

User Guide

HP Notebook

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Product notice

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

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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).

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1 Introduction

This guide contains details about your computer's components, such as ports and jacks. It describes multimedia and other features. And it provides important security, backup, and recovery information.



NOTE: Some of the features described in this guide may not be available on your computer.

Important first steps

After you set up and register the computer, it is important to take the following steps:

1. Set up your wired or wireless network. For more information, refer to [Networking on page 14](#).
2. Update your antivirus software. For more information, refer to [Securing your computer and information on page 50](#).
3. Create recovery discs or a recovery flash drive. For instructions, refer to [Backup and recovery on page 56](#).
4. Get to know your computer. Refer to [Getting to know your computer on page 4](#) and [Pointing devices and keyboard on page 22](#) for additional information.
5. Discover the software that is already installed on the computer by selecting **Start > All Programs**.

Finding information

The computer comes with several resources to help you perform various tasks.

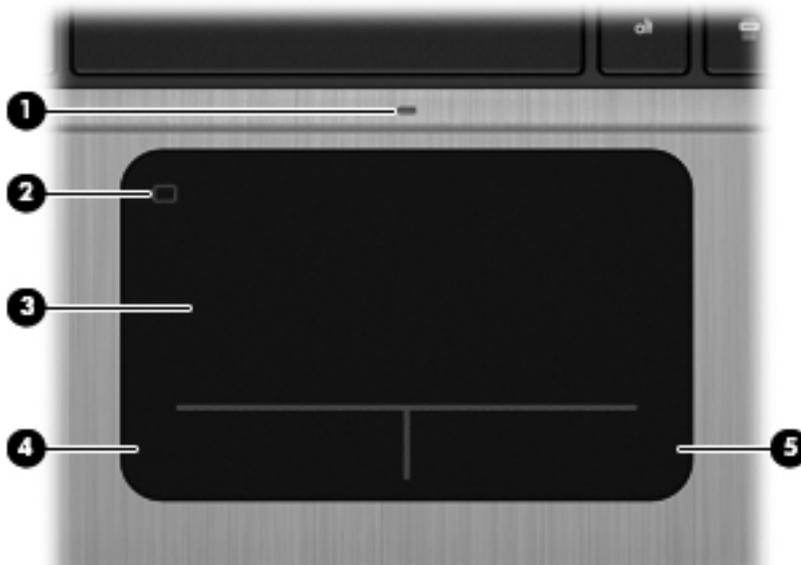
Resource	Contents
<i>Setup Instructions</i>	<ul style="list-style-type: none">• How to set up the computer• Identification of computer components
<i>User Guide</i>	<ul style="list-style-type: none">• Computer features
To access this guide: Select Start > Help and Support > User Guides .	<ul style="list-style-type: none">• Power management features• Instructions for the following:<ul style="list-style-type: none">◦ Connecting to a wireless network◦ Using the keyboard and pointing devices◦ Using the multimedia features of the computer◦ Maximizing battery life◦ Protecting the computer◦ Performing a backup and a recovery◦ Contacting customer support◦ Caring for the computer◦ Updating the software• Computer specifications
Help and Support	<ul style="list-style-type: none">• Operating system information
To access Help and Support, select Start > Help and Support . NOTE: For country- or region-specific support, go to http://www.hp.com/support , select your country or region, and follow the on-screen instructions.	<ul style="list-style-type: none">• Software, driver, and BIOS updates• Troubleshooting tools• Instructions for contacting customer support
<i>Regulatory, Safety and Environmental Notices</i>	<ul style="list-style-type: none">• Regulatory and safety information
To access this guide: Select Start > Help and Support > User Guides .	<ul style="list-style-type: none">• Battery disposal information
<i>Safety & Comfort Guide</i>	<ul style="list-style-type: none">• Proper workstation setup
To access this guide: Select Start > Help and Support > User Guides . – or – Go to http://www.hp.com/ergo .	<ul style="list-style-type: none">• Guidelines for posture and work habits that maximize your comfort and decrease your risk of injury• Electrical and mechanical safety information
<i>Worldwide Telephone Numbers</i> booklet This booklet is provided with your computer.	HP customer support telephone numbers

Resource	Contents
<p>HP Web site</p> <p>To access this Web site, go to http://www.hp.com/support.</p>	<ul style="list-style-type: none"> • Customer support information • Information for ordering parts • Software, driver, and BIOS updates • Information about accessories for the computer
<p><i>Limited Warranty*</i></p> <p>To access the warranty:</p> <p>Select Start > Help and Support > User Guides.</p> <p>– or –</p> <p>Go to http://www.hp.com/go/orderdocuments.</p>	<p>Warranty information</p>
<p>*You can find the expressly provided HP Limited Warranty applicable to your product located with the electronic 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 some 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:</p>	
<ul style="list-style-type: none"> • 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 	
<p>Please include your product number, warranty period (found on your serial number label), name, and postal address.</p>	
<p>IMPORTANT: Do NOT return your HP product to the addresses above. For product support, refer to your product home page at http://www.hp.com/go/contactHP.</p>	

2 Getting to know your computer

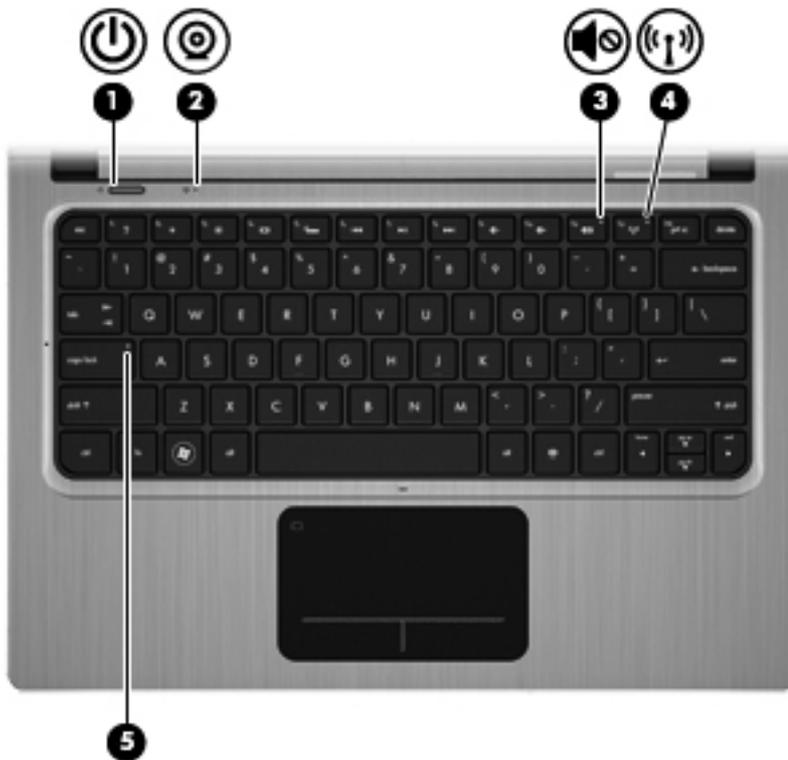
Top

TouchPad



Component	Description
(1) TouchPad light	<ul style="list-style-type: none">• On: The TouchPad is off.• Off: The TouchPad is on.
(2) TouchPad on/off button	Turns the TouchPad on or off.
(3) TouchPad zone	Moves the pointer and selects or activates items on the screen.
(4) Left TouchPad button	Functions like the left button on an external mouse.
(5) Right TouchPad button	Functions like the right button on an external mouse.

Lights



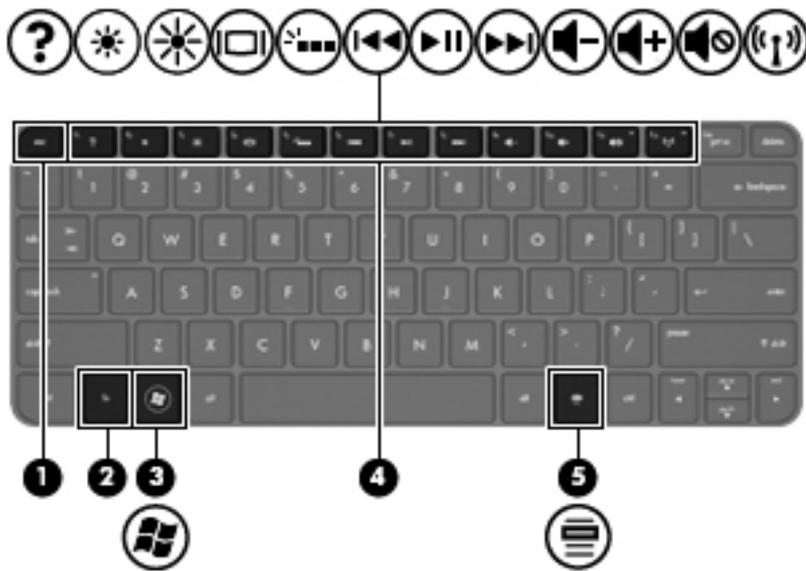
Component	Description
(1)  Power light	<ul style="list-style-type: none"> • White: The computer is on. • Blinking white: The computer is in the Sleep state. • Off: The computer is off or in Hibernation. <p>NOTE: For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity. For more information, refer to Initiating Sleep or Hibernation on page 34.</p>
(2)  Webcam light	On: The webcam is in use.
(3)  Mute light	<ul style="list-style-type: none"> • Amber: Computer sound is off. • Off: Computer sound is on.
(4)  Wireless light	<ul style="list-style-type: none"> • White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. • Amber: All wireless devices are off.
(5) Caps lock light	On: Caps lock is on.

Buttons and other top components



Component	Description
(1) Internal microphone	Records sound.
(2)  Power button	<ul style="list-style-type: none">• 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. <p>If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Security > Power Options.</p>
(3) Speakers (2)	Produce sound.

Keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Displays system information when pressed in combination with the <code>esc</code> key.
(3)  Windows logo key	Displays the Windows Start menu.
(4) Action keys	Execute frequently used system functions.
(5)  Windows applications key	Displays a shortcut menu for items beneath the pointer.

Right side



Component	Description
(1)  USB 2.0 port	Connects optional USB devices.
(2)  Audio-out (headphone) jack/audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone. 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 <i>Regulatory, Safety and Environmental Notices</i> . NOTE: When a device is connected to the jack, the computer speakers are disabled. NOTE: The microphone function is operational only when used with a headphone/microphone unit that has a 4-conductor audio connector.

Left side



Component	Description
(1) 	Power connector Connects an AC adapter.
(2) 	AC adapter/Battery light <ul style="list-style-type: none"> White: The computer is connected to external power and the battery is fully charged. Amber: A battery is charging. Blinking white: The battery charge level is 12% or less (recharge the battery as soon as possible). Off: The computer is not connected to external power.
(3) 	RJ-45 (network) jack Connects a network cable.
(4) 	HDMI port Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(5) 	USB 3.0 port Connects optional USB 3.0 devices and provide enhanced USB power performance. NOTE: The USB 3.0 port is also compatible with USB 1.0 and USB 2.0 devices.
(6) 	Digital Media Slot Supports the following digital card formats: <ul style="list-style-type: none"> Secure Digital (SD) Memory Card Secure Digital Extended Capacity (SDxC) Memory Card Secure Digital High Capacity (SDHC) Memory Card Ultra High Speed MultiMediaCard (UHS/MMC)
(7) 	Hard drive light Blinking white: The hard drive is being accessed. NOTE: All references to the hard disk drive in this guide refer to the solid-state (SSD) drive.
(8) 	Power light <ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state. Off: The computer is off or in Hibernation.

Display



Component	Description
(1) WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Webcam	Records video and captures still photographs. To use the webcam, select Start > All Programs > Communication and Chat > CyberLink YouCam .
(3) Internal display switch	Turns off the display or initiates Sleep if the display is closed while the power is on. NOTE: The display switch is not visible from the outside of the computer.

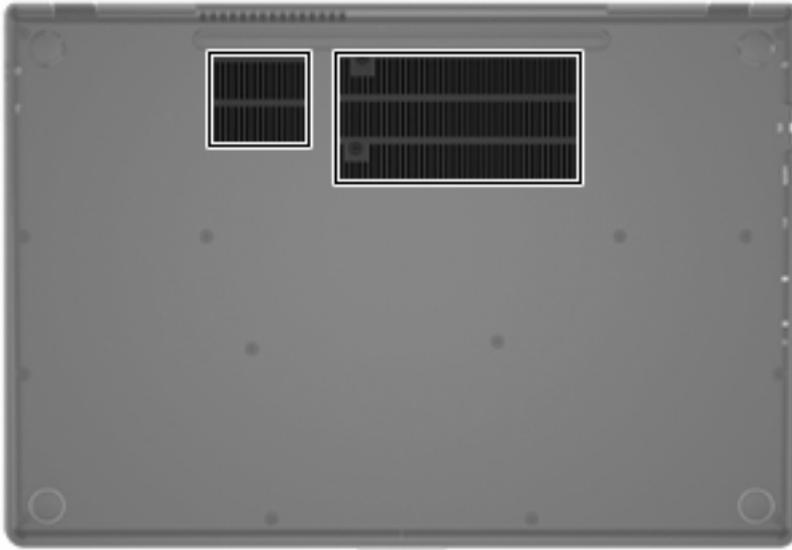
*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. These notices are located in Help and Support.

Rear



Component	Description
Vent	Enables 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.

Bottom



Component	Description
-----------	-------------

Vents (2)

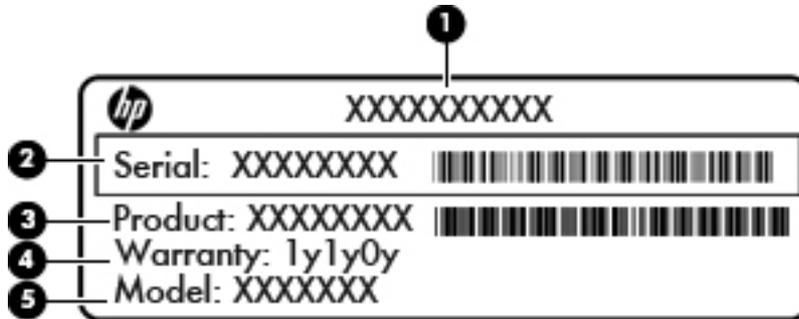
Enable airflow to cool internal components.

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.

Labels

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

- Serial number label—Provides important information, including the following:



Component

(1)	Product name
(2)	Serial number
(3)	Product part number
(4)	Warranty period
(5)	Model description

Have this information available when you contact customer support. The serial number label is affixed on the bottom of the computer.

- Microsoft® Certificate of Authenticity—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. The Microsoft Certificate of Authenticity is affixed on the bottom of the computer.
- Regulatory label—Provides regulatory information about the computer. The regulatory label is affixed on the bottom of the computer.
- Wireless certification label or labels (select models only)—Provide information about optional wireless devices and the approval markings of some of the countries or regions in which the devices have been approved for use. You may need this information when traveling internationally. If your computer model includes one or more wireless devices, one or more certification labels are included with your computer. Wireless certification labels are affixed to the bottom of the computer.

3 Networking

Your computer supports two types of Internet access:

- **Wireless**—Refer to [Creating a wireless connection on page 15](#).
- **Wired**—Refer to [Connecting to a wired network on page 21](#).



NOTE: You must set up Internet service before you can connect to the Internet.

Using an Internet service provider

Before you can connect to the Internet, 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 computer to the modem, and test the Internet service.



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

The following features will help you set up a new Internet account or configure the computer to use an existing account:

- **Internet Services & Offers (available in some locations)**—This utility assists with signing up for a new Internet account and configuring the computer to use an existing account. To access this utility, select **Start > All Programs > Online Services > Get Online**.
- **ISP-provided icons (available in some locations)**—These icons may be displayed either individually on the Windows desktop or grouped in a desktop folder named Online Services. To set up a new Internet account or configure the computer to use an existing account, double-click an icon, and then follow the on-screen instructions.
- **Windows Connect to the Internet Wizard**—This wizard allows you to connect to the Internet in any of the following situations:
 - You already have an account with an ISP.
 - You do not have an Internet account and want to select an ISP from the list provided within the wizard. (The list of ISP providers is not available in all regions.)
 - You have selected an unlisted ISP, and the ISP has provided you with information such as a specific IP address and POP3 and SMTP settings.

To access the Windows Connect to the Internet Wizard and instructions for using it, select **Start > Control Panel > Network and Internet > Network and Sharing Center**.

 **NOTE:** If you are prompted within the wizard to choose between enabling or disabling Windows Firewall, choose to enable the firewall.

Creating a wireless connection

Your computer may be equipped with one or more of the following wireless devices:

- Wireless local area network (WLAN) device
- Bluetooth® device

For more information on wireless technology, refer to the information and Web site links provided in Help and Support.

Identifying wireless and network status icons

Icon	Name	Description
	HP Connection Manager	Opens HP Connection Manager, which enables you to create and manage WLAN, and Bluetooth connections.
	Wired network (connected)	Indicates that one or more network devices are connected to the network.
	Network (disabled/ disconnected)	Indicates that all network devices are disabled in Windows Control Panel.
	Network (connected)	Indicates that one or more network devices are connected to a network.
	Network (disconnected)	Indicates that network devices are not connected to a network.
	Network (disabled/ disconnected)	Indicates that no wireless connections are available.

Turning wireless devices on or off

You can use the wireless key or HP Connection Manager (select models only) to turn on and turn off wireless devices. Refer to [Using the action keys on page 27](#) for information on identifying the location of the wireless key on your computer.

To turn off wireless devices using HP Connection Manager:

- ▲ Right-click the HP Connection Manager icon in the notification area, at the far right of the taskbar, and then click the power button next to the desired device.

– or –

Select **Start > All Programs > HP Help and Support > HP Connection Manager**, and then click the power button next to the desired device.

Using HP Connection Manager

HP Connection Manager provides a central location for managing your wireless devices. HP Connection Manager allows you to manage the following devices:

- Wireless local area network (WLAN)/Wi-Fi
- Bluetooth®

HP Connection Manager provides information and notifications on connection status and power status. Status information and notifications are provided in the notification area, at the far right of the taskbar.

To open HP Connection Manager:

- ▲ Click the HP Connection Manager icon in the notification area, at the far right of the taskbar.

– or –

Select **Start > All Programs > HP Help and Support > HP Connection Manager**.

For more information, refer to the HP Connection Manager software Help.

Using operating system controls

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

To use operating system controls:

- ▲ Select **Start > Control Panel > Network and Internet > Network and Sharing Center**.

For more information, select **Start > Help and Support**.

Using a WLAN

A wireless connection connects the computer to Wi-Fi networks, or WLANs. A WLAN is composed of other computers and accessories that are linked by a wireless router or a wireless access point.

Connecting to an existing WLAN

To connect to an existing WLAN:

1. Be sure that the WLAN device is on. (Refer to [Turning wireless devices on or off on page 16.](#))
2. Click the network icon in the notification area, at the far right of the taskbar.
3. Select your WLAN from the list.
4. Click **Connect**.

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

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

 **NOTE:** If you do not see the WLAN you want to connect to, click **Open Network and Sharing Center**, and then click **Set up a new connection or network**. A list of options is displayed. You can choose to manually search for and connect to a network or to create a new network connection.

After the connection is made, you can place the mouse pointer over the network 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.

Setting up a new WLAN network

Required equipment:

- A broadband modem (either DSL or cable) **(1)** and high-speed Internet service purchased from an Internet service provider (ISP)
- A wireless router (purchased separately) **(2)**
- Your new 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 shows an example of a completed WLAN 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.



Configuring a wireless router

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

The Windows operating system also provides tools to help you set up a new wireless network. To use the Windows tools to set up your network, select **Start > Control Panel > Network and Internet > Network and Sharing Center > Set up a new connection or network > Set up a new network**. Then follow the on-screen instructions.

 **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, you can disconnect the cable, and then 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 in a hotspot, limit your network activities to e-mail that is not confidential and basic Internet surfing.

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

- **Firewall**—A firewall checks both data and requests for data 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.
- **Wireless encryption**—Your computer supports three encryption protocols:
 - Wi-Fi Protected Access (WPA)
 - Wi-Fi Protected Access II (WPA2)
 - Wired Equivalent Privacy (WEP)



NOTE: HP recommends that you select WPA2, which is the most advanced of the three encryption protocols. The use of WEP encryption is not recommended, because it can be overcome with little effort.

- Wi-Fi Protected Access (WPA) and Wi-Fi Protected Access II (WPA2) use security standards to encrypt and decrypt data transmitted over the network. Both WPA and WPA2 dynamically generate a new key for every packet, and they also generate a different set of keys for each computer network. To accomplish this:
 - WPA uses Advanced Encryption Standard (AES) and Temporal Key Integrity Protocol (TKIP)
 - WPA2 uses Cipher Block Chaining Message Authentication Code Protocol (CCMP), which is a new AES protocol.
- Wired Equivalent Privacy (WEP) encrypts data with a WEP key before it is transmitted. Without the correct key, others will not be able to use the WLAN.

Roaming to another network

When you move your computer within range of another WLAN, Windows attempts to connect to that network. If the attempt is successful, your computer is automatically connected to the new network. If Windows does not recognize the new network, follow the same procedure you used initially to connect to your WLAN.

Using Bluetooth wireless devices

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

- Computers
- Phones
- Imaging devices (cameras and printers)
- Audio devices
- Mouse

Bluetooth devices provide peer-to-peer capability that allows you to set up a personal area network (PAN) of Bluetooth devices. For information on configuring and using Bluetooth devices, refer to the Bluetooth software Help.

Bluetooth and Internet Connection Sharing (ICS)

HP does **not** recommend setting up one computer with Bluetooth as a host and using it as a gateway through which other computers may connect to the Internet. When two or more computers are connected using Bluetooth, and Internet Connection Sharing (ICS) is enabled on one of the computers, the other computers may not be able to connect to the Internet using the Bluetooth network.

The strength of Bluetooth is in synchronizing information transfers between your computer and wireless devices including cellular phones, printers, cameras, and PDAs. The inability to consistently connect two or more computers to share the Internet through Bluetooth is a limitation of Bluetooth and the Windows operating system.

Connecting to a wired network

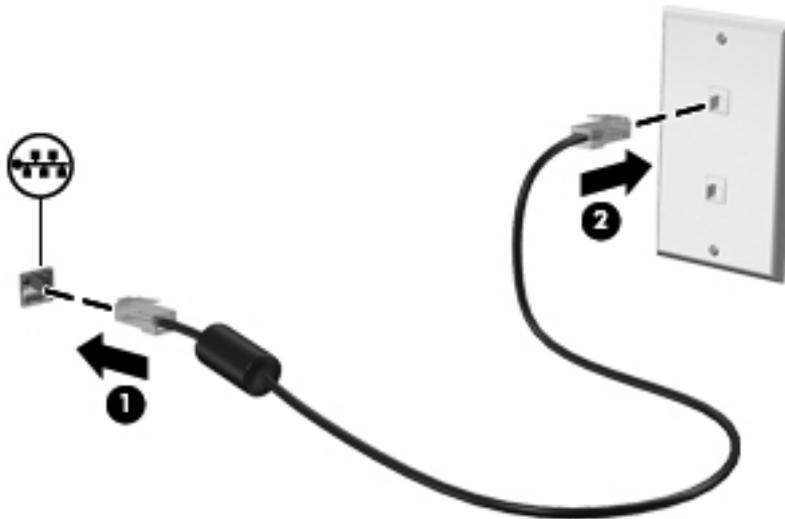
Connecting to a local area network (LAN)

Connecting to a local area network (LAN) requires an 8-pin, RJ-45 network cable (purchased separately). If the network cable contains noise suppression circuitry **(1)**, which prevents interference from TV and radio reception, orient the circuitry end of the cable **(2)** toward the computer.



To connect the network cable:

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.



⚠ WARNING! To reduce the risk of electric shock, fire, or damage to the equipment, do not plug a modem cable or telephone cable into an RJ-45 (network) jack.

4 Pointing devices and keyboard

Using pointing devices

 **NOTE:** In addition to the pointing devices included with your computer, you can use an external USB mouse (purchased separately) by connecting it to one of the USB ports on the computer.

Setting pointing device preferences

Use Mouse Properties in Windows® to customize pointing device settings, button configuration, click speed, and pointer options.

To access Mouse Properties, select **Start > Devices and Printers**. Then right-click the listing that represents your computer, and select **Mouse settings**.

Using the TouchPad

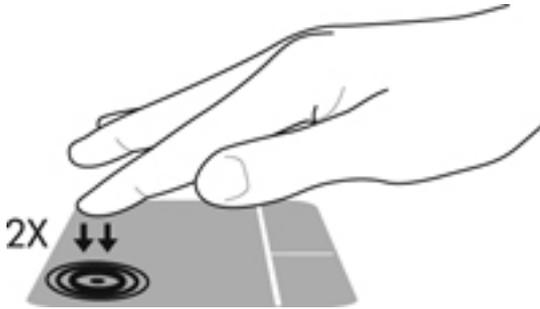
 **NOTE:** The TouchPad on your computer may look slightly different from the illustrations in this section. Refer to [Getting to know your computer on page 4](#) for specific information about the TouchPad on your computer.

To move the pointer, slide one finger across the TouchPad in the direction you want the pointer to go. Use the left and right TouchPad buttons as you would use the buttons on an external mouse.

Turning the TouchPad off or on

To turn the TouchPad off or on, quickly double-tap the TouchPad on/off button.

 **NOTE:** The TouchPad light is off when the TouchPad is on.

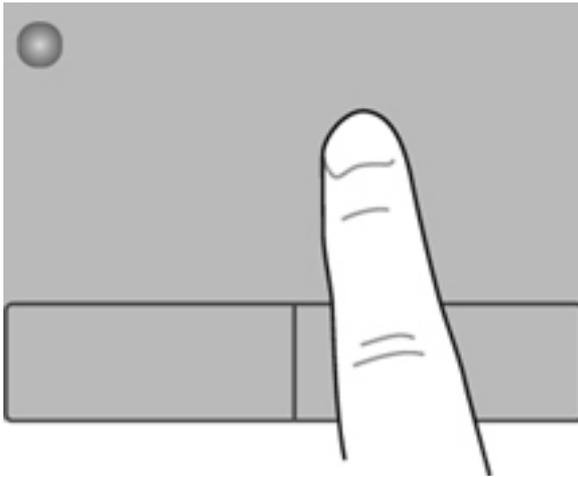


The TouchPad light and onscreen display icons indicate the TouchPad status when the TouchPad is turned off or on. The following table shows and describes the TouchPad display icons.

TouchPad light	Icon	Description
Amber		Indicates that the TouchPad is off.
Off		Indicates that the TouchPad is on.

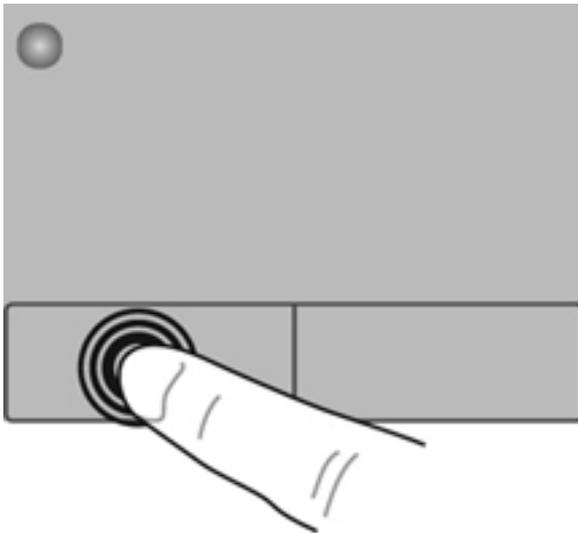
Navigating

To move the pointer, slide one finger across the TouchPad in the direction you want the pointer to go.



Selecting

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



Using TouchPad gestures

The TouchPad supports a variety of gestures. To use TouchPad gestures, place two fingers on the TouchPad at the same time.



NOTE: TouchPad gestures are not supported in all programs.

To view the demonstration of a gesture:

1. Select **Start > Control Panel > Hardware and Sound > Synaptics ClickPad**.
2. Click a gesture to activate the demonstration.

To turn the gestures on or off:

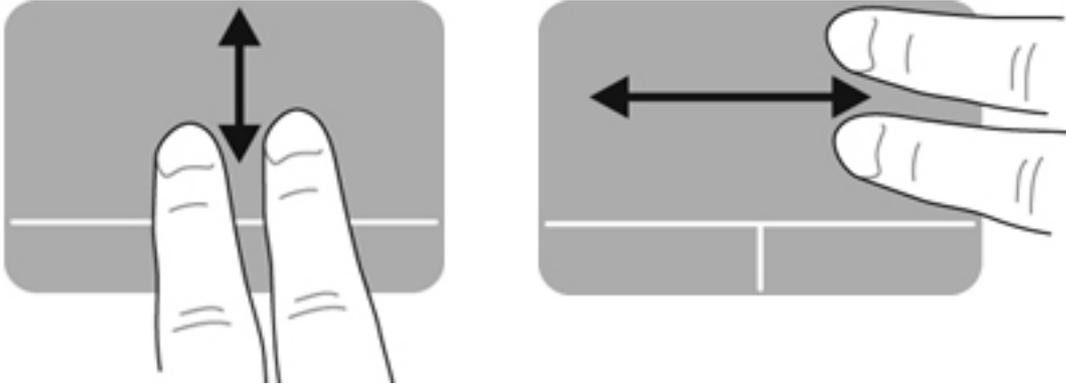
1. Select **Start > Control Panel > Hardware and Sound > Synaptics ClickPad**.
2. Select the check box next to the gesture that you want to turn on or off.
3. Click **Apply**, and then click **OK**.

Scrolling

Scrolling is useful for moving up, down, or sideways on a page or image. To scroll, place two fingers slightly apart on the TouchPad, and then drag them across the TouchPad in an up, down, left, or right motion.

 **NOTE:** Scrolling speed is controlled by finger speed.

 **NOTE:** Two-finger scrolling is enabled at the factory.

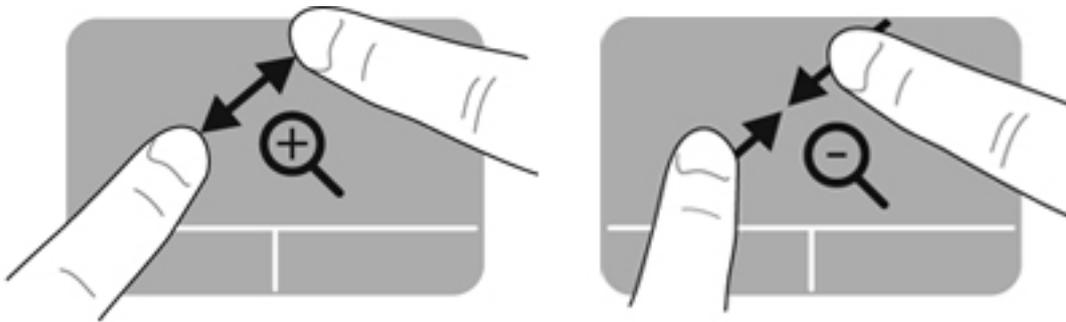


Pinching/Zooming

Pinching allows you to zoom in or out on images or text.

- Zoom in by placing two fingers together on the TouchPad, and then moving them apart.
- Zoom out by placing two fingers apart on the TouchPad, and then moving them together.

 **NOTE:** Pinching/zooming is enabled at the factory.



Using the keyboard

Using the action keys

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

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

The action key feature is enabled at the factory. You can disable the action key feature and revert back to standard settings. Using standard settings, you press the **fn** key and one of the function keys to activate the assigned function. For instructions, refer to [Using Setup Utility \(BIOS\) on page 62](#).

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



Icon	Key	Description
	f1	Opens Help and Support, which provides tutorials, information about your Windows operating system and computer, answers to questions, and updates to your computer. Help and Support also provides automated troubleshooting tools and access to customer support.
	f2	Decreases the screen brightness level incrementally as long as you hold down the key.
	f3	Increases the screen brightness level incrementally as long as you hold down the key.
	f4	Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, 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.
	f5	Turns the keyboard backlight on or off. NOTE: The keyboard backlight is turned on at the factory. To extend battery life, turn off the keyboard backlight.
	f6	Plays the previous track of an audio CD or the previous section of a DVD or a BD.
	f7	Plays, pauses, or resumes a track of an audio CD or a section of a DVD or a BD.
	f8	Plays the next track of an audio CD or the next section of a DVD or a BD.
	f9	Decreases speaker volume incrementally as long as you hold down the key.
	f10	Increases speaker volume incrementally as long as you hold down the key.

Icon	Key	Description
	f11	Mutes or restores speaker sound.
	f12	Turns the wireless feature on or off.

NOTE: A wireless network must be set up before a wireless connection is possible.

Using the hotkeys

A hotkey is a combination of the **fn** key, and the **esc** key.

To use a hotkey:

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

Function	Hotkey	Description
Display system information.	fn+esc	Displays information about system hardware components and the system BIOS version number.

5 Multimedia and other features

Your computer includes the following:

- Two integrated speakers
- One integrated microphone
- Integrated webcam
- Preinstalled multimedia software
- Multimedia keys

Using the media activity controls

Your computer has media action keys that allow you to play, pause, fast forward, or rewind a media file. Refer to [Using the action keys on page 27](#) for information about your computer's media activity controls.

Audio

Your computer provides a variety of audio-related opportunities:

- Play music.
- Record sound.
- Download music from the Internet.
- Create multimedia presentations.
- Transmit sound and images with instant messaging programs.
- Stream radio programs.
- Create (burn) audio CDs using an optional external optical drive (purchased separately).

Adjusting the volume

You can adjust the volume using the volume keys. Refer to [Using the action keys on page 27](#) for more information.

 **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*.

 **NOTE:** Volume can also be controlled through the operating system and some programs.

Checking audio functions on the computer

 **NOTE:** For best results when recording, speak directly into the microphone and record sound in a setting free of background noise.

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

1. Select **Start > Control Panel > Hardware and Sound > Sound**.
2. When the Sound window opens, click the **Sounds** tab. Under Program Events, select any sound event, such as a beep or alarm, and click the **Test** button.

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

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

1. Select **Start > All Programs > Accessories > Sound Recorder**.
2. Click **Start Recording** and speak into the microphone. Save the file to your desktop.
3. Open a multimedia program and play back the sound.

To confirm or change the audio settings on your computer, select **Start > Control Panel > Hardware and Sound > Sound**.

Intel Wireless Display (select models only)

Intel® Wireless Display allows you to share your computer content wirelessly on your TV. To experience wireless display, a wireless third-party TV adapter (purchased separately) is required. Content that asserts output protection, such as Blu-ray discs, will not play on Intel Wireless Display. For details about using the wireless adapter, refer to the device manufacturer's instructions.

 **NOTE:** Be sure that wireless is enabled on your computer before using the wireless display.

 **NOTE:** Intel Wireless Display does not support 3D playback on external display devices.

Webcam

Your computer includes an integrated webcam, located at the top of the display. With the preinstalled software, you can use the webcam to take a photo or record a video. You can preview and save the photo or video recording.

The webcam software enables you to experiment with the following features:

- Capturing and sharing video
- Streaming video with instant message software
- Taking still photos

To access the webcam, select **Start > All Programs > Communication and Chat > CyberLink YouCam**.

For information on using the webcam, select **Start > Help and Support**.

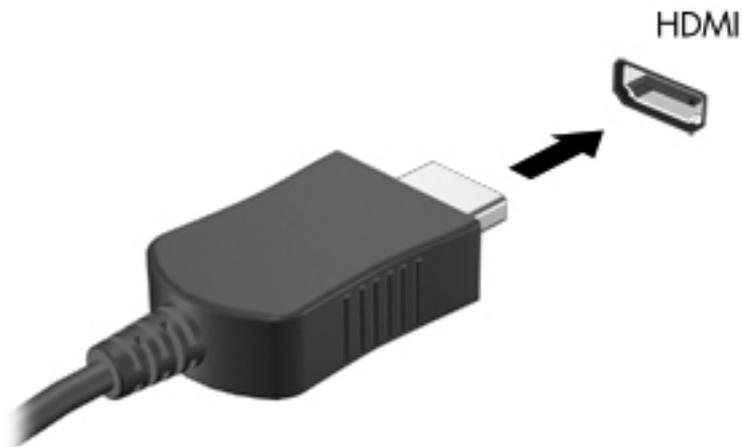
HDMI

The HDMI (High Definition Multimedia Interface) port connects the computer to an optional video or audio device, such as a high-definition television, or to any compatible digital or audio component.

 **NOTE:** To transmit video and/or audio signals through the HDMI port, you need an HDMI cable (purchased separately).

One HDMI device can be connected to the HDMI port on the computer. The information displayed on the computer screen can be simultaneously displayed on the HDMI device.

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 video device, and then refer to the device manufacturer's instructions for additional information.

Configuring audio for HDMI

To configure HDMI audio, first connect an audio or video device, such as a high-definition TV, to the HDMI port on your computer. Then configure the default audio playback device as follows:

1. 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 either **Digital Output** or **Digital Output Device (HDMI)**.
3. Click **Set Default**, and then click **OK**.

To return audio to the computer speakers, follow these steps:

1. 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**.

6 Managing power

Your computer can operate on either battery power or external AC power. When the computer is only running on battery power 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 power plans to manage how your computer uses and conserves power so that you can balance computer performance with power conservation.



IMPORTANT: Do not attempt to replace your computer battery, which is installed at the factory.

Your computer has an internal rechargeable battery that can be replaced only by an authorized service provider. To monitor the status of your battery, or if the battery is no longer holding a charge, run Battery Check in Help and Support. If Battery Check indicates that your battery should be replaced, contact customer support.

Initiating Sleep or Hibernation

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

 **NOTE:** The Rapid Start Technology feature allows your computer to resume quickly from inactivity. Rapid Start Technology manages your power-saving options as follows:

- Sleep – Rapid Start Technology allows you to select the Sleep state. To exit from Sleep, press any key, activate the TouchPad/Imagepad, or press the power button briefly.
- Hibernation - Rapid Start Technology controls Hibernation management and initiates Hibernation automatically under the following conditions:
 - After 2 hours of inactivity when running on battery or external power
 - When the remaining battery charge reaches a critical level

After Hibernation is initiated, press the power button to resume your work.

Because Hibernation is controlled by Rapid Start Technology, Hibernation does not display as an option.

 **NOTE:** Rapid Start Technology is enabled at the factory and can be disabled in Setup Utility (BIOS). If Rapid Start Technology is disabled in Setup Utility (BIOS), Hibernation options are available to be actively selected.

In the Sleep state, the screen clears, and your work is saved to memory, letting you exit Sleep faster than exiting Hibernation. If the computer is in the Sleep state for an extended period or if the battery reaches a critical battery level while in the Sleep state, the computer initiates Hibernation.

In the Hibernation state, your work is saved to a hibernation file on the hard drive and the computer turns off.

 **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 or Hibernation while reading from or writing to a disc using an optional external optical drive (purchased separately) 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.

Initiating and exiting Sleep

The system is set at the factory to initiate Sleep after a period of inactivity when running on battery power or on external power.

Power settings and timeouts can be changed using Power Options in Windows Control Panel.

With the computer on, you can initiate Sleep in any of the following ways:

- Briefly press the power button.
- Close the display.
- Select **Start**, click the arrow next to the Shut down button, and then click **Sleep**.

To exit Sleep:

- Briefly press the power button.
- If the display is closed, open the display.
- Press a key on the keyboard.
- Tap or swipe the TouchPad.

When the computer exits Sleep, the power lights turn on and the computer returns to the screen where you stopped working.

 **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.

Initiating and exiting Hibernation

Power settings and timeouts can be changed in Windows Control Panel.

To initiate Hibernation, select **Start**, click the arrow next to the Shut down button, and then click **Hibernate**.

To exit Hibernation, briefly press the power button.

The power lights turn on and your work returns to the screen where you stopped working.

 **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. Select **Start > Control Panel > System and Security > 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

The power meter is located in the notification area, at the far right of the taskbar. The power meter allows you to quickly access power settings and view the remaining battery charge.

- To display the percentage of remaining battery charge and the current power plan, move the pointer over the power meter icon.
- To access Power Options, or to change the power plan, click the power meter icon and select an item from the list.

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

Selecting a power plan

A power plan manages how the computer uses power and helps you conserve power and maximize performance.

The following power plans are available:

- **HP Recommended.** Automatically balances performance with energy consumption.
- **Power Saver.** Saves power by reducing system performance and screen brightness.
- **High Performance.** Favors performance, but may use more energy.

You can also create your own power plan and customize it to how you use the computer for your needs.

Use HP Power Manager (select models only) or Windows Control Panel to select a power plan or to create your own plan.

To start HP Power Manager, select **Start > Control Panel > Hardware and Sound > HP Power Manager**.

To access the Power Options in the Control Panel, select **Start > Control Panel > System and Security > Power Options**, and then select a power plan from the list.

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 display 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, display brightness, external devices connected to the computer, and other factors.

Finding battery information

Help and Support provides the following tools and information about the battery:

- Battery Check tool in Help and Support to test battery performance
- Information on calibration, power management, and proper care and storage to maximize battery life
- Information on battery types, specifications, life cycles, and capacity

To access battery information, select **Start > Help and Support > Learn > Power Plans: Frequently Asked Questions**.

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 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 Hibernation, 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 AC adapter/battery light indicates a low or critical battery level.

– or –

- The power meter icon in the notification area shows a low or critical battery notification.



NOTE: For additional information about the power meter, refer to “Using the power meter” section.

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

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

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

- Initiate Hibernation.
- 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 on 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 using an optional external optical drive (purchased separately)
- When performing a backup or recovery

When you connect the computer to external AC power:

- The battery begins to charge.
- The display brightness increases.
- The power meter icon in the notification area changes appearance.

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

- The computer switches to battery power.
- The display brightness automatically decreases to save battery life.

Troubleshooting an AC adapter

Contact customer support if 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 make sure 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 customer support for information on obtaining a replacement AC power adapter.

HP CoolSense

HP CoolSense  automatically detects when the computer is not in a stationary position 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 may be higher than it would be with HP CoolSense on.

To turn CoolSense off or on, follow these steps:

1. Select **Start > Control Panel > Hardware and Sound > HP CoolSense**.
2. Select **On** or **Off**.

Refreshing your software content

When the computer is in the Sleep state, Intel® Smart Connect Technology periodically causes the computer to exit Sleep. Smart Connect then updates the content for certain open applications and reinitiates Sleep. As a result, your work is immediately available to you as soon as you exit Sleep. You do not have to wait while updates are downloaded and installed.

- ▲ To open Intel Smart Connect to disable this feature or manually adjust the settings, select **Start > All Programs > Intel > Intel Smart Connect Technology**.

For additional information and a list of supported applications, see the software Help.

Starting your computer with Rapid Start Technology

When the computer is powered on, Intel® Rapid Start Technology gets your system up and running in seconds, saving time and battery life.

- ▲ To open Intel Rapid Start technology to enable this feature or manually adjust the settings, select **Start > All Programs > Intel > Intel Rapid Start Technology**.

Shutting down the computer

 **CAUTION:** Unsaved information is lost when the computer shuts down.

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 shut down 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.

1. Save your work and close all open programs.
2. Select **Start > 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**, and then click the power **Shut down** icon on the display.
- Press and hold the power button for at least 5 seconds.
- Disconnect the computer from external power.

7 External cards and devices

Using Digital Media Slot cards

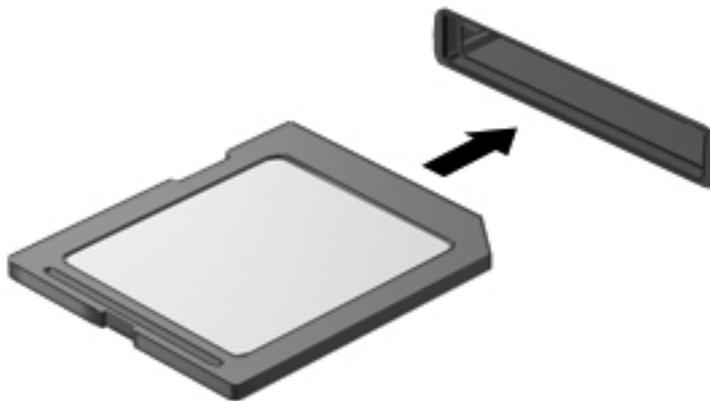
Optional digital cards provide secure data storage and convenient data sharing. These cards are often used with digital media–equipped cameras and PDAs as well as with other computers.

To determine the digital card formats that are supported on your computer, refer to [Left side on page 9](#).

Inserting a digital card

⚠ CAUTION: To reduce the risk of damage to the digital card connectors, use minimal force to insert a digital card.

1. Hold the card label-side up, with the connectors facing the computer.
2. Insert the card into the Digital Media Slot, and then press in on the card until it is firmly seated.

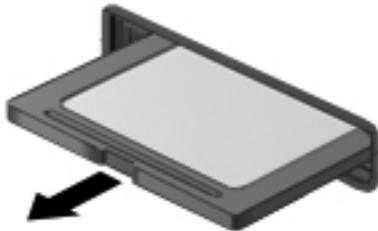


You will hear a sound when the device has been detected, and a menu of options may be displayed.

Removing a digital card

CAUTION: To reduce the risk of loss of data or an unresponsive system, use the following procedure to safely remove the digital card.

1. Save your information and close all programs associated with the digital card.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar. Then follow the on-screen instructions.
3. Remove the card from the slot .



NOTE: If the card does not eject, pull the card out of the slot.

Using a USB device

Universal Serial Bus (USB) is a hardware interface that can be used to connect an optional external device, such as a USB keyboard, mouse, drive, printer, scanner, or hub.

Some USB devices may require additional support software, which is usually included with the device. For more information about device-specific software, refer to the manufacturer's instructions. These instructions may be provided with the software, on disc, or on the manufacturer's Web site.

Your computer has one USB 2.0 port and one USB 3.0 port.

NOTE: Your computer model is equipped with one USB 3.0 port, which connects an optional USB 3.0 devices and provides enhanced USB power performance. USB 3.0 ports are also compatible with USB 1.0 and 2.0 devices.

An optional docking device or USB hub provides additional USB ports that can be used with the computer.

Connecting a USB device

CAUTION: To reduce the risk of damage to a USB connector, use minimal force to connect the device.

- ▲ Connect the USB cable for the device to the USB port.

NOTE: The USB port on your computer may look slightly different from the illustration in this section.



You will hear a sound when the device has been detected.

NOTE: The first time you connect a USB device, a message in the notification area lets you know that the device is recognized by the computer.

Removing a USB device

CAUTION: To reduce the risk of damage to a USB connector, do not pull on the cable to remove the USB device.

CAUTION: To reduce the risk of loss of information or an unresponsive system, use the following procedure to safely remove the USB device.

1. To remove a USB device, save your information and close all programs associated with the device.
2. Click the remove hardware icon in the notification area, at the far right of the taskbar, and then follow the on-screen instructions.
3. Remove the device.

Using optional external devices



NOTE: For more information about required software and drivers, or to learn which computer port to use, refer to the manufacturer's instructions.

To connect an external device to the computer:



CAUTION: To reduce the risk of damage to the equipment when connecting a powered device, be sure that the device is turned off and the AC power cord is unplugged.

1. Connect the device to the computer.
2. If you are connecting a powered device, plug the device power cord into a grounded AC outlet.
3. Turn on the device.

To disconnect an unpowered external device, turn off the device, and then disconnect it from the computer. To disconnect a powered external device, turn off the device, disconnect it from the computer, and then unplug the AC power cord.

Using optional external drives

Removable external drives expand your options for storing and accessing information. A USB drive can be added by connecting the drive to a USB port on the computer.

USB drives include the following types:

- 1.44-megabyte diskette drive
- Hard drive module (a hard drive with an adapter attached)
- Optional external optical drive (CD, DVD, and Blu-ray) (purchased separately)
- MultiBay device

8 Drives

Handling drives

 **CAUTION:** Drives are fragile computer components that must be handled with care. Refer to the following cautions before handling external drives. Additional cautions are included with the procedures to which they apply.

 **NOTE:** All references to the hard disk drive in this guide refer to the solid-state (SSD) drive.

Observe these precautions:

- Before you move a computer that is connected to an external hard drive, initiate Sleep and allow the screen to clear, or properly disconnect the external hard drive.
- Do not type on the keyboard or move the computer while an optional external optical drive (purchased separately) is writing to a disc. The write process is sensitive to vibration.
- When the battery is the only source of power, be sure that the battery is sufficiently charged before writing to media.
- Avoid exposing a drive to temperature or humidity extremes.
- Avoid exposing a drive to liquids. Do not spray the drive with cleaning products.
- Remove media from a drive before traveling with, shipping, or storing a drive.
- 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.

9 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 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	<ul style="list-style-type: none">• 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

Locating your security software (select models only)

HP Security Assistant provides a starting location for you to quickly access a collection of security software applications that are organized by task. Instead of searching for each application through the Start menu and Control Panel, HP Security Assistant allows you to access the applications for the following security tasks:

- Set up Internet and anti-virus security
- Back up and recover files
- Manage passwords, user accounts, and parental controls
- Maintain your computer and install the latest HP and Windows updates

To open HP Security Assistant, select **Start > All Programs > Security and Protection > HP Security Assistant**.

Using passwords

A password is a group of characters that you choose to secure your computer information and to have safer 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 set up 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, select **Start > Help and Support**.

Setting Windows passwords

Password	Function
User password	Protects access to a Windows user account. It also must be entered when you exit Sleep or Hibernation.
Administrator password	Protects administrator-level access to computer contents. NOTE: This password cannot be used to access Setup Utility (BIOS) contents.

Setting passwords in Setup Utility (BIOS)

Password	Function
Administrator password*	<ul style="list-style-type: none">• Must be entered each time you access Setup Utility (BIOS).• If you forget your administrator password, you cannot access Setup Utility (BIOS). <p>NOTE: The administrator password can be used in place of the power-on password.</p> <p>NOTE: Your administrator password is not interchangeable with an administrator password set in Windows, nor is it displayed as it is set, entered, changed, or deleted.</p> <p>NOTE: If you enter the power-on password at the first password check before the “Press the ESC key for Startup Menu” message is displayed, you must enter the administrator password to access Setup Utility (BIOS).</p>
Power-on password*	<ul style="list-style-type: none">• Must be entered each time you turn on or restart the computer, or exit Hibernation.• If you forget your power-on password, you cannot turn on or restart the computer, or exit Hibernation. <p>NOTE: The administrator password can be used in place of the power-on password.</p> <p>NOTE: A power-on password is not displayed as it is set, entered, changed, or deleted.</p>

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

1. Open Setup Utility (BIOS) by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**.
2. Use the arrow keys and follow the on-screen instructions. When the Startup Menu is displayed, press **f10**.
3. 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.

For more information about computer viruses, type `viruses` in the Search box in Help and Support.

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.

Installing Windows security updates

Updates to the operating system and other software may have become available after the computer left the factory. 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.

To be sure that all available updates are installed on the computer, observe these guidelines:

- Run Windows Update as soon as possible after you set up your computer. Select **Start > All Programs > Windows Update**.
- Run Windows Update monthly thereafter.
- Obtain updates to Windows and other Microsoft programs, as they are released, from the Microsoft website and through the updates link in Help and Support.

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” in the Networking chapter.

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 “Backup and recovery.”

10 Backup and recovery

Your computer includes tools provided by the operating system and HP to help you safeguard your information and restore it if ever needed.

This chapter provides information on the following topics:

- Creating a set of recovery discs or a recovery flash drive (HP Recovery Manager software feature)
- Performing a system restore (from the partition, recovery discs, or a recovery flash drive)
- Backing up your information
- Recovering a program or driver

Restoring the system

If the computer hard drive fails, you must use a set of recovery discs or a recovery flash drive to restore your system to its factory image. Ideally, you have already used HP Recovery Manager to create these tools immediately after software setup.

 **NOTE:** All references to the hard disk drive in this guide refer to the solid-state (SSD) drive

For issues other than hard drive failure, you can restore your system by using the HP Recovery partition, rather than by using recovery discs or a recovery flash drive. To check for the presence of a recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

 **CAUTION:** HP Recovery Manager (partition or discs/flash drive) restores only software that was preinstalled at the factory. Software not provided with this computer must be reinstalled manually.

Creating restore media

HP recommends that you create either a set of recovery discs or a recovery flash drive so that you can restore your computer to its original factory state if the hard drive fails, or if for any reason you cannot restore using the recovery partition tools. Create these discs or the flash drive after setting up the computer for the first time.

 **NOTE:** HP Recovery Manager allows the creation of only one set of recovery discs or one recovery flash drive. Handle these recovery tools carefully, and keep them in a safe place.

 **NOTE:** You can use an optional external optical drive (purchased separately) to create recovery discs, or you can purchase recovery discs for your computer from the HP Web site. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.

Guidelines:

- Purchase high-quality DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs.

 **NOTE:** Read-write discs, such as CD-RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the HP Recovery Manager software.

- The computer must be connected to AC power during this process.
- Only one set of recovery discs or one recovery flash drive can be created per computer.

 **NOTE:** If you are creating recovery discs, number each disc before inserting it into an optional external optical drive (purchased separately).

- If necessary, you can exit the program before you have finished creating the recovery discs or recovery flash drive. The next time you open HP Recovery Manager, you will be prompted to continue the backup creation process.

To create a set of recovery discs or a recovery flash drive:

1. Select **Start > All Programs > Security and Protection > HP Recovery Manager > HP Recovery Media Creation**.
2. Follow the on-screen instructions.

Performing a system recovery

HP Recovery Manager software allows you to repair or restore the computer to its original factory state. HP Recovery Manager works from recovery discs, a recovery flash drive, or from a dedicated recovery partition on the hard drive.



NOTE: A system restore must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail. A system restore should be used as a final attempt to correct computer issues.

Note the following when performing a system restore:

- You can restore only the system that you have previously backed up. HP recommends that you use HP Recovery Manager to create either a set of recovery discs or a recovery flash drive as soon as you set up the computer.
- Windows has its own built-in repair features, such as System Restore. If you have not already tried these features, try them before using HP Recovery Manager to restore your system.
- HP Recovery Manager restores 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 Web site or reinstall the software from the disc provided by the manufacturer using an optional external optical drive (purchased separately).

Using the dedicated recovery partition

When using the dedicated recovery partition, there is an option to back up pictures, music and other audio, videos and movies, recorded TV shows, documents, spreadsheets and presentations, e-mails, Internet favorites and settings during this process.

To restore the computer from the recovery partition, follow these steps:

1. Access HP Recovery Manager in either of the following ways:
 - Select **Start > All Programs > Security and Protection > HP Recovery Manager > HP Recovery Manager**.
 - or –
 - 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. Then, press **f11** while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **HP Recovery Manager** window.
3. Follow the on-screen instructions.

Restoring using the restore media

1. If possible, back up all personal files.
2. Insert the first recovery disc into an optional external optical drive (purchased separately), and then restart the computer.

– or –

Insert the recovery flash drive into a USB port on your computer, and then restart the computer.

 **NOTE:** If the computer does not automatically restart in the HP Recovery Manager, the computer boot order needs to be changed.

3. Press **f9** at system bootup.
4. Select the external optical drive or the flash drive.
5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.
2. Press **esc** while the computer is restarting, and then press **f9** for boot options.
3. Select **External CD/DVD ROM Drive** from the boot options window.

To change the boot order for recovery flash drive:

1. Insert the flash drive into a USB port.
2. Restart the computer.
3. Press **esc** while the computer is restarting, and then press **f9** for boot options.
4. Select the flash drive from the boot options window.

Backing up and recovering your information

It is very important to back up your files and keep any new software in a safe place. As you add new software and data files, continue to create backups on a regular basis.

How completely you are able to recover your system depends on how recent your backup is.

 **NOTE:** A recovery from your most recent backup needs to be performed if the computer has a virus attack or if any major system components fail. In order to correct computer issues, a recovery should first be attempted before a system restore is attempted.

You can back up your information to an optional external hard drive, a network drive, or discs. Back up your system at the following times:

- At regularly scheduled times

 **TIP:** Set reminders to back up your information periodically.

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Guidelines:

- Create system restore points using the Windows® System Restore feature, and periodically copy them to an optical disc using an optional external optical drive (purchased separately) or an external hard drive. For more information on using system restore points, refer to [Using Windows system restore points on page 61](#).
- Store personal files in the Documents library and back up this folder periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

To copy only the active window, press **alt+prt sc**.

To copy the entire screen, press **prt sc**.
3. Open a word-processing document, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

Using Windows Backup and Restore

Guidelines:

- Be sure that the computer is connected to AC power before you start the backup process.
- Allow enough time to complete the backup process. Depending on file sizes, it may take over an hour.

To create a backup:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to schedule and create a backup.

 **NOTE:** Windows® includes the User Account Control feature to improve the security of the computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Help and Support for more information.

Using Windows system restore points

A system restore point allows you to save and name a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes.



NOTE: Recovering to an earlier restore point does not affect data files saved or e-mails created since the last restore point.

You also can create additional restore points to provide increased protection for your files and settings.

When to create restore points

- Before you add or modify software or hardware
- Periodically, whenever the computer is functioning optimally



NOTE: If you revert to a restore point and then change your mind, you can reverse the restoration.

Create a system restore point

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **Create**, and then follow the on-screen instructions.

Restore to a previous date and time

To revert to a restore point (created at a previous date and time), when the computer was functioning optimally, follow these steps:

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **System Restore**.
5. Follow the on-screen instructions.

11 Setup Utility (BIOS) and System Diagnostics

Using Setup Utility (BIOS)

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.



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

Starting Setup Utility (BIOS)

To start Setup Utility (BIOS), 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 Setup Utility (BIOS).

Changing the language of Setup Utility (BIOS)

1. Start Setup Utility (BIOS).
2. Use the arrow keys to select **System Configuration > Language**, and then press **enter**.
3. Use the arrow keys to select a language, and then press **enter**.
4. When a confirmation prompt with your language selected is displayed, press **enter**.
5. To save your change and exit Setup Utility (BIOS), use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your change takes effect immediately.

Navigating and selecting in Setup Utility (BIOS)

To navigate and select in Setup Utility (BIOS), 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.
 - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press **enter**.
 - To scroll up and down, use the up arrow key or the down arrow key.
 - To close open dialog boxes and return to the main Setup Utility (BIOS) screen, press **esc**, and then follow the on-screen instructions.
2. Press **f10** to enter Setup Utility (BIOS).

To exit Setup Utility (BIOS) menus, choose one of the following methods:

- To exit Setup Utility (BIOS) menus without saving your changes, press the **esc** key, and then follow the on-screen instructions.
– or –
Use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.
– or –
- To save your changes and exit Setup Utility (BIOS) menus, press **f10**, and then follow the on-screen instructions.
– or –
Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your changes go into effect when the computer restarts.

Displaying system information

1. Start Setup Utility (BIOS).
2. Select the **Main** menu. System information such as the system time and date, and identification information about the computer is displayed.
3. To exit Setup Utility (BIOS) without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Restoring factory settings in Setup Utility (BIOS)



NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Setup Utility (BIOS) to the values that were set at the factory, 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 Setup Utility (BIOS).

3. Use the arrow keys to select **Exit > Load Setup Defaults**. Press **enter**.
4. Follow the on-screen instructions.
5. To save your changes and exit, press **f10**, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your changes go into effect when the computer restarts.



NOTE: Your password settings and security settings are not changed when you restore the factory settings.

Exiting Setup Utility (BIOS)

- To exit Setup Utility (BIOS) and save your changes from the current session:
If the Setup Utility (BIOS) menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.
- To exit Setup Utility (BIOS) without saving your changes from the current session:
If the Setup Utility (BIOS) menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Updating the BIOS

Updated versions of the BIOS may be available on the HP Web site.

Most BIOS updates on the HP Web site 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 displayed by pressing **fn+esc** (if you are already in Windows) or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS).
2. Use the arrow keys to select **Main**. Press **enter**.
3. To exit Setup Utility (BIOS) without saving your changes, use the tab key and the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

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 or Hibernation.

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

1. Select **Start > Help and Support > Maintain**.
2. Click **Refresh**.
3. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
4. At the download area, follow these steps:
 - a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. 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.

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 displayed on the screen after the download is complete. If no instructions are displayed, follow these steps:

1. Open Windows Explorer by selecting **Start > Computer**.
2. Double-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.

BIOS Setup Menu

The tables in this section provide an overview of the BIOS Setup menu options.

Main menu

Select	To do this
System information	<ul style="list-style-type: none">• View and change the system time and date.• View identification information about your computer.• View specification information about the processor, memory size, and system BIOS.

Security menu

Select	To do this
Administrator password	Control access to Setup Utility.
Power-on password	Control access to your computer.
TPM Status	Disable and deactivate or enable and activate (select models only)
TPM Operation	Select no operation and TPM status (select models only)

Diagnostics menu

Select	To do this
Primary Hard Disk Self Test	Run a quick or comprehensive self-test on the hard drive.
Memory Test	Run a diagnostic test on the system memory.

Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. Depending on your computer, the following diagnostic tests may be available in System Diagnostics:

- Start-up test—This test analyzes the main computer components that are required to start the computer.
- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- Battery test—This test analyzes the condition of the battery. If the battery fails the test, contact customer support to report the issue.

You can also view system information and error logs in the System Diagnostics window.

To start System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostics test while it is running, press **esc**.

A Troubleshooting and support

Troubleshooting

The computer is unable to start up

If the computer does not turn on when you press the power button, the following suggestions may help you determine why the computer will not start up:

- If the computer is plugged into an AC outlet, plug another electrical device into the outlet to be sure that the outlet is providing adequate power.



NOTE: Use only the AC adapter provided with the computer or one approved by HP for this computer.

- If the computer is running on battery power or is plugged into an external power source other than an AC outlet, plug the computer into an AC outlet using the AC adapter. Be sure that the power cord and AC adapter connections are secure.

The computer screen is blank

If the screen is blank, but the computer is on and the power light is on, the computer may not be set to display the image on the computer screen. To transfer the image to the computer screen, press the **f4** action key.

Software is functioning abnormally

If the software is unresponsive or responds abnormally, follow these suggestions:

- Restart the computer by selecting **Start > Shut down > Restart**.

If you cannot restart the computer using this procedure, refer to the next section, [The computer is on but not responding on page 69](#).

- Run a virus scan. For information about using the antivirus resources on the computer, refer to [Securing your computer and information on page 50](#).

The computer is on but not responding

If the computer is on but is not responding to software or keyboard commands, try the following emergency shutdown procedures in the sequence provided:

 **CAUTION:** Emergency shutdown procedures result in the loss of unsaved information.

- Press **ctrl+alt+delete**, and then click the **Power** button.
- Press and hold the power button for at least 5 seconds.

The computer is unusually warm

It is normal for the computer to feel warm to the touch while it is in use. But if the computer feels *unusually* warm, it may be overheating because a vent is blocked. If you suspect that the computer is overheating, allow the computer to cool to room temperature. Then be sure to keep all vents free from obstructions while you are using the computer.

 **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).

 **NOTE:** The fan in the computer starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during operation.

An external device is not working

Follow these suggestions if an external device does not function as expected:

- Turn on the device according to the manufacturer's instructions.
- Be sure that all device connections are secure.
- Be sure that the device is receiving electrical power.
- Be sure that the device, especially if it is older, is compatible with the operating system.
- Be sure that the correct drivers are installed and updated.

The wireless network connection is not working

If a wireless network connection is not working as expected, follow these suggestions:

- Be sure that the wireless light on your computer is on (white). If the wireless light is off, press the [f12](#) action key to turn it on.
- Be sure that the device wireless antennas are free from obstructions.
- Be sure that the DSL or the cable modem and its power cord are properly connected and the lights are on.
- Be sure that the wireless router or access point is properly connected to its power adapter and the DSL or cable modem, and that the lights are on.
- Disconnect and then reconnect all cables, and turn the power off and then back on.



NOTE: For more information on wireless technology, refer to the relevant help topics and Web site links in Help and Support.

Contacting customer support

If the information provided in this user guide or in Help and Support does not address your questions, you can contact customer support at:

<http://www.hp.com/go/contactHP>



NOTE: For worldwide support, click **Contact HP worldwide** on the left side of the page, or go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

At this location, you have the following choices:

- Chat online with an HP technician.



NOTE: When technical support chat is not available in a particular language, it is available in English.

- E-mail customer support.
- Find customer support worldwide telephone numbers.
- Locate an HP service center.

B Cleaning your computer

Cleaning the display

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 and cover

To clean and disinfect the sides and cover, use a soft microfiber cloth or a static-free cloth without oil (such as a chamois) moistened with an *alcohol-free* glass cleaner or use an acceptable germicidal disposable wipe.



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

Cleaning the TouchPad and keyboard



CAUTION: When cleaning the TouchPad and keyboard, do not let liquids drip between the keys. This can permanently damage internal components.

- To clean and disinfect the TouchPad and keyboard, use a soft microfiber cloth or a static-free cloth without oil (such as a chamois) moistened with an *alcohol-free* glass cleaner or use an acceptable germicidal 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.



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.

C Traveling with the computer

For best results, follow these traveling and shipping tips:

- Prepare the computer for traveling or shipping:
 - Back up your information.
 - Remove all discs and all external media cards, such as digital cards.
- ⚠ **CAUTION:** To reduce the risk of damage to the computer, damage to a drive, or loss of information, remove the media from a drive before rshipping, storing, or traveling with a drive.
- 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 bags.
- ⚠ **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.
- In-flight computer use is at the discretion of the airline. If you plan to use the computer during a flight, check with the airline in advance.
- If you are shipping the computer, use suitable protective packaging and label the package “FRAGILE.”
- If the computer has a wireless device or an HP Mobile Broadband Module installed, such as an 802.11b/g device, a Global System for Mobile Communications (GSM) device, or a General Packet Radio Service (GPRS) device, the use of these devices may be restricted in some environments. Such restrictions may apply onboard 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 it 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.

D Updating programs and drivers

HP recommends that you update your programs and drivers on a regular basis to the latest versions. Go to <http://www.hp.com/support> to download the latest versions. You can also register to receive automatic update notifications when they become available.

E 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, unplug it after being properly grounded.
- 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 need more information about static electricity or assistance with component removal or installation, contact customer support.

F 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.

Input power	Rating
Operating voltage and current	18.5 V dc @ 3.5 A - 65 W

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

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