

# User Guide

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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.


### **Software terms**

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For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

## Safety warning notice

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 **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 Starting right

This computer is a powerful tool designed to enhance your work and entertainment. To get the most out of your computer, read this chapter to learn about best practices after setup, fun things to do with your computer, and where to go to get more HP resources.

## Best practices

To protect your smart investment, after you set up and register the computer, we recommend the following steps:

- If you haven't already done so, connect to a wired or wireless network. See details in [Connecting to a network on page 15](#).
- Become familiar with the computer hardware and software. Go to [Getting to know your computer on page 3](#) and [Enjoying entertainment features on page 20](#) for information.
- Update or purchase antivirus software. Learn more at [Using antivirus software on page 53](#).
- Back up your hard drive by creating recovery discs or a recovery flash drive. See [Backup and Recovery on page 60](#).

## Fun things to do

- You know you can watch a YouTube video on the computer. But did you know that you can also connect your computer to a TV and watch the video on TV? For more information, see [Connecting an HDMI TV or monitor on page 24](#).
- You know you can listen to music on the computer. But did you know that you can also stream live radio to the computer and listen to music or talk radio from all over the world? See [Using audio on page 21](#).
- You know you can create a powerful presentation with office software applications. But did you know you can also connect to a projector to share your ideas with a group? See [Connecting a VGA monitor or projector on page 22](#).

## More HP resources

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

Resource	Contents
<i>Setup Instructions</i>	<ul style="list-style-type: none"><li>• Overview of computer setup and features.</li></ul>
Linux Help	<ul style="list-style-type: none"><li>• A broad range of how-to information and troubleshooting tips.</li></ul>
To access Help, select <b>Computer &gt; Help</b> .	

Resource	Contents
<p><i>Safety &amp; Comfort Guide</i></p> <p>To access this guide, double-click the <b>HP Documents</b> icon located on the desktop., or go to <a href="http://www.hp.com/ergo">http://www.hp.com/ergo</a>.</p>	<ul style="list-style-type: none"> <li>• Proper workstation setup.</li> <li>• Guidelines for posture and work habits that increase your comfort and decrease your risk of injury.</li> <li>• Electrical and mechanical safety information.</li> </ul>
<p>Worldwide support</p> <p>To get support in your language, go to <a href="http://www.hp.com/support">www.hp.com/support</a>.</p>	<ul style="list-style-type: none"> <li>• Chat online with an HP technician.</li> </ul> <p><b>NOTE:</b> When support chat is not available in a particular language, it is available in English.</p> <ul style="list-style-type: none"> <li>• Email support.</li> <li>• Find support telephone numbers.</li> <li>• Locate an HP service center.</li> </ul>
<p><i>Regulatory, Safety and Environmental Notices</i></p> <p>To access this guide, double-click the <b>HP Documents</b> icon located on the desktop.</p>	<ul style="list-style-type: none"> <li>• Important regulatory notices, including proper battery disposal information.</li> </ul>
<p><i>Limited Warranty*</i></p> <p>To access the warranty, double-click the <b>HP Documents</b> icon located on the desktop. or go to <a href="http://www.hp.com/go/orderdocuments">http://www.hp.com/go/orderdocuments</a>.</p>	<ul style="list-style-type: none"> <li>• Specific warranty information about this computer.</li> </ul>
<p>*You can find the expressly provided HP Limited Warranty applicable to your product located with the user guides on your computer and/or on the CD/DVD provided in the box. In some countries/regions, HP may provide a printed HP Limited Warranty in the box. For countries/regions where the warranty is not provided in printed format, you may request a printed copy from <a href="http://www.hp.com/go/orderdocuments">http://www.hp.com/go/orderdocuments</a> or write to:</p> <ul style="list-style-type: none"> <li>• <b>North America:</b> Hewlett-Packard, MS POD, 11311 Chinden Blvd, Boise, ID 83714, USA</li> <li>• <b>Europe, Middle East, Africa:</b> Hewlett-Packard, POD, Via G. Di Vittorio, 9, 20063, Cernusco s/Naviglio (MI), Italy</li> <li>• <b>Asia Pacific:</b> Hewlett-Packard, POD, P.O. Box 200, Alexandra Post Office, Singapore 911507</li> </ul> <p>When you request a printed copy of your warranty, please include your product number, warranty period (found on your service label), name, and postal address.</p> <p><b>IMPORTANT:</b> Do NOT return your HP product to the addresses above. For U.S. product support, go to <a href="http://www.hp.com/go/contactHP">http://www.hp.com/go/contactHP</a>. For worldwide product support, go to <a href="http://welcome.hp.com/country/us/en/wwcontact_us.html">http://welcome.hp.com/country/us/en/wwcontact_us.html</a>.</p>	

## 2 Getting to know your computer

### Finding your hardware and software information

▲ Click the **Computer** icon. Then select **System Monitor** and click the **Hardware** tab.

A list displays all the devices installed in your computer, including optical drives, solid-state drives (SSD), or a secondary hard drive.

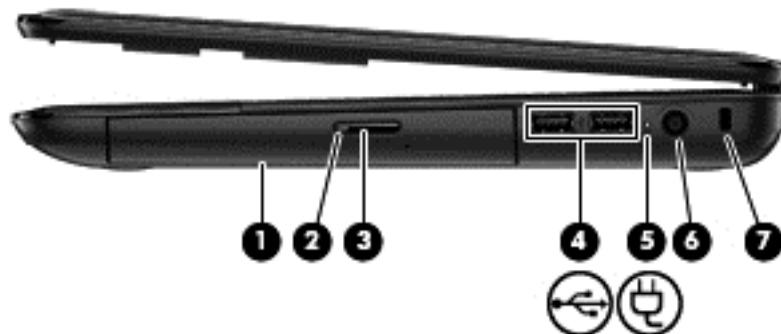
To find out what software is included on your computer, select **Computer > More Applications**.

### Front




Component	Description
(1) Speakers	Produce sound.

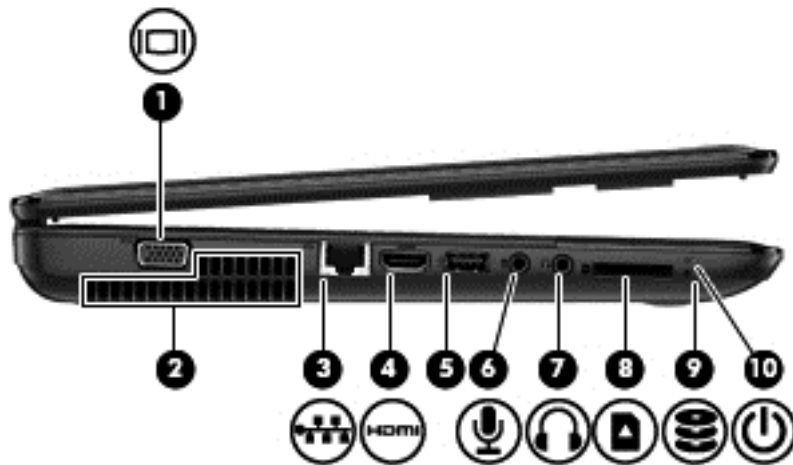
### Right side











Component	Description
(1) Optical drive	Reads from an optical disk.
(2) Optical drive light	<ul style="list-style-type: none"><li>Green: The optical drive is being accessed.</li><li>Off: The optical drive is idle.</li></ul>
(3) Optical drive eject button	Releases the disc tray.
(4) USB ports	Connect optional USB devices. <b>CAUTION:</b> While there are multiple USB ports on the same side, only one USB port will be able to support a high power device at a time. <b>NOTE:</b> For details about different types of USB ports, see <a href="#">Using a USB device on page 37</a> .

Component		Description
(5)	 AC adapter light	<ul style="list-style-type: none"><li>• White: The AC adapter is connected and the battery is charged.</li><li>• Amber: The AC adapter is connected and the battery is charging.</li><li>• Off: The computer is using DC power.</li></ul>
(6)	Power connector	Connects an AC adapter.
(7)	Security cable slot	Attaches an optional security cable to the computer. <b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

## Left side

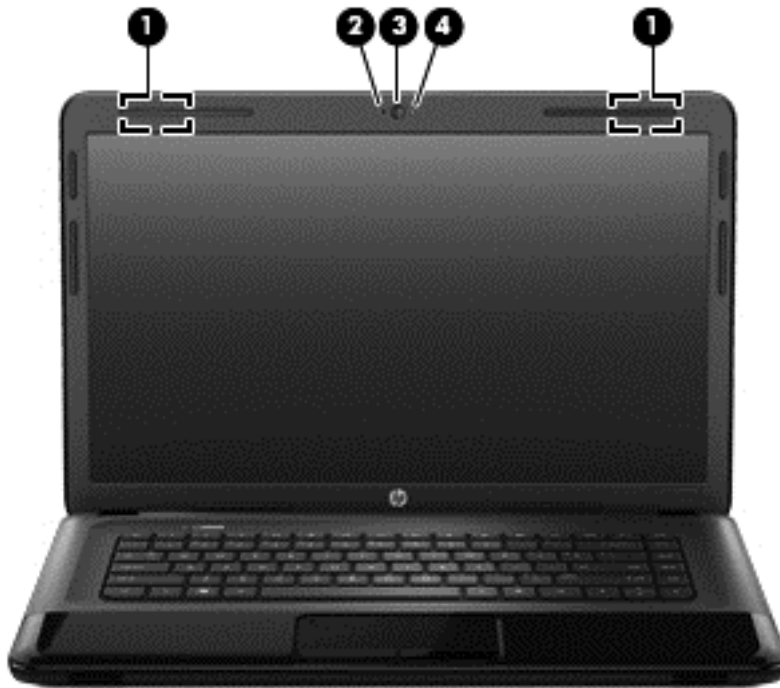


Component	Description
(1) 	External monitor port Connects an external VGA monitor or projector.
(2)	Vents (2) Enable airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3) 	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 port Connects an optional USB device. <b>NOTE:</b> For details about different types of USB ports, see <a href="#">Using a USB device on page 37</a> .
(6) 	Audio-in (microphone) jack Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(7) 	Audio-out (headphone) jacks Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. <b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before using headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety and Environmental Notices</i> . <b>NOTE:</b> When a device is connected to a headphone jack, the computer speakers are disabled.

Component		Digital Media Slot	Description
(8)		Digital Media Slot	Supports the following digital card formats: <ul style="list-style-type: none"> <li>• Secure Digital (SD) Memory Card</li> <li>• Secure Digital Extended Capacity (SDxC) Memory Card</li> <li>• Secure Digital High Capacity (SDHC) Memory Card</li> <li>• MultiMediaCard (MMC)</li> </ul>
(9)		Hard drive light	Blinking white: The hard drive is being accessed.
(10)		Power light	<ul style="list-style-type: none"> <li>• White: The AC adapter is connected and the battery is charged.</li> <li>• Blinking white: The computer is in the Suspend state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components.</li> </ul>



# Display



Component	Description
(1) WLAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphone	Record sound.
(3) Webcam	Records video, captures still photographs, and allows video conferences and online chat by means of streaming video.  For details about using your webcam, click the <b>Help</b> menu in the pre-installed webcam software (Cheese).  To access the Cheese software, click <b>Computer &gt; More Applications &gt; Cheese</b>
(4) Webcam light	On: The webcam is in use.

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

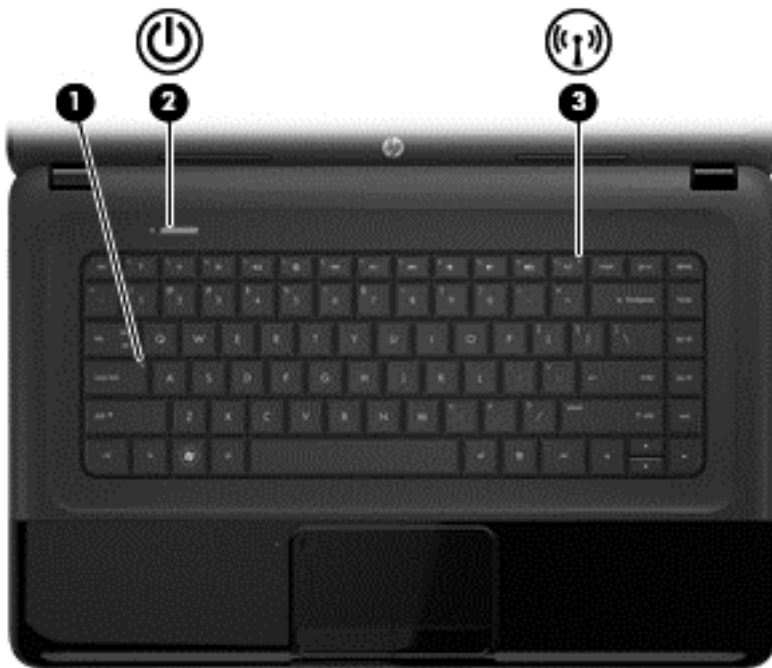
# Top



## TouchPad



Component	Description
(1) TouchPad on/off button	Turns the TouchPad on or off.
(2) TouchPad zone	Moves the on-screen pointer and selects or activates items on the screen.
(3) Left TouchPad button	Functions like the left button on an external mouse.
(4) Right TouchPad button	Functions like the right button on an external mouse.


## Lights



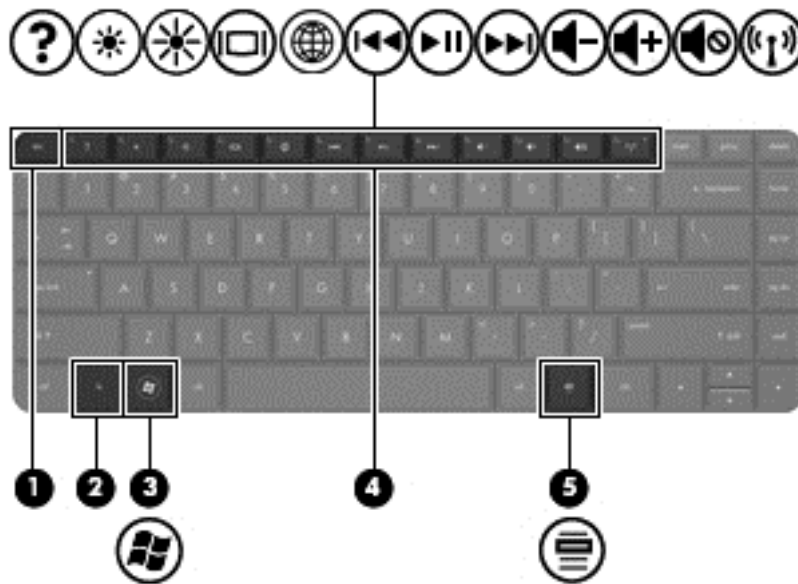
Component	Description
(1) Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(2)  Power light	<ul style="list-style-type: none"><li>• White: The computer is on.</li><li>• Blinking white: The computer is in the Suspend state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components.</li><li>• Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.</li></ul>
(3)  Wireless light	<ul style="list-style-type: none"><li>• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</li><li>• Amber: All wireless devices are off.</li></ul>



## Buttons and speakers



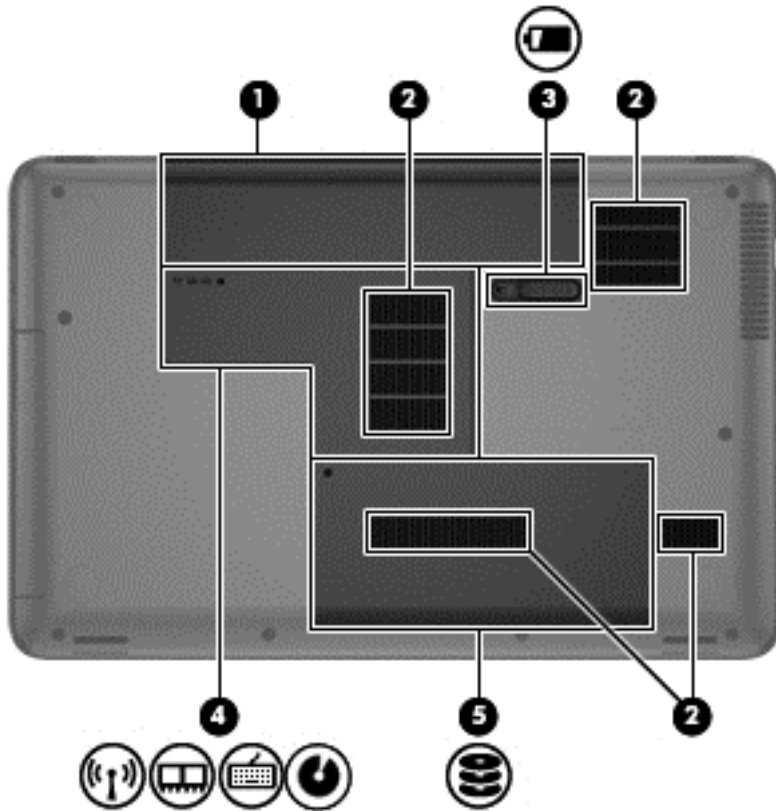
Component	Description
(1)  Power button	<ul style="list-style-type: none"><li>• When the computer is off, press the button to turn on the computer.</li><li>• When the computer is on, press the button briefly to initiate Suspend.</li><li>• When the computer is in the Suspend state, press the button briefly to exit Suspend.</li><li>• When the computer is in Hibernation, press the button down briefly to exit Hibernation.</li></ul> <p><b>CAUTION:</b> Pressing and holding down the power button will result in the loss of unsaved information.</p> <p>If the computer has stopped responding and operating system 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: &gt; <b>Power Options</b>, or see <a href="#">Managing power on page 31</a>.</p> <p>▲ Select <b>Computer &gt; Control Center &gt; System &gt; Power Management</b>.</p> <p>To learn more about your power settings, see <a href="#">Managing power on page 31</a>.</p>


## 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	Used in conjunction with hotkeys.
(3)		Operating system logo key Displays the operating system menu.
(4)	Action keys	Execute frequently used system functions.
(5)		Operating system applications key Displays a shortcut menu for items beneath the cursor.

# Bottom



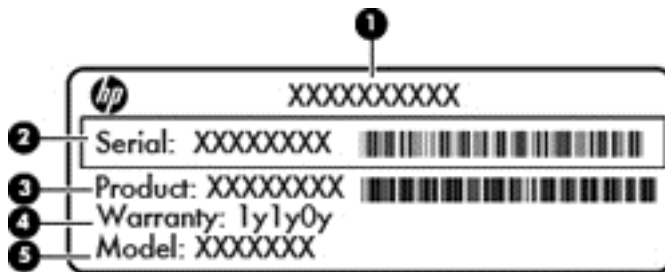
Component		Description
(1)	Battery bay	Holds the battery.
(2)	Vents (4)	Enable airflow to cool internal components.  <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	 Battery release latch	Releases the battery from the battery bay.

Component	Description
(4)    	<p>Wireless compartment, and memory module compartment, keyboard screw, and optical drive bay.</p> <p>The service door provides access to the wireless compartment, memory module compartment, keyboard access screw, and optical drive bay.</p> <p><b>CAUTION:</b> To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact customer support through Help and Support.</p>
(5) 	<p>Hard drive bay</p> <p>The hard drive cover provides access to the hard drive bay.</p>

## Labels

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

- 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 technical support. The serial number label is affixed to the bottom of the computer.

- Regulatory label—Provides regulatory information about the computer. The regulatory label is affixed inside the battery bay.
- Wireless certification label or labels—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. If your computer model includes one or more wireless devices, one or more certification labels are included with your computer. You may need this information when traveling internationally. Wireless certification labels are affixed inside the battery bay.



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## 3 Connecting to a network

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

### Connecting to a wireless network

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

- **Wireless local area network (WLAN) device**—Connects the computer to wireless local area networks (commonly referred to as Wi-Fi networks, wireless LANs, or WLANs) in corporate offices, your home, and public places such as airports, restaurants, coffee shops, hotels, and universities. In a WLAN, the mobile wireless device in your computer communicates with a wireless router or a wireless access point.
- **Bluetooth device**—Creates a personal area network (PAN) to connect to other Bluetooth-enabled devices such as computers, phones, printers, headsets, speakers, and cameras. In a PAN, each device communicates directly with other devices, and devices must be relatively close together—typically within 10 meters (approximately 33 feet) of each other.

For more information about wireless technology, see the information and website links provided in Help.

### Using the wireless controls

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

- Wireless button, wireless switch, or wireless key (referred to in this chapter as the wireless button)
- Linux Network Manager software
- Operating system controls

### Using the wireless button

The computer has a wireless button, one or more wireless devices, and one or two wireless lights, depending on the model. All of the wireless devices on your computer are enabled at the factory, so the wireless light is on (white) when you turn on the computer.

The wireless light indicates the overall power state of your wireless devices, not the status of individual devices. If the wireless light is white, at least one wireless device is on. If the wireless light is off, all wireless devices are off.



**NOTE:** On some models, the wireless light is amber when all wireless devices are off.

Because the wireless devices are enabled at the factory, you can use the wireless button to turn on or turn off the wireless devices simultaneously. Individual wireless devices can be controlled through Linux Network Manager.

## 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 enable or disable a wireless or wired network device:


1. Right-click the **Network Connection** icon in the notification area, at the far right of the taskbar.
2. To enable or disable one of the following devices, select or clear one of the following options:
  - **Enable Networking** (all network devices)
  - **Enable Wireless**

For more information, select **Computer > Help**.

## Using a WLAN

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

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

---


- A large-scale WLAN, such as a corporate or public WLAN, typically uses wireless access points that can accommodate a large number of computers and accessories and can separate critical network functions.
- A home or small office WLAN typically uses a wireless router, which allows several wireless and wired computers to share an Internet connection, a printer, and files without requiring additional pieces of hardware or software.

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

## Using an Internet service provider

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

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


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## Setting up a WLAN

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

- A broadband modem (either DSL or cable) **(1)** and high-speed Internet service purchased from an Internet service provider
- A wireless router **(2)** (purchased separately)
- A wireless computer **(3)**

---

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

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The illustration below shows an example of a wireless network installation that is connected to the Internet.




As your network grows, additional wireless and wired computers can be connected to the network to access the Internet.

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

## Configuring a wireless router

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

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

## Protecting your WLAN

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

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

- Use a firewall.

A firewall checks 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.


- Use wireless encryption.

Wireless encryption uses security settings to encrypt and decrypt data that is transmitted over the network. For more information, see Help.

## Connecting to a WLAN

To connect to the WLAN, follow these steps:


1. Be sure that the WLAN device is on. If the device is on, the wireless light is on. If the wireless light is off, press the wireless button.


 **NOTE:** On some models, the wireless light is amber when all wireless devices are off.

2. Click the network status icon in the notification area, at the far right of the taskbar.
3. Select your WLAN from the list.
4. Click **Connect**.

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


---

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

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

---

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

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

---

## Using Bluetooth wireless devices


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

- Computers (desktop, notebook, PDA)
- Phones (cellular, cordless, smart phone)
- Imaging devices (printer, camera)
- Audio devices (headset, speakers)
- Mouse

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

## Connecting to a wired network

There are 2 kinds of wired connections: local area network (LAN) and modem connection. A LAN connection uses a network cable and is much faster than a modem, which uses telephone cable. Both cables are sold separately.

 **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.

---

## Connecting to a local area network (LAN)


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

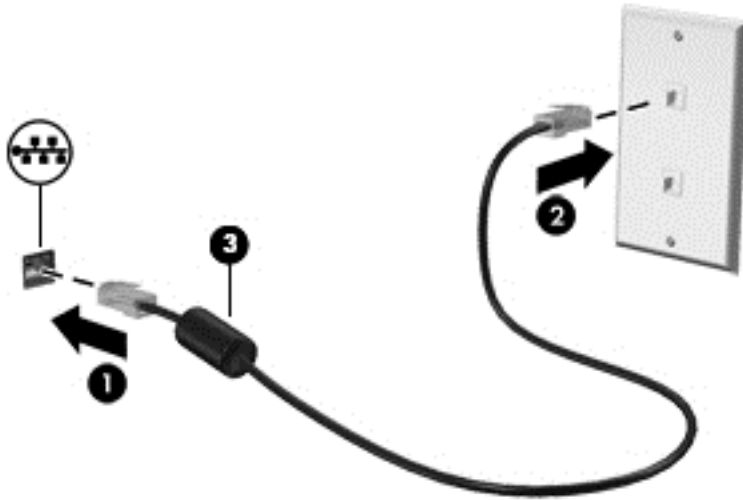
Connecting to a LAN requires an 8-pin, RJ-45 network cable.

To connect the network cable, follow these steps:

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

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

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

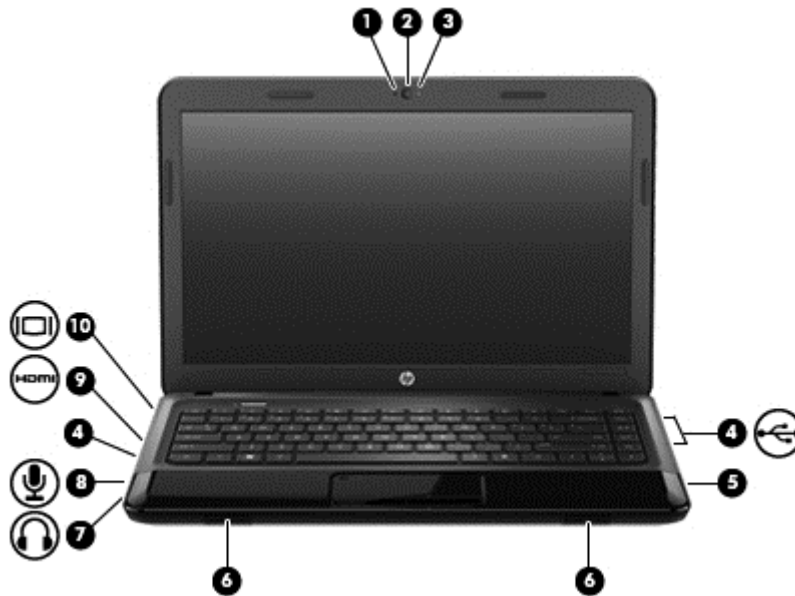



# 4 Enjoying entertainment features





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

## Multimedia Features

Here are some of the entertainment features on your computer.



Component		Description
(1)	Internal microphone	Records sound.
(2)	Webcam	Records video and captures still photographs.
(3)	Webcam light	On: The webcam is in use.
(4)	 USB ports	Connect optional USB devices. <b>NOTE:</b> For details about different types of USB ports, see <a href="#">Using a USB device on page 37</a> .
(5)	Optical drive	Reads and writes (select models only) to an optical disc.
(6)	Speakers (2)	Produce sound.

Component			Description
(7)		Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio.  <b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety and Environmental Notices</i> .
(8)		Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(9)		HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(10)		External monitor port	Connects an external VGA monitor or projector.

## Using the webcam

Your computer has an integrated webcam, a powerful social networking tool that allows you to communicate up close with friends and colleagues next door or on the other side of the world. With the webcam, you can stream video with your instant messaging software, capture and share video, and take still photos.

For details about using the webcam, click the Help menu in the Cheese software.

## Using audio

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

### Connecting speakers

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

To connect wireless speakers to your computer, follow the device manufacturer's instructions. To connect high-definition speakers to the computer, see [Configuring audio settings \(with HDMI TV\) on page 25](#). Before connecting audio devices, be sure to adjust the volume.

### Connecting headphones

You can connect wired headphones to the headphone jack on your computer.

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

**⚠ WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*.

## Connecting a microphone

To record audio, connect a microphone to the microphone jack on the computer. For best results when recording, speak directly into the microphone and record sound in a setting free of background noise.

## Checking the sound


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

1. Select **Computer > Control Center**.
2. In the left pane, under **Hardware**, click **Sound**.
3. Select the **Sound Effects** tab, and then select one of the sound options under **Choose an alert sound** to test each sound.

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

1. Select **Computer > Control Center**
2. In the left pane, under **Hardware**, click **Sound**.
3. Select the **Input** tab, and then select **Microphone** or **Line-in** in the drop-down menu next to **Connector**.
4. Adjust the input volume by moving the **Input** volume slider to the desired setting.

---

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

---


To confirm or change the audio settings on your computer, right-click the **Sound** icon in the notification area, at the far right of the taskbar.

## Using video

Your HP computer is a powerful video device that enables you to watch streaming video from your favorite websites and download video and movies to watch on your computer, without needing to access a network.

To enhance your viewing enjoyment, use one of the video ports on the computer to connect an external monitor, projector, or TV. Most computers have a video graphics array (VGA) port, which connects analog video devices. Some computers also have a high-definition multimedia interface (HDMI) port, which allows you to connect a high-definition monitor or TV.

---

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

---

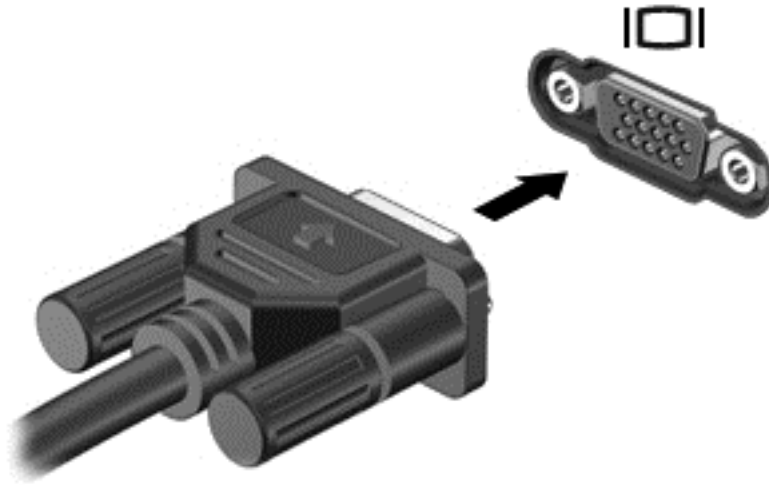
## Connecting a VGA monitor or projector

To see the computer screen image on an external VGA monitor or projected for a presentation, connect a monitor or projector to the computer's VGA port.



To connect a monitor or projector:

1. Connect the VGA cable from the monitor or projector to the VGA port on the computer as shown.



2. On select models, press **f4** to alternate the screen image between 3 display states:
  - View the screen image on the computer.
  - View the screen image simultaneously on *both* the computer and external device.
  - View the screen image on the computer extended to the external device.
  - View the screen image on the external device (monitor or projector).

Each time you press **f4**, the display state changes.

If your external monitor is not detected after pressing **f4**, follow these steps:


---

 **NOTE:** If you have an AMD card, follow the instructions in the next section.

---

1. Click the **Gnome Display Applet** icon in the notification area at the far right of the taskbar.
2. Select **Configure Display Settings**.
3. Click **Detect Monitors**.
4. Click the **On** radio button to the right of the display layout. If the default monitor is not detected, set the resolution and the refresh rate using your external monitor specifications. Change the rotation if desired. If the display requires mirroring, click the **Mirror Screens** check box.

---

 **NOTE:** Click **Default** to change the external monitor to landscape mode.

---

5. Click **Apply**.
6. Click **Close**.

If your external monitor is not detected after pressing **f4**, and you have an AMD graphics card, follow these steps:

1. Select **Computer > More Applications > System > ATI Catalyst Control Center (as Superuser)**.
2. Enter your root password.

3. Select **Display Manager** from the right pane.
4. Click the **Detect connected displays** button.
5. Your display settings can be modified by clicking your monitor in the dialog box, and then selecting the **Display properties** tab or **Multi-Display** tab.
6. After the settings are configured, click **Apply**, and then click **OK**. Your computer may require rebooting.

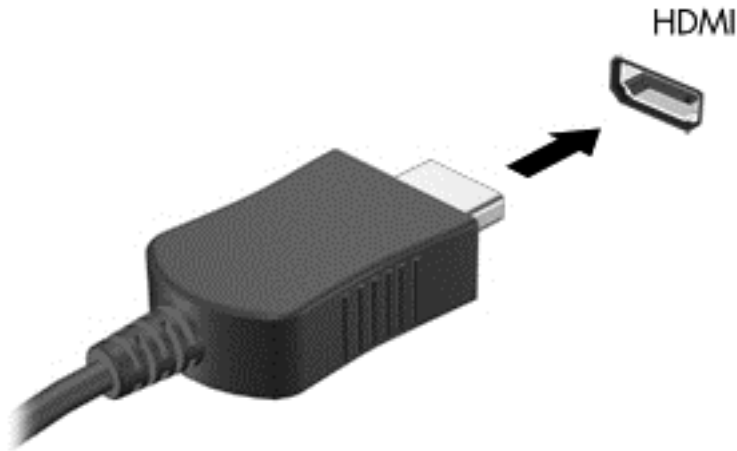
## Connecting an HDMI TV or monitor

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

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

To connect a high-definition TV or monitor to your computer:

1. Connect one end of the HDMI cable to the HDMI port on the computer.



2. Connect the other end of the cable to the high-definition TV or monitor.
3. Press **f4** to alternate the computer screen image between 3 display states:
  - View the screen image on the computer.
  - View the screen image simultaneously on *both* the computer and external device (TV or monitor).
  - View the screen image on the computer extended to the external device.
  - View the screen image on the external device.

Each time you press **f4**, the display state changes.

## Configuring audio settings (with HDMI TV)

HDMI is the only video interface that supports high-definition video *and audio*. After you connect an HDMI TV to the computer, if the HDMI sound does not configure itself automatically, you can turn on HDMI audio by following these steps:

1. Right-click the **Speaker** icon in the notification area, at the far right of the taskbar, and then click **Sound Preferences**.
2. On the Output tab, click **HD-Audio Generic Digital Stereo (HDMI)**.
3. Close the **Sound Preferences** window.

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

1. Right-click the **Speaker** icon in the notification area, at the far right of the taskbar, and then click **Sound Preferences**.
2. On the Output tab, click **HD-Audio Generic Analog Stereo**.
3. Close the **Sound Preferences** window.

---

## 5 Using the keyboard and pointing devices

Your computer allows easy on-screen navigation. In addition to the keyboard, a TouchPad allows you to perform on-screen functions. Your computer may also have an integrated numeric keypad. Select models also have special action keys or hot key functions to perform routine tasks simply.


In addition to the pointing devices, such as a TouchPad, 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.

To customize pointing device settings, button configuration, click speed, and pointer options, select **Computer > Control Center > Mouse**.

### Using the keyboard

The keyboard allows you to type and the action keys and hot keys allow you to perform specific functions. For more details about the keyboard keys, see [Keys on page 11](#).

---

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

---

### Using ALT GR key combinations

Some countries have keyboards with an **alt gr** key that is used for special key combinations. To type the rupee symbol on a keyboard that includes this key, use the **alt gr+4** key combination. Region-specific keyboards in India can use the **ctrl+shift+4** keys for the rupee symbol.

### 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 this feature in Setup Utility (BIOS). See [Setup Utility \(BIOS\) and Advanced System Diagnostics on page 56](#) for instructions on opening Setup Utility (BIOS), and then follow the instructions at the bottom of the screen.

To activate the assigned function after disabling the action key feature, you must press the **fn** key in combination with the appropriate action key.











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

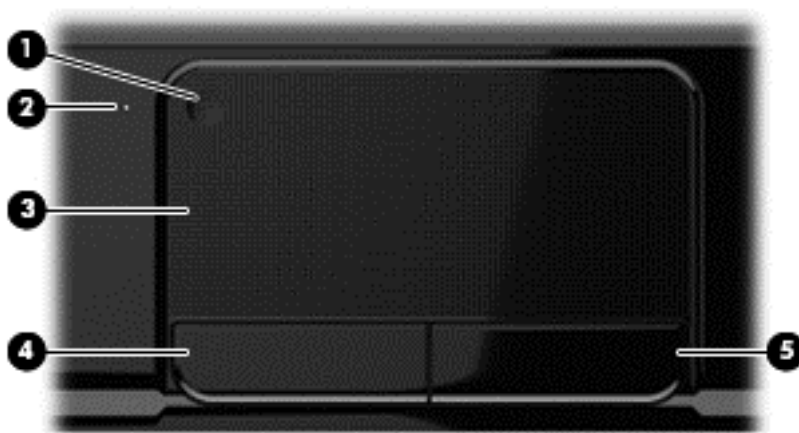
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Icon	Key	Description
	<b>f1</b>	Opens Help. Help provides tutorials, answers to questions, and product updates.
	<b>f2</b>	Decreases the screen brightness incrementally as long as you hold down the key.

---

Icon	Key	Description
	f3	Increases the screen brightness incrementally as long as you hold down the key.
	f4	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, 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.  Most external monitors receive video information from the computer using the external VGA video standard. This action key can also alternate images among other devices that are receiving video information from the computer.
	f5	Opens a Web browser.
	f6	Plays the previous track of an audio CD or the previous section of a DVD or a BD.
	f7	Begins, pauses, or resumes playback of an audio CD, 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.
	f11	Mutes or restores speaker sound.
	f12	Turns the wireless feature on or off.  <b>NOTE:</b> A wireless network must be set up before a wireless connection is possible.

## Using the TouchPad



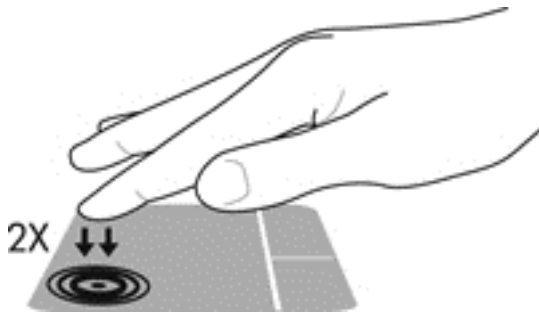
Component	Description
(1) TouchPad on/off button	Turns the TouchPad on or off.
(2) TouchPad light	<ul style="list-style-type: none"> <li>• On: The TouchPad is off.</li> <li>• Off: The TouchPad is on.</li> </ul>
(3) TouchPad zone	Moves the on-screen pointer and selects or activates items on the screen.
(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.

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

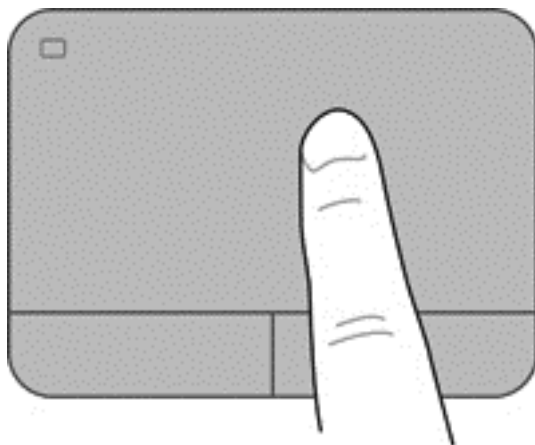
To turn the TouchPad off or on, quickly double-tap the TouchPad on/off button.

The TouchPad light is off when the TouchPad is on.



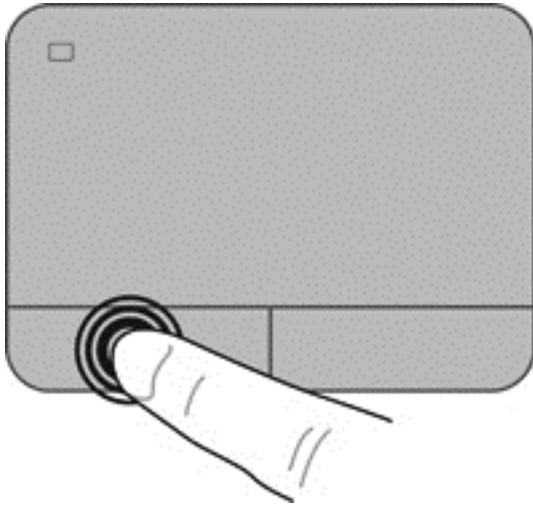
## Navigating

To move the on-screen 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 that let your fingers swipe, pinch, and rotate to manipulate items on the desktop. 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 information about gestures:


1. Select **Computer > Control Center > TouchPad**.
2. Click a gesture to view information about it.

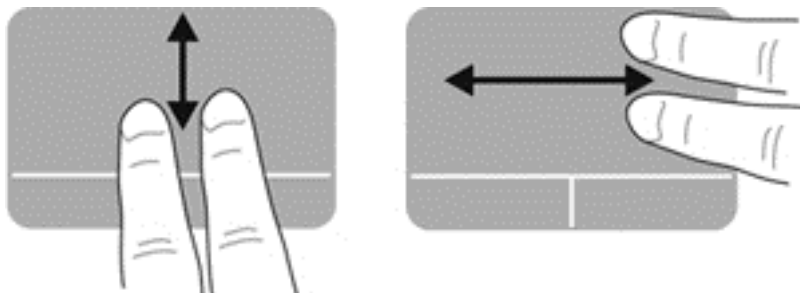
To turn the gestures off or on:

1. Select **Computer > Control Center > TouchPad** and then click the **Settings** button.
2. Select 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.

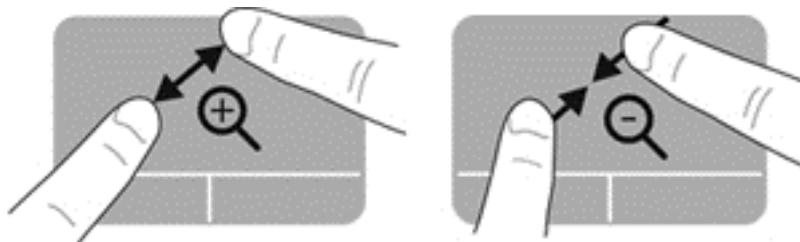
 **NOTE:** Scrolling speed is controlled by finger speed.



## 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.





---

## 6 Managing power

Your computer can operate on either battery power or external 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.


### Using Suspend or Hibernation


The computer has two power-saving states enabled at the factory: Suspend and Hibernation

When Suspend is initiated, the screen clears, and your work is saved to memory, allowing you to resume your work faster than when you exit Hibernation. If the computer is in the Suspend state for an extended period or if the battery reaches a critical battery level while in the Suspend 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 Suspend or Hibernation while reading from or writing to a disc or an external media card.

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

---

### Initiating and exiting Suspend

The system is set at the factory to initiate Suspend after a specific period of inactivity, depending on whether the computer is running on battery power or on external power.

Power settings and timeouts can be changed using Power Management in Control Center.

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

- Briefly press the power button.
- Close the display.
- Select **Computer > Shutdown > Suspend**.
- Click the **Power** icon, located on the far right of the taskbar, and then click **Suspend**.

To exit Suspend:

- 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 Suspend, the power lights turn on and the computer displays the screen as it was when you stopped working.



---

**NOTE:** If you have set the computer to require a password on wakeup, you must enter your password before the computer redispays your work.

---

## Initiating and exiting Hibernation

The system is set at the factory to initiate Hibernation after a specific period of inactivity, depending on whether the computer is running on battery power or on external power, or when the battery reaches a critical battery level.

Power settings and timeouts can be changed in Control Center.

To initiate Hibernation, select **Computer > Shutdown > Hibernate**.

To exit Hibernation, briefly press the power button.

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 password before the computer will return to the screen.

---

## Setting password protection on wakeup

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

1. Open Setup Utility 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**. When the Startup Menu is displayed, press **f10**.
2. Use the arrow keys to select **Security > Set Power-On Password**, and then press **enter**.
  - To set a power-on password, type your password in the **Enter New Password** and **Confirm New Password** fields, and then press **enter**.
  - To change a power-on password, type your current password in the **Enter Current Password** field, type a new password in the **Enter New Password** and **Confirm New Password** fields, and then press **enter**.
  - To delete a power-on password, type your current password in the **Enter Current Password** field, and then press **enter** 4 times.
3. To save your changes and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**.

Your changes take effect when the computer restarts.

## Using the Power icon

The Power icon 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 icon, at the far right of the taskbar.
- To access Power Options, or to change the power plan, click the Power icon and select an item from the list.

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

## Using power management

Power management is a collection of system settings that manages how the computer uses power. Power management can help you conserve power or maximize performance.

You can customize power management settings.

## Viewing the current power management settings

- ▲ Right-click the **Power** icon in the notification area, at the far right of the taskbar, and then click **Preferences**.

## Changing the current power management settings

1. Right-click the **Power** icon in the notification area, at the far right of the taskbar, and then click **Preferences**.
2. Change the settings on the **On AC Power** tab, **On Battery Power** tab, and **General** tab, as needed.

## 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 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.

## Removing a user-replaceable battery

Your computer includes a user-replaceable battery.

---


 **WARNING!** To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

 **CAUTION:** Removing a battery that is the sole power source for the computer can cause loss of information. So before removing the battery, save your work and initiate Hibernation, or shut down the computer through the operating system.

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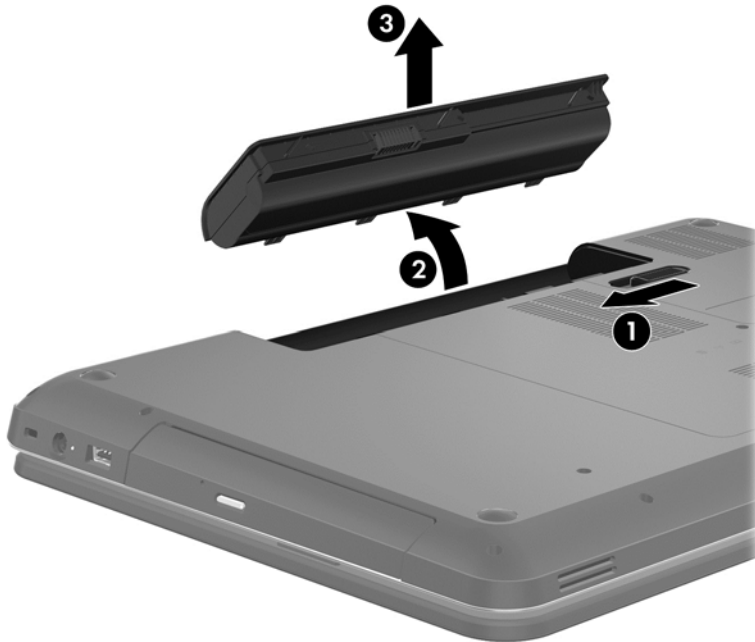
To remove the battery:

1. Turn the computer upside down on a flat surface.
2. Slide the battery release latch **(1)** to release the battery.

 **NOTE:** The battery release latch automatically returns to its original position.

---

3. Pivot the battery (2) upward and (3) remove it from the computer.



## Finding battery information

Help provides the following tools and information about the battery:

- Information about calibration, power management, and proper care and storage to maximize battery life
- Information about battery types, specifications, life cycles, and capacity

To access Linux Help, select **Computer > Help**. Then navigate to the sections on power management.

## Conserving battery power

Use the following tips for conserving battery power and maximizing battery life:

- Lower the brightness on the display.
- Select the **Power saver** setting in Power Options.
- Remove the battery from the computer when it is not being used or charged.
- Turn off wireless devices when you are not using them.
- Disconnect unused external devices that are not plugged into an external power source, such as an external hard drive connected to a USB port.
- Stop, disable, or remove any external media cards that you are not using.
- Before you leave your computer, initiate Suspend 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 power icon in the notification area displays a low or critical battery notification.



---

**NOTE:** For additional information about the power, see [Using the Power icon on page 32](#).

---

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

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

## Storing a user-replaceable battery



---

**CAUTION:** To reduce the risk of damage to a battery, do not expose it to high temperatures for extended periods of time.

---

If your computer will be unused and unplugged from external power for more than 2 weeks, remove the battery and store it separately in a cool, dry place to prolong the battery charge.

A stored battery should be checked every 6 months. If the capacity is less than 50 percent, recharge the battery before returning it to storage.

## Disposing of a user-replaceable battery



---

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

---

See the *Regulatory, Safety and Environmental Notices* for proper battery disposal. To access this guide, double-click the **HP Documents** icon located on the desktop.

## Replacing a user-replaceable battery

You may need to replace the battery when an internal cell is not charging properly or when the battery storage capacity has reached a weak condition. If the battery is possibly covered by an HP warranty, instructions in Help include a warranty ID. Please see the HP website for more information about ordering a replacement battery.

## Running on external power

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

The computer does not use battery power when the computer is connected to 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 power under any of the following conditions:



---

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

---

- When charging or calibrating a battery
- When installing or modifying system software
- When writing information to a disc (select models only)

- When running Disk Defragmenter on computers with internal hard drives
- When performing a backup or recovery

When you connect the computer to external power:


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

When you disconnect external power, the following events occur:

- The computer switches to battery power.
- The display brightness automatically decreases to save battery life.
- The Power icon in the notification area changes appearance.

## 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 need to replace the battery or access components inside the computer
- 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 Shut down command:

---

 **NOTE:** If the computer is in the Suspend state or in Hibernation, you must first exit Suspend or Hibernation before shutdown is possible.

---

1. Save your work and close all open programs.
2. Select **Computer > Shutdown > 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 and hold the power button for at least 5 seconds.
- Disconnect the computer from external power.
- On models with a user-replaceable battery, remove the battery.


---

# 7 Managing and sharing information

Drives are digital storage devices, including hard drives, solid-state drives, optical drives and more, that help you store, manage, share, and access information. Your computer has an internal hard drive that stores your computer's software, operating system, as well as providing storage for all of your personal files. Some computers also have a built-in optical drive that allows you to read or write to a CD or DVD to play and record audio and video.

For added capacity or functionality, connect an external drive (purchased separately), such as an optical drive or hard drive, or insert a digital storage card to import information directly from your phone or camera. A USB flash drive, connected to the Universal Serial Bus (USB) port on your computer, also allows quick data transfer. Some devices use the computer's power to run; others have their own power source. Some devices come with software that must be installed.

 **NOTE:** For information about connecting external wireless devices, see [Connecting to a network on page 15](#).

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

---

## Using a USB device


Most computers have more than one USB port, because this versatile interface allows you to connect to numerous kinds of external devices to your computer, such as a USB keyboard, mouse, external drive, printer, scanner, or USB hub.

Your computer may have more than one type of USB port. Be sure to purchase devices that are compatible with your computer.

Type	Description
USB 2.0	Transfers data at 60 MB/s.
USB 3.0	Transfers data at 640 MB/s. USB 3.0 ports, also known as SuperSpeed ports, are also compatible with USB 1.0 and 2.0 devices.


---

## 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.



A sound indicates that 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. Open File Browser by selecting **Computer > Nautilus**.
3. Click the **Eject** icon next to the name of the device in the **Places** list on the left pane of **File**.
4. Remove the device.

## Connecting a powered USB device

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

1. Connect the device to the computer.
2. Plug the device power cord into a grounded AC outlet.
3. Turn on the device.

To disconnect an unpowered external device, stop 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.

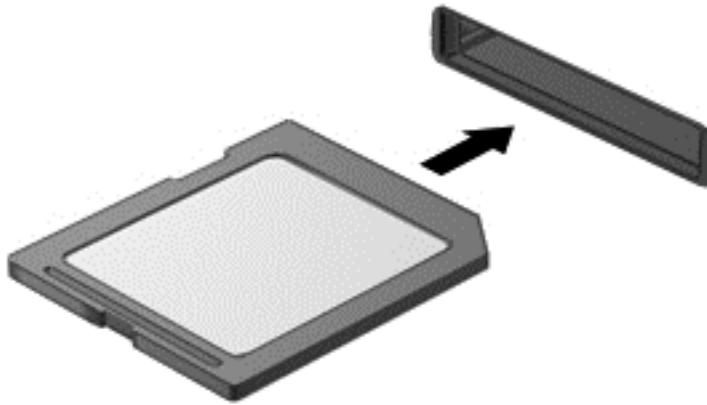


## Inserting and removing a digital storage card

To insert a digital storage 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 storage slot, and then press in on the card until it is firmly seated.

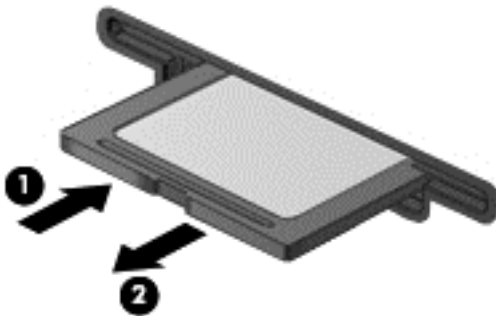


A sound indicates that the device has been detected, and a menu of options displays.

To remove a digital storage 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. Open File Browser by selecting **Computer > Nautilus**.
3. Click the **Eject** icon next to the name of the device in the **Places** list on the left pane of **File**.
4. Press in on the card (1), and then remove it from the slot (2).



**NOTE:** If the card is not ejected, pull the card out of the slot.

## Using optical drives

An optical disc drive uses laser light to read or store large amounts of information. Some drives can only read information, but others can also write (burn) information onto a blank disc.

Use these tips for best performance of your optical drive:

- When the battery is the only source of power, be sure the battery is sufficiently charged before writing to media.
- Do not type on the keyboard or move the computer while an optical drive is writing to a disc. The write process is sensitive to vibration.
- Make sure you have installed the latest software updates for the drive.
- If the disc you are using is not clean, wipe it with a dry, lint-free, soft cloth.

Your computer may include an optical drive that supports one or more of the following disc technologies:

- CD—A compact disc stores data that is read by a laser from the optical disc drive. The following CD formats are available:
  - CD-Recordable (CD-R), which allows the computer to read information and to record information one time on the CD. Once the information is recorded on the CD-R disc, it cannot be changed or erased; it is permanent.
  - CD-Re-Writable (CD-RW), which allows you to read information and record information many times to the CD. Information on the CD can be erased.
- DVD—A digital video disc is a high-capacity optical disc. It can store more information than a CD. A double-sided DVD can store up to 17 GB. The following DVD formats are available:
  - DVD-Recordable (DVD-R or DVD+R), which allow the computer to read information and to record information one time on the DVD. After the information is recorded on the disc, it cannot be changed or erased; it is permanent. The DVDs can be used in DVD±R drives.
  - DVD-Re-Writable (DVD-RW or DVD+RW), which allow to read information and record information many times to the disc. Information on the disc can be erased. The DVDs can be used in DVD±R drives.


## Inserting an optical disc

1. Turn on the computer.
2. Press the release button **(1)** on the drive bezel to release the disc tray.
3. Pull out the tray **(2)**.
4. Hold the disc by the edges to avoid touching the flat surfaces and position the disc label-side up over the tray spindle.

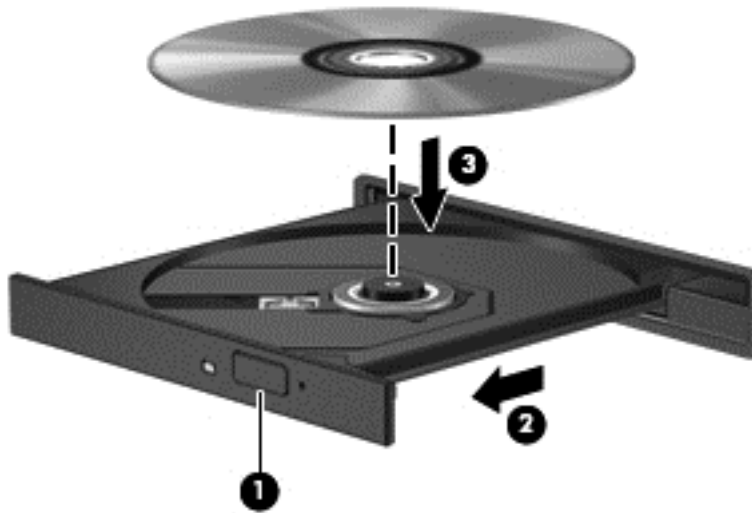


**NOTE:** If the tray is not fully accessible, tilt the disc carefully to position it over the spindle.


5. Gently press the disc (3) down onto the tray spindle until the disc snaps into place.

 **NOTE:** If the tray is not fully accessible, tilt the disc carefully as you remove it.

---




6. Close the disc tray.

 **NOTE:** After you insert a disc, a short pause is normal. If you have not selected a media player, an AutoPlay dialog box opens. It prompts you to select how you want to use the media content.

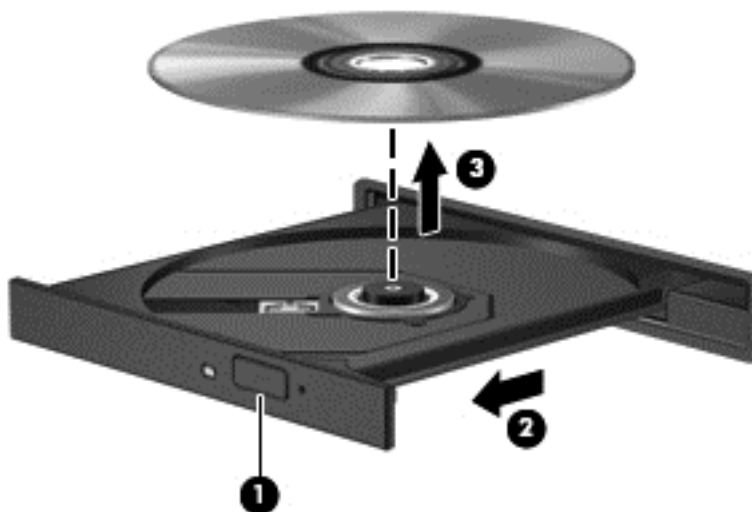
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## Removing an optical disc

1. Press the release button (1) on the drive bezel to release the disc tray, and then gently pull out the tray (2) until it stops.
2. Remove the disc (3) from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

 **NOTE:** If the tray is not fully accessible, tilt the disc carefully as you remove it.

---



3. Close the disc tray and place the disc in a protective case.

If the disc tray does not open normally, see [Disc drive problems on page 64](#).

---

# 8 Maintaining your computer

It is important to perform regular maintenance to keep your computer in optimal condition. This chapter provides information about improving the performance of your computer by running system tools and by replacing a hard drive or adding memory. It also provides information about updating your programs and drivers, instructions for cleaning your computer, and tips for travelling with your computer.

## Improving performance


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

### Handling drives

Observe these precautions when handling drives:

- Before removing or installing a drive, shut down the computer. If you are unsure whether the computer is off, in the Suspend state, or in Hibernation, turn the computer on, and then shut it down through the operating system.
- Before handling a drive, discharge static electricity by touching the unpainted metal surface of the drive.
- Do not touch the connector pins on a removable drive or on the computer.
- Do not use excessive force when inserting a drive into a drive bay.
- When the battery is the only source of power, be sure that the battery is sufficiently charged before writing to media.
- If a drive must be mailed, place the drive in a bubble-pack mailer or other suitable protective packaging and label the package "FRAGILE."
- 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.
- Remove media from a drive before removing the drive from the drive bay, or traveling with, shipping, or storing a drive.
- Do not type on the keyboard or move the computer while an optical drive is writing to a disc. The write process is sensitive to vibration.
- Before you move a computer that is connected to an external hard drive, initiate Suspend and allow the screen to clear, or properly disconnect the external hard drive.

### Replacing a hard drive

 **CAUTION:** Drives are fragile computer components that must be handled with care. Do not drop a drive, place items on it, or expose it to liquids, or temperature or humidity extremes. See [Handling drives on page 43](#) for specific precautions when handling drives.

**CAUTION:** To prevent information loss or an unresponsive system:

Before removing or installing a drive, shut down the computer. If you are unsure whether the computer is off, in the Sleep state, or in Hibernation, turn the computer on, and then shut it down through the operating system.

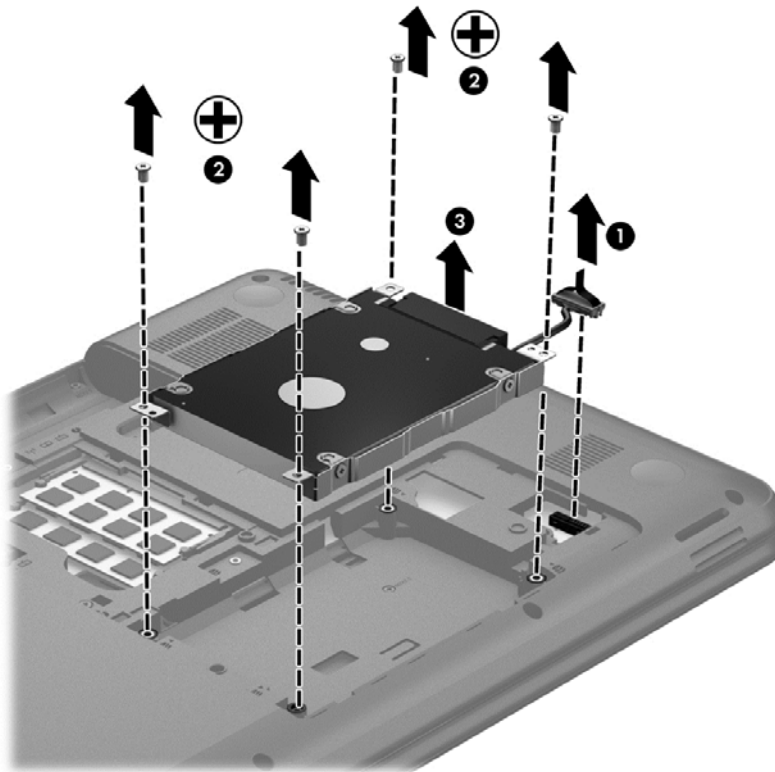
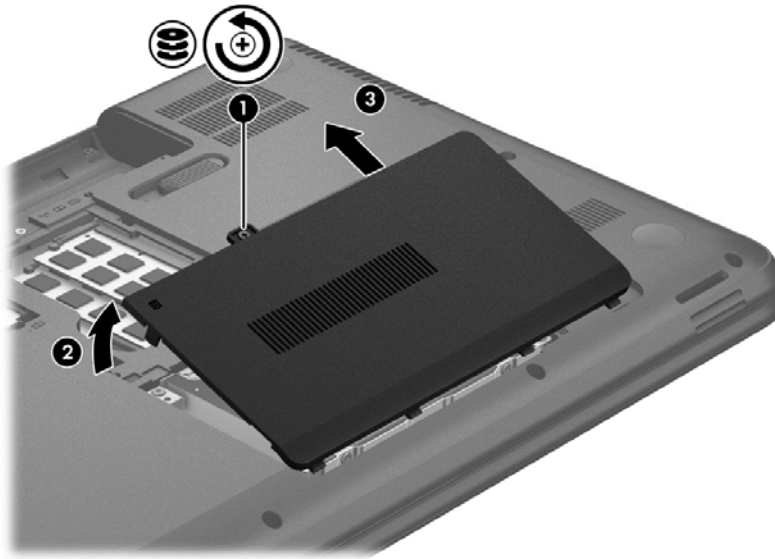
---

1. Save your work and shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Unplug the power cord from the AC outlet.
4. Turn the computer upside down on a flat surface.
5. Remove the battery.

Remove the hard drive:

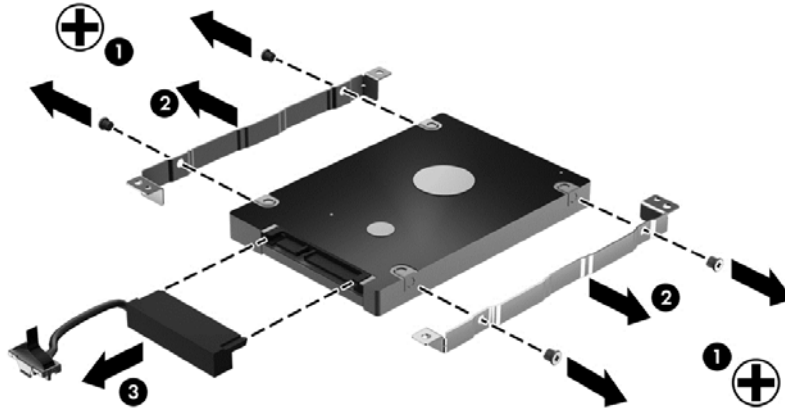
1. Remove the service door.

2. Loosen the hard drive cover screw (1) and then lift up the cover (2) and remove it (3).



3. Remove the 4 screws that hold the drive in place (1).
4. Remove the hard drive bracket (2), which hold the hard drive in place, to access the hard drive itself. Disconnect the hard drive cable (3) from the computer. Lift the hard drive out of the hard drive bay.

5. Disconnect the hard drive cable (1) from the hard drive.



Remove the brackets from the hard drive (2). Disconnect the hard drive cable (3) from the hard drive.

To install a hard drive, reverse this procedure.

## Adding or replacing memory modules

Adding memory can help improve your computer's performance. Your computer is like your physical work area. The hard drive is the filing cabinet where you store your work and the memory is the desk where you work. When your memory isn't big enough to hold all your work easily, like a desk overflowing with work, your productivity slows down. A great solution to improve performance is to expand the amount of memory you have in your computer.

The computer has two memory module slots. The memory module slots are located on the bottom of the computer under the service door. The memory capacity of the computer can be upgraded by adding a memory module or replacing the existing memory module in one of the memory module slots.

---

**WARNING!** To reduce the risk of electric shock and damage to the equipment, unplug the power cord and remove all batteries before installing a memory module.

**CAUTION:** Electrostatic discharge (ESD) can damage electronic components. Before beginning any procedure, ensure that you are discharged of static electricity by touching a grounded metal object.

**NOTE:** To use a dual-channel configuration with a second memory module, be sure that both memory modules are identical.

---

To add or replace a memory module:

---

**CAUTION:** To prevent information loss or an unresponsive system:

Shut down the computer before adding or replacing memory modules. Do not remove a memory module while the computer is on, in the Suspend state, or in Hibernation.

If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

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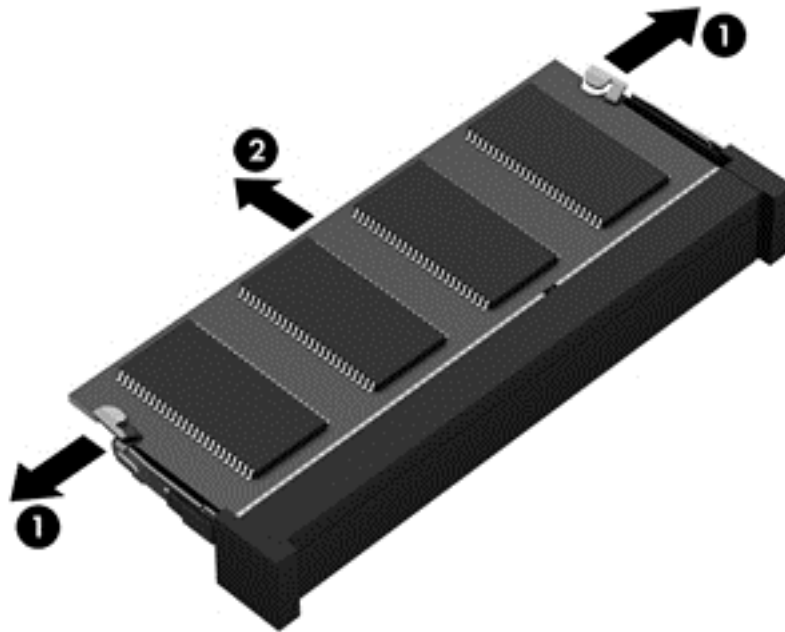
1. Save your work and shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Unplug the power cord from the AC outlet.
4. Turn the computer upside down on a flat surface.



5. Remove the battery from the computer.
6. Remove the service door from the computer.
7. If you are replacing a memory module, remove the existing memory module:

- a. Pull away the retention clips **(1)** on each side of the memory module.  
The memory module tilts up.
- b. Grasp the edge of the memory module **(2)**, and then gently pull the module out of the memory module slot.

**⚠ CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



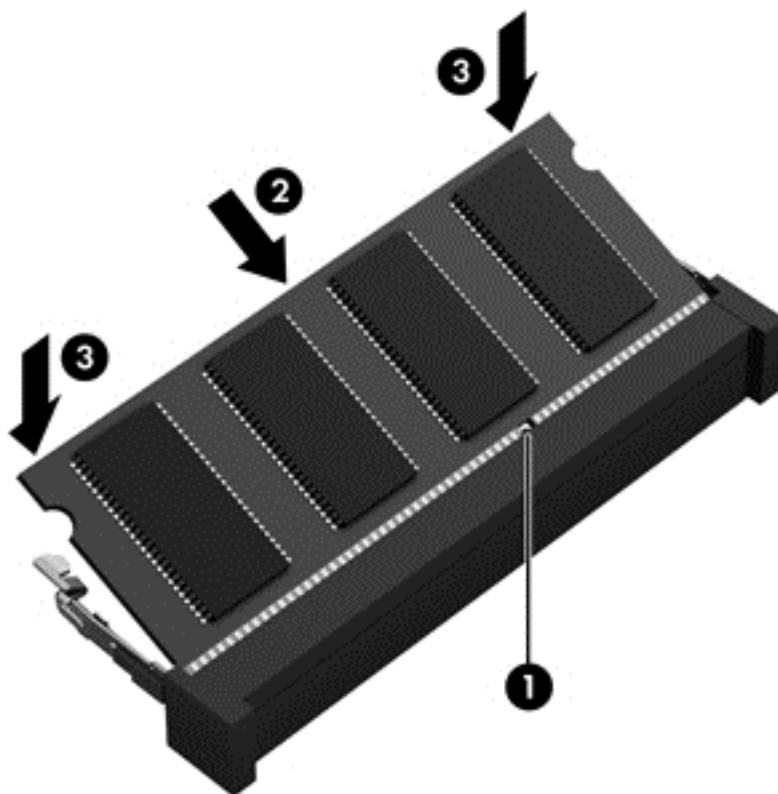
To protect a memory module after removal, place it in an electrostatic-safe container.

8. Insert a new memory module:

**⚠ CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

- a. Align the notched edge **(1)** of the memory module with the tab in the memory module slot.
- b. With the memory module at a 45-degree angle from the surface of the memory module compartment, press the module into the memory module slot **(2)** until it is seated.
- c. Gently press the memory module **(3)** down, applying pressure to both the left and right edges of the module, until the retention clips snap into place.

**⚠ CAUTION:** To prevent damage to the memory module, be sure that you do not bend the module.



9. Replace the memory module service door.
10. Replace the battery.
11. Turn the computer right-side up, and then reconnect external power and external devices.
12. Turn on the computer.

## Updating programs and drivers

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

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

## Cleaning your computer

Cleaning your computer and external devices helps keep them in good working condition. If you don't clean your computer, dust and dirt particles can build up.


**CAUTION:** Avoid using the following cleaning products to clean your computer:

Strong solvents, such as alcohol, acetone, ammonium chloride, methylene chloride, and hydrocarbons, which can permanently damage the surface of the computer.

## Cleaning the display, sides, and cover


Gently wipe the display using a soft, lint-free cloth moistened with an *alcohol-free* glass cleaner. Allow the display to dry before closing the computer cover.

Use a pre-moistened germicidal wipe to clean the sides and cover. Fibrous materials, such as paper towels, can scratch the computer.

 **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:** Never allow liquids to drip between the keys on the keyboard, even when you are cleaning the computer. 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 cloth) 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.

---

## Traveling with or shipping your computer


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

- Prepare the computer for traveling or shipping:
  - Back up your information to an external drive.
  - Remove all discs and all external media cards, such as digital storage cards, from the computer.
  - Turn off, and then disconnect all external devices.
  - Remove any media from the drive before removing the drive from a drive bay.

 **CAUTION:** Perform this action before shipping, storing, or traveling with a drive. This will help reduce the risk of damage to the computer, damage to a drive, or loss of information.

---

- Shut down the computer.
- Take along a backup of your information. Keep the backup separate from the computer.
- When traveling by air, carry the computer as hand luggage; do not check it in with the rest of your luggage.


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

---

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

- If the computer will be unused and disconnected from external power for more than 2 weeks, remove the battery and store it separately.
- If you are shipping the computer or a drive, use suitable protective packaging and label the package “FRAGILE.”
- If the computer has a wireless device installed, the use of these devices may be restricted in some environments. Such restrictions may apply 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 your computer before you turn it on.
- If you are traveling internationally, follow these suggestions:
  - Check the computer-related customs regulations for each country or region on your itinerary.
  - Check the power cord and adapter requirements for each location in which you plan to use the computer. Voltage, frequency, and plug configurations vary.

---

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

---

# 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 operating system, HP applications, the Setup Utility (BIOS), and other third-party software can help protect your computer from a variety of risks, such as viruses, worms, and other types of malicious code.



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

Computer risk	Security feature
Unauthorized use of the computer	<ul style="list-style-type: none"><li>• Power-on password</li></ul>
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 user account	User password
Unauthorized removal of the computer	Security cable lock

## Locating your security software

HP Security Assistant (select models only) provides a starting location for quick access to a collection of security software applications that are organized by task. Instead of searching for each application through Computer and the Control Center, HP Security Assistant allows you to access the applications for the following security tasks:

- Setting up Internet and antivirus security.
- Backing up and recovering files.
- Managing passwords, user accounts, and parental controls.
- Maintaining your computer and installing the latest HP and operating system updates.

## Using passwords

A password is a group of characters that you choose to secure your computer information and to protect online transactions. Several types of passwords can be set. For example, when you set up your computer for the first time, you were asked to create a user password to secure your computer. Additional passwords can be set in the operating system 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 an operating system 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 passwords, such as screen-saver passwords, select **Computer > Help**.

## Setting operating system passwords

Password	Function
User password	Protects access to a user account. You may also set up your computer to require the user password to exit Suspend or Hibernation. See <a href="#">Setting password protection on wakeup on page 32</a> for more information.
Administrator password	Protects administrator-level access to computer contents. <b>NOTE:</b> This password cannot be used to access Setup Utility (BIOS) contents.

## Setting Setup Utility (BIOS) passwords

Password	Function
Administrator password	<ul style="list-style-type: none"><li>• Must be entered each time you access Setup Utility (BIOS).</li><li>• If you forget your administrator password, you cannot access Setup Utility (BIOS).</li></ul> <b>NOTE:</b> The administrator password can be used in place of the power-on password. <b>NOTE:</b> Your administrator password is not interchangeable with an administrator password set in the operating system, nor is it displayed as it is set, entered, changed, or deleted. <b>NOTE:</b> 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).
Power-on password	<ul style="list-style-type: none"><li>• Must be entered each time you turn on or restart the computer, or exit Hibernation.</li><li>• If you forget your power-on password, you cannot turn on or restart the computer, or exit Hibernation.</li></ul> <b>NOTE:</b> The administrator password can be used in place of the power-on password. <b>NOTE:</b> A power-on password is not displayed as it is set, entered, changed, or deleted.

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, select **Computer > Help**.

### 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, operating system, and third-party software installed on your computer should be regularly updated to correct security problems and improve software performance. For more information, see [Updating programs and drivers on page 48](#).

### Installing security updates

Updates to the operating system and other software may have become available after the computer left the factory. To protect the computer from security breaches and computer viruses, install all critical operating system updates as soon as you receive an alert.

## Installing HP and third-party software updates

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

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

## Securing your wireless network

When you set up your wireless network, always enable security features. For more information, see [Protecting your WLAN on page 17](#).

## 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 on page 60](#).

## Using an optional security cable lock

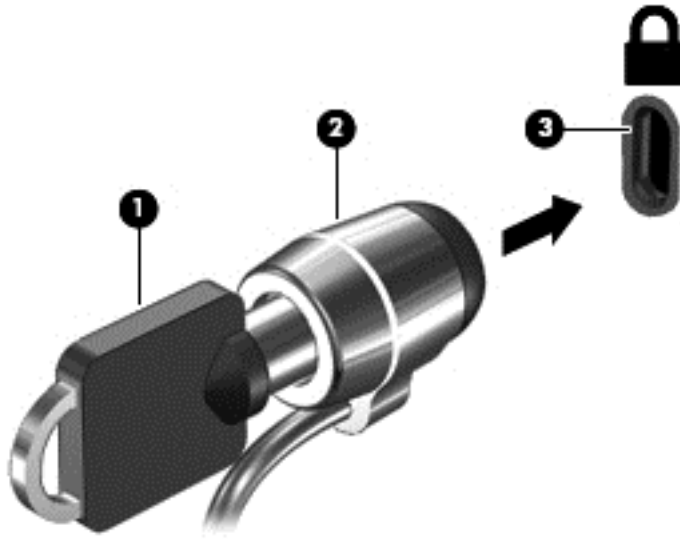
A security cable lock, which is purchased separately, is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. Security cable locks are only one of several methods that should be employed as part of a complete security solution to help maximize theft protection.

The security cable slot on your computer may look slightly different from the illustration in this section. For the location of the security cable slot on your computer, see [Getting to know your computer on page 3](#).

1. Loop the security cable lock around a secured object.
2. Insert the key **(1)** into the security cable lock **(2)**.



3. Insert the security cable lock into the security cable slot on the computer (3), and then lock the security cable lock with the key.



4. Remove the key and keep it in a safe place.

---

# 10 Setup Utility (BIOS) and Advanced System Diagnostics

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 includes settings for the types of peripherals 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. Errors can prevent the computer from operating properly.

---

## Starting Setup Utility

- ▲ 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 **f10**.

## Using Setup Utility

### Changing the language of Setup Utility

1. Start Setup Utility.
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, 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

Setup Utility does not support the TouchPad. Navigation and selection are by keystroke.

- To choose a menu or a menu item, use the arrow keys.
- To choose an item in a list or to toggle a field—for example an Enable/Disable field—use either the arrow keys or **f5** and **f6**.
- To select an item, press **enter**.
- To close a text box or return to the menu display, press **esc**.
- To display additional navigation and selection information while Setup Utility is open, press **f1**.

## Displaying system information

1. Start Setup Utility.
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 without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press [enter](#).

## Restoring factory default settings in Setup Utility

1. Start Setup Utility.
2. Use the arrow keys to select **Exit > Load Setup Defaults**, and then press [enter](#).
3. When the Setup Confirmation is displayed, press [enter](#).
4. To save your change and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press [enter](#).

The Setup Utility factory settings take effect when the computer restarts.



---

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

---

## Exiting Setup Utility

- To exit Setup Utility and save your changes from the current session:  
If the Setup Utility 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 without saving your changes from the current session:  
If the Setup Utility 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.

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.

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

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed by pressing **fn+esc** or by using Setup Utility.

1. Start Setup Utility.
2. If the system information is not displayed, use the arrow keys to select the **Main** menu.  
BIOS and other system information is displayed.
3. To exit Setup Utility, use 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, 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 Suspend or Hibernation.


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

1. Access the page on the HP Web site that provides software for your computer.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. 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.

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

# Using Advanced System Diagnostics

Advanced System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in Advanced 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.
- **Memory test**—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- **Battery test**—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact HP Customer Support to report the issue and purchase a replacement battery.
- **System Tune-Up**—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

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

To start Advanced 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**.

---

---

# 11 Backup and Recovery


The following sections are included in this chapter:


- [Performing a system recovery](#)
- [Backing up your information](#)

Recovery after a system failure is as good as your most recent backup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

## Performing a system recovery

Recovery allows you to repair or restore the computer to its original factory state. You can create an HP factory image restore DVD, using an external DVD±RW optical drive. You can also create an HP factory restore image on a USB storage device.

 **CAUTION:** Using Recovery completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery tool reinstalls the original operating system and HP programs and drivers that were installed at the factory. Software, drivers, and updates not installed by HP must be manually reinstalled. Personal files must be restored from a backup.

 **NOTE:** HP recommends that you create the HP factory image restore in the event of a system failure.


## Creating the restore DVDs

The restore creation software creates a set of system restore discs using blank, writable DVDs (DVD-R or DVD+R). HP recommends using blank DVD+R discs from a manufacturer you trust, because these recovery DVDs are so important. You need approximately 3 blank DVD+R discs. The program states how many discs are needed at the beginning of the process.

To create restore DVDs:

1. Select **Computer > More Applications**.
2. Click **Applications**, and then click **Create Restore DVDs**.
3. Follow the on-screen instructions.

## Creating a restore image on a USB device

 **NOTE:** Be sure AC power is connected to the computer you begin.

Verify the exact amount of free space on your storage device before you begin the creation process. For most models, you will need at least 8 GB of free space on the storage device. However, depending on the drivers and software installed on your computer, you may need slightly more than 8 GB of space. **HP recommends that you use a 16 GB device for best results.**


To create the restore image:

1. Select **Computer > More Applications**.
2. Click **Tools**, and then click **Create Restore USB**.
3. Follow the on-screen instructions.

## Performing recovery using the restore DVD

1. If possible, back up all personal files.
2. Shut down the computer.
3. Be sure the restore DVD or USB device is connected to the computer.
4. Restart the computer.
5. Using the arrow keys, select **Recovery**, and then press **enter**.
6. Follow the on-screen instructions.

---

 **NOTE:** If you are unable to boot (start up) your computer with the primary operating system, and you did not create a system recovery disc, you must purchase a *SUSE Linux Enterprise Desktop Operating System DVD* to reinstall the operating system. For additional information, refer to the *Worldwide Telephone Numbers* booklet.

---

## Backing up your information

You should back up your computer files on a regular schedule to maintain a current backup. You can manually back up your information to an optional external drive, a network drive, or discs. Back up your system at the following times:


- At regularly scheduled times
- Before the computer is repaired or restored
- Before you add or modify hardware or software

To back up your home directory files using Backup Manager Settings:

1. Select **Computer > More Applications > Tools > Backup Manager Settings**, and then click **Backup my home directory**.
2. Click the **Storage Destination Location** menu and select a location to back up your information.
3. Click the **Schedule** menu and select a time schedule to perform backups at a regularly scheduled time.

To immediately back up your information, select the **Backup Now** check box.

---

 **NOTE:** Before you back up your information, be sure you have designated a location to save the backup files.

---

4. Click **Save and Backup** to start the backup and to save the backup settings.

To restore backup files:

1. Select **Computer > More Applications > Backup Manager Restore**.
2. Click the **Backup Source** menu and select the location of the backup files.
3. Click the **Restore Destination** menu and select the destination to restore the files.

4. To restore all files from the selected location, click **Restore all files**. To restore selected files only, click **Restore selected files**, click **Select Files**, and then select the files to be restored.
5. Under **Restore Point**, click the time and date of the backup.



---

**NOTE:** If multiple backups have been performed, click **Use the latest version** to restore the latest version.

---

6. Click **Restore** to start restoring the files, or click **Cancel** to cancel the operation.



# 12 Specifications

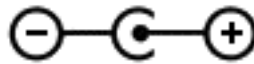
## Input power


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


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

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

Input power	Rating
Operating voltage and current	18.5V/ 3.5A or 19.5V/ 3.33A – 65W
	19V/ 4.74A or 19.5V/ 4.62A – 90W
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.
<b>Temperature</b>		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
<b>Relative humidity (noncondensing)</b>		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
<b>Maximum altitude (unpressurized)</b>		
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

---

# 13 Troubleshooting and support

- [Troubleshooting](#)
- [Contacting customer support](#)


## Troubleshooting

### Disc drive problems

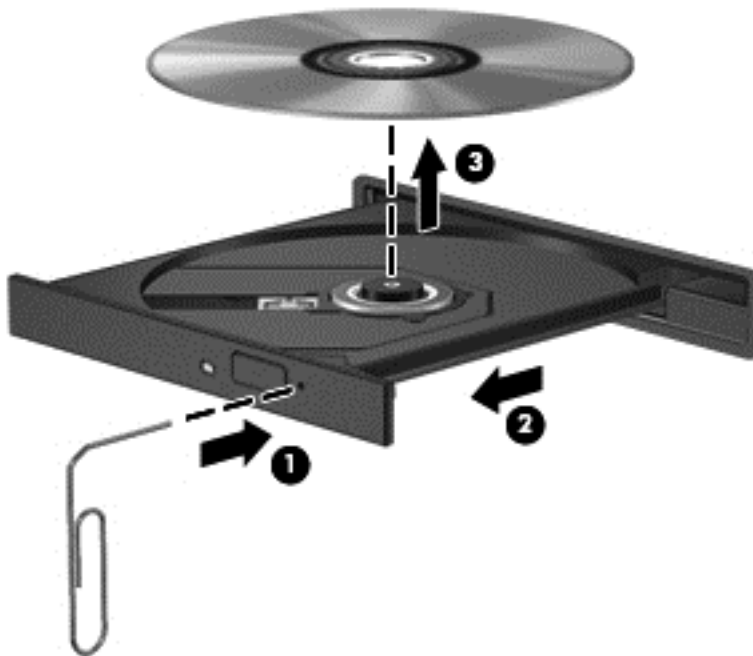
If the disc tray fails to open normally, follow these steps:

1. Insert the end of a paper clip into the release access **(1)** in the front bezel of the drive.
2. Press in gently on the paper clip until the tray is released, and then pull out the tray **(2)** until it stops.
3. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

---

 **NOTE:** If the tray is not fully accessible, tilt the disc carefully as you remove it.

---



4. Close the disc tray and place the disc in a protective case.

### Wireless connection problems

Some possible causes for wireless connection problems include the following:

- Wireless device is not turned on.
- Wireless device is not installed correctly or has been disabled.

- Wireless device encountered interference from other devices.
- Wireless device or router hardware has failed.



**NOTE:** Wireless networking devices are included with select computer models only. If wireless networking is not listed in the feature list on the side of the original computer package, you may add wireless networking capability to the computer by purchasing a wireless networking device.

## Cannot connect to a WLAN

If you have a problem connecting to a WLAN, confirm that the integrated WLAN device is turned on and properly installed on your computer.

1. If the wireless light is off or amber, press the wireless button, wireless switch, or wireless key to turn the wireless device on.
2. Then try connecting to the WLAN again.

If you are still unable to connect, follow the steps below.

1. Select **Computer > YaST > Hardware information**.
2. On the Network Card pane, verify that the WLAN device is listed.
3. If no WLAN device is listed, either your computer does not have an integrated WLAN device, or the driver for the WLAN device is not properly installed.

For more information about troubleshooting WLANs, see the website links provided in Help.

## Cannot connect to a preferred network

You may not be able to connect to a preferred network because it is a security-enabled WLAN. You must have the security code to connect to this type of WLAN. See the next section for additional information.

If entering a security code is not the problem, you may have a corrupted WLAN connection. Many times, the operating system can automatically repair a corrupted WLAN connection.

- If there is a network status icon in the notification area, right click and then select the preferred Wireless AP.

The operating system resets your network device and attempts to reconnect to one of the preferred networks.

- If there is no network status icon in the notification area, follow these steps:
- If there is no network status icon in the notification area, follow these steps:
  1. Select **Computer > Control Center > Network Settings**.
  2. Select **Global Option > User controlled by Network Manager** and then click the **OK** button.

## Current network security codes are unavailable

If you are prompted for a security code (or network key) or a name (SSID) when connecting to a WLAN, the network is protected by security. You must have the current codes to make a connection

on a secure network. The SSID and security code are alphanumeric codes that you enter into your computer to identify your computer to the network.

- For a network connected to your personal wireless router, review the router user guide for instructions on setting up the same codes on both the router and the WLAN device.
- For a private network, such as a network in an office or at a public Internet chat room, contact the network administrator to obtain the codes, and then enter the codes when prompted to do so.

Some networks change the SSID or network keys used in their routers or access points on a regular basis to improve security. You must change the corresponding code in your computer accordingly.

If you are provided with new wireless network keys and SSID for a network, and if you have previously connected to that network, follow the steps below to connect to the network:

1. Right-click on the **Network Manager** icon on the task bar.
2. A list showing the available WLANs is displayed. If you are in a hotspot where several WLANs are active, several will be displayed.
3. Select the network in the list, and then attempt to connect again.



---

**NOTE:** If the network you want is not listed, check with the network administrator to be sure that the router or access point is operating.

---

4. Click the **Security** tab and enter the correct wireless encryption data into the **Network security key** box.
5. Click **OK** to save these settings.

## WLAN connection is very weak

If the connection is very weak, or if your computer cannot make a connection to a WLAN, minimize interference from other devices, as follows:

- Move your computer closer to the wireless router or access point.
- Temporarily disconnect wireless devices such as a microwave, cordless phone, or cellular phone to be sure that other wireless devices are not interfering.

If the connection does not improve, try forcing the device to reestablish all connection values:

1. Right-click on the **Network Manager** icon on the task bar.
2. A list showing the available WLANs is displayed. If you are in a hotspot where several WLANs are active, several will be displayed.
3. Select a network in the list, and then attempt to connect again.

## Cannot connect to the wireless router

If you are trying to connect to the wireless router and are unsuccessful, reset the wireless router by removing power from the router for 10 to 15 seconds.

If the computer still cannot make a connection to a WLAN, restart the wireless router. For details, see the router manufacturer's instructions.

## Network status icon is not displayed

If the network status icon is not displayed in the notification area after you configure the WLAN, the software driver is either missing or corrupted. A “Device not Found” error message may also be displayed. The driver must be reinstalled.

Get the latest version of the WLAN device software and drivers for your computer from the HP website at <http://www.hp.com>. If the WLAN device you are using was purchased separately, consult the manufacturer’s website for the latest software.

To get the latest version of the WLAN device software for your computer, follow these steps:

1. Open your Internet browser and go to <http://www.hp.com/support>.
2. Select your country or region.
3. Click the option for software and driver downloads, and then type your computer model number in the search box.
4. Press **enter**, and then follow the on-screen instructions.



**NOTE:** If the WLAN device you are using was purchased separately, consult the manufacturer’s website for the latest software.

## Audio problems

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

1. Select **Computer > Control Center**.
2. In the left pane, click **Hardware**, and then click **Sound** in the right pane.
3. Click the **Sound Effects** tab, and then select one of the sound options under **Choose an alert sound** to test each sound.

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

1. Select **Computer > Control Center**
2. In the left pane, click **Hardware**, and then click **Sound** in the right pane.
3. Click the **Input** tab, and then select **Microphone** or **Line-in** in the drop-down menu next to **Connector**.
4. Adjust the input volume by moving the **Input** volume slider to the desired setting.

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

## Power management problems

Some possible causes for power management problems include the following:

- Low battery levels
- AC adapter problems

## 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. Replace the discharged user-replaceable battery with a charged battery, or connect the AC adapter to the computer and to external power.
2. Exit Hibernation by pressing the power button.

## Troubleshooting an AC adapter

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

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

To test the AC adapter:

1. Shut down the computer.
2. Remove the battery from the computer.
3. Connect the AC adapter to the computer, and then plug it into an AC outlet.
4. 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 about obtaining a replacement AC power adapter.

## Contacting customer support

If the information provided in this user guide or in Help does not answer your questions, you can contact HP Customer Support at <http://www.hp.com/go/contactHP>.



---

**NOTE:** For worldwide support, go to [http://welcome.hp.com/country/us/en/wwcontact\\_us.html](http://welcome.hp.com/country/us/en/wwcontact_us.html).

---

Here you can:

- Chat online with an HP technician.



---

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

---

- Email support.
- Find support telephone numbers.
- Locate an HP service center.

---

# 14 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 and before removing a cover.
- Keep components in their electrostatic-safe containers until you are ready to install them.
- Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.
- Use nonmagnetic tools.
- Before handling components, discharge static electricity by touching an unpainted metal surface of the component.
- If you remove a component, place it in an electrostatic-safe container.

If you need more information about static electricity or assistance with component removal or installation, contact customer support.



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