



User Guide

© Copyright 2014 Hewlett-Packard Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by Hewlett-Packard Company under license. Intel is a trademark of Intel Corporation in the U.S. and other countries. Microsoft and Windows are U.S. registered trademarks of the Microsoft group of companies.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

First Edition: December 2014

Document Part Number: 781554-001

Product notice

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

This computer may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See <http://windows.microsoft.com/en-us/windows7/get-know-windows-7> for details.

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

Software terms

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

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

Safety warning notice

 **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).

Table of contents

1 Welcome	1
Finding information	2
2 Getting to know your computer	4
Right	4
Left	5
Display	6
Top	8
TouchPad	8
Lights	9
Buttons, speakers, and fingerprint reader (select models only)	10
Keys	12
Bottom	13
Front	14
3 Connecting to a network	15
Connecting to a wireless network	15
Using the wireless controls	15
Turning wireless devices on or off	15
Using the wireless button	15
Using operating system controls	16
Using a WLAN	16
Using an Internet service provider	16
Setting up a WLAN	16
Configuring a wireless router	17
Protecting your WLAN	17
Connecting to a WLAN	17
Using Bluetooth wireless devices (select models only)	18
Connecting to a wired network	18
Connecting to a local area network (LAN)	18
4 Navigating using the keyboard, touch gestures and pointing devices	20
Using pointing devices	20
Setting pointing device preferences	20
Using the TouchPad and gestures	20
Turning the TouchPad off and on	21

Tapping	21
Scrolling	22
2-finger pinch zoom	22
2-finger click	23
Using the keyboard	23
Identifying the hot keys	23
Using the action keys	24
Using keypads	25
Using an optional external numeric keypad	25

5 Multimedia 26

Using the media activity controls	26
Audio	26
Connecting speakers	26
Adjusting the volume	26
Connecting headphones and microphones	27
Checking audio functions on the computer	27
Webcam (select models only)	27
Video	27
VGA	29
HDMI	29
Configuring audio for HDMI	30

6 Power management 30

Shutting down the computer	31
Setting power options	31
Using power-saving states	31
Intel Rapid Start Technology (select models only)	32
Initiating and exiting Sleep	32
Initiating and exiting Hibernation	32
Using the power meter and power settings	33
Setting password protection on wakeup	33
Using battery power	33
Finding additional battery information	33
Using Battery Check	34
Displaying the remaining battery charge	34
Maximizing battery discharge time	34
Managing low battery levels	34
Identifying low battery levels	34
Resolving a low battery level	35
Inserting or removing the battery	35

Inserting a battery	35
Removing a battery	35
Conserving battery power	36
Storing a user-replaceable battery	36
Disposing of a user-replaceable battery	36
Replacing a user-replaceable battery	37
Using external AC power	37
Testing an AC adapter	37
Refreshing your software content with Intel Smart Connect Technology (select models only)	38
7 External cards and devices	39
Using memory card readers	39
Inserting a memory card	39
Removing a memory card	39
Using a USB device	40
Connecting a USB device	41
Removing a USB device	41
Using optional external devices	41
Using optional external drives	42
8 Drives	43
Handling drives	43
Using hard drives	43
Intel Smart Response Technology (select models only)	43
Removing or replacing the service door	44
Removing the service door	44
Replacing the service door	44
Replacing or upgrading the hard drive	45
Removing the hard drive	45
Installing a hard drive	47
Replacing a drive in the upgrade bay	47
Replacing an optical drive	47
Improving hard drive performance	51
Using Disk Defragmenter	51
Using Disk Cleanup	52
Using HP 3D DriveGuard (select models only)	52
Identifying HP 3D DriveGuard status	52

9 Security	53
Protecting the computer	53
Using passwords	53
Setting passwords in Windows	54
Setting passwords in Computer Setup	55
Managing an administrator password in Computer Setup	55
Entering an administrator password in Computer Setup	56
Using antivirus software	56
Using firewall software	57
Installing critical security updates	57
Installing an optional security cable	57
Using the fingerprint reader (select models only)	58
Locating the fingerprint reader	58
Using HP SimplePass (select models only)	58
Registering fingerprints	59
Using your registered fingerprint to log on to Windows	59
10 Maintenance	60
Adding or replacing memory modules	60
Cleaning your computer	64
Cleaning procedures	65
Cleaning the display (All-in-Ones or Notebooks)	65
Cleaning the sides or cover	65
Cleaning the TouchPad, keyboard, or mouse	65
Updating programs and drivers	65
11 Backing up, restoring, and recovering	66
Creating backups	66
Creating recovery media to recover the original system	66
What you need to know	66
Creating the recovery media	67
Creating system restore points	67
What you need to know	67
Creating a system restore point	67
Backing up system and personal information	67
Tips for a successful backup	68
What you need to know	68
Creating a backup using Windows Backup and Restore	68
Restore and recovery	69
Restoring to a previous system restore point	69

Restoring specific files	69
Restoring specific files using Windows Backup and Restore	69
Recovering the original system using HP Recovery Manager	69
What you need to know	69
Recovering using HP Recovery partition (select models only)	70
Recovering using the recovery media	70
Changing the computer boot order	70
12 Using Setup Utility (BIOS) and HP PC Hardware Diagnostics (UEFI)	72
Starting Setup Utility (BIOS)	72
Updating the BIOS	72
Determining the BIOS version	72
Downloading a BIOS update	72
Using HP PC Hardware Diagnostics (UEFI)	73
Downloading HP PC Hardware Diagnostics (UEFI) to a USB device	74
13 Support	75
Contacting support	75
Labels	76
14 Specifications	77
Input power	77
Operating environment	77
15 Accessibility	78
Supported assistive technologies	78
Contacting support	78
Appendix A Traveling with or shipping your computer	79
Appendix B Troubleshooting	80
Troubleshooting resources	80
Resolving issues	80
The computer is unable to start up	80
The computer screen is blank	80
Software is functioning abnormally	81
The computer is on but not responding	81
The computer is unusually warm	81
An external device is not working	81
The wireless network connection is not working	82

A disc does not play	82
A movie is not visible on an external display	82
The process of burning a disc does not begin, or it stops before completion	83

Appendix C Electrostatic discharge	84
--	----

Index	85
-------------	----

1 Welcome

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

- **Connect to the Internet**—Set up your wired or wireless network so that you can connect to the Internet. For more information, see [Connecting to a network on page 15](#).
- **Update your antivirus software**—Protect your computer from damage caused by viruses. The software is preinstalled on the computer. For more information, see [Using antivirus software on page 56](#).
- **Get to know your computer**—Learn about your computer features. Refer to [Getting to know your computer on page 4](#) and [Navigating using the keyboard, touch gestures and pointing devices on page 20](#) 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 or a recovery flash drive. See [Backing up, restoring, and recovering on page 66](#).

Finding information

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

Resources	For information about
<i>Setup Instructions</i> poster	- How to set up the computer - Help to identify computer components
Help and Support To access Help and Support, select Start > Help and Support . To access the latest user guide, go to http://www.hp.com/support , and select your country. Select Drivers & Downloads , and then follow the on-screen instructions.	- Operating system information - Software, driver, and BIOS updates - Troubleshooting tools - How to access support
Worldwide support To get support in your language, go to http://welcome.hp.com/country/us/en/wwcontact_us.html .	- Online chat with an HP technician - Support telephone numbers - HP service center locations
HP website To access the latest user guide, go to http://www.hp.com/support , and select your country. Select Drivers & Downloads , and then follow the on-screen instructions.	- Support information - Ordering parts and finding additional help - Accessories available for the device
<i>Safety & Comfort Guide</i> To access the user guides, select Start > Help and Support > User guides . – or – Go to http://www.hp.com/ergo .	- Proper workstation setup, posture, health, and work habits - Electrical and mechanical safety information
<i>Regulatory, Safety, and Environmental Notices</i> To access the user guides, select Start > Help and Support > User guides .	- Regulatory and safety information - Battery disposal information
<i>Limited Warranty*</i> To access this guide, select Start > Help and Support > User guides > View Warranty Information . – or – Go to http://www.hp.com/go/orderdocuments .	Warranty information

*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 <http://www.hp.com/go/orderdocuments> or write to:

- North America:** Hewlett-Packard, MS POD, 11311 Chinden Blvd., Boise, ID 83714, USA
- Europe, Middle East, Africa:** Hewlett-Packard, POD, Via G. Di Vittorio, 9, 20063, Cernusco s/Naviglio (MI), Italy
- Asia Pacific:** Hewlett-Packard, POD, P.O. Box 200, Alexandra Post Office, Singapore 911507

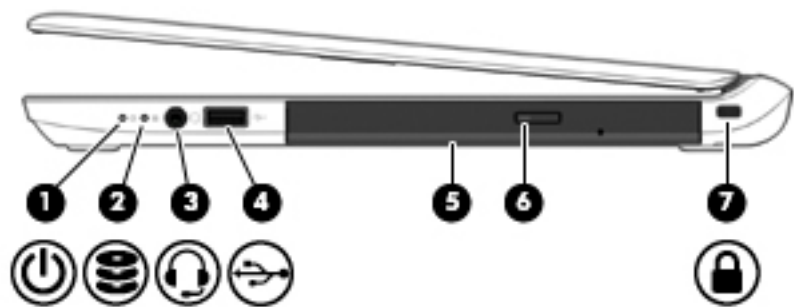
When you request a printed copy of your warranty, please include your product number, warranty period (found on your service label), name, and postal address.

Resources**For information about**

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

2 Getting to know your computer

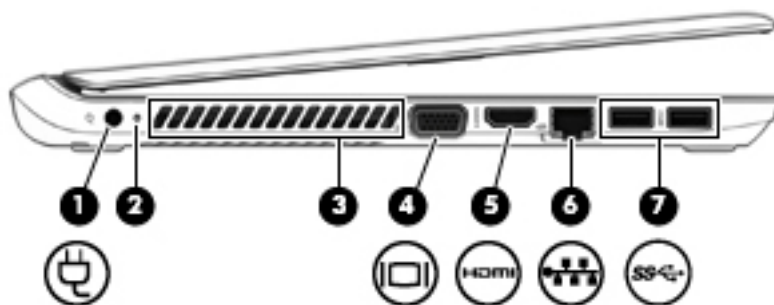
Right



Component	Description
(1)  Power light	- On: The computer is on. - Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. - Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. NOTE: For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity. For more information, see Using power-saving states on page 31.
(2)  Hard drive light	- Blinking white: The hard drive is being accessed. - Amber: HP 3D DriveGuard has temporarily parked the hard drive. (select models only) NOTE: For more information about HP 3D DriveGuard, see Using HP 3D DriveGuard (select models only) on page 52.
(3)  Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices. WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>. To access the user guides, select Start > Help and Support > User Guides. NOTE: When a device is connected to the jack, the computer speakers are disabled.

Component		Description
		NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4)	 USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. NOTE: For details about different types of USB ports, see Using a USB device on page 40 .
(5)	Optical drive (select models only)	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.
(6)	Optical drive eject button (select models only)	Releases the optical drive disc tray.
(7)	 Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left



Component		Description
(1)	 Power connector	Connects an AC adapter.
(2)	AC adapter/Battery light	- White: The AC adapter is connected to external power and the battery is fully charged. - Amber: The AC adapter is connected to external power and the battery is charging. - Off: The AC adapter is not connected to external power.
(3)	Vent	Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	 External monitor port	Connects an external VGA monitor or projector.

Component		Description
(5)	 HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(6)	 RJ-45 (network) jack/lights	Connects a network cable. - Green (left): The network is connected. - Amber (right): The network is showing activity.
(7)	 USB 3.0 ports (2)	Each USB 3.0 port connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. NOTE: For details about different types of USB ports, see Using a USB device on page 40.

Display



Component		Description
(1)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	Internal microphones	Record sound.
(3)	Webcam light (select models only)	On: The webcam is in use.
(4)	Webcam (select models only)	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.

Component	Description
	For information on using the webcam, select Start > All Programs > Communication and Chat > HP WebCam .
*The antennas are not visible on 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 <i>Regulatory, Safety, and Environmental Notices</i> that applies to your country or region. To access the user guides, select Start > Help and Support > User Guides.	

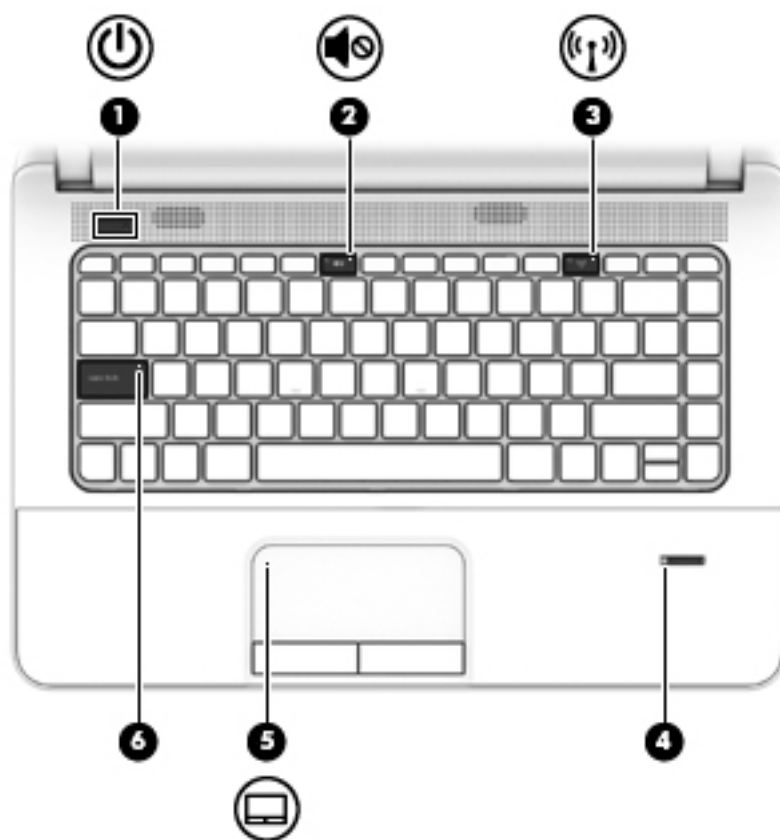
Top

TouchPad



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

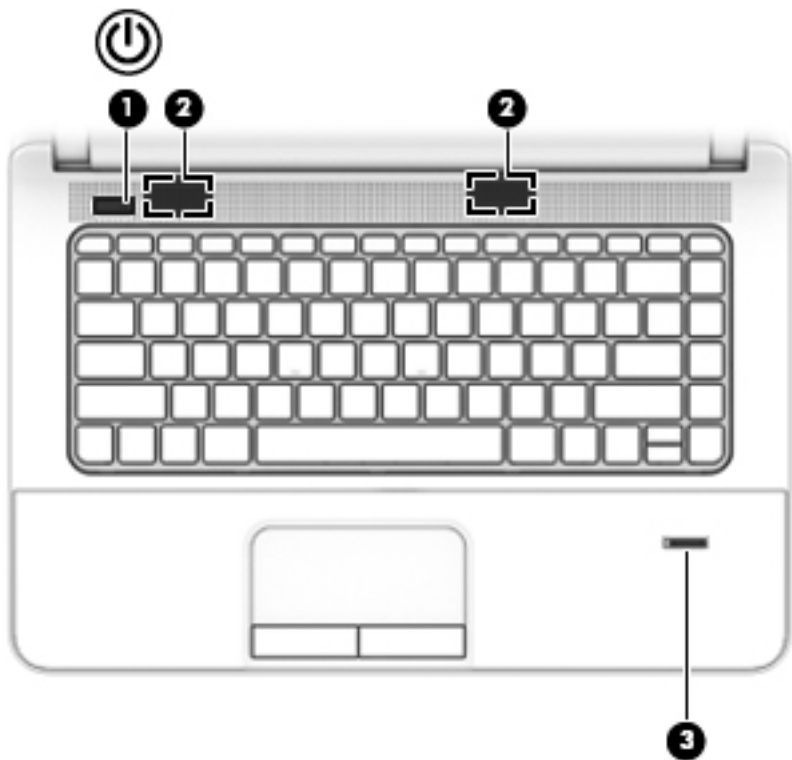
Lights



Component		Description
(1)	 Power light	- On: The computer is on. - Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. - Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. NOTE: For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity. For more information, see Using power-saving states on page 31.
(2)	 Mute light	- Amber: Computer sound is off. - Off: Computer sound is on.
(3)	 Wireless light	On: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. NOTE: On some models, the wireless light is amber when all wireless devices are off.
(4)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows®, instead of a password logon.

Component		Description
(5)	TouchPad light	- On: The TouchPad is off. - Off: The TouchPad is on.
(6)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.

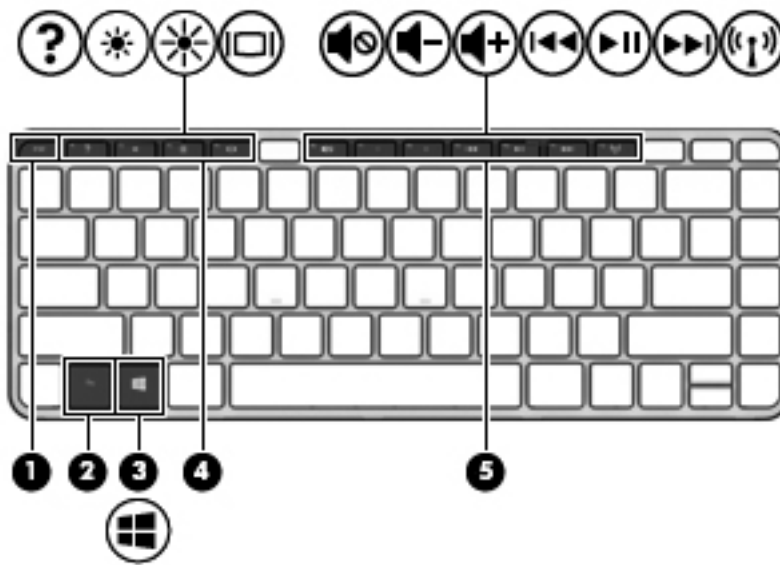
Buttons, speakers, and fingerprint reader (select models only)



Component		Description
(1)	 Power button	- When the computer is off, press the button to turn on the computer. - When the computer is on, press the button briefly to initiate Sleep. - When the computer is in the Sleep state, press the button briefly to exit Sleep. - When the computer is in Hibernation, press the button briefly to exit Hibernation. CAUTION: Pressing and holding down the power button will result in the loss of unsaved information. If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.

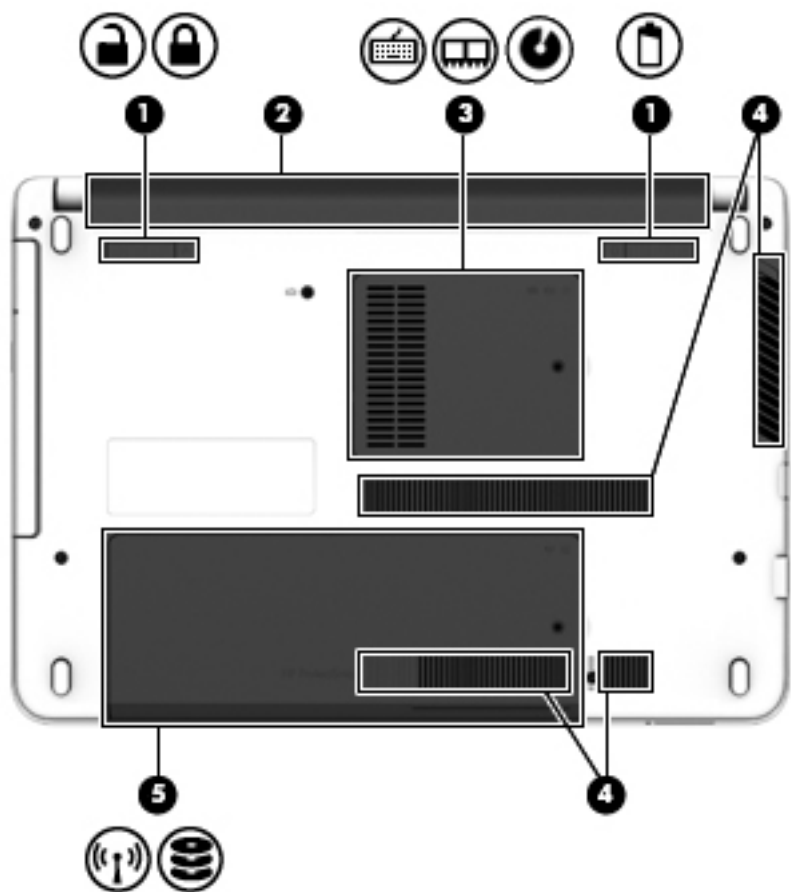
Component		Description
		NOTE: For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity. For more information, see Using power-saving states on page 31. To learn more about your power settings: Select Start > Control Panel > System and Security > Power Options.
(2)	Speakers (2)	Produce sound.
(3)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Displays system information when pressed in combination with the esc key.
(3)	 Windows button	Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	Action keys	Execute frequently used system functions.

Bottom



Component		Description
(1)	  	Battery cover release latch and lock Releases the battery cover over the battery bay.
(2)		Battery bay Holds the battery.
(3)	  	Memory service cover Provides access to the keyboard screw, memory module slots, and optical drive.
(4)		Vents (4) Enable airflow to cool internal components.

Component		Description
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	 	Service door Provides access to the hard drive bay, the wireless LAN (WLAN) module slot, and the memory module slots. CAUTION: 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. To access Help and Support, select Start > Help and Support.

Front



Component		Description
(1)	Memory card reader	Reads optional memory cards that store, manage, share, or access information.

3 Connecting to a network

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

Connecting to a wireless network

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

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

For more information about wireless technology, see the information and website links provided in Help and Support. To access Help and Support, select **Start > Help and Support**.

Using the wireless controls

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

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

Turning wireless devices on or off

You can use the wireless button to turn on and turn off wireless devices.

 **NOTE:** A computer may have a wireless button, a wireless switch, or a wireless key on the keyboard. The term wireless button is used throughout this guide to refer to all types of wireless controls.

Using the wireless button

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

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

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

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

Using operating system controls

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

To use operating system controls:

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

For more information, access Help and Support by selecting **Start > Help and Support**.

Using a WLAN

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

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

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

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

Using an Internet service provider

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

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

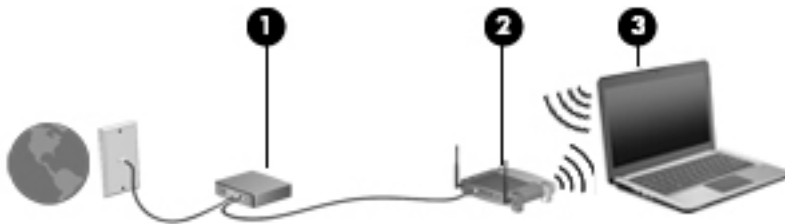
Setting up a WLAN

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

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

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

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



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

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

Configuring a wireless router

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

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

Protecting your WLAN

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

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

- Use a firewall.
A firewall checks both data and requests for data that are sent to your network, and discards any suspicious items. Firewalls are available in both software and hardware. Some networks use a combination of both types.
- Use wireless encryption.
Wireless encryption uses security settings to encrypt and decrypt data that is transmitted over the network. For more information, access Help and Support by selecting **Start > Help and Support**.

Connecting to a WLAN

To connect to the WLAN, follow these steps:

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

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

2. Click the network status icon in the notification area, at the far right of the taskbar.
3. Select a WLAN to connect to.

4. Click **Connect**.

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

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

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

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

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

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

Using Bluetooth wireless devices (select models only)

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

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

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

Connecting to a wired network

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

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

Connecting to a local area network (LAN)

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

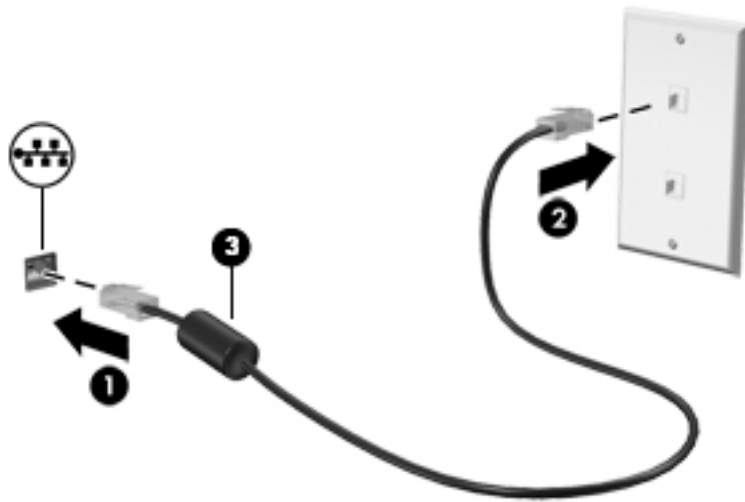
Connecting to a LAN requires an 8-pin, RJ-45 network cable.

To connect the network cable, follow these steps:

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

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

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



4 Navigating using the keyboard, touch gestures and pointing devices

Your computer allows navigation using touch gestures (select models only) in addition to the keyboard and mouse. Touch gestures can be used on your computer TouchPad or on a touch screen (select models only).

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

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. You can also view demonstrations of TouchPad gestures.

To access Mouse Properties:

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

Using the TouchPad and gestures

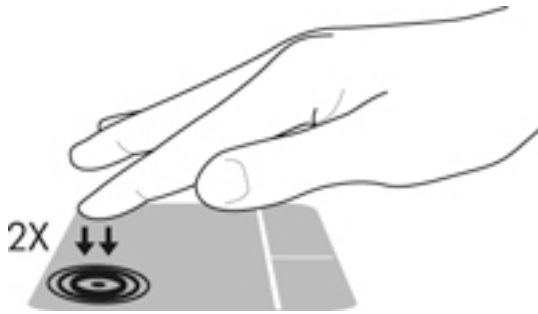
The TouchPad allows you to navigate the computer screen and control the pointer by using simple finger movements.

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

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

Turning the TouchPad off and on

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



Tapping

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

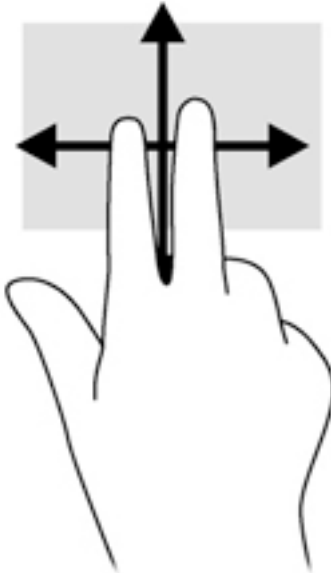
- Tap one finger on the TouchPad zone to make a selection. Double-tap an item to open it.



Scrolling

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

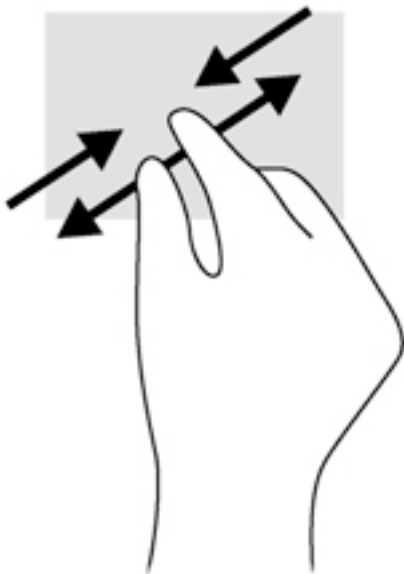
- Place two fingers slightly apart on the TouchPad zone and then drag them up, down, left, or right.



2-finger pinch zoom

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

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



2-finger click

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

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

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



Using the keyboard

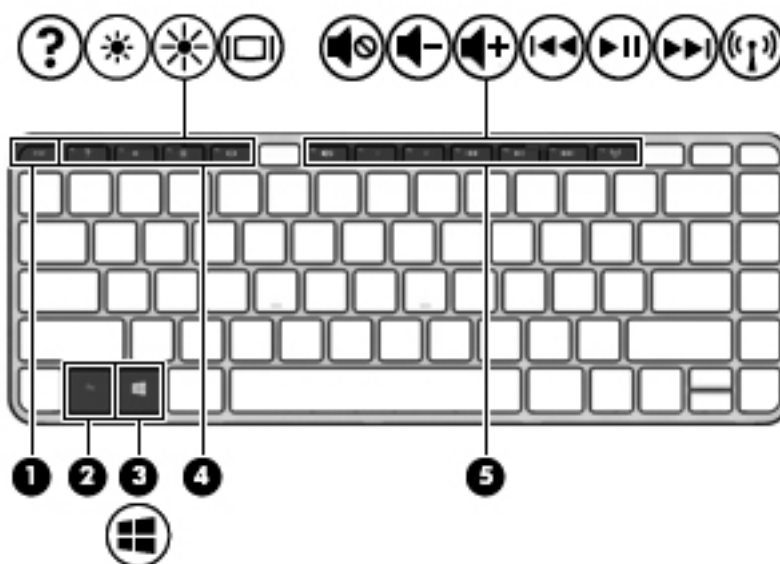
The keyboard and mouse allow you to type select items, scroll and to perform the same functions as using touch gestures. The keyboard also allows you to use action keys and hot keys to perform specific functions.

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

Identifying the hot keys

A hot key is a combination of the **fn** key (2) and the **esc** key (1).

fn+esc displays system information.



Using the action keys

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

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

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

The action key feature is enabled at the factory. You can disable this feature in Setup Utility (BIOS). See [Using Setup Utility \(BIOS\) and HP PC Hardware Diagnostics \(UEFI\) on page 72](#) for instructions on opening Setup Utility (BIOS), and then follow the instructions at the bottom of the screen.

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

Icon	Key	Description
	f1	Opens Help and Support. Opens Help and Support, which provides tutorials, information about the Windows operating system and your computer, answers to questions, and updates to your computer.
	f2	Decreases the screen brightness incrementally as long as you hold down the key.
	f3	Increases the screen brightness incrementally as long as you hold down the key.
	f4	Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, f4 alternates the screen image from computer display to monitor display to simultaneous display on both the computer and the monitor. Most external monitors receive video information on the computer using the external VGA video standard. The f4 key can also alternate images among other devices that are receiving video information on the computer.

Icon	Key	Description
	f6	Mutes or restores speaker sound.
	f7	Decreases speaker volume incrementally as long as you hold down the key.
	f8	Increases speaker volume incrementally as long as you hold down the key.
	f9	Plays the previous track of an audio CD or the previous section of a DVD or a BD.
	f10	Begins, pauses, or resumes playback of an audio CD, a DVD, or a BD.
	f11	Plays the next track of an audio CD or the next section of a DVD or a BD.
	f12	Turns the wireless feature on or off. NOTE: This key does not establish a wireless connection. To establish a wireless connection, a wireless network must be set up.

Using keypads

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

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.

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 action keys
- 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 jack) on your computer or on a docking station.

To connect wireless speakers to your computer, follow the device manufacturer's instructions. To connect high-definition speakers to the computer, see [Configuring audio for HDMI on page 30](#). 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 action keys
- 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)/audio-in (microphone) jack on your computer. Many headsets with integrated microphones are commercially available.

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

 **WARNING!** To reduce the risk of personal injury, lower the volume setting before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*. To access this guide, select **Start > Help and Support > User guides**.

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 has a high-definition multimedia interface (HDMI) port, which allows you to connect a high-definition monitor or TV.

Your computer has the following external video ports:

- VGA
- HDMI (High Definition Multimedia Interface)



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.

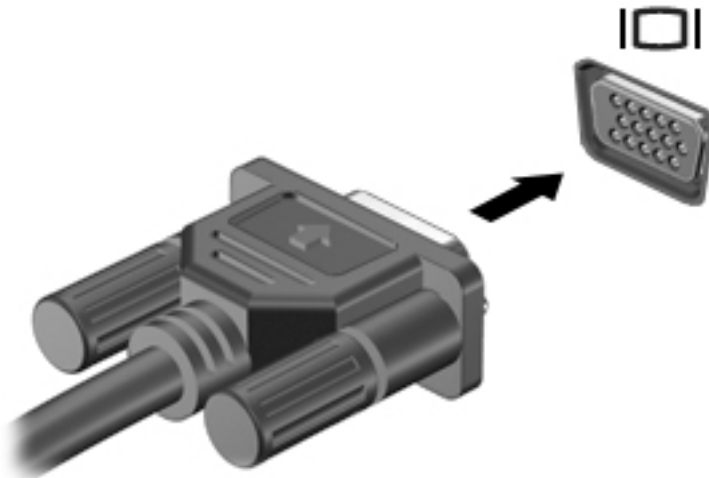


NOTE: Refer to the [Getting to know your computer on page 4](#) section for information about your computer's video ports.

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.

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



2. Press **f4** to alternate the screen image between 4 display states:

- **PC Screen only:** View the screen image on the computer only.
- **Duplicate:** View the screen image simultaneously on *both* the computer and the external device.
- **Extend:** View the screen image extended across *both* the computer and the external device.
- **Second screen only:** View the screen image on the external device only.

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

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

HDMI

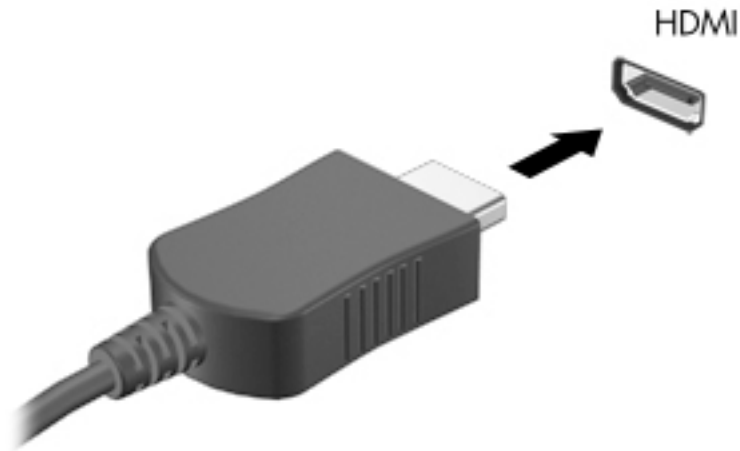
The HDMI port connects the computer to an optional video or audio device, such as a high-definition television, or to any compatible digital or audio component.

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

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

To connect a video or audio device to the HDMI port:

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



2. Connect the other end of the cable to the video device
3. Press **f4** to alternate the screen image between 4 display states:
 - **PC Screen only:** View the screen image on the computer only.
 - **Duplicate:** View the screen image simultaneously on *both* the computer and external device.
 - **Extend:** View the screen image extended across *both* the computer and external device.
 - **Second screen only:** View the screen image on the external device only.

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

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

Configuring audio for HDMI

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

1. Right-click the **Speakers** icon in the notification area, at the far right of the taskbar, and then click **Playback devices**.
2. On the Playback tab, click either **Digital Output** or **Digital Output Device (HDMI)**.
3. Click **Set Default**, and then click **OK**.

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

1. Right-click the **Speakers** icon in the notification area, at the far right of the taskbar, and then click **Playback devices**.
2. On the Playback tab, click **Speakers**.
3. Click **Set Default**, and then click **OK**.

6 Power management

 **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.

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 memory card.

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

Intel Rapid Start Technology (select models only)

For select models, the Intel Rapid Start Technology (RST) feature is enabled by default. Rapid Start Technology allows your computer to resume quickly from inactivity.

Rapid Start Technology manages your power-saving options as follows:

- **Sleep**—Rapid Start Technology allows you to select the Sleep state. To exit from Sleep, press any key, activate the TouchPad, or press the power button briefly.
- **Hibernation**—Rapid Start Technology initiates Hibernation after a period of inactivity while in the Sleep state when running on battery power or on external power or when the battery reaches a critical level. After Hibernation is initiated, press the power button to resume your work.

 **NOTE:** Rapid Start Technology can be disabled in Setup Utility (BIOS). If you want to be able to initiate the Hibernation state, you must enable user-initiated Hibernation using Power Options. See [Initiating and exiting Hibernation on page 32](#).

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 reveal 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 reveals 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 33](#).

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.

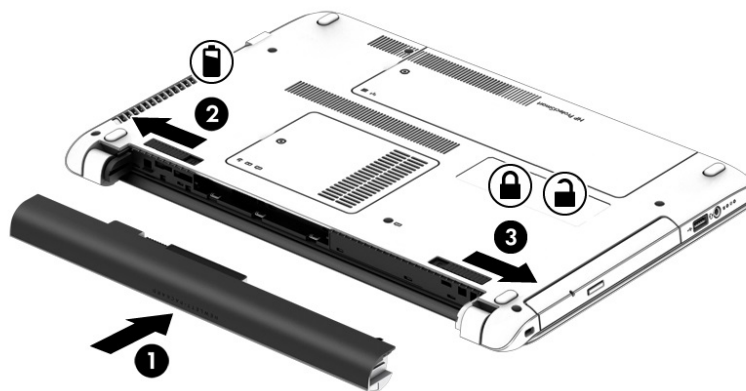
Inserting or removing the battery

Inserting a battery

To insert the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Insert the battery (1) into the battery bay until it is seated.

The battery release latch (2) automatically holds the battery in place. Slide the battery lock (3) outward to lock the battery securely in place.

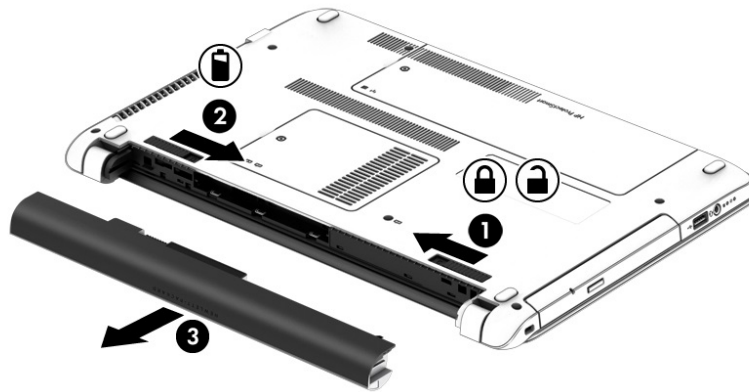


Removing a battery

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. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the battery release latch (1) and battery lock (2) inward to release the battery.
3. Remove the battery from the computer (3).



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 devices that are not plugged into an external power source.
- Stop, disable, or remove any external memory 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.

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

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

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

To reveal the Intel Smart Connect Technology icon, hover over the icons in the notification area, at the far right of the taskbar, and then click the icon.

7 External cards and devices

Using memory card readers

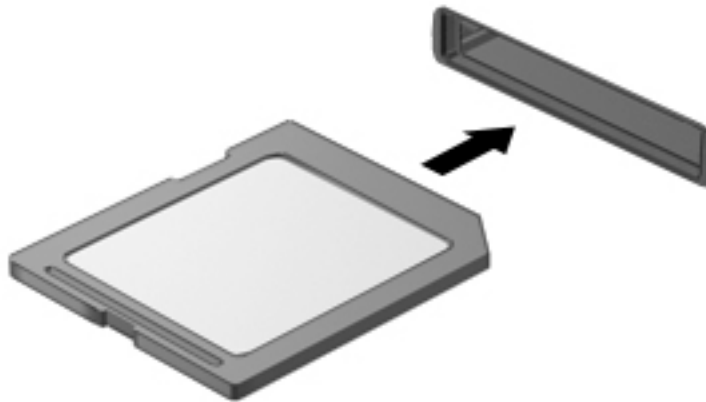
Optional memory cards provide secure data storage and convenient data sharing. These cards are often used with digital media–equipped cameras and PDAs as well as with other computers.

To determine the memory 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.



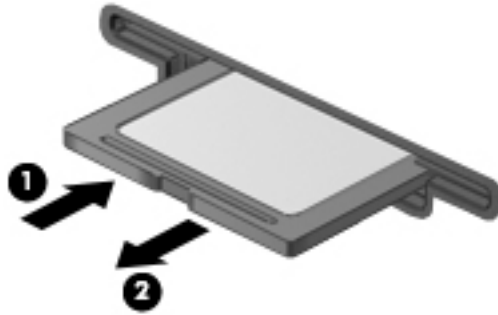
You will hear a sound when the device has been detected, and a menu of options may be displayed.

Removing a memory card

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

1. Save your information and close all programs associated with the memory 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).



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

Using a USB device

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

Some USB devices may require additional support software, which is usually included with the device. For more information about device-specific software, 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.

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

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

Using optional external drives

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

 **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.
- Before handling a drive, discharge static electricity by touching a grounded surface.
- 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.
- 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.

Intel Smart Response Technology (select models only)

Intel® Smart Response Technology (SRT) is an Intel® Rapid Storage Technology (RST) caching feature that significantly enhances computer system performance. SRT allows computers with an SSD mSATA module to be used as cache memory between the system memory and hard disk drive. This provides the advantage of having a hard disk drive (or a RAID volume) for maximum storage capacity while simultaneously delivering SSD enhanced system performance experience.

If you add or upgrade a hard drive and intend to set a RAID volume, you must temporarily disable SRT, set the RAID volume, and then enable SRT. To temporarily disable SRT:

1. Select **Start > All Programs > Intel > Intel Rapid Storage Technology**.
2. Click the **Acceleration** link, and then click the **Disable Acceleration** link.
3. Wait for the Acceleration Mode to complete.
4. Click the **Reset to Available** link.

 **IMPORTANT:** You must temporarily disable SRT when changing RAID modes. Make the change and then re-enable SRT. Failure to temporarily disable this feature will prevent you from creating or changing RAID volumes.

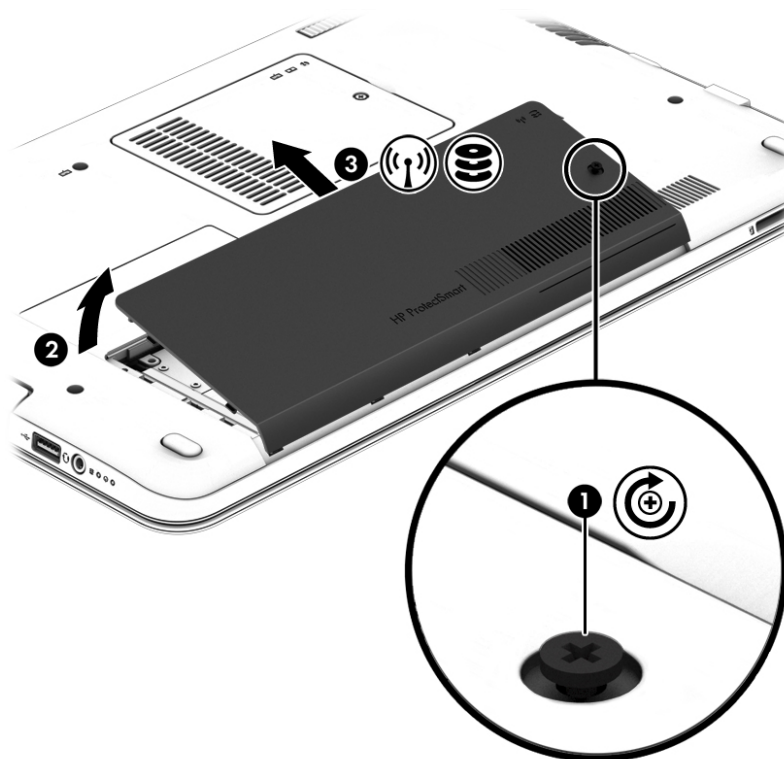
 **NOTE:** HP does not support SRT with self-encrypting drives (SEDs).

Removing or replacing the service door

Removing the service door

Remove the service door to access the hard drive and other components.

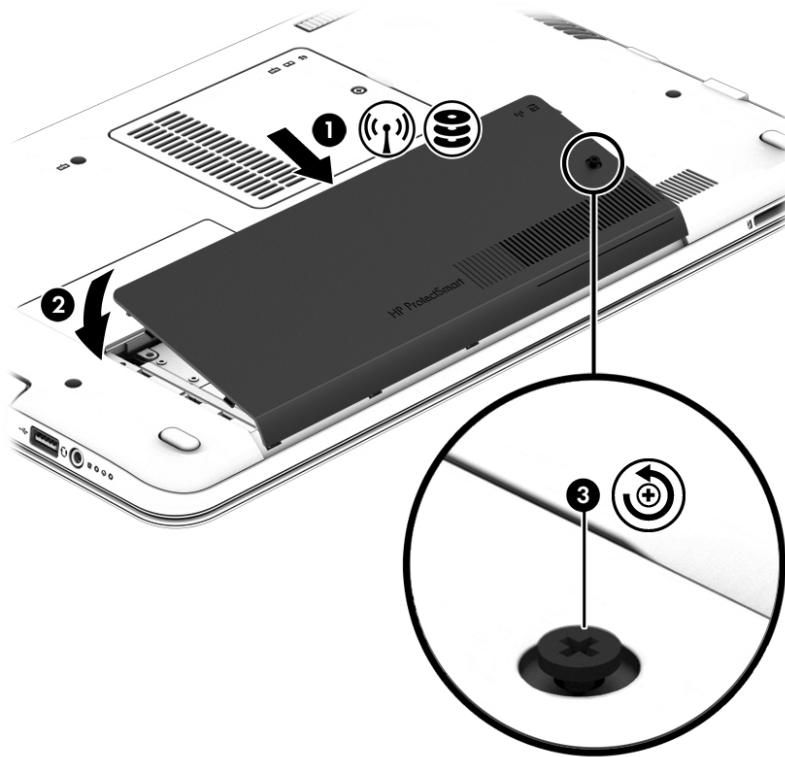
1. Remove the battery (see [Inserting or removing the battery on page 35](#)).
2. With the battery bay away from you, remove the screw (1), tilt the service door up (2), and then lift the service door away (3).



Replacing the service door

Replace the service door after accessing the hard drive and other components.

1. With the battery bay away from you, tilt down the service door to align the front edge of the service door near the front edge of the computer (1).
2. Insert the alignment tabs (2) on the rear edge of the service door with the notches on the computer, and tilt down and into place.
3. Insert and tighten the screw (3).



4. Insert the battery (see [Inserting or removing the battery on page 35](#)).

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.

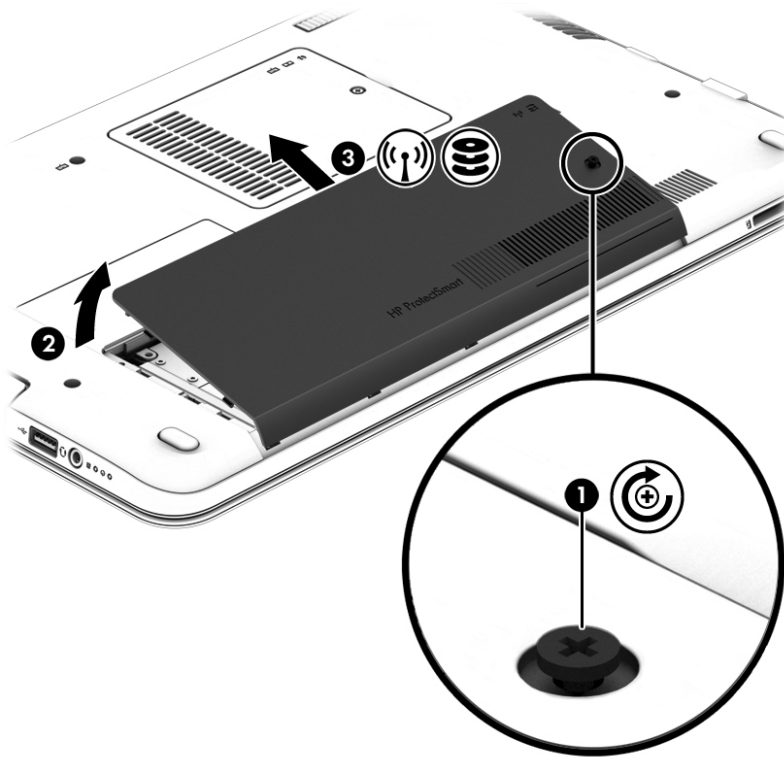
If you are not sure whether the computer is off, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

Removing the hard drive

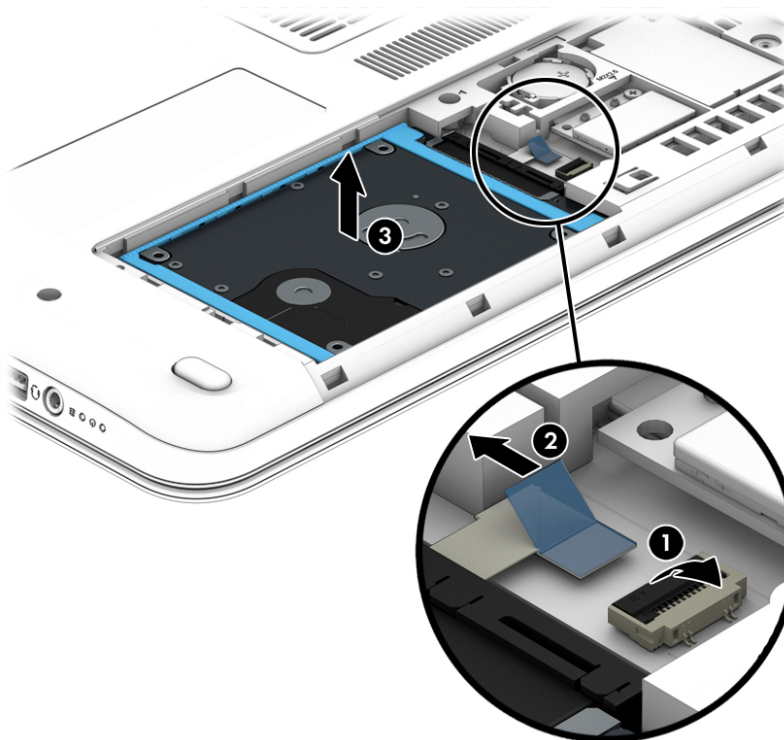
To remove a hard drive:

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 battery. (See [Replacing a user-replaceable battery on page 37](#).)

5. With the battery bay away from you, remove the screw (1), tilt the service door up (2), and then lift the service door away (3).



6. Lift connector (1) to disconnect the hard drive. Pull the plastic tab to move the hard drive cable away (2) and then lift the hard drive of the bay (3).

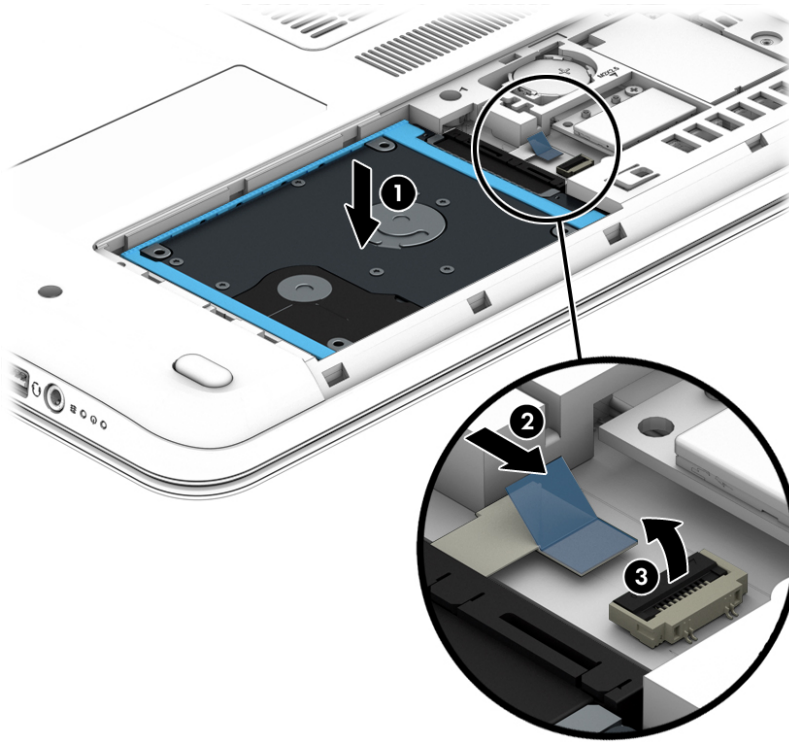


Installing a hard drive

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

To install the hard drive:

1. Insert the hard drive into the hard drive bay (1), and pull the plastic tab (2) to reconnect the drive cable. Then press the connector down to reconnect the hard drive (3).



2. Replace the service door (see [Removing or replacing the service door on page 44](#)).
3. Insert the battery (see [Inserting or removing the battery on page 35](#)).
4. Connect AC power and external devices to the computer.
5. Turn on the computer.

Replacing a drive in the upgrade bay

The upgrade bay can hold an optical drive.

Replacing an optical drive

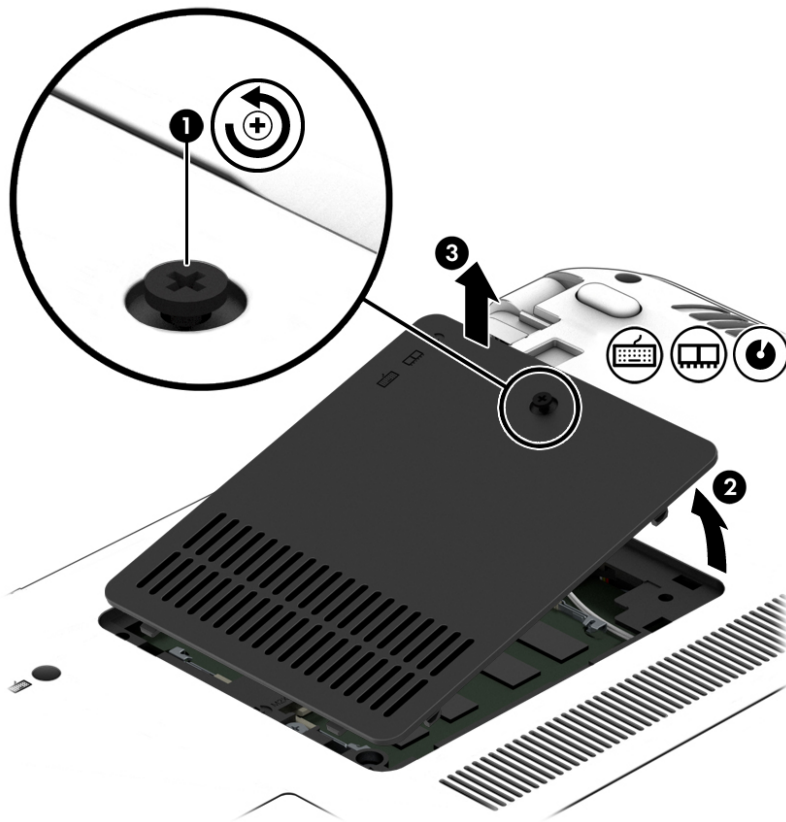
 **CAUTION:** To prevent information loss or an unresponsive system:

Shut down the computer before removing the optical drive from the upgrade bay. Do not remove the optical 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.

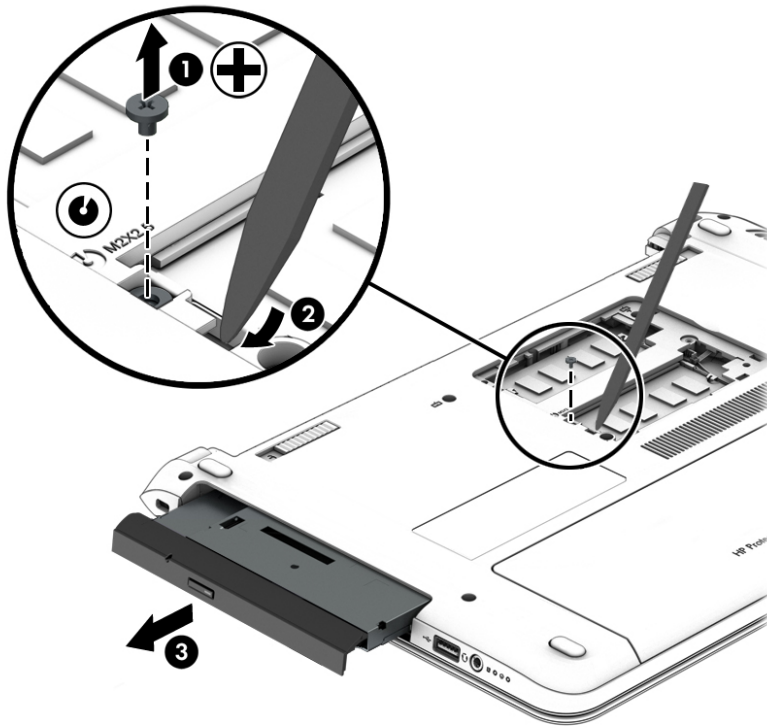
To remove an optical drive from the upgrade bay:

1. Save your work.
2. Shut down the computer and close the display.
3. Disconnect all external hardware devices connected to the computer.
4. Unplug the power cord from the AC outlet.
5. Turn the computer upside down on a flat surface, with the upgrade bay toward you.
6. Remove the battery (see [Inserting or removing the battery on page 35](#)).
7. Remove the memory service cover.
 - a. With the battery bay away from you, remove the screw (1).
 - b. Tilt the memory service cover (2) up.
 - c. Lift the memory service cover away (3).



8. Loosen the upgrade bay screw (1).
9. Using a flat-bladed screwdriver, gently push the tab to release the optical drive (2).

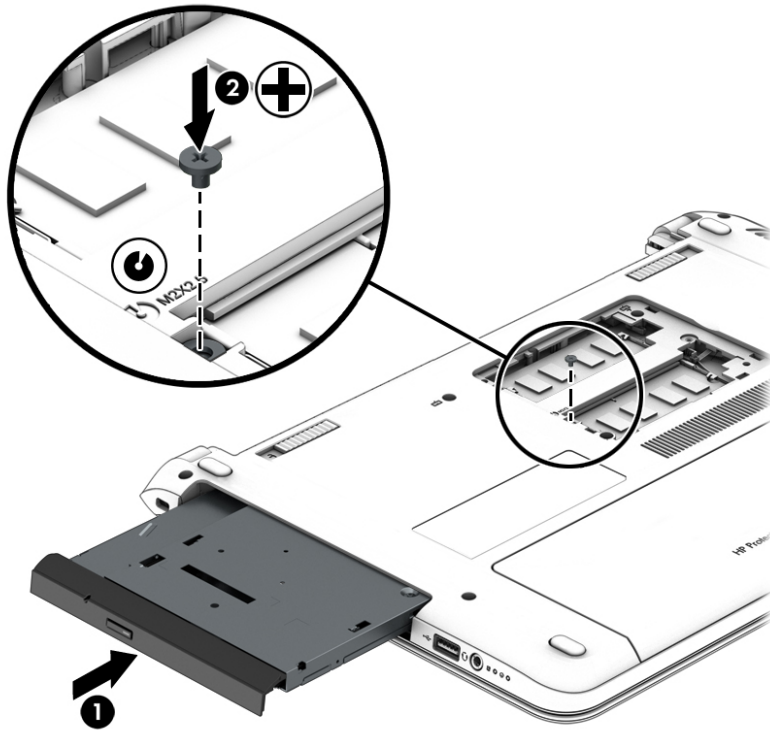
10. Remove the optical drive from the upgrade bay (3).



To install an optical drive in the upgrade bay:

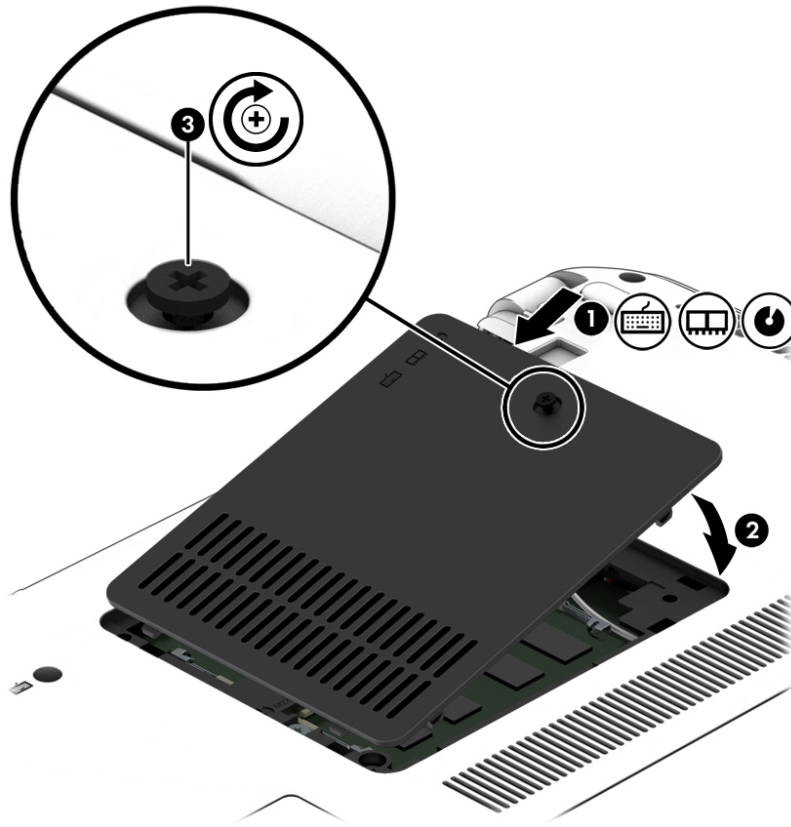
1. Insert the optical drive into the upgrade bay (1).

2. Tighten the upgrade bay screw (2).



3. Replace the memory service cover.

- a. With the battery bay away from you, tilt down the memory service cover (1) to align the left edge of the memory service cover with the computer bay.
- b. Tilt the memory service cover (2) down and in place.
- c. Tighten the screw (3).



4. Insert the battery (see [Inserting or removing the battery on page 35](#)).
5. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.
6. 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.

 **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 (select models only)

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

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

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

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

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

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

Identifying HP 3D DriveGuard status

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

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.

Computer risk	Security feature
Unauthorized access to Computer Setup (f10)	Administrator 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	• Windows user password • Windows Defender
Unauthorized access to Computer Setup settings and other system identification information	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 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.

- Administrator passwords are set in Computer Setup and are managed by the system BIOS.
- Windows passwords are set only in the Windows operating system.

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.
- Do not store passwords in a file on the computer.

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

Setting passwords in Windows

Password	Function
Administrator password*	Protects access to a Windows administrator-level account. NOTE: Setting the Windows Administrator password does not set the Administrator password in Computer Setup.
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
Administrator password*	Protects access to Computer Setup. NOTE: If features have been enabled to prevent removing the administrator password, you may not be able to remove it until those features have been disabled.
*For details about these passwords, see the following topics.	

Managing an administrator password in Computer Setup

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

Setting a new 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 the arrow keys to select **Security > Administrator Password**, and then press **enter**.
4. When prompted, type a password, and then press **enter**.
5. When prompted, type the new password again to confirm, and then press **enter**.
6. Read the notice and select to continue.
7. To save your changes and exit Computer Setup, press **f10** to Save and Exit, and then follow the on-screen instructions.

– or –
Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter** and follow the on-screen instructions.

Your changes go into effect when the computer restarts.

Changing an 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 the arrow keys to select **Security > Administrator Password**, and then press **enter**.
4. When prompted, type your current password, and then press **enter**.
5. When prompted for the new password, type the new password, and then press **enter**.
6. When prompted to type your new password again, type the new password, and then press **enter**.

7. Read the notice and select to continue.
8. To save your changes and exit Computer Setup, press **f10** to Save and Exit, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter** and follow the on-screen instructions.

Your changes go into effect when the computer restarts.

Deleting an 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 the arrow keys to select **Security > Administrator Password**, and then press **enter**.
4. When prompted, type your current password, and then press **enter**.
5. When prompted for the new password, leave the field empty, and then press **enter**.
6. When prompted to type your new password again, leave the field empty, and then press **enter**.
7. Read the notice and select to continue.
8. To save your changes and exit Computer Setup, press **f10** to Save and Exit, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter** and follow the on-screen instructions.

Your changes go into effect when the computer restarts.

Entering an administrator password in Computer Setup

At the **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 administrator password, you must restart the computer and try again.

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.

Installing an optional security cable

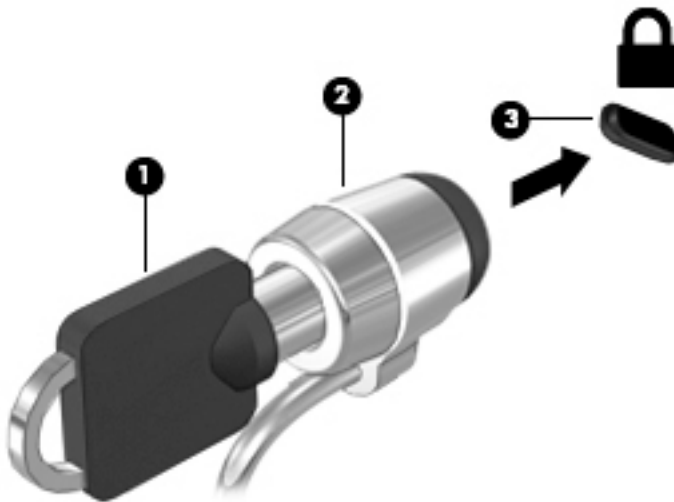


NOTE: A security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.



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 set up a user account and password on the computer and then register one or more fingerprints using HP SimplePass software.

Locating the fingerprint reader

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

- Near the bottom of the TouchPad
- On the right side of the keyboard
- On the upper-right side of the display
- On the left side of the display

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. See [Getting to know your computer on page 4](#) for the location of the fingerprint reader on your computer.

Using HP SimplePass (select models only)

HP SimplePass provides an easy-to-use interface to help secure your computer and simplify the way you log on to your computer and password-protected websites. Use a registered fingerprint to:

- Log on to Windows.
- Access websites and other programs that require a logon.
- Set up a single sign-on service that allows you to use a registered fingerprint to create credentials for any application that requires a user name and password.
- Set up protected accounts on the computer for multiple users.

For more information, see the HP SimplePass software Help.

Registering fingerprints

To register one or more fingerprints with HP SimplePass:

1. Swipe a finger on the fingerprint sensor to launch HP SimplePass.
2. When the HP SimplePass welcome screen is revealed, click **Get Started**.
3. HP SimplePass prompts you to swipe your right index finger over the sensor.
4. Swipe your finger 3 times to finish the registration.
A green circle is revealed on the finger if it is registered successfully.
5. To set up a Windows password, select **Set up Windows logon**.

Using your registered fingerprint to log on to Windows

To log on to Windows using your fingerprint:

1. After you register your fingerprints, restart Windows.
2. Swipe any of your registered fingerprints to log on to Windows.

10 Maintenance

Adding or replacing memory modules

The computer has one memory module compartment. 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.



NOTE: Before adding or replacing a memory module, make sure the computer has the most recent BIOS version, and update the BIOS if needed. See [Updating the BIOS on page 72](#).



CAUTION: Failure to update the computer to the latest BIOS prior to installing or replacing a memory module may result in various system problems.



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.

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.

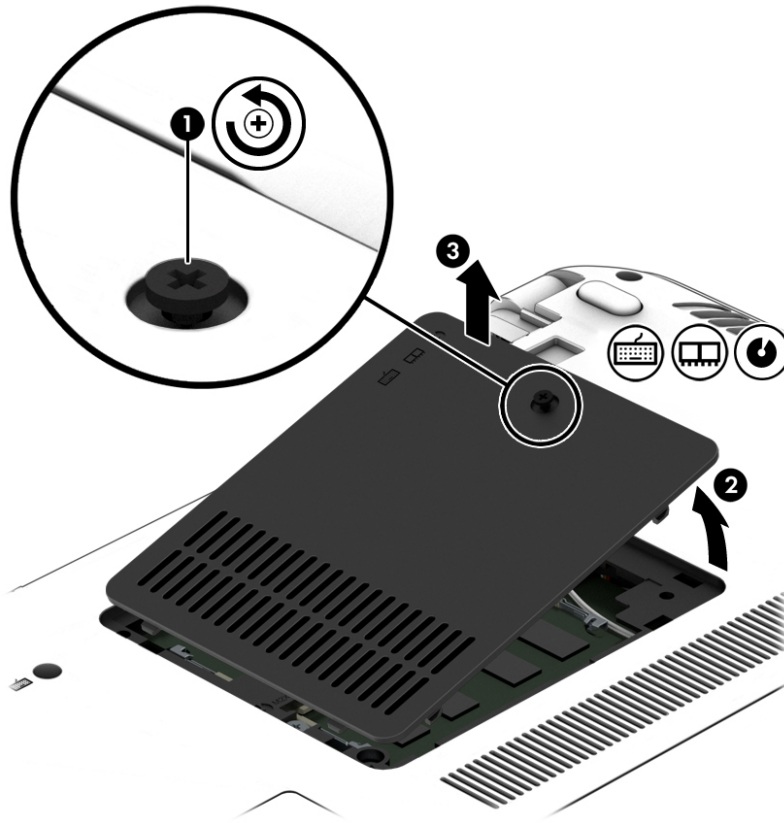
If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.



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:

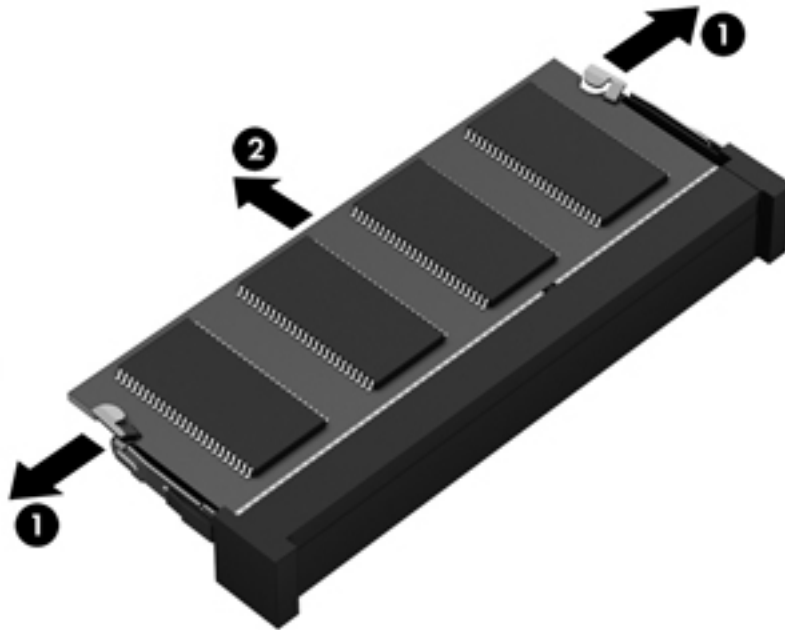
1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Remove the battery (see [Inserting or removing the battery on page 35](#)).
4. Remove the memory service cover.
 - a. With the battery bay away from you, remove the screw **(1)**.
 - b. Tilt the memory service cover **(2)** up.
 - c. Lift the memory service cover away **(3)**.



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.

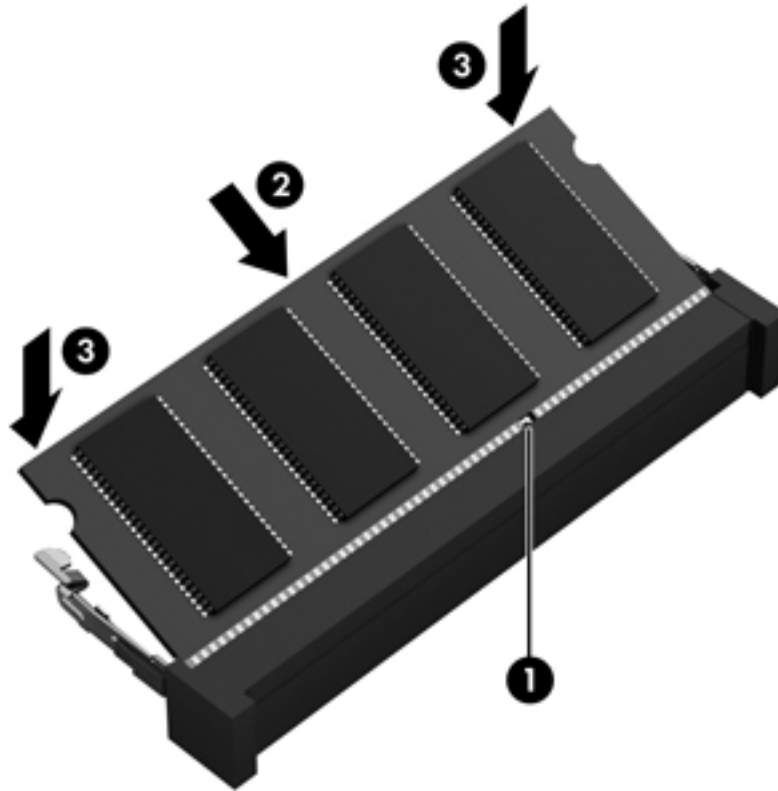
6. Insert a new memory module:

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.

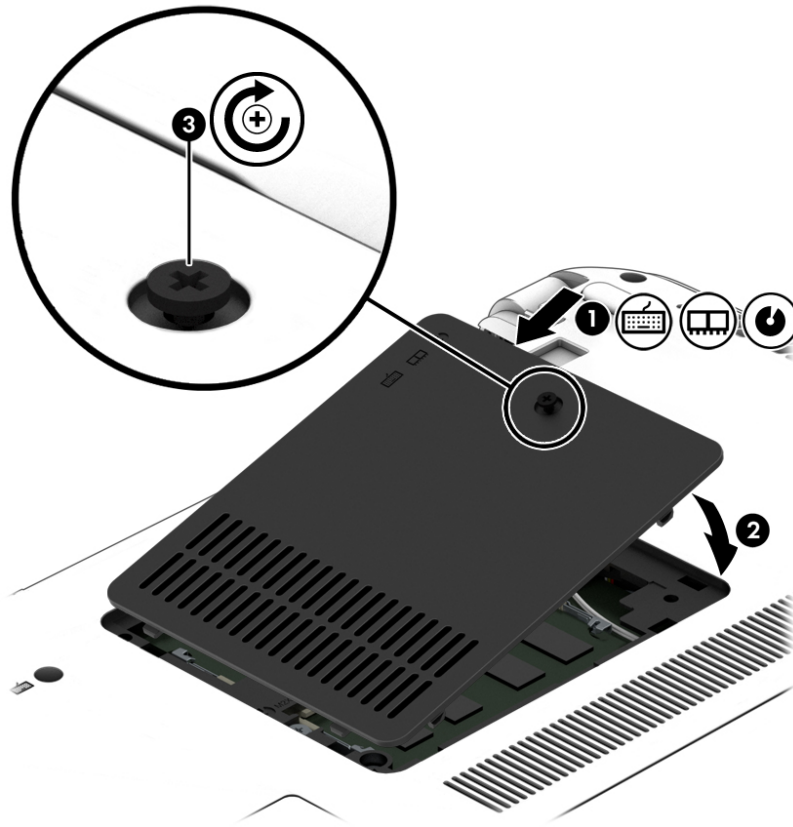
- a. Align the notched edge (1) of the memory module with the tab in the memory module slot.
- b. With the memory module at a 45-degree angle from the surface of the memory module compartment, press the module (2) into the memory module slot until it is seated.

- 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 memory service cover.
 - a. With the battery bay away from you, tilt down the memory service cover (1) to align the left edge of the memory service cover with the computer bay.
 - b. Tilt the memory service cover (2) down and in place.
 - c. Tighten the screw(3).



8. Insert the battery (see [Inserting or removing the battery on page 35](#)).
9. Connect AC power and external devices to the computer.
10. Turn on the computer.

Cleaning your computer

Use the following products to safely clean your computer:

- Dimethyl benzyl ammonium chloride 0.3 percent maximum concentration (for example, disposable wipes, which come in a variety of brands).
- Alcohol-free glass-cleaning fluid
- Water with mild soap solution
- Dry microfiber cleaning cloth or a chamois (static-free cloth without oil)
- Static-free cloth wipes

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

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

Cleaning procedures

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

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

- Turn off the computer.
- Disconnect AC power.
- Disconnect all powered external devices.

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

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

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

Cleaning the sides or cover

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

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

Cleaning the TouchPad, keyboard, or mouse

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

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

- To clean the TouchPad, keyboard, or mouse, use a soft microfiber cloth or a chamois moistened with one of the cleaning solutions listed previously or use an acceptable disposable wipe.
- To prevent keys from sticking and to remove dust, lint, and particles from the keyboard, use a can of compressed air with a straw extension.

Updating programs and drivers

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

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

11 Backing up, restoring, and recovering

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

Creating backups

1. Use HP Recovery Manager to create recovery media immediately after you set up the working computer.
2. As you add hardware and software programs, create system restore points.
3. As you add photos, video, music, and other personal files, create a backup of your system and personal information.

Creating recovery media to recover the original system

After you successfully set up the computer, you should create recovery discs or a recovery flash drive using HP Recovery Manager. You will need these recovery discs or recovery flash drive to perform a system recovery should the hard drive become corrupted. A system recovery reinstalls the original operating system, and then configures the settings for the default programs.

What you need to know

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the flash drive or the number of blank DVD discs that will be required.

Use DVD-R, DVD+R, DVD-R DL, DVD+R DL discs or a flash drive. Do not use rewriteable discs such as CD±RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take up to an hour or more. Do not interrupt the creation process.
- Store the recovery media in a safe location, separate from the computer.
- If necessary, you can exit the program before you have finished creating the recovery media. The next time you open HP Recovery Manager, you will be prompted to continue the process.

Creating the recovery media

1. Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list. Allow the action to continue, if prompted.
2. Click **Recovery Media Creation**.
3. Follow the on-screen instructions to continue.

To recover, see [Recovering the original system using HP Recovery Manager on page 69](#).

Creating system restore points

A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A restore point contains information such as registry settings that Windows uses. Restoring to a previous restore point allows you to reverse changes that have been made to the system since the restore point was created.

Restoring to an earlier system restore point does not affect data files saved or emails created since the last restore point, but it does affect software you may have installed.

For example, if you download a photo from a digital camera and then restore the computer to the state it was on the previous day, the photo remains on the computer.

However, if you install photo viewing software and then restore your computer to the state it was on the previous day, the software will be uninstalled, and you won't be able to use it.

What you need to know

- If you restore to a restore point and then change your mind, you can undo the restoration.
- You should create system restore points:
 - Before you add or change software or hardware
 - Periodically, whenever the computer is running normally
- System Restore also saves shadow copies of files that have been changed since the last restore point was created. For more information about using shadow copies to restore, see Help and Support.

Creating a system restore point

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

To restore, see [Restoring to a previous system restore point on page 69](#).

Backing up system and personal information

Your computer stores information that is important to you, such as files, emails, and photos, and you will want to keep that information even if you download a virus or the system stops working properly. How completely you are able to recover your files depends on how recent your backup is. As you add new software and data files, you should create backups on a regular basis.

Tips for a successful backup

- Number backup discs before inserting them into the optical drive.
- Store personal files in the Documents, Music, Pictures, and Videos libraries, and back up these folders periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:
To copy only the active window, press **alt+prt sc**.
To copy the entire screen, press **prt sc**.
3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

What you need to know

- You can back up your information to an optional external hard drive, a flash drive, a network drive, or discs.
- Connect the computer to AC power during backups.
- Allow enough time for the backup. Depending on files sizes, it may take more than an hour.
- Verify the amount of free space on your backup storage device before you back up.
- You should back up:
 - Before adding or changing software or hardware.
 - Before the computer is repaired or restored.
 - On a regular schedule to be sure you have recent copies of personal information.
 - After you add many files—for example, if you saved videos from a birthday party.
 - Before using antivirus software to remove a malicious program.
 - After adding information that is hard to replace, such as pictures, videos, music, project files, or data records.

Creating a backup using Windows Backup and Restore

Windows allows you to back up files using Windows Backup and Restore. You can select the level you want to back up, from individual folders to drives. The backups are compressed to save space. To back up:

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



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

To restore, see [Restoring specific files using Windows Backup and Restore on page 69](#).

Restore and recovery

Restoring to a previous system restore point

Sometimes installing a software program causes your computer or Windows to behave unpredictably. Usually uninstalling the software fixes the problems. If uninstalling does not fix the problems, you can restore the computer to a previous system restore point (created at an earlier date and time).

To restore to a previous system restore point, when the computer was running correctly:

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

Restoring specific files

If files are accidentally deleted from the hard disk and they can no longer be restored from the Recycle Bin, or if files become corrupt, restoring specific files is useful. Restoring specific files is also useful if you ever choose to recover the original system using HP Recovery Manager. You can only restore specific files that you have backed up before.

Restoring specific files using Windows Backup and Restore

Windows allows you to restore files that were backed up using Windows Backup and Restore:

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



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

Recovering the original system using HP Recovery Manager

HP Recovery Manager software allows you to repair or recover the computer to its original factory state.

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the disc provided by the manufacturer.
- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see [Restoring to a previous system restore point on page 69](#)) and partial restores (see [Restoring specific files on page 69](#)), try them before using HP Recovery Manager to recover your system.
- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

- If the recovery media do not work, you can obtain recovery discs for your system from the HP website.
- The Minimized Image Recovery option is recommended for advanced users only. All hardware-related drivers and software are re-installed, but other software applications are not. Do not interrupt the process until it is complete, otherwise the recovery will fail.

Recovering using HP Recovery partition (select models only)

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

To check for the presence of a recovery partition, select **Start**, right-click **Computer** then select **Manage > Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

 **NOTE:** Recovery discs have been included if your computer did not ship with a recovery partition.

1. Access HP Recovery Manager in either of the following ways:
 - Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list.
 - or –
 - Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen. Then press `f11` while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **HP Recovery Manager** window.
3. Follow the on-screen instructions.

Recovering using the recovery media

1. If possible, back up all personal files.
2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.
- or –
- Insert the recovery flash drive into a USB port on your computer, and then restart the computer.

 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 70](#).

3. Press `f9` at system startup.
4. Select the optical drive or the flash drive.
5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

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

To change the boot order for a recovery flash drive:

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

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

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

Starting Setup Utility (BIOS)

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

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

Updating the BIOS

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

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

Determining the BIOS version

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

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

1. Start Setup Utility (BIOS) (see [Starting Setup Utility \(BIOS\) on page 72](#)).
2. To exit Setup Utility (BIOS) without saving your changes, use the arrow keys to select **Exit**, select **Exit Discarding Changes**, and then press **enter**.
3. Select **Yes**.

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

1. From **Start**, type `hp support assistant`, and then select the **HP Support Assistant** app.
2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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



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

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

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

The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.



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

Using HP PC Hardware Diagnostics (UEFI)

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

To start HP PC Hardware Diagnostics UEFI:

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

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

- a. Connected USB drive



NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see [Downloading HP PC Hardware Diagnostics \(UEFI\) to a USB device on page 74](#).

- b. Hard drive
- c. BIOS

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



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

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



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

There are two options to download HP PC Hardware Diagnostics to a USB device:

Option 1: HP PC Diagnostics homepage—Provides access to the latest UEFI version

1. Go to <http://hp.com/go/techcenter/pcdiags>.
2. Click the **UEFI Download** link, and then select **Run**.

Option 2: Support and Drivers page—Provides downloads for a specific product for earlier and later versions

1. Go to <http://www.hp.com>.
2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.
3. In the text box, enter the product name, and then click **Go**.

– or –

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

4. Select your computer model, and then select your operating system.
5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

– or –

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

13 Support

Contacting support

If the information provided in this user guide or 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.

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.

- 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.

- 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.



Component	
(1)	Serial number
(2)	Product number
(3)	Warranty period

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

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

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

14 Specifications

- [Input power](#)
- [Operating environment](#)

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	19.5 V dc @ 3.33 A – 65 W
	19.5 V dc @ 2.31 A – 45 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

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

15 Accessibility

HP designs, produces, and markets products and services that can be used by everyone, including people with disabilities, either on a stand-alone basis or with appropriate assistive devices.

Supported assistive technologies

HP products support a wide variety of operating system assistive technologies and can be configured to work with additional assistive technologies. Use the Search feature on your device to locate more information about assistive features.

 **NOTE:** For additional information about a particular assistive technology product, contact customer support for that product.

Contacting support

We are constantly refining the accessibility of our products and services and welcome feedback from users. If you have an issue with a product or would like to tell us about accessibility features that have helped you, please contact us at +1 (888) 259-5707, Monday through Friday, 6 A.M. to 9 P.M. North American Mountain Time. If you are deaf or hard-of-hearing and use TRS/VRS/WebCapTel, contact us if you require technical support or have accessibility questions by calling +1 (877) 656-7058, Monday through Friday, 6:00 a.m. to 9:00 p.m. North American Mountain Time.

 **NOTE:** Support is in English only.

A Traveling with or shipping your computer

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

- Prepare the computer for traveling or shipping:
 - Back up your information to an external drive.
 - Remove all discs and all external media cards, such as memory cards, from the computer.
 - Turn off and then disconnect all external devices.
 - Shut down the computer.
- Take along a backup of your information. Keep the backup separate on 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 you are shipping the computer or a drive, use suitable protective packaging and label the package “FRAGILE.”

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

- If you are traveling internationally, follow these suggestions:
 - Check the computer-related customs regulations for each country or region on your itinerary.
 - Check the power cord and adapter requirements for each location in which you plan to use the computer. Voltage, frequency, and plug configurations vary.

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

B Troubleshooting

Troubleshooting resources

- Access website links and additional information about the computer through Help and Support. To access 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 HP 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.

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.

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

Resolving issues

The following sections describe several common issues and solutions.

The computer is unable to start up

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

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



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

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

The computer screen is blank

If the screen is blank but you have not turned off the computer, one or more of these settings may be the cause:

- The computer may be in the Sleep state. To exit Sleep, briefly press the power button. Sleep is an energy-saving feature that turns off the display. Sleep can be initiated by the system while the computer is on but is not in use, or when the computer has reached a low battery level. To

change these and other power settings, right-click the **Battery** icon on the Windows desktop in the notification area, at the far right of the taskbar, and then click **Preferences**.

- The computer may not be set to display the image on the computer screen. To transfer the image to the computer screen, press **f4**. On most models, when an optional external display, such as a monitor, is connected to the computer, the image can be displayed on the computer screen or the external display, or on both devices simultaneously. When you press **f4** repeatedly, the image alternates among the computer display, one or more external displays, and simultaneous display on all devices.

Software is functioning abnormally

If the software is unresponsive or responds abnormally, restart the computer. Click **Start**, click the arrow next to **Shut down**, and then select **Restart**. If you cannot restart the computer using this procedure, see the next section, [The computer is on but not responding on page 81](#).

The computer is on but not responding

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

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

- Press and hold the power button for at least 5 seconds.
- Disconnect the computer from external power and remove the battery.

The computer is unusually warm

It is normal for the computer to feel warm to the touch while it is in use. But if the computer feels *unusually* warm, it may be overheating because a vent is blocked.

If you suspect that the computer is overheating, allow the computer to cool to room temperature. Be sure to keep all vents free from obstructions while you are using the computer.

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

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

An external device is not working

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

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

The wireless network connection is not working

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

- To enable or disable a wireless or wired network device, right-click the **Network Connection** icon on the Windows desktop in the notification area, at the far right of the taskbar. To enable devices, select the check box from the menu option. To disable the device, clear the check box.
- Be sure that the wireless device is turned on.
- Be sure that the computer wireless antennas are free from obstructions.
- Be sure that the cable or DSL modem and its power cord are properly connected and that the lights are on.
- Be sure that the wireless router or access point is properly connected to its power adapter and to the cable or DSL modem, and that the lights are on.
- Disconnect and then reconnect all cables, and turn the power off and then back on.

A disc does not play

- Save your work and close all open programs before playing a CD or a DVD.
- Log off the Internet before playing a CD or a DVD.
- Be sure that you insert the disc properly.
- Be sure that the disc is clean. If necessary, clean the disc with filtered water and a lint-free cloth. Wipe from the center of the disc to the outer edge.
- Check the disc for scratches. If you find scratches, treat the disc with an optical disc repair kit available at many electronics stores.
- Disable Sleep mode before playing the disc.

Do not initiate Sleep while playing a disc. Otherwise, you may see a warning message asking if you want to continue. If this message is displayed, click **No**. After you click No, the computer may behave in either of the following ways:

- Playback may resume.

– or –

- The playback window in the multimedia program may close. To return to playing the disc, click the **Play** button in your multimedia program to restart the disc. In rare cases, you may need to exit the program and then restart it.

A movie is not visible on an external display

1. If both the computer display and an external display are turned on, press **f4** one or more times to switch between the 2 displays.
2. Configure the monitor settings to make the external display primary:
 - a. From the Windows desktop, right-click on a blank area of the computer desktop, and select **Screen resolution**.
 - b. Specify a primary display and a secondary display.



NOTE: When using both displays, the DVD image will not appear on any display designated as the secondary display.

The process of burning a disc does not begin, or it stops before completion

- Be sure that all other programs are closed.
- Turn off Sleep mode.
- Be sure that you are using the right kind of disc for your drive.
- Be sure that the disc is inserted properly.
- Select a slower write speed and try again.
- If you are copying a disc, save the information on the source disc to your hard drive before trying to burn the contents to a new disc, and then burn from your hard drive.

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 HP support.

Index

Symbols/Numerics

- 2-finger click TouchPad gestures 23
- 2-finger pinch zoom TouchPad gesture 22

A

- AC adapter, testing 37
- AC adapter/battery light 5
- accessibility 78
- action keys
 - decrease screen brightness 24
 - Help and Support 24
 - identifying 12
 - increase screen brightness 24
 - next track or section 25
 - play, pause, resume 25
 - previous track or section 25
 - switch screen image 24
 - volume down 25
 - volume mute 25
 - volume up 25
 - wireless 25
- action keys, media 26
- administrator password 54
- antivirus software 56
- audio functions, checking 27
- audio-in (microphone) jack, identifying 4
- audio-out (headphone) jack, identifying 4

B

- backups 66
- battery
 - conserving power 36
 - discharging 34
 - displaying remaining charge 34
 - disposing 36
 - inserting 35
 - low battery levels 34
 - removing 35

- replacing 37
- storing 36
- Battery Check 34
- battery cover release latch 13
- battery cover, identifying 13
- battery information, finding 33
- battery power 33
- battery temperature 36
- BIOS
 - determining version 72
 - downloading an update 72
 - updating 72
- Bluetooth device 15, 18
- Bluetooth label 76
- boot order
 - changing 70
- buttons
 - left TouchPad 8
 - media 26
 - optical drive eject 5
 - power 10, 31
 - right TouchPad 8
 - volume 26
 - Windows button 12

C

- cables
 - USB 41
- caps lock light, identifying 10
- caring for your computer 64
- checking audio functions 27
- cleaning your computer 64
- components
 - bottom 13
 - display 6
 - front 14
 - left side 5
 - right side 4
 - top 8
- Computer Setup
 - administrator password 55
- computer, traveling 36, 79
- configuring
 - audio for HDMI 30
- connecting to a WLAN 17

- connector, power 5
- conservation, power 36
- corporate WLAN connection 17
- critical battery level 31
- critical updates, software 57

D

- deleted files
 - restoring 69
- Disk Cleanup software 52
- Disk Defragmenter software 51
- drive media 31
- drives
 - external 42
 - handling 43
 - hard 42
 - optical 42
 - using 43

E

- electrostatic discharge 84
- esc key, identifying 12
- external AC power, using 37
- external devices 41
- external drive 42
- external monitor port 5, 29

F

- fingerprint reader 58
- fingerprint reader, identifying 11
- fingerprints, registering 59
- firewall software 57
- fn key, identifying 12, 23

H

- hard drive
 - external 42
 - HP 3D DriveGuard 52
 - installing 47
 - removing 45
- hard drive light 52
- hard drive light, identifying 4
- hard drive, identifying 14
- HDMI port, connecting 29
- HDMI port, identifying 6

- HDMI, configuring audio 30
- headphone (audio-out) jack 4
- headphones and microphones, connecting 27
- Hibernation
 - exiting 32
 - initiating 32
- high-definition devices, connecting 29
- hot keys
 - description 23
- HP 3D DriveGuard 52
- HP PC Hardware Diagnostics (UEFI)
 - downloading 74
 - using 73
- HP Recovery Manager 69
- hubs 40

I

- input power 77
- internal microphones, identifying 6
- Internet connection setup 16
- issues, resolving 80

J

- jacks
 - audio-in (microphone) 4
 - audio-out (headphone) 4
 - network 6
 - RJ-45 (network) 6

K

- keyboard hot keys, identifying 23
- keypad, external
 - num lock 25
 - using 25
- keys
 - action 12
 - esc 12
 - fn 12
 - media 26
 - volume 26

L

- labels
 - Bluetooth 76
 - Microsoft Certificate of Authenticity 76
 - regulatory 76

- serial number 76
- wireless certification 76
- WLAN 76
- latch, battery cover release 13
- lights
 - AC adapter/battery 5
 - caps lock 10
 - hard drive 4
 - power 4, 9
 - RJ-45 (network) status 6
 - TouchPad 10
 - wireless 9
- lights, hard drive 52
- low battery level 34

M

- maintenance
 - Disk Cleanup 52
 - Disk Defragmenter 51
- media action keys 26
- media activity controls 26
- memory card
 - inserting 39
 - removing 39
 - supported formats 39
- memory card reader, identifying 14
- memory module
 - identifying 14
 - inserting 62
 - removing 61
 - replacing 60
- memory service, identifying 13
- microphone (audio-in) jack, identifying 4
- Microsoft Certificate of Authenticity label 76
- mouse, external
 - setting preferences 20

N

- network jack, identifying 6
- num lock, external keypad 25

O

- operating environment 77
- optical drive 42
- optical drive eject button, identifying 5
- optical drive, identifying 5

- optional external devices, using 41
- original system recovery 69

P

- passwords
 - administrator 54, 55
 - user 54
- pointing devices, setting preferences 20
- ports
 - external monitor 5, 29
 - HDMI 6, 29
 - USB 5
 - VGA 29
- power
 - battery 33
 - conserving 36
 - options 31
- power button 31
- power button, identifying 10
- power connector, identifying 5
- power lights 4, 9
- power switch 31
- power-saving states 31
- product name and number, computer 76
- public WLAN connection 17

R

- readable media 31
- recovering from the recovery discs 70
- recovering the original system 69
- recovery 69
 - HP Recovery Manager 69
- recovery discs 66
- recovery media 66
- recovery, system 69
- regulatory information
 - regulatory label 76
 - wireless certification labels 76
- restore points 67
- restoring the original system
 - creating recovery media 66
- RJ-45 (network) jack, identifying 6
- RJ-45 (network) lights, identifying 6

S

- scrolling TouchPad gesture 22
- security cable slot, identifying 5
- security, wireless 17
- serial number 76
- serial number, computer 76
- setting password protection on
 - wakeup 33
- setting power options 31
- setup of WLAN 16
- shutdown 31
- Sleep
 - exiting 32
 - initiating 32
- slots
 - security cable 5
- software
 - antivirus 56
 - critical updates 57
 - Disk Cleanup 52
 - Disk Defragmenter 51
 - firewall 57
- speakers, identifying 11
- storing a battery 36
- supported discs 66
- switch, power 31
- system recovery 69
- system restore points 67
 - creating 67

T

- temperature 36
- testing an AC adapter 37
- TouchPad
 - buttons 8
 - using 20
- TouchPad gestures
 - 2-finger click 23
 - 2-finger pinch zoom 22
 - scrolling 22
 - using 20
- TouchPad light, identifying 10
- TouchPad zone
 - identifying 8
- traveling with the computer 36, 76, 79
- troubleshooting
 - disc burning 83
 - disc play 82

- troubleshooting, external display 82
- turning off the computer 31

U

- unresponsive system 31
- upgrade bay
 - replacing an optical drive 47
- USB 3.0 port 6
- USB cable, connecting 41
- USB devices
 - connecting 41
 - description 40
 - removing 41
- USB hubs 40
- USB ports, identifying 5, 6
- user password 54
- using
 - external AC power 37
 - power-saving states 31

V

- vents, identifying 5, 13
- VGA port, connecting 29
- video 27
- volume
 - adjusting 26
 - buttons 26
 - keys 26

W

- webcam 6, 27
- webcam, identifying 6
- Windows Backup and Restore
 - restoring files 69
- Windows button, identifying 12
- wireless button 15
- wireless certification label 76
- wireless controls
 - button 15
 - operating system 15
- wireless light 9, 15
- wireless network (WLAN)
 - connecting 17
 - corporate WLAN connection 17
 - equipment needed 16
 - functional range 18
 - public WLAN connection 17
 - security 17
 - using 16

- WLAN antennas, identifying 6
- WLAN device 16, 76
- WLAN label 76
- writable media 31