be complied with in respect to the nature of the personal information collected, the purpose for its collection, how it is to be used, and what is disclosed to any other party.

This equipment shall not be set to make automatic calls to the Telecom '111' Emergency Service.

Power cord notice

If you were not provided with a power cord for the computer or for an external power accessory intended for use with the computer, you should purchase a power cord that is approved for use in your country or region.

The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product. In addition, the diameter of the wire must be a minimum of **0.75 mm²**/18AWG, and the length of the cord must be between **1.5 m** (5 ft) and **2 m** (6½ ft). If you have questions about the type of power cord to use, contact your authorized service provider.

A power cord should be routed so that it is not likely to be walked on or pinched by items placed upon it or against it. Particular attention should be paid to the plug, electrical outlet, and the point where the cord exits from the product.

Japan power cord notice

製品には、同梱された電源コード をお使い下さい。
同梱された電源コード は、他の製品では使用出来ません。

DC plug of external HP power supply

NOTE: This product is designed for IT power systems in Norway with phase-to-phase voltage not exceeding 240 V rms.

NOTE: The computer operating voltage and current can be found on the system regulatory label.

Macrovision Corporation 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.

2 Safety notices

Heat-related safety warning notice

WARNING! To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

Potential safety conditions notice

If you notice any of the following conditions (or if you have other safety concerns), do not use the computer: crackling, hissing, or popping sound, or a strong odor or smoke coming from the computer. It is normal for these conditions to appear when an internal electronic component fails in a safe and controlled manner. However, these conditions may also indicate a potential safety issue. Do not assume it is a safe failure. Turn off the computer, disconnect it from its power source, and contact technical support for assistance.

User-replaceable battery notices

WARNING! Risk of explosion if battery is replaced by an incorrect type. Dispose of used batteries according to the instructions.

WARNING! To reduce the risk of fire or burns, do not disassemble, crush, or puncture; do not short external contacts; do not dispose of in fire or water.

WARNING! Keep the battery away from children.

WARNING! To reduce potential safety issues, only the battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased as an accessory from HP should be used with the computer.

Headset and earphone volume level notice

⚠ WARNING! Listening to music at high volume levels and for extended durations can damage one's hearing. To reduce the risk of hearing damage, lower the volume to a safe, comfortable level and reduce the amount of time listening at high levels.

For your own safety, before using headsets or earphones, always reset the volume. Some headphones are louder than other headphones, even if the volume control setting is the same.

Changing the default audio or equalizer settings might lead to higher volume and should only be done with caution.

For your own safety, headsets or earphones used with this product should comply with the headphone limits in EN 50332-2.

If the computer includes a headset or earphones, this combination is in compliance to EN 50332-1.

Power cord notices

⚠ WARNING! To reduce the risk of electric shock or damage to the equipment:

Plug the power cord into an AC outlet that is easily accessible at all times.

Disconnect power from the computer by unplugging the power cord from the AC outlet (not by unplugging the power cord from the computer).

If provided with a 3-pin attachment plug on the power cord, plug the cord into a grounded (earthed) 3-pin outlet. Do not disable the power cord grounding pin, for example, by attaching a 2-pin adapter. The grounding pin is an important safety feature.

⚠ WARNING! To reduce potential safety issues, only the AC adapter provided with the computer, a replacement AC adapter provided by HP, or an AC adapter purchased as an accessory from HP should be used with the computer.

Cleaning the keyboard

⚠ WARNING! To reduce the risk of electric shock or damage to internal components, do not use a vacuum cleaner attachment to clean the keyboard. A vacuum cleaner can deposit household debris on the keyboard surface. Clean the keyboard regularly to prevent keys from sticking and to remove dust, lint, and particles that can become trapped beneath the keys. A can of compressed air with a straw extension can be used to blow air around and under the keys to loosen and remove debris.

Travel notice

⚠ WARNING! To reduce the risk of electric shock, fire, or damage to the equipment, do not attempt to power the computer with a voltage converter kit sold for appliances.

Norway and Sweden: Cable grounding notice for products with a TV tuner

⚠ CAUTION: To reduce potential safety issues, use a galvanic isolator when connecting to a cable distribution system.

3 Environmental notices

This chapter provides country- and region-specific environmental notices and compliance information. Some of these notices may not apply to your product.

Electronic hardware and battery recycling

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.

Disposal of waste equipment by users in private households in the European Union

This symbol means do not dispose of your product with your other household waste. Instead, you should protect human health and the environment by handing over your waste equipment to a designated collection point for the recycling of waste electrical and electronic equipment. For more information, please contact your household waste disposal service.

Chemical substances

HP is committed to providing our customers with information about the chemical substances in our products as needed to comply with legal requirements such as REACH (Regulation EC No 1907/2006 of the European Parliament and the Council). A chemical information report for this product can be found at http://www.hp.com/go/reach.

China material content declarations

微型计算机电源声明书

能耗信息說明

惠普公司对笔记本电脑提供能耗信息說明，更多信息请登陆
http://www.hp.com/hpinfo/globalcitizenship/environment/productdata/chinasepa.
html

当本产品进行操作时，著在未接任何外部输入电源的状态下，产品将实现零能耗的状况，特此声明。

回收信息说明

惠普公司对废弃的电子计算机（笔记本电脑）提供回收服务，更多信息请登陆
http://h20423.www2.hp.com/program/suppliesrecycling/cn/zh/hardware/index.asp

环境标志信息

笔记本电脑已在中国环境标志认证产品的范围中，环境标志表明该产品不仅品质合格，而且在生产、使用和处理处置过程中符合特定的环境保护要求，与同类产品相比，具有低毒少害、节约资源等环境优势，在国家环境保护部网站（http://www.sepa.gov.cn）上可浏览到关于环境标志的信息。

The Table of Toxic and Hazardous Substances/Elements and their Content

As required by China's Management Methods for Controlling Pollution by Electronic Information Products

	Toxic and Hazardous Substances and Elements					
Part Name	**Lead (Pb)**	**Mercury (Hg)**	**Cadmium (Cd)**	**Hexavalent Chromium (Cr(VI))**	**Polybrominated biphenyls (PBB)**	**Polybrominated diphenyl ethers (PBDE)**
Battery	X	O	O	O	O	O
Cables	X	O	O	O	O	O
Camera	X	O	O	O	O	O
Chassis/Other	X	O	O	O	O	O
Flash memory card reader	X	O	O	O	O	O

Part Name	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated biphenyls (PBB)	Polybrominated diphenyl ethers (PBDE)
Floppy disk drive	X	O	O	O	O	O
Hard disk drive	X	O	O	O	O	O
Headphones	X	O	O	O	O	O
I/O PCAs	X	O	O	O	O	O
Keyboard	X	O	O	O	O	O
Liquid crystal display (LCD) panel	X	O	O	O	O	O
Media (CD/DVD/floppy)	O	O	O	O	O	O
Memory	X	O	O	O	O	O
Motherboard, processor, heat sinks	X	O	O	O	O	O
Mouse	X	O	O	O	O	O
Optical disk drive	X	O	O	O	O	O
Optional docking device	X	O	O	O	O	O
Power adapter	X	O	O	O	O	O
Power supply	X	O	O	O	O	O
Remote control	X	O	O	O	O	O
Smart card/Java™ card reader	X	O	O	O	O	O
Speakers, external	X	O	O	O	O	O
TV tuner	X	O	O	O	O	O
USB flash memory drive	X	O	O	O	O	O
USB hub	X	O	O	O	O	O
Web camera	X	O	O	O	O	O
Wireless receiver	X	O	O	O	O	O
Wireless cards	X	O	O	O	O	O

O: Indicates that this toxic or hazardous substance contained in all of the homogeneous materials for this part is below the limit requirement in SJ/T11363-2006.

X: Indicates that this toxic or hazardous substance contained in at least one of the homogeneous materials used for this part is above the limit requirement in SJ/T11363-2006.

All parts named in this table with an X are in compliance with the European Union's RoHS Legislation "Directive 2002/95/EC of the European Parliament and of the Council of 27 January 2003 on the restriction of the use of certain hazardous substances in electrical and electronic equipment" and its amendments.

NOTE: The referenced Environmental Protection Use Period Marking was determined according to normal operating use conditions of the product such as temperature and humidity.

产品中有毒有害物质或元素的名称及含量

根据中国 《电子信息产品污染控制管理办法》

部件名称	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
	Toxic and Hazardous Substances and Elements					
电池	X	O	O	O	O	O
电缆	X	O	O	O	O	O
照相机	X	O	O	O	O	O
机箱 / 其他	X	O	O	O	O	O
闪存读卡器	X	O	O	O	O	O
软驱	X	O	O	O	O	O
硬盘	X	O	O	O	O	O
某机	X	O	O	O	O	O
I/O PCA	X	O	O	O	O	O
键盘	X	O	O	O	O	O
液晶显示屏	X	O	O	O	O	O
介质 (CD/DVD/软盘)	O	O	O	O	O	O
内存条	X	O	O	O	O	O
主板、处理器和散热器	X	O	O	O	O	O
鼠标	X	O	O	O	O	O
光驱	X	O	O	O	O	O
对接设备选件	X	O	O	O	O	O
电源适配器	X	O	O	O	O	O
电源	X	O	O	O	O	O
遥控器	X	O	O	O	O	O
Smart 卡 / Java 卡读卡器	X	O	O	O	O	O
外置扬声器	X	O	O	O	O	O
电视接收器	X	O	O	O	O	O
USB 闪存盘	X	O	O	O	O	O
USB 集线器	X	O	O	O	O	O
网络摄像头	X	O	O	O	O	O
无线接收器	X	O	O	O	O	O
无线网卡	X	O	O	O	O	O

O: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。
表中标有 "X" 的所有部件都符合欧盟 RoHS 法规 "欧洲议会和欧盟理事会 2003 年 1 月 27 日关于电子电器设备中限制使用某些有害物质的 2002/95/EC 号指令"。

II: 环保使用期限的参考标识取决于产品正常工作的温度和湿度等条件。

Japan material content declaration

A Japanese regulatory requirement, defined by specification JIS C 0950, 2008, mandates that manufacturers provide material content declarations for certain categories of electronic products offered for sale after July 1, 2006. To view the JIS C 0950 material declaration for this product, see the HP Web site at http://www.hp.com/go/jisc0950.

2008年、日本における製品含有表示方法、JISC0950が公示されました。製造事業者は、2006年7月1日以降に販売される電気・電子機器の特定化学物質の含有につきまして情報提供を義務付けられました。製品の部材表示につきましては、www.hp.com/go/jisc0950を参照してください。

Mexico Sustainable Energy Use Law

This product has been labeled in compliance with the Mexico Sustainable Energy Use Law requiring disclosure of power consumption in the normal use (idle mode) and standby modes. Your product is one of many configurations in this model family; the idle mode power consumption of your specific configuration may vary from the information on the label. Actual power consumption of your product may be higher or lower than the value reported on the Mexico product energy label due to factors such as configuration (components and modules chosen) and usage (tasks being performed, software installed and running, etc.).

Turkey EEE regulation

In Conformity with the EEE regulation

EEE Yönetmeliğine Uygundur

Ukraine Restriction of Hazardous Substances

The equipment complies with requirements of the Technical Regulation, approved by the Resolution of Cabinet of Ministry of Ukraine as of December 3, 2008 № 1057, in terms of restrictions for the use of certain dangerous substances in electrical and electronic equipment.

Україна обмеження на наявність небезпечних речовин

Обладнання відповідає вимогам Технічного регламенту щодо обмеження використання деяких небезпечних речовин в електричному та електронному обладнані, затвердженого постановою Кабінету Міністрів України від 3 грудня 2008 № 1057.

Perchlorate material—special handling may apply

See http://www.dtsc.ca.gov/hazardouswaste/perchlorate.

This product's real-time clock battery or coin cell battery may contain perchlorate and may require special handling when recycled or disposed of in California.

Index