

# Getting Started

HP Notebook

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This guide describes features that are  
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## 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 Welcome

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

- **Connect to the Internet**—Set up your wired or wireless network so that you can connect to the Internet. For more information, see [Networking on page 15](#).
- **Update your antivirus software**—Protect your computer from damage caused by viruses. The software is preinstalled on the computer and includes a limited subscription for free updates. For more information, see the *HP Notebook Reference Guide*. For instructions on accessing this guide, see [Finding information on page 2](#).
- **Get to know your computer**—Learn about your computer features. See [Getting to know your computer on page 4](#) and [Navigating using the keyboard, touch gestures and pointing devices on page 18](#) for additional information.
- **Find installed software**—Access a list of the software preinstalled on the computer. Select **Start > All Programs**. For details about using the software included with the computer, see the software manufacturer's instructions, which may be provided with the software or on the manufacturer's website.
- Back up your hard drive by creating recovery discs. See [Backup and recovery on page 71](#)

# Finding information

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

Resources	For information about
<i>Setup Instructions</i> poster	<ul style="list-style-type: none"><li>• How to set up the computer</li><li>• Help to identify computer components</li></ul>
<i>HP Notebook Reference Guide</i> To access this guide on your computer: Select <b>Start &gt; Help and Support &gt; User Guides</b> .	<ul style="list-style-type: none"><li>• Power management features</li><li>• How to maximize battery life</li><li>• How to use the multimedia features of the computer</li><li>• How to protect the computer</li><li>• How to care for the computer</li><li>• How to update the software</li><li>• How to install certain components</li><li>• How to create a wired and/or wireless network</li></ul>
Help and Support To access Help and Support, select <b>Start &gt; Help and Support</b> . <b>NOTE:</b> For U.S. support, go to <a href="http://www.hp.com/go/contactHP">http://www.hp.com/go/contactHP</a> . For worldwide 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> .	<ul style="list-style-type: none"><li>• Operating system information</li><li>• Software, driver, and BIOS updates</li><li>• Troubleshooting tools</li><li>• How to access support</li></ul>
<i>Regulatory, Safety, and Environmental Notices</i> To access this guide: Select <b>Start &gt; Help and Support &gt; User Guides</b> .	<ul style="list-style-type: none"><li>• Regulatory and safety information</li><li>• Battery disposal information</li></ul>
<i>Safety &amp; Comfort Guide</i> To access this guide: Select <b>Start &gt; Help and Support &gt; User Guides</b> . – or – Go to <a href="http://www.hp.com/ergo">http://www.hp.com/ergo</a> .	<ul style="list-style-type: none"><li>• Proper workstation setup, posture, health, and work habits</li><li>• Electrical and mechanical safety information</li></ul>
<i>Worldwide Telephone Numbers</i> booklet This booklet is provided with your computer.	HP support telephone numbers
HP website For U.S. support, go to <a href="http://www.hp.com/go/contactHP">http://www.hp.com/go/contactHP</a> . For worldwide 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> .	<ul style="list-style-type: none"><li>• Support information</li><li>• Ordering parts and finding additional help</li><li>• Accessories available for the device</li></ul>

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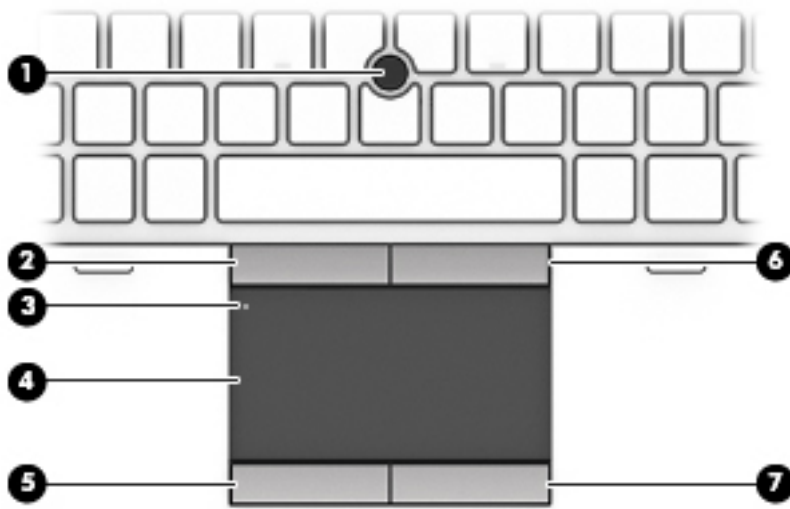
Resources	For information about
<i>Limited Warranty*</i>	Warranty information
To access the warranty:	
Select <b>Start &gt; Help and Support &gt; User Guides &gt; View Warranty Information.</b>	
– or –	
Go to <a href="http://www.hp.com/go/orderdocuments">http://www.hp.com/go/orderdocuments</a> .	
*You 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 some 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:	
<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 9115077</li></ul>	
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.	
<b>IMPORTANT:</b> Do NOT return your HP product to the addresses above. For U.S. support, go to <a href="http://www.hp.com/go/contactHP">http://www.hp.com/go/contactHP</a> . For worldwide 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> .	

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## 2 Getting to know your computer

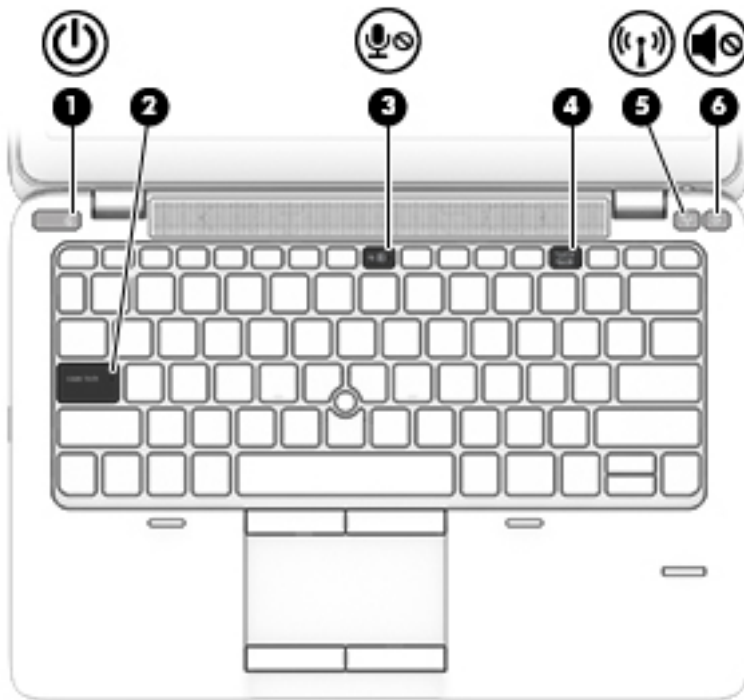
### Top





#### TouchPad



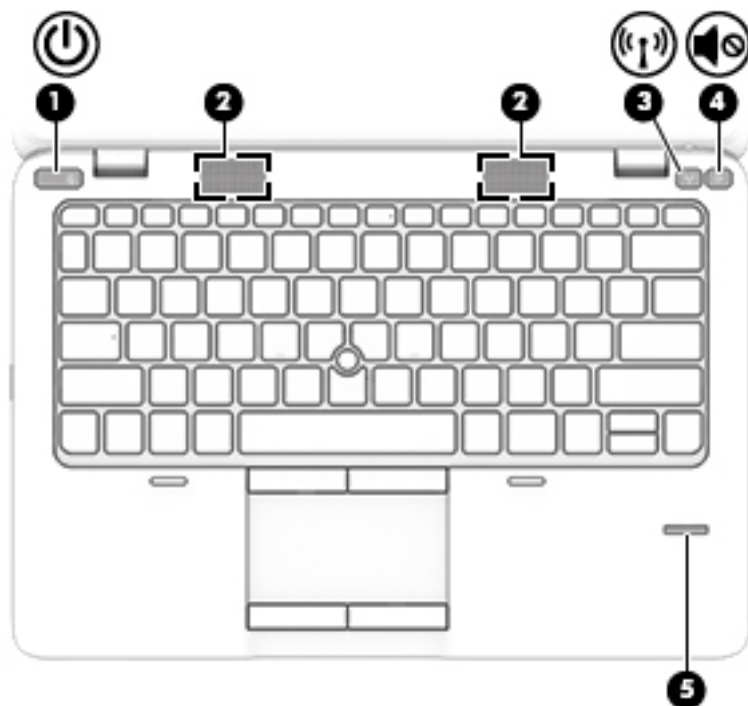
Component	Description
(1) Pointing stick	Moves the pointer and selects or activates items on the screen.
(2) Left pointing stick button	Functions like the left button on an external mouse.
(3) TouchPad on/off button	Turns the TouchPad on and off.
(4) TouchPad zone	Moves the pointer and selects or activates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



## Lights




Component	Description
(1)  Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(2) Caps lock light	On: Caps lock is on.
(3)  Microphone mute light	On: Microphone is muted.
(4) Num lock light	On: Num lock is on.
(5)  Wireless light	<ul style="list-style-type: none"> <li>White: An integrated wireless device, such as a wireless local area network (WLAN) device, is on.</li> <li>Amber: All wireless devices are off.</li> </ul>
(6)  Mute light	<ul style="list-style-type: none"> <li>Amber: Computer sound is off.</li> <li>Off: Computer sound is on.</li> </ul>

## Buttons and fingerprint reader (select models only)

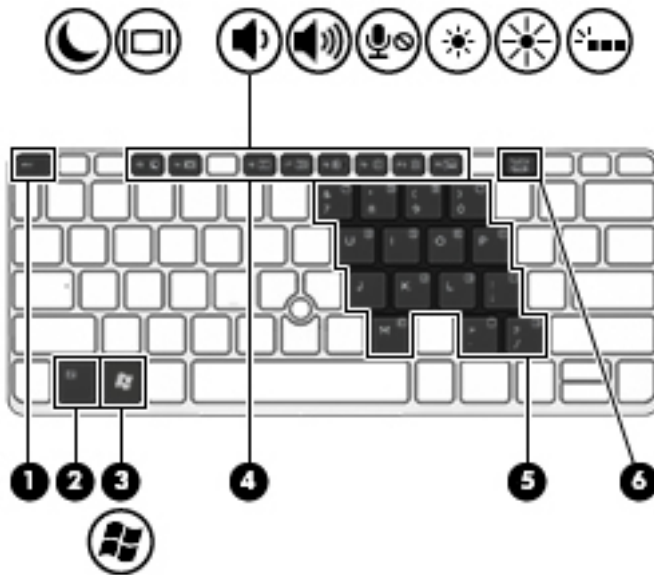



Component	Description
<p>(1)  Power button</p>	<ul style="list-style-type: none"> <li>• When the computer is off, press the button to turn on the computer.</li> <li>• When the computer is on, press the button briefly to initiate Sleep.</li> <li>• When the computer is in the Sleep state, press the button briefly to exit Sleep.</li> <li>• When the computer is in Hibernation, press the button briefly to exit Hibernation.</li> </ul> <p>If the computer has stopped responding and Microsoft® Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings:</p> <ul style="list-style-type: none"> <li>• Select <b>Start &gt; Control Panel &gt; System and Security &gt; Power Options</b>.</li> <li>• For more information, see the <i>HP Notebook Reference Guide</i>.</li> </ul>
<p>(2) Speakers (2)</p>	<p>Produce sound.</p>
<p>(3)  Wireless button</p>	<p>Turns the wireless feature on or off but does not establish a wireless connection.</p>



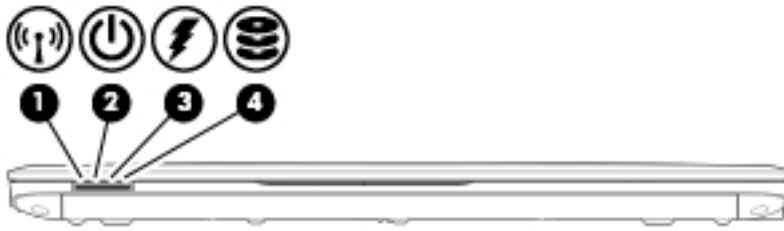
Component	Description
(4)  Volume mute button	Mutes and restores speaker sound.
(5) Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.





## Keys



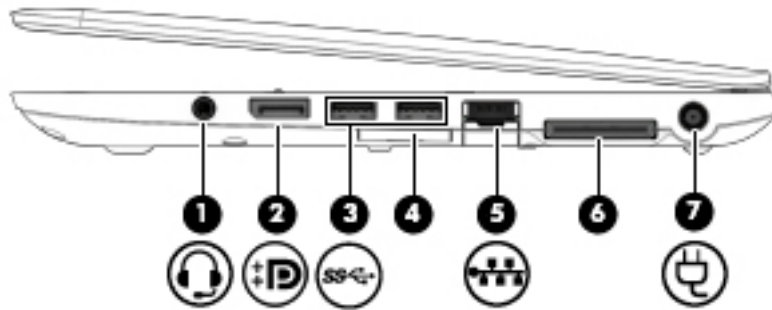
Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes frequently used system functions when pressed in combination with a function key, the <code>num lk</code> key, the <code>esc</code> key, or other keys. For more information, see <a href="#">Navigating using the keyboard, touch gestures and pointing devices on page 18</a> .
(3)  Windows logo key	Displays the Windows Start menu.
(4) Function keys	Execute frequently used system functions when pressed in combination with the <code>fn</code> key. For more information, see <a href="#">Navigating using the keyboard, touch gestures and pointing devices on page 18</a> .
(5) Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad.  Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(6) <code>num lk</code> key	Turns the embedded numeric keypad on and off when pressed in combination with the <code>fn</code> key.  Alternates between the navigational and numeric functions on the integrated numeric keypad.








# Front



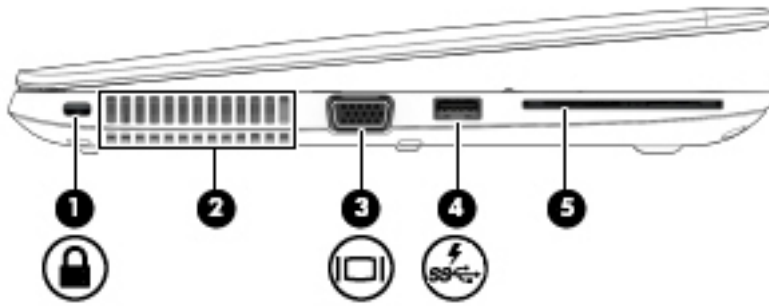
Component	Description
(1)  Wireless light	The wireless connection is on.
(2)  Power light	<ul style="list-style-type: none"> <li>• On: The computer is on.</li> <li>• Blinking: The computer is in the Sleep state.</li> <li>• Off: The computer is off or in Hibernation.</li> </ul>
(3)  AC adapter/Battery light	<ul style="list-style-type: none"> <li>• Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent.</li> <li>• White: The computer is connected to external power and the battery is charged from 90 to 99 percent.</li> <li>• Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.</li> <li>• Off: The battery is fully charged.</li> </ul>
(4)  Hard drive light	<ul style="list-style-type: none"> <li>• Blinking white: The hard drive is being accessed.</li> <li>• Amber: HP 3D DriveGuard has temporarily parked the hard drive.</li> </ul> <p><b>NOTE:</b> For information on HP 3D DriveGuard, see the <i>HP Notebook Reference Guide</i>.</p>




# Right



Component	Description
(1)  Audio-out (headphone) jack/Audio-in (microphone) jack	<p>Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.</p> <p><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>.</p> <p><b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.</p> <p><b>NOTE:</b> Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).</p>
(2)  DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)  USB 3.0 ports (2)	Connect optional USB 3.0 devices and provide enhanced USB power performance.
(4)  Memory card reader	Reads data from and writes data to memory cards such as Secure Digital (SD).
(5)  RJ-45 (network) jack	Connects a network cable.
(6)  Docking port	Connects an optional docking device.
(7)  Power connector	Connects an AC adapter.

# Left



Component	Description
(1)  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.
(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)  External VGA monitor port	Connects an external VGA monitor or projector.
(4)  USB 3.0 charging port	Connects an optional USB device. The USB charging port can also charge select models of cell phones and MP3 players, even when the computer is off. <b>NOTE:</b> A USB charging port (also referred to as a powered USB port) allows you to charge connected USB devices. Standard USB ports will not charge all USB devices or will charge using a low current. Some USB devices require power and require you to use a powered port.
(5) Smart card reader	Supports optional smart cards.

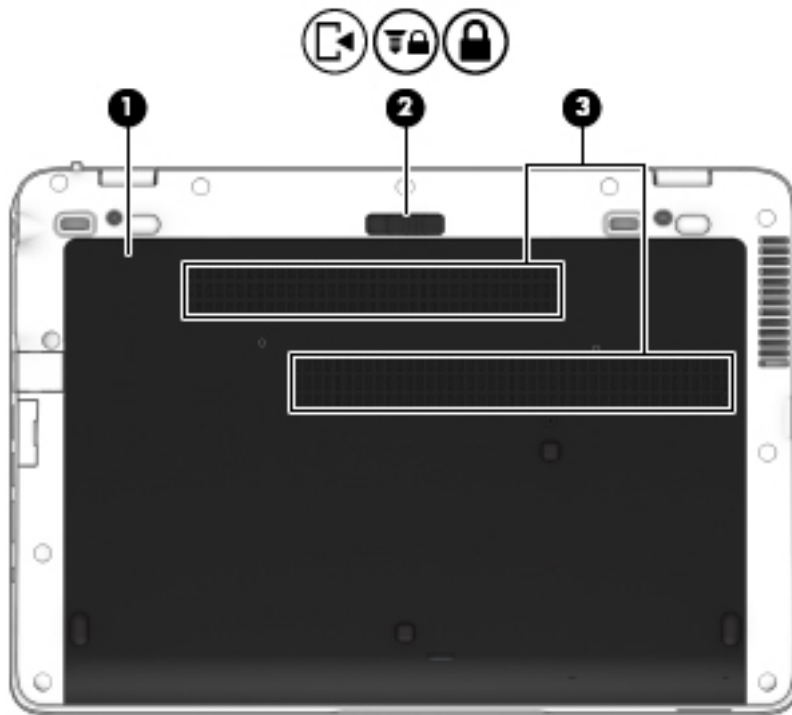
# Display






Component	Description
(1) WLAN antennas (2)*	<p>Send and receive wireless signals to communicate with wireless local area networks (WLAN).</p> <p><b>NOTE:</b> To set up a WLAN and connect to the Internet, you need a broadband modem (either DSL or cable) (purchased separately), high-speed Internet service, purchased from an Internet service provider, and a wireless router (purchased separately).</p>
(2) WWAN antennas (2)*	<p>Send and receive wireless signals to communicate with wireless wide area networks (WWAN).</p>
(3) Internal microphones (2)	<p>Record sound.</p>
(4) Webcam light (select models only)	<p>On: The webcam is in use.</p>
(5) Webcam (select models only)	<p>Records video and captures still photographs.</p> <p>To use the webcam, select <b>Start &gt; All Programs &gt; Communication and Chat &gt; HP Webcam</b>.</p>
(6) Internal display switch	<p>Turns off the display or initiates Sleep if the display is closed while the power is on.</p> <p><b>NOTE:</b> The display switch is not visible from the outside of the computer.</p>

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

# Bottom



Component	Description	Description
(1)	Service door	Provides access to the hard drive bay, the wireless LAN (WLAN) module slot, the WWAN module slot, and the memory module slots.  <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 support through Help and Support.


Component	Description
(2)   	Service door release lock  Releases the service door from the computer. A security screw is available to prevent the service door from being accidentally removed.
(3) 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.



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## 3 Networking

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 **NOTE:** Internet hardware and software features vary depending on computer model and your location.

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Your computer may support one or both of the following types of Internet access:

- **Wireless**—For mobile Internet access, you can use a wireless connection. For more information, see [Connecting to an existing WLAN on page 16](#) or [Setting up a new WLAN network on page 16](#).
- **Wired**—You can access the Internet by connecting to a wired network. For information on connecting to a wired network, see the *HP Notebook Reference Guide*.

### Using an Internet service provider (ISP)

Before you can connect to the Internet, you must establish an ISP account. Contact a local ISP to purchase Internet service and a modem. 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 password to access the Internet. Record this information and store it in a safe place.


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

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

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

---

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

---

## 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
- HP Mobile Broadband Module, a wireless wide area network (WWAN) device

For more information on wireless technology and connecting to a wireless network, see the *HP Notebook Reference Guide* and information and website links provided in Help and Support.


## Connecting to an existing WLAN

1. Turn on the computer.
2. Be sure that the WLAN device is on.
3. Click the network icon in the notification area, at the far right of the taskbar.
4. Select a WLAN to connect to.

---

 **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. You can choose to manually search for and connect to a network or to create a new network connection.

---


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

## Setting up a new WLAN network

Required equipment:

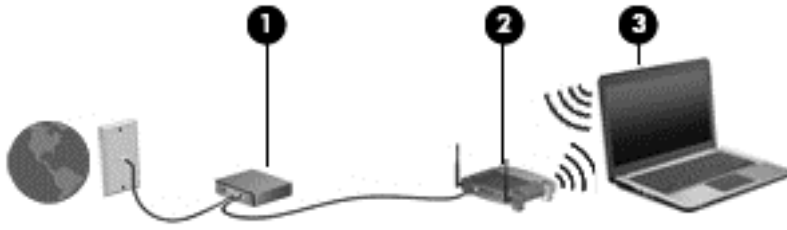
- A broadband modem (either DSL or cable) (purchased separately) **(1)** and high-speed Internet service purchased from an Internet service provider (ISP)
- A wireless router (purchased separately) **(2)**
- Your new wireless computer **(3)**

---

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

---

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



## Configuring a wireless router

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

The Windows operating system also provides tools to help you set up a new wireless network. To use the Windows tools to set up your network:

- Select **Start > Control Panel > Network and Internet > Network and Sharing Center > Set up a new connection or network > Set up a network**. Then follow the on-screen instructions.



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

## Protecting your WLAN

When you set up a WLAN or access an existing WLAN, always enable security features to protect your network from unauthorized access.

For information on protecting your WLAN, see the *HP Notebook Reference Guide*.

# 4 Navigating using the keyboard, touch gestures and pointing devices





## Using the keyboard





### Identifying the hot keys

A hot key is a combination of the **fn** key and either the **esc** key or one of the function keys.

To use a hot key:

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

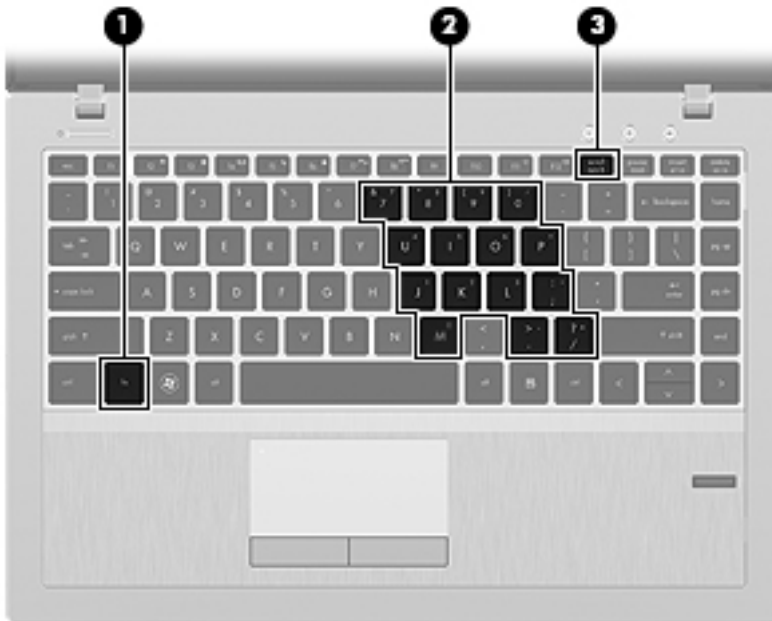
Hot key combination	Description
<b>fn+esc</b>	Displays system information.
 <b>fn+f3</b>	<p>Initiates Sleep, which saves your information in system memory. The display and other system components turn off and power is conserved.</p> <p>To exit Sleep, briefly press the power button.</p> <p><b>CAUTION:</b> To reduce the risk of information loss, save your work before initiating Sleep.</p> <p><b>NOTE:</b> If a critical battery level occurs while the computer is in the Sleep state, the computer initiates Hibernation and the information stored in system memory is saved to the hard drive.</p> <p>The function of the <b>fn+f3</b> hot key can be changed. For example, you can set the <b>fn+f3</b> hot key to initiate Hibernation instead of Sleep. In all Windows operating system windows, references to the <i>sleep button</i> apply to the <b>fn+f3</b> hot key.</p>
 <b>fn+f4</b>	<p>Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, <b>fn+f4</b> alternates the screen image from computer display to monitor display to simultaneous display on both the computer and the monitor.</p> <p>Most external monitors receive video information from the computer using the external VGA video standard. The <b>fn+f4</b> hot key can also alternate images among other devices that are receiving video information from the computer.</p>
 <b>fn+ f6</b>	Decreases speaker volume.
 <b>fn+f7</b>	Increases speaker volume.

Hot key combination	Description
 <a href="#">fn+f8</a>	Microphone on/off.
 <a href="#">fn+f9</a>	Decreases the screen brightness level.
 <a href="#">fn+f10</a>	Increases the screen brightness level.
 <a href="#">fn+f11</a>	Turns the keyboard backlight on and off. <b>NOTE:</b> The keyboard backlight is turned on at the factory. To extend battery life, turn off the keyboard backlight.

## Using keypads

The computer includes an embedded numeric keypad. The computer also supports an optional external numeric keypad, or an optional external keyboard that includes a numeric keypad.

### Using the embedded numeric keypad



Component	Description
(1) <a href="#">fn</a> key	Turns the embedded numeric keypad on and off when pressed in combination with the <a href="#">num lk</a> key. <b>NOTE:</b> The embedded numeric keypad will not function while an external keyboard or numeric keypad is connected to the computer.

Component	Description
(2) Embedded numeric keypad	<p>When the keypad is turned on, it can be used like an external numeric keypad.</p> <p>Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.</p>
(3) num lk key	<p>Turns the embedded numeric keypad on and off when pressed in combination with the fn key.</p> <p><b>NOTE:</b> The keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.</p>

## Turning the embedded numeric keypad on and off

Press **fn+num lk** to turn on the embedded numeric keypad. Press **fn+num lk** again to turn off the keypad.



**NOTE:** The embedded numeric keypad is turned off while an external keyboard or numeric keypad is connected to the computer.

## Switching key functions on the embedded numeric keypad

You can temporarily alternate the functions of keys on the embedded numeric keypad between their standard keyboard functions and their keypad functions:

- To use the navigational function of a keypad key while the keypad is off, press and hold the **fn** key while pressing the keypad key.
- To use the standard function of a keypad key while the keypad is on:
  - Press and hold the **fn** key to type in lowercase.
  - Press and hold **fn+shift** to type in uppercase.

## Using an optional external numeric keypad

Keys on most external numeric keypads function differently according to whether num lock is on or off. (Num lock is turned off at the factory.) For example:

- When num lock is on, most keypad keys type numbers.
- When num lock is off, most keypad keys function like the arrow, page up, or page down keys.

When num lock on an external keypad is turned on, the num lock light on the computer is turned on. When num lock on an external keypad is turned off, the num lock light on the computer is turned off.

To turn num lock on or off on an external keypad as you work:

- ▲ Press the **num lk** key on the external keypad, not on the computer.

## Using pointing devices



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

## Setting pointing device preferences

Use Mouse Properties in Windows to customize settings for pointing devices, such as button configuration, click speed, and pointer options.

To access Mouse Properties:

- Select **Start > Devices and Printers**. Then right-click the device representing your computer, and select **Mouse settings**.

## Using the pointing stick

Press the pointing stick in the direction you want to move the pointer on the screen. Use the left and right pointing stick buttons as you would the left and right buttons on an external mouse.

## Using the TouchPad

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 like the buttons on an external mouse.

## Turning the TouchPad off and on

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

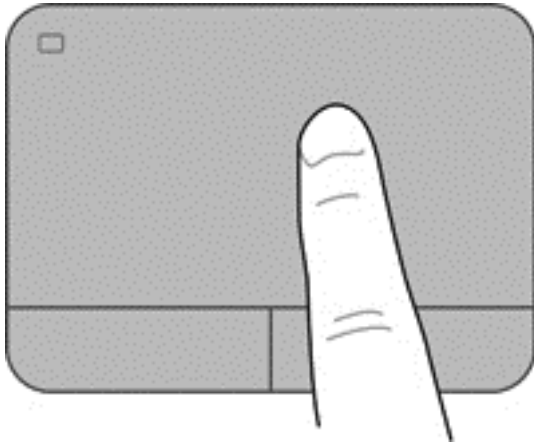


The TouchPad light and onscreen display icons indicate the TouchPad status. The following table shows and describes the TouchPad display icons.

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

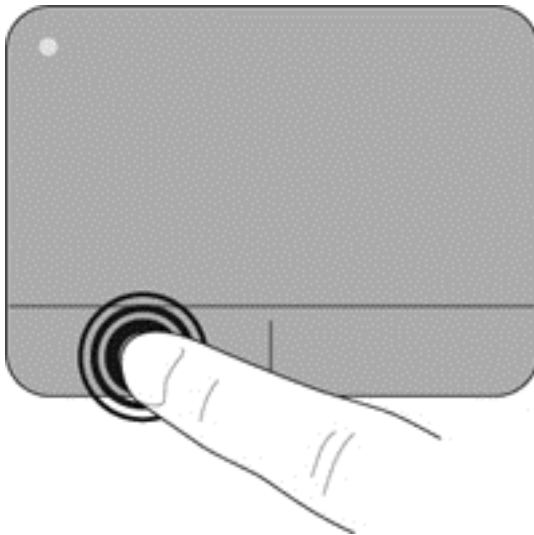
## Navigating

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



## Selecting

Use the left and right TouchPad buttons like the corresponding buttons on an external mouse.




## Using TouchPad gestures

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



**NOTE:** TouchPad gestures are not supported in all programs.


To view the demonstration of a gesture:

1. Click the **Show hidden icons** icon in the notification area, at the far right of the taskbar.
2. Click the **Synaptics Pointing Device** icon , and then click **Pointing Device Properties**.




3. Click the **Device Settings** tab, select the device in the window that is displayed, and then click **Settings**.
4. Select the gesture to activate the demonstration.

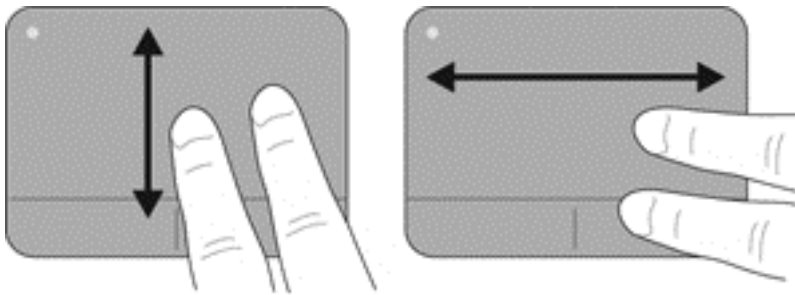
To turn the gestures on and off:

1. Click the **Show hidden icons** icon in the notification area, at the far right of the taskbar.
2. Click the **Synaptics Pointing Device** icon , and then click **Pointing Device Properties**.
3. Click the **Device Settings** tab, select the device in the window that is displayed, and then click **Settings**.
4. Select the check box next to the gesture that you want to turn on or off.
5. 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.

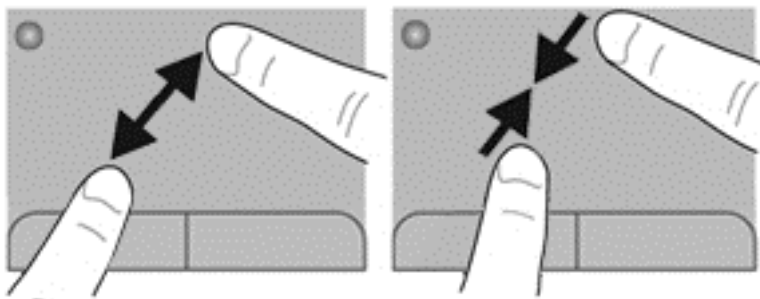
 **NOTE:** Scrolling speed is controlled by finger speed.



## 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.



---

# 5 Multimedia

Your computer may include the following:

- Integrated speaker(s)
- Integrated microphone(s)
- Integrated webcam
- Preinstalled multimedia software
- Multimedia buttons or keys

## Using the media activity controls

Depending on your computer model, you may have the following media activity controls that allow you to play, pause, fast forward, or rewind a media file:

- Media buttons
- Media hot keys (specific keys pressed in combination with the **fn** key)
- Media keys

## 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 a USB port (or the audio-out/headphone jack) on your computer or on a docking station.


To connect wireless speakers to your computer, follow the device manufacturer's instructions. Before connecting audio devices, be sure to adjust the volume.


## Adjusting the volume


Depending on your computer model, you can adjust the volume using the following:

- Volume buttons
- Volume hot keys (specific keys pressed in combination with the **fn** key)
- Volume keys

---

 **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*. To access the user guides, select **Start > Help and Support > User guides**.

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

 **NOTE:** Refer to the [Getting to know your computer on page 4](#) section for information on what type of volume controls your computer has.


---

## Connecting headphones and microphones

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

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


---

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

---

## Checking audio functions on the computer

---

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

---

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

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

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

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

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

To confirm or change the audio settings on your computer:

- ▲ Select **Start > Control Panel > Audio**.

## Webcam (select models only)

Some computers include an integrated webcam. With the preinstalled software, you can use the webcam to take a photo or record a video. You can preview and save the photo or video recording.

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

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

## 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 connect to a network.

To enhance your viewing enjoyment, use one of the video ports on the computer to connect an external monitor, projector, or TV.

Your computer may have one or more of the following external video ports:

- VGA
- DisplayPort



---

**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.



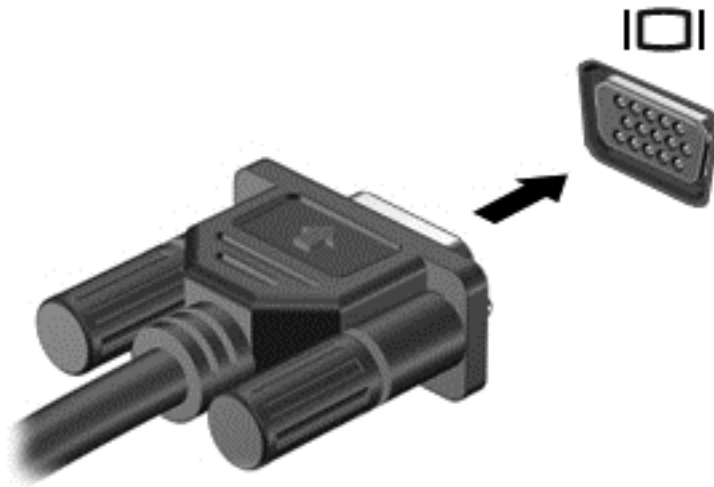
**NOTE:** Refer to the [Getting to know your computer on page 4](#) section for information about your computer's video ports.

---

## VGA


The external monitor port, or VGA port, is an analog display interface that connects an external VGA display device such as an external VGA monitor or a VGA projector to the computer.


- ▲ To connect a VGA display device, connect the device cable to the external monitor port.



## DisplayPort

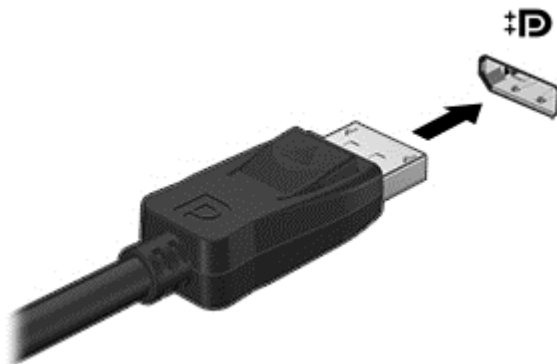
The DisplayPort connects the computer to an optional video or audio device, such as a high-definition television, or to any compatible digital or audio component. The DisplayPort delivers higher performance than the VGA external monitor port and improves digital connectivity.

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


 **NOTE:** One DisplayPort device can be connected to the DisplayPort port on the computer. The information displayed on the computer screen can be simultaneously displayed on the DisplayPort device.

To connect a video or audio device to the DisplayPort:

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




2. Connect the other end of the cable to the video device, and then see the device manufacturer's instructions for additional information.

 **NOTE:** To remove the device cable, press down on connector release button to disconnect it on the computer.

---

## 6 Power management


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 **NOTE:** A computer may have a power button or a power switch. The term *power button* is used throughout this guide to mean both types of power controls.

---

### Shutting down the computer

---

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

---


The shutdown 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 Universal Serial Bus (USB) port
- When the computer will be unused and disconnected from external power for an extended period

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

---

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

---

1. Save your work and close all open programs.
2. Select **Start > Shut Down**.

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

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

# Refreshing your software content with Intel Smart Connect Technology

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

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


## Setting power options


### Using power-saving states

Sleep is enabled at the factory.

When Sleep is initiated, the power lights blink and the screen clears. Your work is saved to memory.

---

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

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

---

### Initiating and exiting Sleep

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


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

To exit Sleep

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

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

---

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

---

## Initiating and exiting Hibernation

The system is set at the factory to initiate Hibernation after a period of inactivity when 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 Windows Control Panel.

To initiate Hibernation


- ▲ Select **Start**, click the arrow next to the Shut down button, and then click **Hibernate**.

To exit Hibernation:

- ▲ Briefly press the power button.

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

---

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

---

## Using the power meter and power settings

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

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


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

## Setting password protection on wakeup

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

1. Select **Start > Control Panel > System and Security > Power Options**.
2. In the left pane, click **Require a password on wakeup**.
3. Click **Change Settings that are currently unavailable**.
4. Click **Require a password (recommended)**.

---


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

---

5. Click **Save changes**.

## Using battery power

---


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

---



The computer runs on battery power whenever it is not plugged into external AC power. Computer battery life varies, depending on power management settings, running programs, display brightness, external devices connected to the computer, and other factors. Keeping the battery in the computer whenever the computer is plugged into AC power charges the battery and also protects your work in case of a power outage. If the computer contains a charged battery and is running on external AC power, the computer automatically switches to battery power if the AC adapter is disconnected on the computer or an AC power loss occurs.

---

 **NOTE:** When you disconnect AC power, the display brightness is automatically decreased to save battery life.

---

## Finding additional battery information

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

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

To access battery information:

- ▲ Select **Start > Help and Support > Learn > Power Plans: Frequently Asked Questions**.


## Using Battery Check

Help and Support provides information on the status of the battery installed in the computer.

To run Battery Check:

1. Connect the AC adapter to the computer.

---

 **NOTE:** The computer must be connected to external power for Battery Check to work properly.

---

2. Select **Start > Help and Support > Troubleshoot > Power, Thermal, and Mechanical**.
3. Click the **Power** tab, and then click **Battery Check**.

Battery Check examines the battery and its cells to see if they are functioning properly, and then reports the results of the examination.

## Displaying the remaining battery charge

- ▲ Move the pointer over the power meter icon on the Windows desktop in the notification area, at the far right of the taskbar.

## Maximizing battery discharge time

Battery discharge time varies depending on features you use while on battery power. Maximum discharge time gradually decreases as the battery storage capacity naturally degrades.

Tips for maximizing battery discharge time:

- Lower the brightness on the display.
- Remove the battery on the computer when it is not being used or charged, if the computer contains a user-replaceable battery
- Store the user-replaceable battery in a cool, dry location.
- Select the **Power saver** setting in Power Options.

## Managing low battery levels

The information in this section describes the alerts and system responses set at the factory. Some low-battery alerts and system responses can be changed using Power Options. Preferences set using Power Options do not affect lights.

### Identifying low battery levels

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

- The battery light (select models only) indicates a low or critical battery level.
- or –
- The power meter icon in the notification area shows a low or critical battery notification.



**NOTE:** For additional information about the power meter, see [Using the power meter and power settings on page 30](#).

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

### Resolving a low battery level

#### Resolving a low battery level when external power is available

- ▲ Connect one of the following devices:
  - AC adapter
  - Optional docking or expansion device
  - Optional power adapter purchased as an accessory from HP

#### Resolving a low battery level when no power source is available

To resolve a low battery level when no power source is available, save your work and shut down the computer.

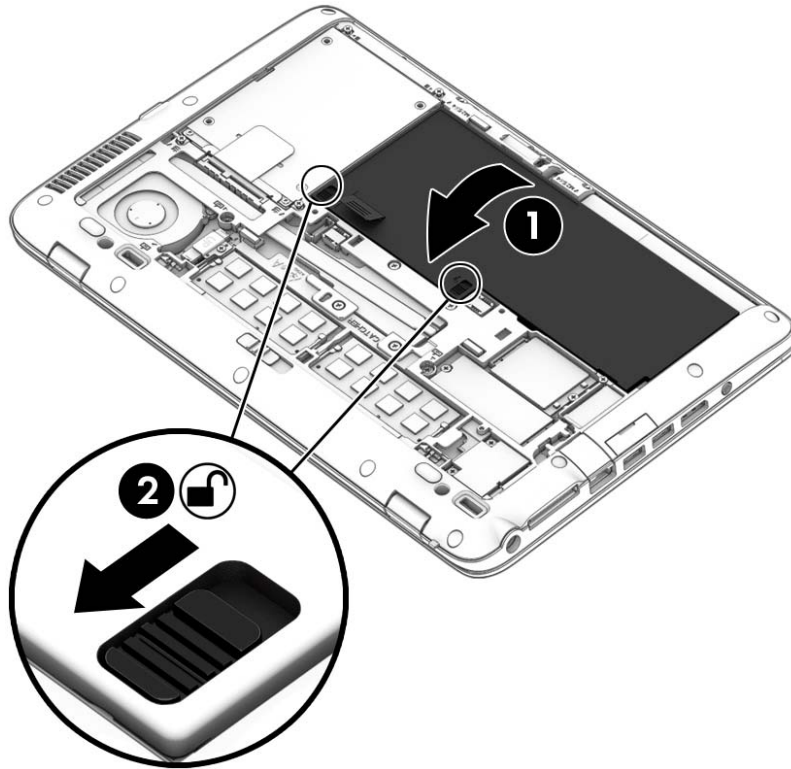
## Inserting or removing the battery

### Inserting a battery

To insert the battery:

1. Insert the battery into the battery bay, aligning the tabs on the battery (**1**) with the notches on the computer, and then press the battery down until it is seated.

2. Slide the battery release latch **(2)** to lock the battery into place.



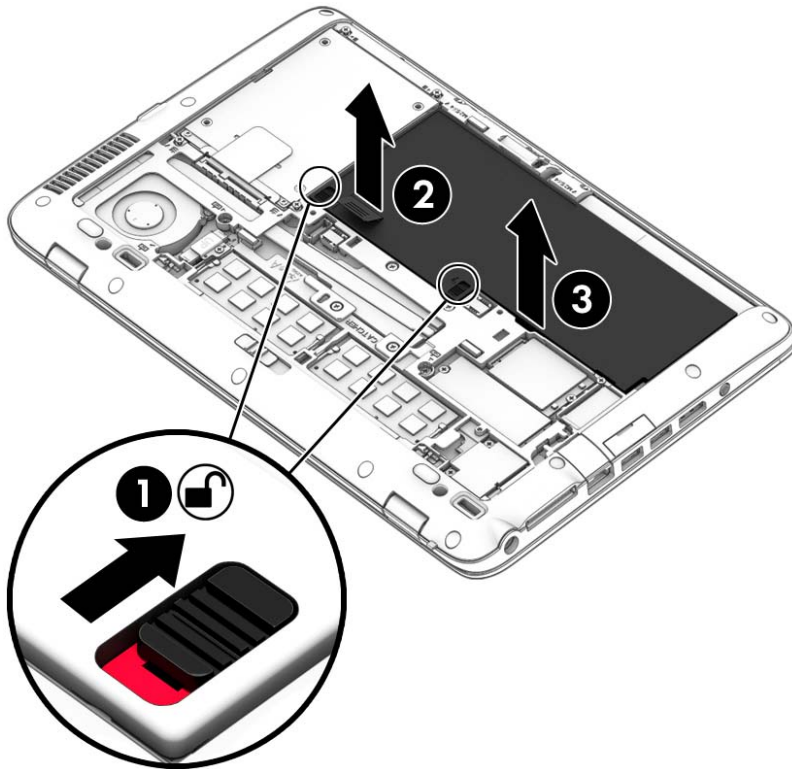
### Removing a battery

To remove the battery:

**⚠ CAUTION:** Removing a battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work and shut down the computer through Windows before removing the battery.

1. Remove the service door. See [Removing or replacing the service door on page 43](#).

2. Slide the two battery release latches to the unlocked position (1). You will be able to see red beneath the latches. Using the cloth tab, tilt the battery up (2) and then lift it (3) out of the enclosure.



## Conserving battery power

- Select low power-use settings through Power Options in Windows Control Panel.
- Turn off wireless and LAN connections and exit modem applications when you are not using them.
- Disconnect unused external memory cards that are not plugged into an external power source.
- Stop, disable, or remove any external media cards that you are not using.
- Decrease screen brightness.
- Before you leave your work, initiate Sleep, or shut down the computer.

## 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 a computer will be unused and unplugged from external power for more than 2 weeks, remove the user-replaceable battery and store it separately.


To prolong the charge of a stored battery, place it in a cool, dry place.

**NOTE:** 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.

Calibrate a battery before using it if it has been stored for one month or more.

## 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 the user guides, select the **Start > Help and Support > User Guides**. To access battery information, select **Start > Help and Support > Learn > Power Plans: Frequently Asked Questions**.


## Replacing a user-replaceable battery


Battery Check notifies you 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 include a warranty ID. A message refers you to the HP website for more information about ordering a replacement battery.

## Using external AC power

---

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

 **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.

 **NOTE:** For information on connecting to AC power, see the *Setup Instructions* poster provided in the computer box.

---

External AC power is supplied through an approved AC adapter or an optional docking or expansion device.

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

- When charging or calibrating a battery
- When installing or modifying system software
- When writing information to a CD, a DVD, or a BD (select models only)
- When running Disk Defragmenter
- When performing a backup or recovery

When you connect the computer to external AC power, the following events occur:

- The battery begins to charge.
- If the computer is turned on, the power meter icon in the notification area changes appearance.

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

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

## Testing 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:



---

**NOTE:** The following instructions apply to computers with user-replaceable batteries.

---

1. Shut down the computer.
2. Remove the battery on 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*, the AC adapter is not functioning and should be replaced.

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

---

# 7 External cards and devices

## Using Memory Card Readers

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

To determine the digital card formats that are supported on your computer, see the [Getting to know your computer on page 4](#) section.

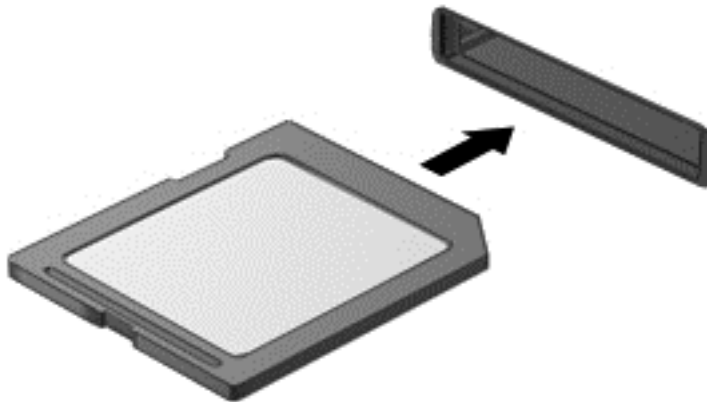
### Inserting a memory card

---

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

---

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



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

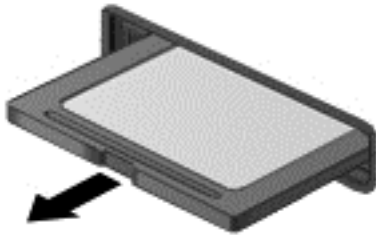
## Removing a digital card

---

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

---

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



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

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## Using smart cards

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**NOTE:** The term *smart card* is used throughout this chapter to mean both smart cards and Java™ Cards.

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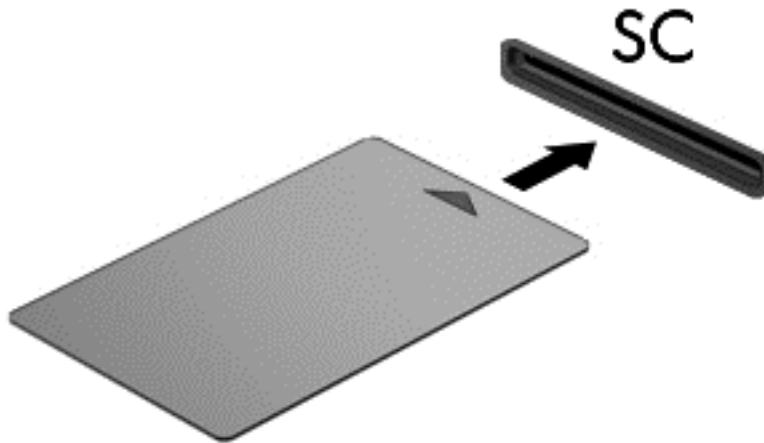
A smart card is a credit card-sized accessory that carries a microchip containing memory and a microprocessor. Like personal computers, smart cards have an operating system to manage input and output, and they include security features to protect against tampering. Industry-standard smart cards are used with the smart card reader (select models only).

A PIN is needed to gain access to the contents of the microchip. For more information about smart card security features, access Help and Support by selecting **Start > Help and Support**.



## Inserting a smart card

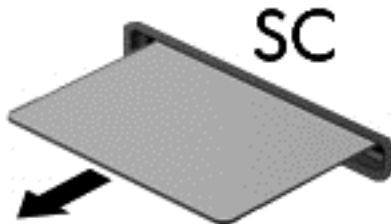
1. Hold the card label-side up, and gently slide the card into the smart card reader until the card is seated.



2. Follow the on-screen instructions for logging on to the computer using the smart card PIN.

## Removing a smart card

- ▲ Grasp the edge of the smart card, and then pull it out of the smart card reader.



## Using a USB device

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

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

The computer has at least 1 USB port that supports USB 1.0, 1.1, 2.0, or 3.0 devices. Your computer may also have a USB charging port that provides power to an external device. An optional docking device or USB hub provides additional USB ports that can be used with the computer.

## Connecting a USB device

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

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

**NOTE:** The following illustration may look slightly different than your computer.



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

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

## Removing a USB device

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

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


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

## Using optional external devices

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

To connect an external device to the computer:

---

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

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

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

## Using optional external drives

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

---

 **NOTE:** HP external USB optical drives should be connected to the powered USB port to the computer.

---

USB drives include the following types:


- 1.44-megabyte diskette drive
- Hard drive module
- External optical drive (CD, DVD, and Blu-ray)
- MultiBay device

---

# 8 Drives

## Handling drives

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 **CAUTION:** Drives are fragile computer components that must be handled with care. Refer to the following cautions before handling drives. Do not drop a drive, place items on it, or expose it to liquids, or temperature or humidity extremes.


---

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 Sleep 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 Sleep and allow the screen to clear, or properly disconnect the external hard drive.

## Using hard drives

---

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

---

Save your work and shut down the computer before adding or replacing a memory module or hard drive.


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

## Removing or replacing the service door

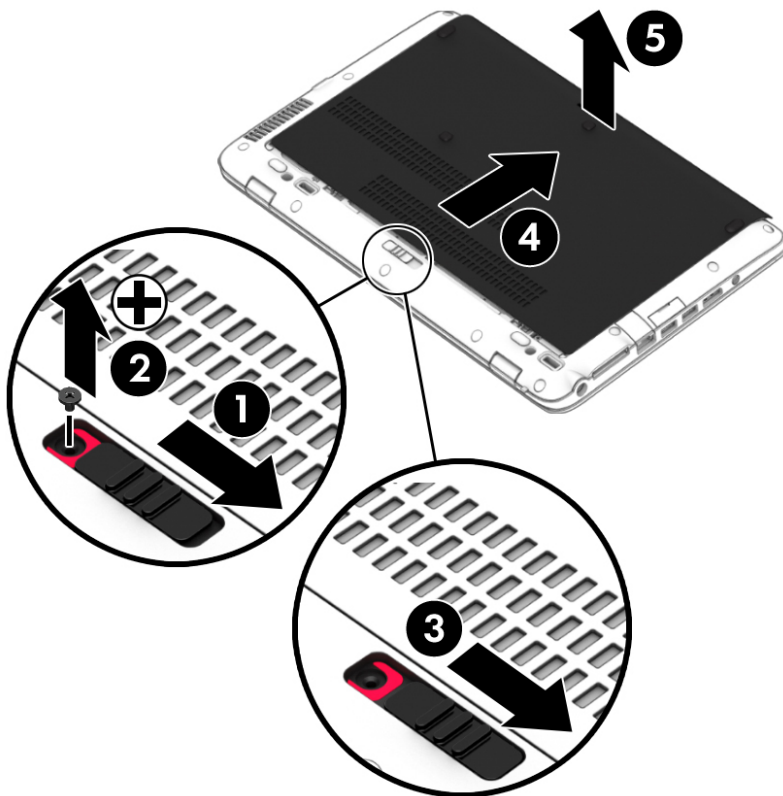
### Removing the service door

Remove the service door to access the battery, memory module slot, hard drive, and other components.

1. With the computer turned over, slide the service door release latch to the unlock position **(1)**, and **(2)** remove the screw (if the optional screw is being used), or, if the screw is not in used, simply slide the release latch to the right **(3)**.

 **NOTE:** If you want to use the optional security screw, it is stored inside the service door.

2. Slide the service door towards the front of the computer **(4)** and lift to remove the service door **(5)**.




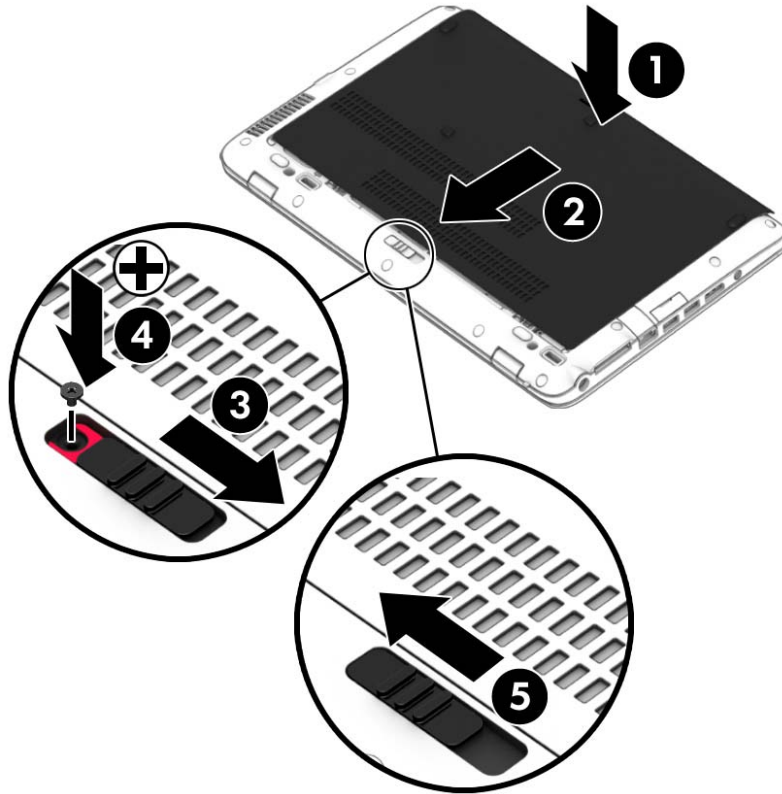
### Replacing the service door

Replace the service door after accessing the battery, memory module slot, hard drive, regulatory label, and other components.


1. Tilt down the service door to align the front edge of the service door near the front edge of the computer **(1)**.
2. Slide the service cover forwards **(2)** until it snaps into place.

3. With the battery bay toward you, slide the service door release latch to the right (3), and if you choose to, insert and tighten the optional screw (4) to hold the service door in place. Slide the release latch to the left to lock the service door (5).

 **NOTE:** If you want to use the optional screw, it is stored inside the service door.



## Replacing or upgrading the hard drive

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

Shut down the computer before removing the hard drive from the hard drive bay. Do not remove the hard drive while the computer is on, in the Sleep state, or in Hibernation.

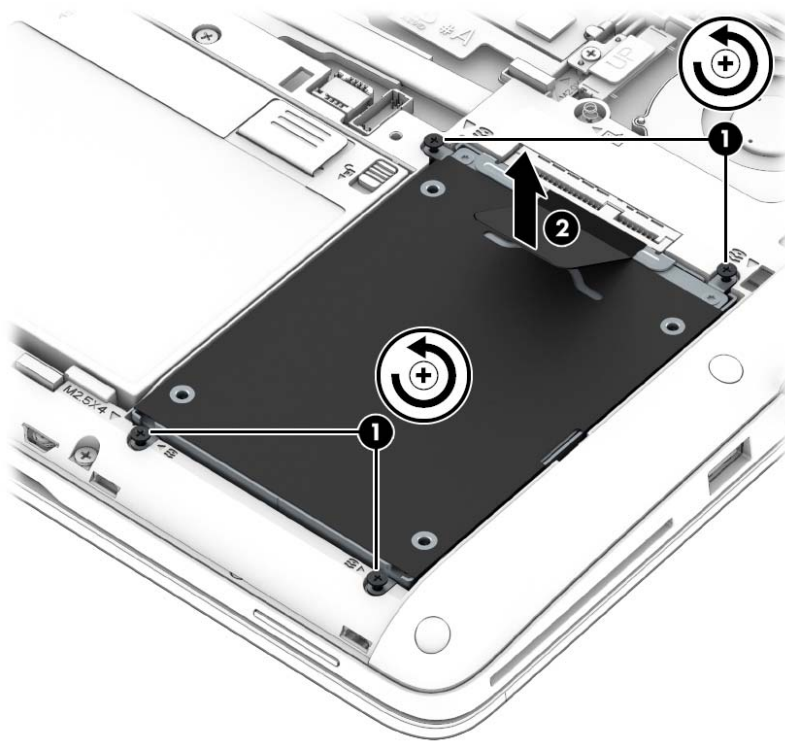
If you are not sure whether the computer is off, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

### Removing the hard drive


To remove a hard drive:

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Turn the computer upside down on a flat surface.
4. Remove the service door (see [Removing or replacing the service door on page 43](#)) and the battery (see [Inserting or removing the battery on page 32](#)).

5. Loosen the 4 hard drive door screws (1). Pull the cloth hard drive tab (2) upwards, and then remove the drive.



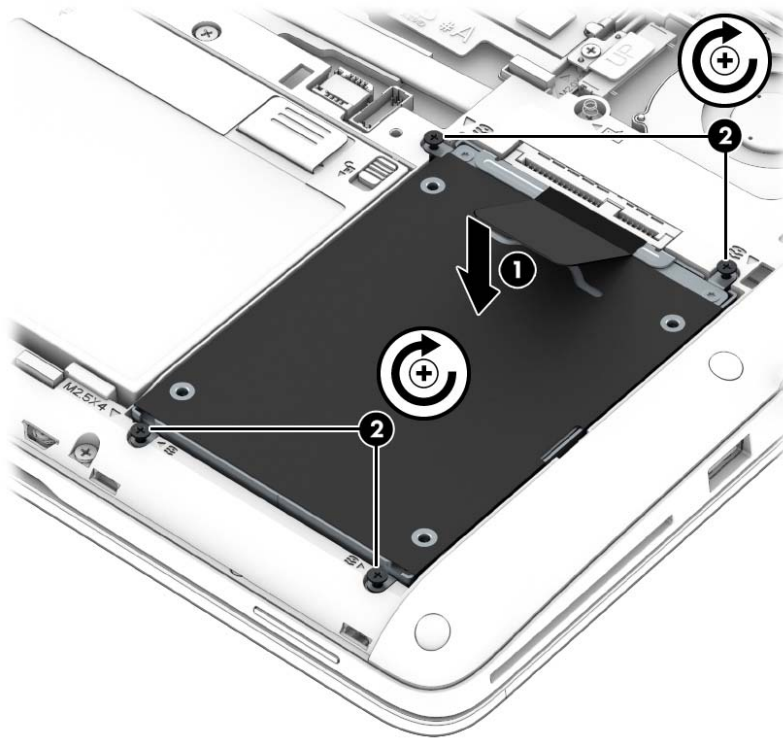
## Installing a hard drive

 **NOTE:** Your computer may look slightly different from the illustration in this section.

To install the hard drive:

1. Place the hard drive into the hard drive bay, (1), ensuring that the cloth tab remains on top.

2. Replace the 4 screws (2) to secure the hard drive.




3. Replace the battery (see [Inserting or removing the battery on page 32](#)) and the service door (see [Removing or replacing the service door on page 43](#)).
4. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.
5. Turn on the computer.

## Improving hard drive performance

### Using Disk Defragmenter

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

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

---

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


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



To run Disk Defragmenter:

1. Connect the computer to AC power.
2. Select **Start > All Programs > Accessories > System Tools > Disk Defragmenter**.
3. Click **Defragment disk**.

---

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

---

For additional information, access the Disk Defragmenter software Help.

## Using Disk Cleanup

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

To run Disk Cleanup:

1. Click **Start > All Programs > Accessories > System Tools > Disk Cleanup**.
2. Follow the on-screen instructions.


## Using HP 3D DriveGuard

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


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

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

---

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

---

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




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

## Identifying HP 3D DriveGuard status

The hard drive light on the computer changes color to show that the drive in a primary hard drive bay and/or the drive in a secondary hard drive bay (select models only) is parked. To determine whether a


drive is currently protected or whether it is parked, view the icon on the Windows desktop in the notification area, at the far right of the taskbar, or in the Mobility Center:


- If the software is actively protecting the drive, a green check mark  is superimposed over the icon.
- If the software has been disabled, a no symbol  is superimposed over the icon.
- If the software has parked the drive due to a shock event, an orange cone  is superimposed over the icon.

# 9 Security


## Protecting the computer

Standard security features provided by the Windows operating system and the non-Windows Computer Setup utility (BIOS) can protect your personal settings and data from a variety of risks.

 **NOTE:** Security solutions are designed to act as deterrents. These deterrents may not prevent a product from being mishandled or stolen.

 **NOTE:** Before you send your computer for service, back up and delete confidential files, and remove all password settings.

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

 **NOTE:** Your computer supports Computrace, which is an online security-based tracking and recovery service available in select regions. If the computer is stolen, Computrace can track the computer if the unauthorized user accesses the Internet. You must purchase the software and subscribe to the service in order to use Computrace. For information about ordering the Computrace software, go to the HP website at <http://hp-pt.absolute.com>.

Computer risk	Security feature
Unauthorized use of the computer	HP Client Security, in combination with a password, smart card, contactless card, registered face scenes, registered fingerprints, or other authentication credential
Unauthorized access to Computer Setup (f10)	BIOS administrator password in Computer Setup*
Unauthorized access to the contents of a hard drive	DriveLock password or Automatic DriveLock password in Computer Setup*
Unauthorized startup from an optional external optical drive (select models only), optional external hard drive (select models only), or internal network adapter	Boot options feature in Computer Setup*
Unauthorized access to a Windows user account	Windows user password
Unauthorized access to data	<ul style="list-style-type: none"><li>• HP Drive Encryption software</li><li>• Windows Defender</li></ul>
Unauthorized access to Computer Setup settings and other system identification information	BIOS administrator password in Computer Setup*
Unauthorized removal of the computer	Security cable slot (used with an optional security cable)

\*Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load. You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

## Using passwords

A password is a group of characters that you choose to secure your computer information. Several types of passwords can be set, depending on how you want to control access to your information. Passwords can be set in Windows or in the non-Windows Computer Setup utility that is preinstalled on the computer.

- BIOS administrator and DriveLock are set in Computer Setup and are managed by the system BIOS.
- Automatic DriveLock passwords are enabled in Computer Setup.
- Windows passwords are set only in the Windows operating system.
- If HP SpareKey has been set up previously, and if you forget the BIOS administrator password set in Computer Setup, you can use HP SpareKey to access the utility.
- If you forget both the DriveLock user password and the DriveLock master password set in Computer Setup, the hard drive that is protected by the passwords is permanently locked and can no longer be used.

You can use the same password for a Computer Setup feature and for a Windows security feature. You can also use the same password for more than one Computer Setup feature.

Use the following tips for creating and saving passwords:

- When creating passwords, follow requirements set by the program.
- Do not use the same password for multiple applications or websites, and do not reuse your Windows password for any other application or website.
- Use HP Client Security's Password Manager to store your user names and passwords for all of your websites and applications. You can securely read them in the future if they cannot be remembered.
- Do not store passwords in a file on the computer.

The following tables list commonly used Windows and BIOS administrator passwords and describe their functions.

### Setting passwords in Windows

Password	Function
Administrator password*	Protects access to a Windows administrator-level account. <b>NOTE:</b> Setting the Windows Administrator password does not set the BIOS Administrator password.
User password*	Protects access to a Windows user account.

\*For information about setting a Windows administrator password or a Windows user password, access Help and Support by selecting **Start > Help and Support**.

## Setting passwords in Computer Setup

Password	Function
BIOS administrator password*	Protects access to Computer Setup.  <b>NOTE:</b> If features have been enabled to prevent removing the BIOS administrator password, you may not be able to remove it until those features have been disabled.
DriveLock master password*	Protects access to the internal hard drive that is protected by DriveLock. It is also used to remove DriveLock protection. This password is set under DriveLock Passwords during the enable process.  <b>NOTE:</b> A BIOS Administrator password must be set before you can set a DriveLock password.
DriveLock user password*	Protects access to the internal hard drive that is protected by DriveLock, and is set under DriveLock Passwords during the enable process.  <b>NOTE:</b> A BIOS Administrator password must be set before you can set a DriveLock password.

\*For details about each of these passwords, see the following topics.

## Managing a BIOS administrator password

To set, change, or delete this password, follow these steps:

### Setting a new BIOS administrator password

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Setup BIOS Administrator Password**, and then press **enter**.
4. When prompted, type a password.
5. When prompted, type the new password again to confirm.
6. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

– or –

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

Your changes go into effect when the computer restarts.

### Changing a BIOS administrator password

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Security > Change Password**, and then press [enter](#).
4. When prompted, type your current password.
5. When prompted, type your new password again to confirm.
6. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

### Deleting a BIOS administrator password

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Change Password**, and then press [enter](#).
4. When prompted, type your current password.
5. When prompted for the new password, leave the field empty, and then press [enter](#).
6. Read the warning. To continue, select **YES**.
7. When prompted to type your new password again, leave the field empty, and then press [enter](#).
8. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –


Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.


### Entering a BIOS administrator password

At the **BIOS administrator password** prompt, type your password (using the same kind of keys you used to set the password), and then press [enter](#). After 3 unsuccessful attempts to enter the BIOS administrator password, you must restart the computer and try again.

## Managing a Computer Setup DriveLock password

 **CAUTION:** To prevent the DriveLock-protected hard drive from becoming permanently unusable, record the DriveLock user password and the DriveLock master password in a safe place away from your computer. If you forget both DriveLock passwords, the hard drive will be permanently locked and can no longer be used.

DriveLock protection prevents unauthorized access to the contents of a hard drive. DriveLock can be applied only to the internal hard drive(s) of the computer. After DriveLock protection is applied to a drive, a password must be entered to access the drive. The drive must be inserted into the computer or an advanced port replicator in order for it to be accessed by the DriveLock passwords.

 **NOTE:** A BIOS Administrator password must be set before you can access the DriveLock features.

To apply DriveLock protection to an internal hard drive, a user password and a master password must be set in Computer Setup. Note the following considerations about using DriveLock protection:

- After DriveLock protection is applied to a hard drive, the hard drive can be accessed only by entering either the user password or the master password.
- The owner of the user password should be the day-to-day user of the protected hard drive. The owner of the master password may be either a system administrator or the day-to-day user.
- The user password and the master password can be identical.
- You can delete a user password or master password only by removing DriveLock protection from the drive. DriveLock protection can be removed from the drive only with the master password.

## Setting a DriveLock password

To set a DriveLock password in Computer Setup, follow these steps:

1. Turn on the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press **enter**.
4. Click Set DriveLock Password (global).
5. Enter the BIOS Administrator password, and then press **enter**.
6. Use a pointing device or the arrow keys to select the hard drive you want to protect, and then press **enter**.
7. Read the warning. To continue, select **YES**.
8. When prompted, type a master password, and then press **enter**.
9. When prompted, type the master password again to confirm, and then press **enter**.
10. When prompted, type a user password, and then press **enter**.
11. When prompted, type the user password again to confirm, and then press **enter**.

12. To confirm DriveLock protection on the drive you have selected, type `DriveLock` in the confirmation field, and then press [enter](#).



---

**NOTE:** The DriveLock confirmation is case sensitive.

---

13. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.



## Entering a DriveLock password

Be sure that the hard drive is inserted into the computer (not into an optional docking device or external MultiBay).

At the **DriveLock Password** prompt, type your user or master password (using the same kind of keys you used to set the password), and then press **enter**.

After 2 incorrect attempts to enter the password, you must shut down the computer and try again.

## Changing a DriveLock password

To change a DriveLock password in Computer Setup, follow these steps:

1. Turn on the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press **enter**.
4. Enter the BIOS Administrator password, and then press **enter**.
5. Use a pointing device or the arrow keys select Set DriveLock Password, and then press **enter**.
6. Use the arrow keys to select an internal hard drive, and then press **enter**.
7. Use a pointing device or the arrow keys to select **Change Password**.
8. When prompted, type your current password, and then press **enter**.
9. When prompted, type a new password, and then press **enter**.
10. When prompted, type the new password again to confirm, and then press **enter**.
11. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

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

Your changes go into effect when the computer restarts.

## Removing DriveLock protection

To remove DriveLock protection in Computer Setup, follow these steps:

1. Turn on the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > DriveLock**, and then press **enter**.
4. Enter the BIOS Administrator password, and then press **enter**.
5. Use a pointing device or the arrow keys to select **Set DriveLock Password**, and then press **enter**.

6. Use a pointing device or the arrow keys to select an internal hard drive, and then press [enter](#).
7. Use a pointing device or the arrow keys to select **Disable protection**.
8. Type your master password, and then press [enter](#).
9. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

## Using Computer Setup Automatic DriveLock

In a multiple-user environment, you can set an Automatic DriveLock password. When the Automatic DriveLock password is enabled, a random user password and a DriveLock master password will be created for you. When any user passes the password credential, the same random user and DriveLock master password will be used to unlock the drive.



---

**NOTE:** A BIOS Administrator password must be set before you can access the Automatic DriveLock features.

---

### Entering an Automatic DriveLock password

To enable an Automatic DriveLock password in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **Security > Automatic DriveLock**, and then press [enter](#).
4. Enter the BIOS Administrator password, and then press [enter](#).
5. Use a pointing device or the arrow keys to select an internal hard drive, and then press [enter](#).
6. Read the warning. To continue, select **YES**.
7. To save your changes and exit Computer Setup, click the **Save** icon and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

### Removing Automatic DriveLock protection

To remove DriveLock protection in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Security > Automatic DriveLock**, and then press [enter](#).
4. Enter the BIOS Administrator password, and then press [enter](#).
5. Use a pointing device or the arrow keys to select an internal hard drive, and then press [enter](#).
6. Use a pointing device or the arrow keys to select **Disable protection**.
7. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

## Using antivirus software

When you use the computer to access e-mail, a network, or the Internet, you potentially expose it to computer viruses. Computer viruses can disable the operating system, programs, or utilities, or cause them to function abnormally.

Antivirus software can detect most viruses, destroy them, and, in most cases, repair any damage they have caused. To provide ongoing protection against newly discovered viruses, antivirus software must be kept up to date.

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

## Using firewall software

Firewalls are designed to prevent unauthorized access to a system or network. A firewall can be a software program you install on your computer and/or network, or it can be a solution made up 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.

Your computer or networking equipment may already have a firewall installed. If not, firewall software solutions are available.



**NOTE:** Under some circumstances a firewall can block access to Internet games, interfere with printer or file sharing on a network, or block authorized e-mail attachments. To temporarily resolve the problem, disable the firewall, perform the task that you want to perform, and then reenable the firewall. To permanently resolve the problem, reconfigure the firewall.

## Installing critical security updates

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

Updates to the operating system and other software may have become available after the computer left the factory. To be sure that all available updates are installed on the computer, observe these guidelines:

1. Run Windows Update as soon as possible after you set up your computer.
2. Run Windows Update monthly thereafter.
3. Obtain updates to Windows and other Microsoft programs, as they are released, from the Microsoft website and through the updates link in Help and Support.

## Using HP Client Security

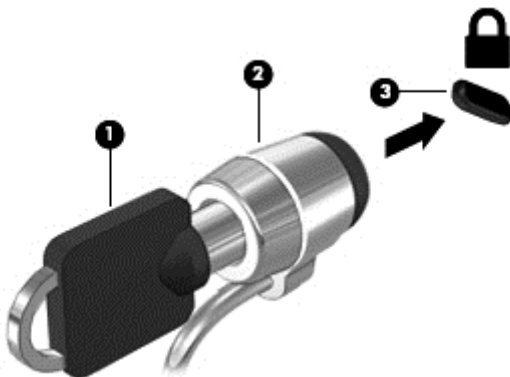
HP Client Security software is preinstalled on select computer models. This software can be accessed through Windows Control Panel. It provides security features that help protect against unauthorized access to the computer, networks, and critical data. For more information, see the HP Client Security software Help.

## Installing an optional security cable

**NOTE:** A security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

**NOTE:** The security cable slot on your computer may look slightly different from the illustration in this section. Refer to the [Getting to know your computer on page 4](#) section for the location of the security cable slot on your computer.

1. Loop the security cable around a secured object.
2. Insert the key (1) into the cable lock (2).
3. Insert the cable lock into the security cable slot on the computer (3), and then lock the cable lock with the key.



## Using the fingerprint reader (select models only)

Integrated fingerprint readers are available on select computer models. In order to use the fingerprint reader, you must enroll your fingerprints in the HP Client Security's Credential Manager. Refer to the HP Client Security software Help.

After you enroll your fingerprints in Credential Manager, you can use HP Client Security's Password Manager to store and fill in your user names and passwords in supported websites and applications.

### Locating the fingerprint reader


The fingerprint reader is a small metallic sensor that is located in one of the following areas of your computer:

- On the right side of the keyboard

Depending on your computer model, the reader may be oriented horizontally or vertically. Both orientations require that you swipe your finger perpendicular to the metallic sensor. Refer to the [Getting to know your computer on page 4](#) section for the location of the reader on your computer.

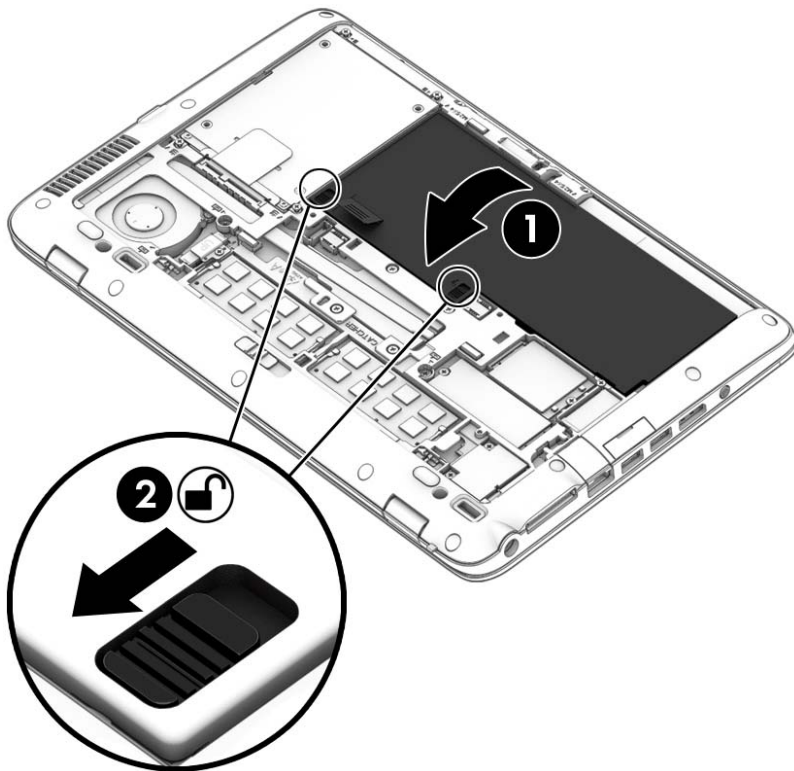
# 10 Maintenance

## Inserting or removing the battery

 **NOTE:** For additional information on using the battery, see the *HP Notebook Reference Guide*.

To insert the battery:

1. Insert the battery into the battery bay, aligning the tabs on the battery **(1)** with the notches on the computer, and then press the battery down until it is seated.
2. Slide the battery release latch **(2)** to lock the battery into place.

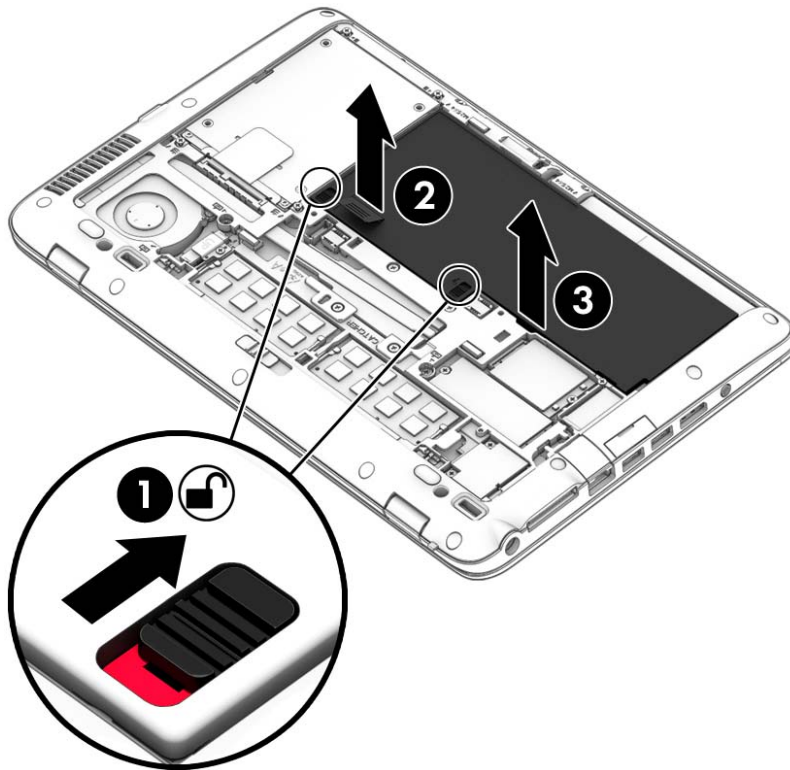


3. Align the notches on the battery **(1)** with the tabs on the computer, and then press down to close the battery **(2)**. The battery automatically locks into place.

To remove the battery:

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

1. Remove the service door. See [Removing or replacing the service door on page 62](#).
2. Slide the two battery release latches to the unlocked position (1). You will be able to see red beneath the latches. Using the cloth tab, tilt the battery up (2) and then lift it (3) out of the enclosure.



## Removing or replacing the service door

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

Save your work and shut down the computer before adding or replacing a memory module or hard drive.

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.

### Removing the service door

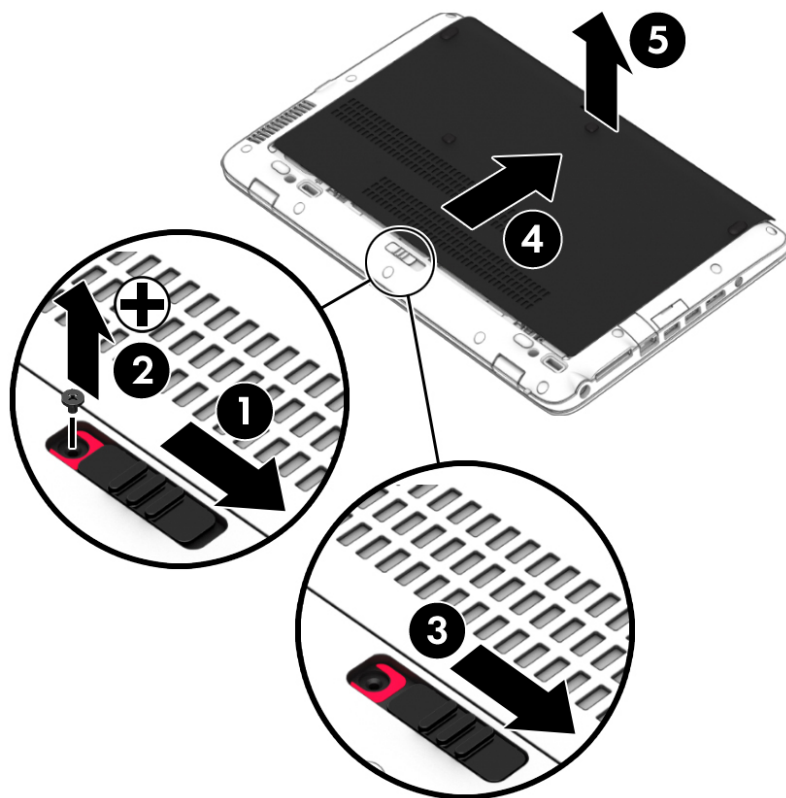
Remove the service door to access the battery, memory module slot, hard drive, regulatory label, and other components.

To remove the service door:

1. With the computer turned over, slide the service door release latch to the unlock position **(1)**, and **(2)** remove the screw (if the optional screw is being used), or, if the screw is not in used, simply slide the release latch to the right **(3)**.

**NOTE:** If you want to use the optional security screw, it is stored inside the service door.

2. Slide the service door towards the front of the computer **(4)** and lift to remove the service door **(5)**.






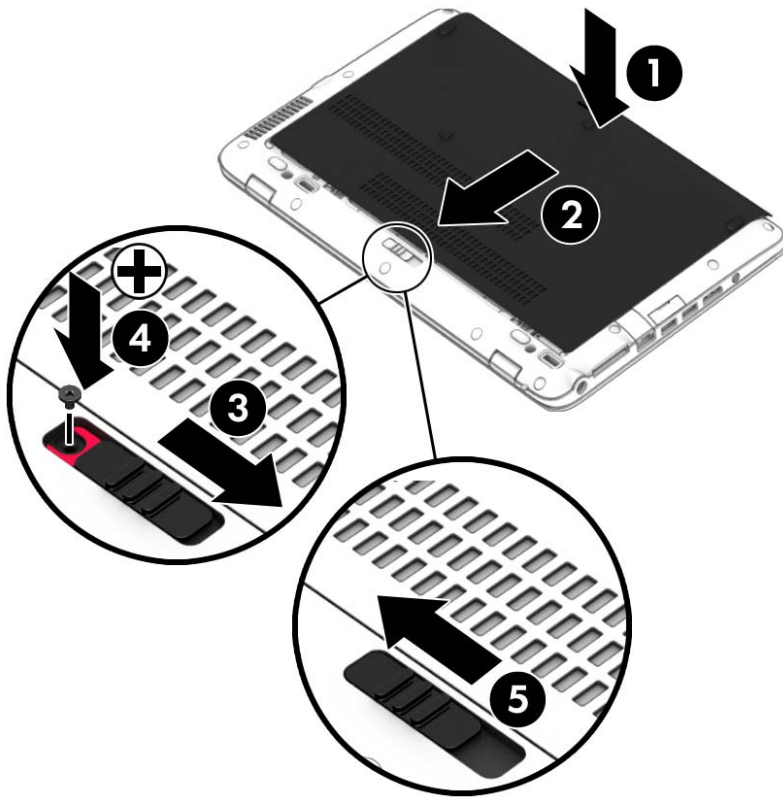
## Replacing the service door

Replace the service door after accessing the battery, memory module slot, hard drive, regulatory label, and other components.

To replace the service door:

1. Tilt down the service door to align the front edge of the service door near the front edge of the computer (1).
2. Slide the service cover forwards (2) until it snaps into place.
3. With the battery bay toward you, slide the service door release latch to the right (3), and if you choose to, insert and tighten the optional screw (4) to hold the service door in place. Slide the release latch to the left to lock the service door (5).

 **NOTE:** If you want to use the optional screw, it is stored inside the service door.



## Replacing or upgrading the hard drive

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

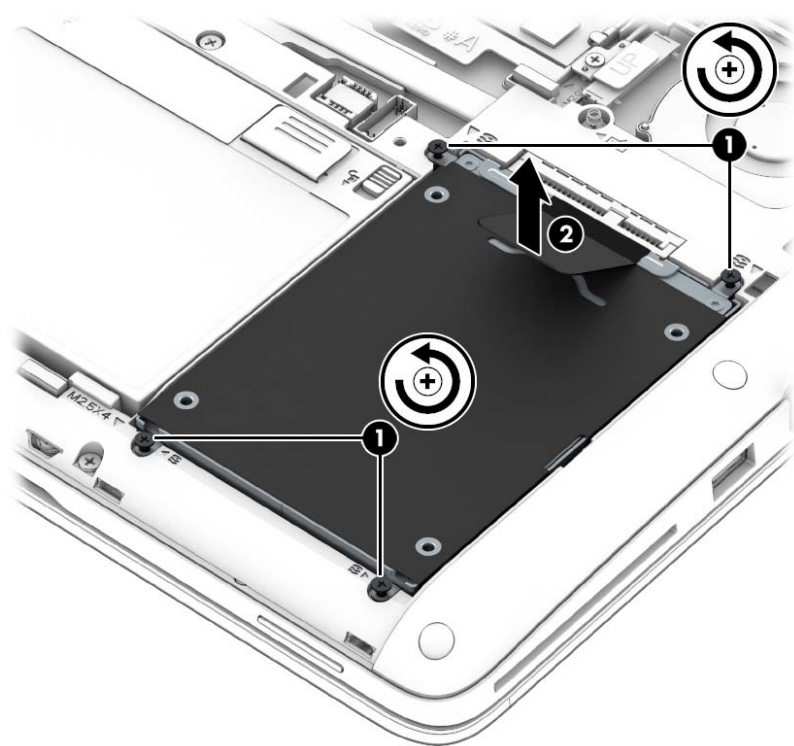
Shut down the computer before removing the hard drive from the hard drive bay. Do not remove the hard drive while the computer is on, in the Sleep state, or in Hibernation.

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.

### Removing the hard drive

To remove a hard drive:

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Turn the computer upside down on a flat surface.
4. Remove the service door (see [Removing or replacing the service door on page 62](#)) and the battery (see [Inserting or removing the battery on page 60](#)).
5. Loosen the 4 hard drive door screws (1). Pull the cloth hard drive tab (2) upwards, and then remove the drive.

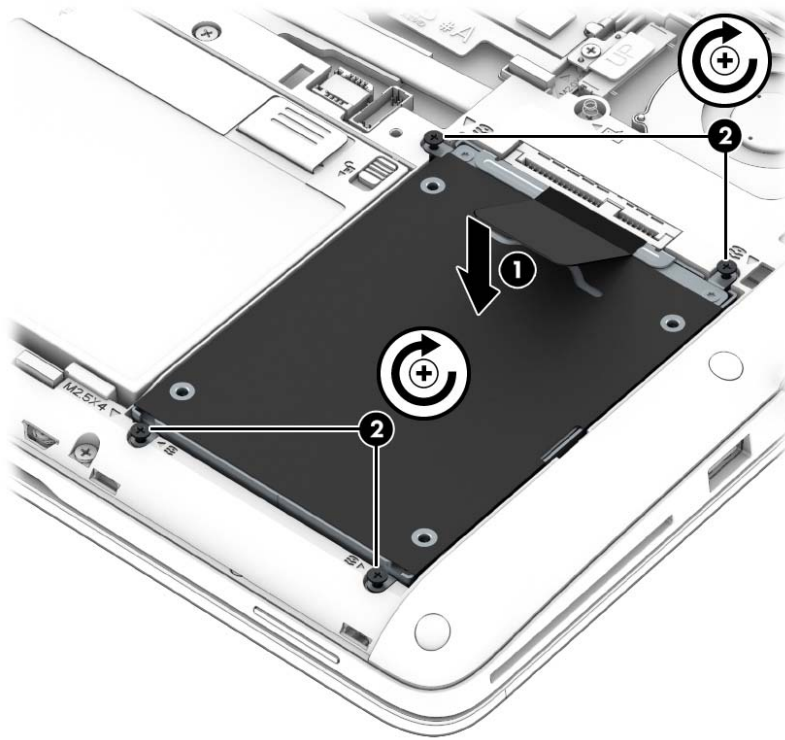


### Installing a hard drive

To install the hard drive:

1. Place the hard drive into the hard drive bay, (1), ensuring that the cloth tab remains on top.

2. Replace the 4 screws (2) to secure the hard drive.




3. Replace the battery (see [Inserting or removing the battery on page 60](#)) and the service door (see [Removing or replacing the service door on page 62](#)).
4. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.
5. Turn on the computer.


# Adding or replacing memory


## Adding or replacing memory modules

The computer has two memory module slots. The capacity of the computer can be upgraded by adding a memory module to the vacant expansion memory module slot or by upgrading the existing memory module in the primary memory module slot.

---

 **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 when adding 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 Sleep 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.

---

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Turn the computer upside down on a flat surface.
4. Remove the battery (see [Inserting or removing the battery on page 32](#)) and the service door (see [Removing or replacing the service door on page 43](#)).
5. 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.

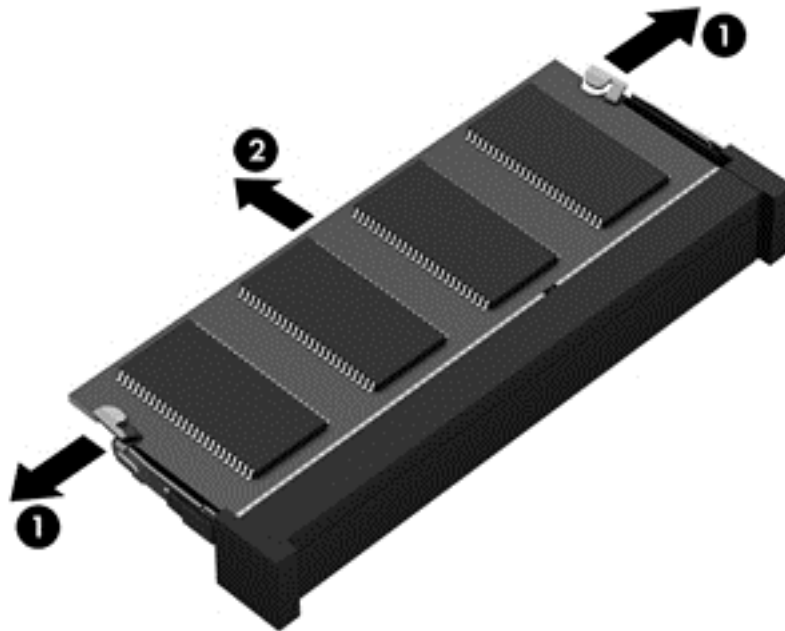
The memory module tilts up.

- b. Grasp the edge of the memory module (2), and then gently pull the memory 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.

6. Insert a new memory module:

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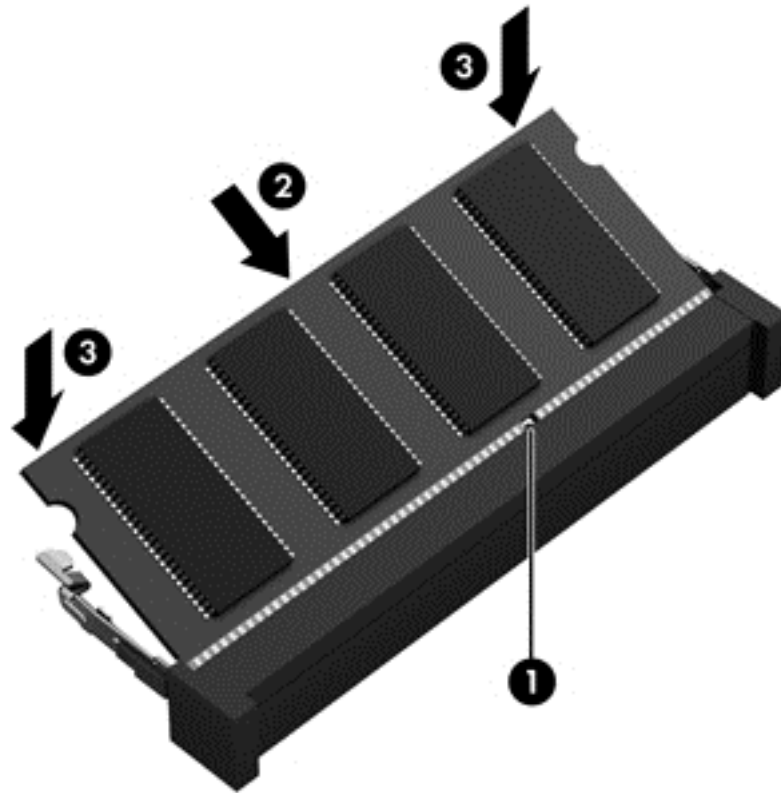
**⚠ CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

---

- 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 (2) into the memory module slot until it is seated.

- c. Gently press the memory module **(3)** down, applying pressure to both the left and right edges of the memory module, until the retention clips snap into place.

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



7. Replace the battery (see [Inserting or removing the battery on page 32](#)) and the service door (see [Removing or replacing the service door on page 43](#)).
8. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.
9. Turn on the computer.

## Updating programs and drivers

HP recommends that you update your programs and drivers on a regular basis with the latest versions. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to [http://welcome.hp.com/country/us/en/wwcontact\\_us.html](http://welcome.hp.com/country/us/en/wwcontact_us.html).

# Cleaning your computer

## Cleaning products

Use the following products to safely clean and disinfect your computer:

- Dimethyl benzyl ammonium chloride 0.3 percent maximum concentration (For example: germicidal disposable wipes. These wipes come in a variety of brand names.)
- Alcohol-free glass cleaning fluid
- Water with mild soap solution
- Dry microfiber cleaning cloth or a chamois (static-free cloth without oil)
- Static-free cloth wipes

---

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

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

---

## Cleaning procedures

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

---

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

Turn off the computer.

Disconnect external power.

Disconnect all powered external devices.

---

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

---

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

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

## Cleaning the sides and cover

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

---

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

---

## Cleaning the TouchPad and keyboard

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

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

---

- To clean and disinfect the TouchPad and keyboard, use a soft microfiber cloth or chamois moistened with one of the cleaning solutions listed previously 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.



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# 11 Backup and recovery

To protect your information, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive (select models only), create system repair discs (select models only) with the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.


Windows Backup and Restore provides the following options:

- Creating a system repair disc (select models only) by using the installed optical drive (select models only) or an optional external optical drive
- Backing up your information
- Creating a system image (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools

---


 **NOTE:** For detailed instructions, perform a search for these topics in Help and Support.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

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

---

## Creating recovery media with HP Recovery Disc Creator

 **NOTE:** Your computer may not come equipped with an internal optical drive. In order to create the recovery DVD, you may need to plug in an external optical drive.


---

HP Recovery Disc Creator is a software program that offers an alternative way to create recovery media. After you successfully set up the computer, you can create recovery media using HP Recovery Disc Creator. This recovery media performs a system recovery if the hard drive becomes corrupted. A system recovery reinstalls the original operating system and the software programs installed at the factory, and then configures the settings for the programs.

HP Recovery Disc Creator can create two kinds of recovery DVDs as follows:

- **Windows DVD**—Installs the operating system without additional drivers or applications. Choosing this selection creates a DVD that restores the original operating system and the software programs installed at the factory.
- **Driver DVD**—Installs specific drivers and applications only, in the same way that the HP Software Setup utility installs drivers and applications.

## Creating recovery media

 **NOTE:** Operating system recovery media can be created only once. Thereafter, the option to create that media will not be available.

---

1. Select **Start > All Programs > Security and Protection > HP Recovery Disc Creator**.
2. Select **Driver DVD** or **Windows DVD**.
3. From the drop-down menu, select the drive for burning the recovery media.
4. Click the **Burn** button to start the burning process.

## Backing up your information


Recovery after a system failure is as good as your most recent backup. Immediately after software setup, you should create system repair discs (select models only) using HP Recovery Disc Creator using the installed optical drive (select models only) or an optional external optical drive and back up your system. 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. The system repair discs (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.


You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to reset your preferences.


- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive you are using.


 **NOTE:** Your computer may not come equipped with an internal optical drive. In order to create back up discs, you may need to plug in an external optical drive.

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

- When backing up to discs, number each disc before inserting it into the external drive.

To create a backup using Backup and Restore:

 **NOTE:** Be sure that the computer is connected to AC power before you start the backup process.


 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.


1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create a system repair disc (select models only).

## Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. For additional information, see [Using a Windows 7 operating system DVD \(purchased separately\) on page 75](#).

 **NOTE:** Your computer may not come equipped with an internal optical drive. In order to use the operating system DVD, you may need to plug in an external optical drive.


## Using the Windows recovery tools

To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.

To recover your information using Startup Repair, follow these steps:

---


 **CAUTION:** Using Startup Repair 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. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

---

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition and the HP Recovery partition.


To check for the Windows partition, select **Start > Computer**.

To check for the HP Recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

 **NOTE:** If the HP Recovery partition has been deleted, the **f11** restore option will not function. You must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately) if the Windows partition and the HP Recovery partition are not listed. For additional information, see [Using a Windows 7 operating system DVD \(purchased separately\) on page 75](#).

---


3. If the Windows partition and the HP Recovery partition are listed, restart the computer, and then press **f8** before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.

 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

---

## Using f11 recovery tools


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 **CAUTION:** Using **f11** recovery tools 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 **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

---

To recover the original hard drive image using **f11**:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

 **NOTE:** If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, see [Using a Windows 7 operating system DVD \(purchased separately\) on page 75](#).

 **NOTE:** Your computer may not come equipped with an internal optical drive. In order to use the operating system DVD, you may need to plug in an external optical drive.


---

3. If the HP Recovery partition is listed, restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

## Using a Windows 7 operating system DVD (purchased separately)

To order a Windows 7 operating system DVD, go to the HP website. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to [http://welcome.hp.com/country/us/en/wwcontact\\_us.html](http://welcome.hp.com/country/us/en/wwcontact_us.html). You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.


---


 **CAUTION:** Using a Windows 7 operating system DVD 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. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

---

To initiate recovery using a Windows 7 operating system DVD:

---

 **NOTE:** This process takes several minutes.

 **NOTE:** Your computer may not come equipped with an internal optical drive. In order to use the operating system DVD, you may need to plug in an external optical drive.

---

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

After the repair is completed:

1. Eject the Windows 7 operating system DVD, and then insert the *Driver Recovery* disc.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.


---

# 12 Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI)

## Using Computer Setup

Computer Setup, 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). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.


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

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## Starting Computer Setup

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 **NOTE:** An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

---

To start Computer Setup, follow these steps:


1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.

## Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

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

---

 **NOTE:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

---

2. Press **f10** to enter Computer Setup.
  - To select a menu or a menu item, use the **tab** key and the keyboard arrow keys and then press **enter**, or use a pointing device to click the item.
  - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
  - To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

Click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

- To save your changes and exit Computer Setup menus:

Click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Save Changes and Exit**, and then press **enter**.

Your changes go into effect when the computer restarts.

## Restoring factory settings in Computer Setup



---

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

---

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

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

Your changes go into effect when the computer restarts.



---

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

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## Updating the BIOS

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

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

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

### Determining the BIOS version

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


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

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Use the **tab** key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

### Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.


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

1. Access Help and Support by selecting **Start > Help and Support**.
2. Select **Updates and tune-ups**, and then select **Check for HP updates now**.
3. At the download area, follow these steps:
  - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
  - b. Follow the on-screen instructions to download your selection to the hard drive.

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



---

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

---


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

1. Select **Start > Computer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*).

The BIOS installation begins.

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

---

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

---

# Using MultiBoot

## About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.



**NOTE:** Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then press **f9**. Pressing **f9** displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

## Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.
- To dynamically choose the boot device, by pressing **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen, and then pressing **f9** to enter the Boot Device Options menu.
- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

## Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.
3. Use a pointing device or the arrow keys to select the **Legacy Boot Order** list, and then press **enter**.
4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the **+ key**.

– or –

To move the device down in the boot order, use a pointing device to click the down arrow, or press the **-** key.

5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

## Dynamically choosing a boot device using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f9](#).
3. Use a pointing device or the arrow keys to select a boot device, then press [enter](#).

## Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **System Configuration > Boot Options**, and then press [enter](#).
4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)
5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

## Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press [enter](#).
- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press [enter](#).
- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

## Using HP PC Hardware Diagnostics (UEFI) (select models only)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The tool runs outside of the operating system to isolate hardware failures from issues that may be caused by the operating system or other software components.

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press [esc](#), and then press [f2](#).

After pressing [f2](#), the BIOS searches three places for the HP PC Hardware Diagnostics (UEFI) tools in the following order:

- a. Connected USB drive



**NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see [Downloading HP PC Hardware Diagnostics \(UEFI\) to a USB device on page 83](#).

- b. Hard drive
- c. BIOS

2. Click the type of diagnostic test you want to run, and then follow the on-screen instructions.



**NOTE:** If you need to stop a diagnostic test while it is running, press [esc](#).

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



**NOTE:** The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.

---

1. Go to <http://www.hp.com>.
2. Click **Support & Drivers**, and then click the **Drivers & Software** tab.
3. Enter the product name in the text box, and then click **Search**.
4. Select your computer model, and then select your operating system.
5. In the Diagnostic section, click **HP UEFI Support Environment**.

– or –

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

---

# 13 Support

## Contacting support

If the information provided in this user guide, in the *HP Notebook Reference Guide*, or in Help and Support does not address your questions, you can contact support. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to [http://welcome.hp.com/country/us/en/wwcontact\\_us.html](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.

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


# Labels

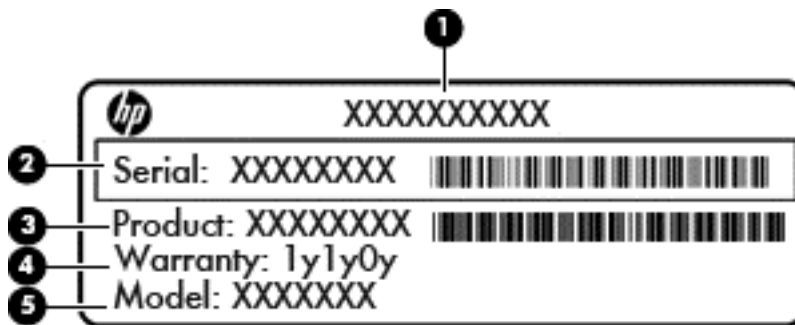
The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer:

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

For help finding these locations, refer to [Getting to know your computer on page 4](#).

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

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



## Component

- |     |  |
|-----|--|
| (1) | Product name                           |
| (2) | Serial number (s/n)                    |
| (3) | Part number/Product number (p/n)       |
| (4) | Warranty period                        |
| (5) | Model description (select models only) |



## Component

- |     |                 |
|-----|-----------------|
| (1) | Warranty period |
| (2) | Model number    |

---

(3) Serial number

---

(4) Product number

---

- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings of some of the countries or regions in which the devices have been approved for use.
- SIM (subscriber identity module) label (select models only)—Provides the ICCID (Integrated Circuit Card Identifier) of the SIM. This label is located inside the battery bay.
- HP Mobile Broadband Module service label (select models only)—Provides the serial number of the HP Mobile Broadband Module. This label is located inside the battery bay.



---

# 14 Specifications


## Input power


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

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

The computer can operate on DC power within the following specifications.

Input Power	Rating
Operating voltage and current	19.5V dc @ 2.31 A - 45 W
	19.5 V dc @ 3.33 A - 65 W

 **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

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

---


# A Traveling with the 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 memory cards, such as digital storage cards from the computer.
  - ⚠ **CAUTION:** To reduce the risk of damage to the computer, damage to a drive, or loss of information, remove the media from a drive before shipping, storing, or traveling with a drive.
  - 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 bags.
- ⚠ **CAUTION:** Avoid exposing a drive to magnetic fields. Security devices with magnetic fields include airport walk-through devices and security wands. Airport conveyer belts and similar security devices that check carry-on baggage use X-rays instead of magnetism and do not damage drives.
- 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 the computer contains a user-replaceable battery.

- If you are shipping the computer or a drive, use suitable protective packaging and label the package “FRAGILE.”
- 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.

---

---

## B Troubleshooting resources

- Access website links and additional information about the computer through Help and Support. Select **Start > Help and Support**.



---

**NOTE:** Some checkup and repair tools require an Internet connection. HP also provides additional tools that do not require an Internet connection.

---

- Contact support. For U.S. support, go to <http://www.hp.com/go/contactHP>. For worldwide support, go to [http://welcome.hp.com/country/us/en/wwcontact\\_us.html](http://welcome.hp.com/country/us/en/wwcontact_us.html).

Choose from the following types of support:

- Chat online with an HP technician.



---

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

---

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

---

## C 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 support.

---

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