User Guide

Product notice

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

To obtain the latest information in this guide, 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.

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 refund subject to the refund policy of your place of purchase.

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

Safety warning notice

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

Table of contents

1   Welcome

IMPORTANT: The Linux operating system installed on this computer does not support some of the features that are available on other operating systems. For example, Linux may not support discrete graphics or mSATA drives.

After you set up and register the computer, take the following steps:

- **Connect to the Internet**—Set up your wired or wireless network so that you can connect to the Internet. For more information, see Networking on page 14.

- **Get to know your computer**—Learn about your computer features. See Getting to know your computer on page 4 and Keyboard and pointing devices on page 19 for additional information.

- **Find installed software**—Access a list of the software preinstalled on the computer. Select **Computer > More Applications**.

  NOTE: For details about using the software included with the computer, select **Computer > Help**. You can also see the software manufacturer's instructions, which may be provided with the software or on the manufacturer's Web site.

- **Update programs and drivers**—Update your programs and drivers with the latest versions on a regular basis. Registering a computer through the Novell Customer Center (NCC) adds the computer to the NCC and allows the operating system to receive online updates. For additional U.S. driver support, go to http://www.hp.com/go/contactHP. For additional worldwide driver support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

Finding information

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

Resources	For information about
Setup Instructions poster	• Setting up the computer
	• Identifying computer components
Linux Help	• Computer software
To access the Linux Help, select **Computer > Help**.	• Computer settings
	• Connecting to the Internet
	• Computer utilities
Regulatory, Safety, and Environmental Notices	• Regulatory and safety information
To access the notices, double-click the **HP Documents** icon located on the desktop.	• Battery disposal information
Safety & Comfort Guide	• Proper workstation setup, posture, health, and work habits
To access this guide, double-click the **HP Documents** icon located on the desktop.	• Electrical and mechanical safety information
– or –	
Go to http://www.hp.com/ergo.	
Worldwide Telephone Numbers booklet	HP support telephone numbers
This booklet is provided with your computer.	
HP Web site	• Support information
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.	• Ordering parts and finding additional help
	• Software, driver, and BIOS updates
	• Accessories available for the device

Resources	For information about
*Limited Warranty**	Warranty information

To access the warranty:

Double-click the **HP Documents** icon located on the desktop.

– or –

Go to http://www.hp.com/go/orderdocuments.

*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.

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

Top

TouchPad

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

Lights

Component		Description
(1)	Power light	• On: The computer is on.
		• Blinking: The computer is in the Sleep state.
		• Off: The computer is off or in Hibernation.
(2)	Microphone mute light	• On: Microphone is off.
		• Amber: Microphone is on.
(3)	Num lock light	On: Num lock is on.
(4)	Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.
		• Amber: All wireless devices are off.
(5)	Mute light	• Amber: Computer sound is off.
		• Off: Computer sound is on.
(6)	Caps lock light	On: Caps lock is on.
(7)	TouchPad light	• Amber: The TouchPad is off.
		• Off: The TouchPad is on.

Buttons 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 Suspend.
		• When the computer is in the Suspend state, press the button briefly to exit Suspend.
		• 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 operating system shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.
		To learn more about your power settings:
		1. Select **Computer > Control Center**.
		2. In the left pane, click **System**, and then click **Power Management** in the right pane.
(2) ((ᴵ))	Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.

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

Keys
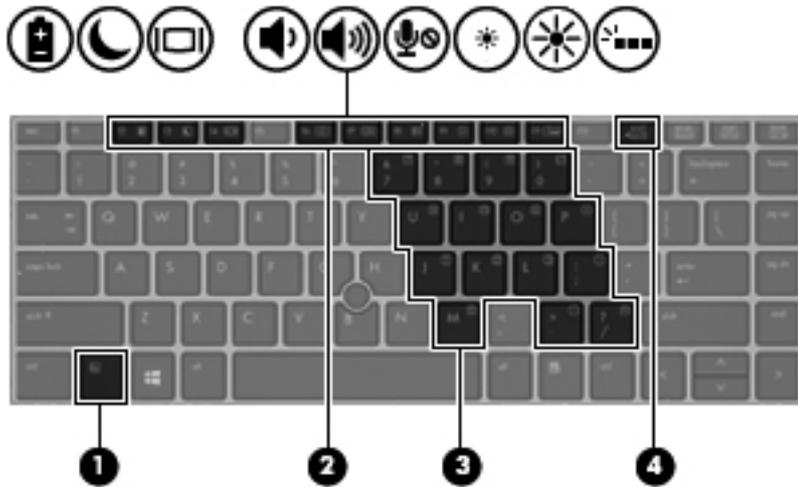
Component		Description
(1)	fn key	Executes frequently used system functions when pressed in combination with a function key.
(2)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.
		Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(3)	Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad.
(4)	num lk key	Turns the embedded numeric keypad on and off when pressed in combination with the fn key.

Front

Component			Description
(1)		Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth device, is on.
			• Amber: All wireless devices are off.
(2)		Power light	• On: The computer is on.
			• Blinking: The computer is in the Suspend state.
			• Off: The computer is off or in Hibernation.
(3)		AC adapter/battery light	• Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent.
			• White: The computer is connected to external power and the battery is charged from 90 to 99 percent.
			• Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.
			• Off: The battery is fully charged.
(4)		Hard drive light	• Blinking white: The hard drive is being accessed.
			• Amber: HP 3D DriveGuard has temporarily parked the hard drive.

Right

Component		Description
(1) SS←	USB 3.0 ports (2)	Connect optional USB devices.
(2) ‡D	DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
(3)	Media Card Reader	Supports the following digital card formats: • MultiMediaCard (MMC) • MultiMediaCardplus (MMC+) • Secure Digital (SD) Card • Secure Digital High Capacity (SDHC) Card • Secure Digital Extra Capacity (SDXC) Card
(4) |□|	External monitor port	Connects an external VGA monitor or projector.
(5)	Docking connector	Connects an optional docking device.
(6)	RJ-45 (network) jack	Connects a network cable.

Left

Component			Description
(1)		Power connector	Connects an AC adapter.
(2)		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.
(3)		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.
(4)		USB 3.0/USB charging port	Connects an optional USB device. The USB charging port can also charge select models of cell phones and MP3 players, even when the computer is off.
(5)		Audio-out (headphone) jack/Audio-in (microphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.
			WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*.
			NOTE: When a device is connected to the jack, the computer speakers are disabled.
			NOTE: Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(6)		Smart card reader	Supports optional Smart cards.

Display

Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	Internal microphones (2)	Record sound.
(3)	Webcam light (select models only)	On: The webcam is in use.
(4)	Webcam (select models only)	Records video and captures still photographs.
		For information on using the webcam, access Help and Support. From the Start screen, type help, and then select **Help and Support** from the list of apps.

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

Bottom

Component		Description
(1)	Wireless and memory module compartment	Contains the wireless and memory modules. **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.
(2)	Travel battery connector	Connects an optional travel battery.
(3)	Vents (2)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Speakers (2)	Produce sound.
(5)	Hard drive bay	Contains the hard drive.
(6)	Battery release latch	Releases the battery from the battery bay.
(7)	Battery bay	Contains the battery.

3 Networking

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

- Wireless—For mobile Internet access, you can use a wireless connection. See Connecting to an existing WLAN on page 15 or Setting up a new WLAN on page 16.

- Wired—You can access the Internet by connecting to a wired network. For information on connecting to a wired network, see Connecting to a wired network on page 17.

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

Using an Internet service provider (ISP)

Before you can connect to the Internet, you must establish an ISP account. Contact a local ISP to purchase Internet service and a modem. The ISP can help set up the modem, install a network cable to connect your wireless computer to the modem, and test the Internet service.

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

Identifying wireless and network status icons

Icon	Name	Description
	Wireless (connected)	Indicates that one or more wireless devices are on.
	Network Connection (connected)	Indicates that the wired network is connected and active. If both wired and wireless connections are active, the operating system uses the wired connection because it is faster.
	Network Connection (disconnected)	Indicates that wired and wireless networks are not connected.

Creating a wireless connection

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

- Wireless local area network (WLAN) device

- Bluetooth device

Turning wireless devices on and off

Using the wireless button

Use the wireless button to turn both the wireless network controller and the Bluetooth controller off or on simultaneously. They can be controlled individually through Control Center or Computer Setup.

NOTE: See Getting to know your computer on page 4 for information on identifying the type and location of the wireless button on your computer.

Using the operating system controls

To enable or disable a wireless or wired network device:

1. Right-click the **Network Connection** icon in the notification area, at the far right of the taskbar.

2. To enable or disable one of the following devices, select or clear one of the following options:

   - **Enable Networking** (all network devices)

   - **Enable Wireless**

Using a WLAN

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

NOTE: When creating a wireless connection or allowing access to users in a network, you are prompted for the root password.

Connecting to an existing WLAN

1. Be sure that the WLAN device is on.

   NOTE: See Getting to know your computer on page 4 for information on identifying the location of the wireless button and wireless light on your computer.

2. Click the **Network Connection** icon in the notification area, at the far right of the taskbar.

   Available wireless networks are listed under **Wireless Networks**.

3. Click the desired wireless network.

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

   NOTE: To connect to a network that is not automatically detected, click the **Network Connection** icon and select **Connect to Hidden Wireless Network**. Enter the ESSID information, and set encryption parameters.

   NOTE: If no WLANs are listed, and your network is not hidden, you are out of range of a wireless router or access point.

   If you do not see the network you want to connect to, right-click the **Network Connection** icon in the notification area, at the far right of the taskbar, and click **Edit Connections**.

Setting up a new WLAN

Required equipment:

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

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

- The wireless computer **(3)**

The illustration below shows an example of a wireless network installation that is connected to the Internet.
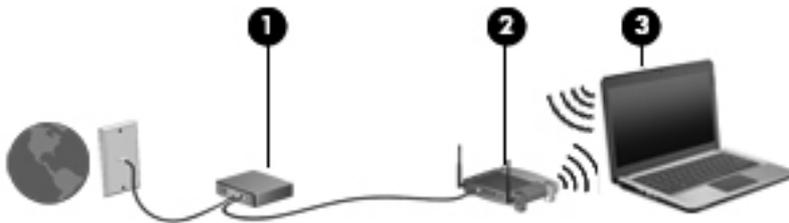
NOTE: Some cable modems include a built-in router. Check with your ISP to see if you need a separate router.

NOTE: When setting up a wireless connection, be sure that your computer and wireless router are synchronized. To synchronize your computer and wireless router, turn your computer and wireless router off and then back on.

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.

Protecting your WLAN

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

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

- **Use a firewall**—Checks both data and requests for data that are sent to your network, and discards any suspicious items. Firewalls are available in both software and hardware. Some networks use a combination of both types.

- **Wireless encryption**—Your computer supports three encryption protocols:

  ◦ Wi-Fi Protected Access (WPA)

  ◦ Wi-Fi Protected Access II (WPA2)

  ◦ Wired Equivalent Privacy (WEP)

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

- Wi-Fi Protected Access (WPA) and Wi-Fi Protected Access II (WPA2) use security standards to encrypt and decrypt data transmitted over the network. Both WPA and WPA2 dynamically generate a new key for every packet, and they also generate a different set of keys for each computer on the network. To accomplish this:

  ◦ WPA uses Advanced Encryption Standard (AES) and Temporal Key Integrity Protocol (TKIP).

  ◦ WPA2 uses Cipher Block Chaining Message Authentication Code Protocol (CCMP), which is a new AES protocol.

- Wired Equivalent Privacy (WEP) encrypts data with a WEP key before it is transmitted. Without the correct key, others will not be able to use the WLAN.

Roaming to another network

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

Using Bluetooth wireless devices

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

- Computers

- Phones

- Audio devices

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

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

Connecting to a wired network

Connecting to a local area network (LAN)

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

To connect the network cable:

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

2. Plug the other end of the cable into a network wall jack **(2)** or a router (not illustrated).
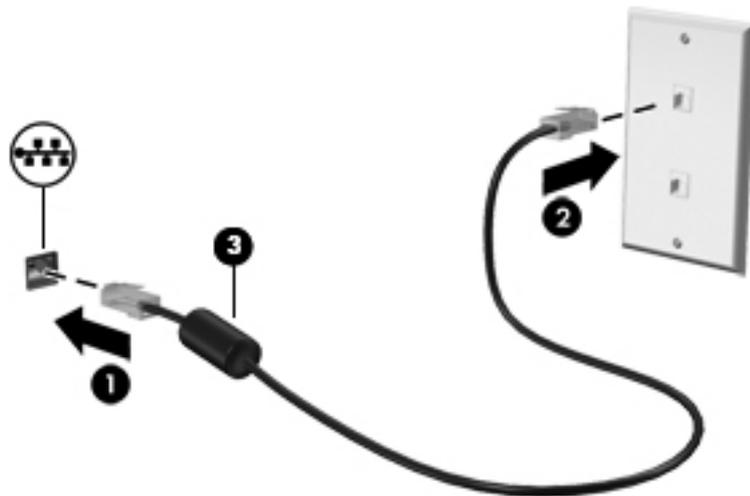
⚠ **WARNING!** To reduce the risk of electric shock, fire, or damage to the equipment, do not plug a modem or telephone cable into the RJ-45 (network) jack.

4 Keyboard and pointing devices

Using the keyboard

Identifying the hot keys

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

To use a hot key:

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

Hot key combination		Description
	fn+esc	Displays system information.
🔋	fn+f2	Displays charge information for all installed batteries. The display indicates which batteries are charging and reports the amount of charge remaining in each battery.
🌙	fn+f3	Initiates Suspend, which saves your information in system memory. The display and other system components turn off and power is conserved.
		To exit Suspend, briefly press the power button.
		CAUTION: To reduce the risk of information loss, save your work before initiating Suspend.
		NOTE: If a critical battery level occurs while the computer is in Suspend, the computer initiates Hibernation and the information stored in memory is saved to the hard drive.
🖥	fn+f4	Switches the screen image among display devices connected to the system. For example, if a monitor is connected to the computer, fn+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 from the computer using the external VGA video standard. The fn+f4 hot key can also alternate images among other devices that are receiving video information from the computer.
🔉	fn+f6	Decreases speaker volume.
🔊	fn+f7	Increases speaker volume.
🎤	fn+f8	Mutes or restores microphone input.
☀	fn+f9	Decreases the screen brightness level.

Hot key combination		Description
☀	fn+f10	Increases the screen brightness level.
⠰▪▪▪	fn+f11	Turns keyboard backlight on full brightness, half brightness and off.
		NOTE: The keyboard backlight is turned on at the factory. To extend battery life, turn off the keyboard backlight.

Using keypads

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

Using the embedded numeric keypad
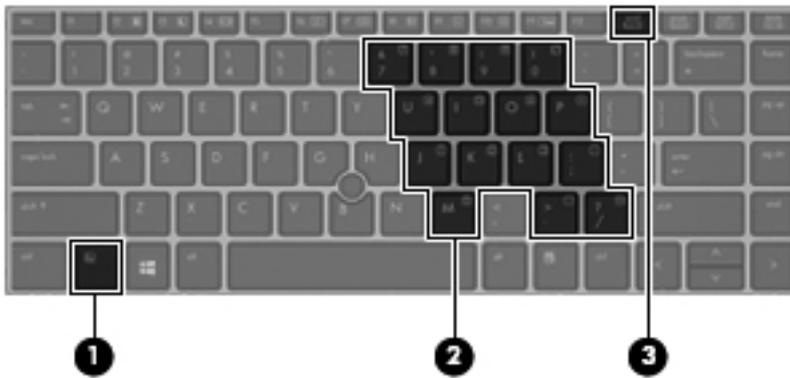
	Component	Description
(1)	fn key	Turns the embedded numeric keypad on and off when pressed in combination with the num lk key.
		NOTE: The embedded numeric keypad will not function while an external keyboard or numeric keypad is connected to the computer.
(2)	Embedded numeric keypad	When the keypad is turned on, it can be used like an external numeric keypad.
		Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key.
(3)	num lk key	Turns the embedded numeric keypad on and off when pressed in combination with the fn key.
		NOTE: The keypad function that is active when the computer is turned off is reinstated when the computer is turned back on.

Turning the embedded numeric keypad on and off

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

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

Switching key functions on the embedded numeric keypad

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

- To use the navigational function of a keypad key while the keypad is off, press and hold the fn key while pressing the keypad key.

- To use the standard function of a keypad key while the keypad is on:

  ◦ Press and hold the fn key to type in lowercase.

  ◦ Press and hold fn+shift to type in uppercase.

Using an optional external numeric keypad

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

- When num lock is on, most keypad keys type numbers.

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

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

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

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

Using the TouchPad

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

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.

Turning the TouchPad off and on

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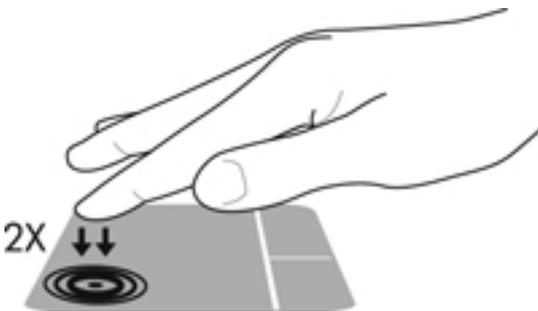
Navigating

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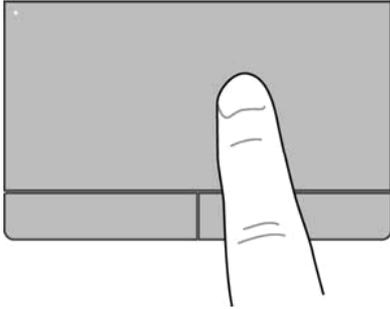
Selecting

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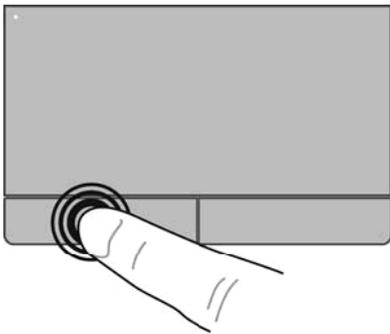
Using TouchPad gestures

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

NOTE: TouchPad gestures are not supported in all programs.

To view information about each gesture:

1. Select **Computer > More Applications**.

2. In the left pane, click **System**, and then click the **TouchPad** icon in the right pane.

3. On the **Device Settings** tab, click the device, and then click **Settings**.

4. Click the gesture to view information about its features.

To turn the gestures on and off:

1. Select **Computer > More Applications**.

2. In the left pane, click **System**, and then click the **TouchPad** icon in the right pane.

3. On the **Device Settings** tab, click the device, and then click **Settings**.

4. Select the check box next to the gesture that you want to turn on or off.

5. Click **Apply**, and then click **OK**.

Scrolling

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

NOTE: Scrolling speed is controlled by finger speed.
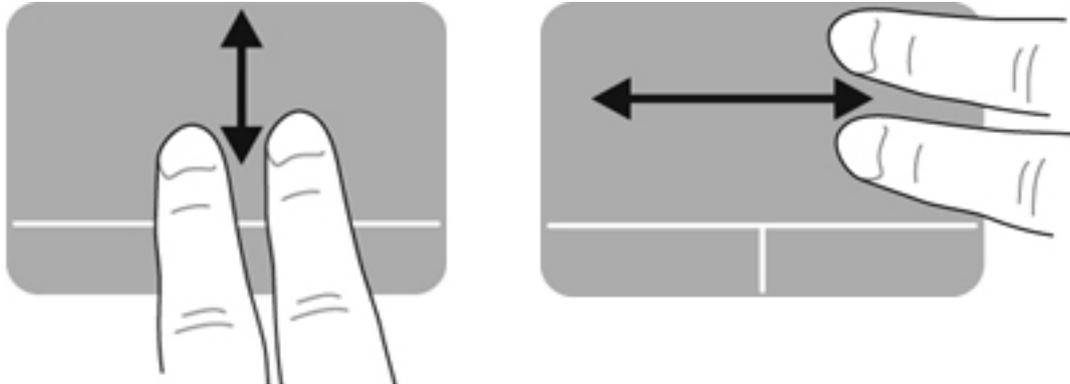
Pinching/Zooming

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

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

Setting pointing device preferences

To customize settings for button configuration, click speed, pointer options, and so on:

1. Select **Computer > Control Center**.

2. In the left pane, click **Hardware**, and then click **Mouse** in the right pane.

Using the pointing stick

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

5   Multimedia

Your computer includes the following:

- Integrated speakers
- Integrated microphones
- Integrated webcam
- Preinstalled multimedia software
- Multimedia buttons or keys

Using the audio features

Your computer enables you to use a variety of audio features:

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

Adjusting the volume

You can adjust the volume using the following:

- Volume buttons
- Volume hot 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*.

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

📝 **NOTE:**   See <u>Getting to know your computer on page 4</u> and <u>Keyboard and pointing devices on page 19</u> for information on what type of volume controls your computer has.

Checking your audio functions

To check the system sound on your computer, follow these steps:

1. Select **Computer > Control Center**.

2. In the left pane, click **Hardware**, and then click **Sound** in the right pane.

3. Click the **Sound Effects** tab, and then select one of the sound options under **Choose an alert sound** to test each sound.

To check the recording functions of the computer, follow these steps:

1. Select **Computer > Control Center**.

2. In the left pane, click **Hardware**, and then click **Sound** in the right pane.

3. Click the **Input** tab, and then select **Microphone** or **Line-in** in the drop-down menu next to **Connector**.

4. Adjust the input volume by moving the **Input volume** slider to the desired setting.

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

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

Using the webcam (select models only)

Some computers include an integrated webcam, located at the top of the display. With the preinstalled software, Cheese, 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

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

Using video devices

Your computer has the following external video ports:

*   VGA

*   DisplayPort

VGA

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

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

Press fn+f4 to switch the image between the display devices connected to the computer.

NOTE: Pressing fn+f4 allows you to switch between settings. You can toggle between a laptop panel, an external display in combination with the laptop panel, or one of the external monitors. You also can attach external monitors to both the DisplayPort and the VGA ports, but only one external display can be active at a time.
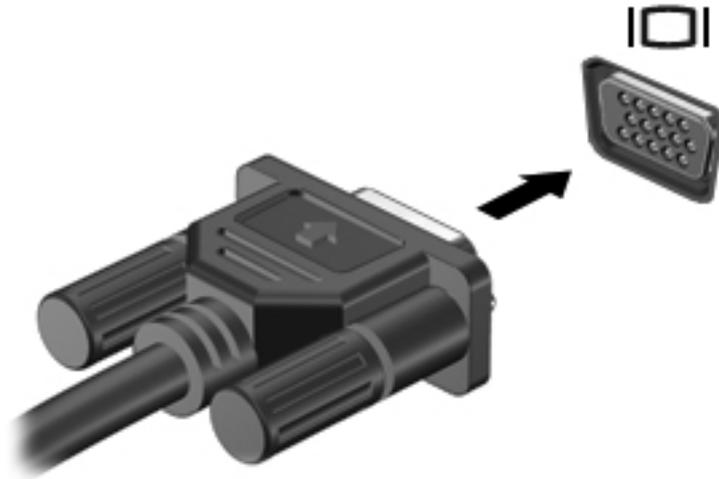
If your external monitor is not detected after pressing fn+f4, follow these steps:

1. Click the **Gnome Display Applet** icon in the notification area, at the far right of the taskbar.

2. Select **Configure Display Settings**.

3. Click **Detect Monitors**.

4. Click the **On** radio button to the right of the display layout. If the default monitor is not detected, set the resolution and the refresh rate using your external monitor specifications. Change the rotation if desired. If the display requires mirroring, click the **Mirror Screens** check box.

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

5. Click **Apply**.

6. Click **Close**.

DisplayPort

The DisplayPort connects a compatible digital display device such as a high-performance monitor or projector. The DisplayPort delivers higher performance than the VGA external monitor port and improves digital connectivity.

▲   To connect a digital display device, connect the device cable to the DisplayPort.
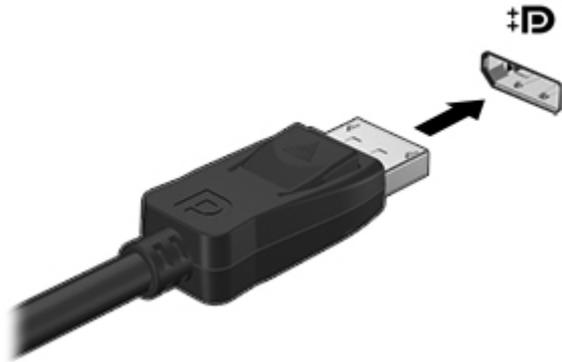
NOTE: Press fn+f4 to switch the image between the display devices connected to the computer.

NOTE: To remove the device cable, press down on the connector latch to disconnect it from the computer.

6 Power management

Shutting down the computer

CAUTION: Unsaved information will be lost when the computer is shut 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 USB port
- When the computer will be unused and disconnected from external power for an extended period

To shut down the computer, follow these steps:

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

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

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

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

Setting power options

Using power-saving states

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

When Suspend is initiated, the power lights blink and the screen clears. Your work is saved to memory, letting you exit the Suspend state faster than exiting Hibernation. If the computer is in the Suspend state for an extended period or if the battery reaches a critical battery level while in the Suspend state, the computer initiates Hibernation.

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

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

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

Initiating and exiting Suspend

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

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

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

- Briefly press the power button.

- Close the display.

  NOTE: This works only when the computer is running on battery power.

- Select **Computer > Shutdown > Suspend**.

- Click the **Power** icon, located on the far right of the taskbar, and then click **Suspend**.

To exit Suspend:

▲ Briefly press the power button.

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

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 using Power Management in Control Center.

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

- Briefly press the power button.

- Select **Computer > Shutdown > Hibernate**.

- Click the **Power** icon, located on the far right of the taskbar, and then click **Hibernate**.

To exit Hibernation:

▲ Briefly press the power button.

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

Using the Power icon

The **Power** icon is located in the notification area, at the far right of the taskbar. The **Power** icon allows you to quickly access power settings, view remaining battery charge, and select a different power plan.

- To display the percentage of remaining battery charge, click the **Power** icon, and then click **Information**.

- To access Power Management Preferences, right-click the **Power** icon, and then click **Preferences**.

Using power management

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

You can customize power management settings.

Viewing the current power management settings

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

Changing the current power management settings

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

2. Change the settings on the **On AC Power** tab, **On Battery Power** tab, and **General** tab, as needed.

Using battery power

When a charged battery is in the computer and the computer is not plugged into external power, the computer runs on battery power. When a charged battery is in the computer and the computer is plugged into external AC power, the computer runs on AC power.

If the computer contains a charged battery and is running on external AC power supplied through the AC adapter, the computer switches to battery power if the AC adapter is disconnected from the computer.

NOTE: When you disconnect AC power, the display brightness is automatically decreased to save battery life. For information on increasing or decreasing display brightness, see Keyboard and pointing devices on page 19.

You can keep a battery in the computer or in storage, depending on how you work. 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. However, a battery in the computer slowly discharges when the computer is off and unplugged from external 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.

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

Displaying the remaining battery charge

▲ Move the pointer over the **Power** icon in the notification area, at the far right of the taskbar.

Inserting or removing the battery

To insert the battery:

1. Turn the computer upside down on a flat surface, with the battery bay away from you.

2. Insert the battery connector end of the battery into the bay, aligning it to the left edge.

3. Slide the battery **(1)** into the bay until it drops and the latch snaps **(2)**, then slide the latch to the left to lock the battery.

NOTE: In the locked position there will be no red color shown in the latch slot.

To remove the battery:

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

1. Turn the computer upside down on a flat surface, with the battery bay away from you.

2. Slide the battery latch to the right **(1)** to release the battery.

3. Slide the battery outward, then lift the front of the battery **(2)**, and then pull it outward **(3)** to remove the battery from the computer.
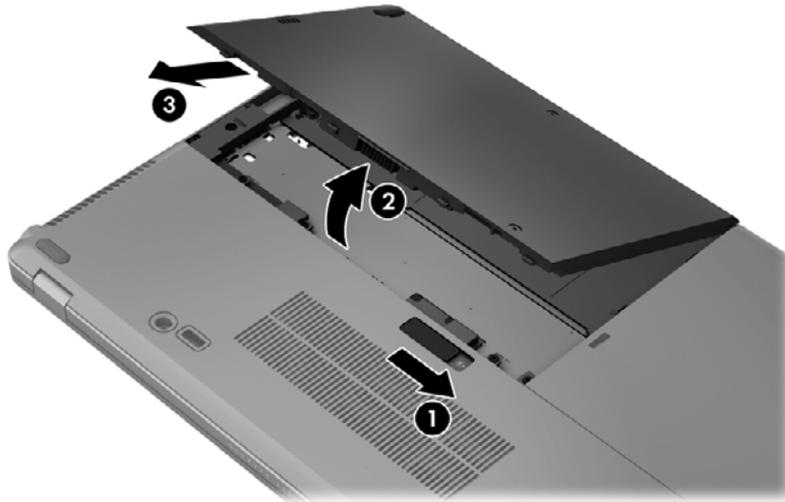
Charging a battery

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

The battery charges whenever the computer is plugged into external power through an AC adapter or an optional power adapter.

The battery charges whether the computer is off or in use, but it charges faster when the computer is off.

Charging may take longer if a battery is new, has been unused for 2 weeks or more, or is much warmer or cooler than room temperature.

To prolong battery life and optimize the accuracy of battery charge displays, follow these recommendations:

- If you are charging a new battery, charge it fully before turning on the computer.

  📝 **NOTE:** If the computer is on while the battery is charging, the battery meter in the notification area may show 100 percent charge before the battery is fully charged.

- Allow the battery to discharge below 5 percent of a full charge through normal use before charging it.

- If the battery has been unused for one month or more, calibrate the battery instead of simply charging it.

Maximizing battery life

To maximize battery life:

1. Select **Computer > Control Center**.

2. In the left pane, click **System**, and then click **Power Management** in the right pane.

3. On the **On Battery Power** tab:

- Adjust the slider to the right of **Put computer to sleep when inactive for** to 30 minutes.

- Select the **Suspend** or **Hibernate** option from the dialog box to the right of **When laptop lid is closed**.

- Select the **Hibernate** or **Shutdown** option from the dialog box to the right of **When battery power is critically low**.

4. Adjust the slider to the right of **Put display to sleep when inactive for** to 15 minutes, and select the check box next to **Reduce backlight brightness**.

5. Select the check box next to **Dim display when idle**.

6. Click **Close**.

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

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 Management in Control Center. Preferences set using Power Management 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:

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

- If Hibernation is disabled and the computer is on or in Suspend, the computer remains briefly in Suspend, 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 the computer to external power using 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 a charged battery is available

1. Turn off the computer or initiate Hibernation.

2. Replace the discharged battery with a charged battery.

3. Turn on the computer.

Resolving a low battery level when no power source is available

- Initiate Hibernation.

- Save your work and shut down the computer.

Resolving a low battery level when the computer cannot exit Hibernation

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

1. Replace the discharged battery with a charged battery, or connect the AC adapter to the computer and to external power.

2. Exit Hibernation by briefly pressing the power button.

Conserving battery power

- Turn off wireless and local area network (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 media cards that you are not using.

- Decrease display brightness.

- Initiate Suspend or Hibernation, or shut down the computer when you are not using it.

Storing a 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 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 used 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 battery disposal information.

Replacing the battery

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

You can find details about the battery by clicking the **Battery** icon in the notification area, at the far right of the taskbar, and then click **Laptop Battery**.

NOTE: To ensure that you always have battery power when you need it, HP recommends purchasing a new battery when the storage capacity indicator turns green-yellow.

Using external AC power

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.

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

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

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

- When you are charging or calibrating a battery
- When you are installing or modifying system software
- When writing information to a CD or DVD

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 **Battery** 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:

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

   - If the power lights turn *on*, the AC adapter is functioning properly.
   - If the power lights remain *off*, the AC adapter is not functioning and should be replaced.

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

7   Drives

Handling drives

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

Observe these precautions:

- Before you move a computer that is connected to an external hard drive, initiate Suspend and allow the screen to clear, or properly disconnect the external hard drive.

- Before handling a drive, discharge static electricity by touching the unpainted metal surface of the drive.

- Do not touch the connector pins on a removable drive or on the computer.

- Handle a drive carefully; do not drop a drive or place items on it.

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

- Do not use excessive force when inserting a drive into a drive bay.

- 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.

- When the battery is the only source of power, be sure that the battery is sufficiently charged before writing to media.

- Avoid exposing a drive to temperature or humidity extremes.

- Avoid exposing a drive to liquids. Do not spray the drive with cleaning products.

- Remove media from a drive before removing the drive from the drive bay, or traveling with, shipping, or storing a drive.

- 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.

Removing or replacing the hard drive cover

Removing the hard drive cover

Remove the hard drive cover to access the hard drive.

1. Remove the battery (see).

2. Loosen the 2 hard drive cover screws **(1)**. Slide the hard drive cover to the right **(2)** away from the computer, and then remove the cover **(3)**.
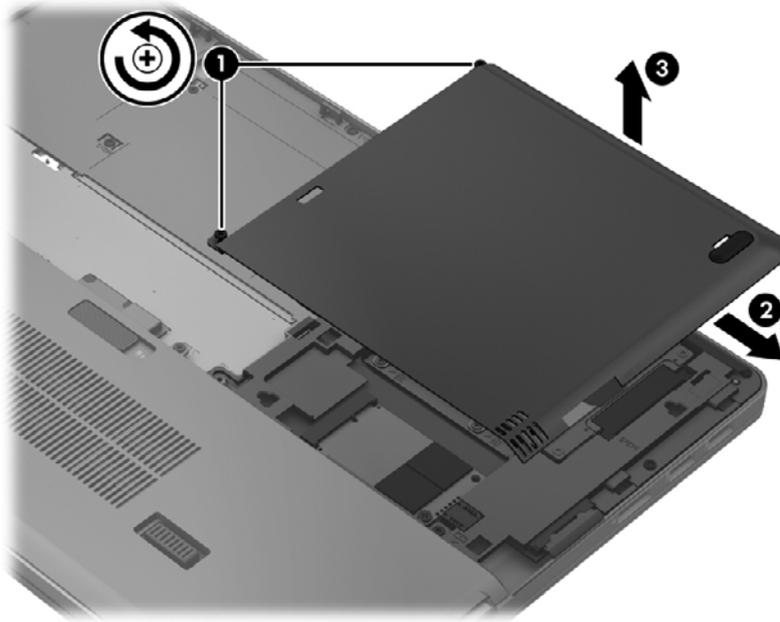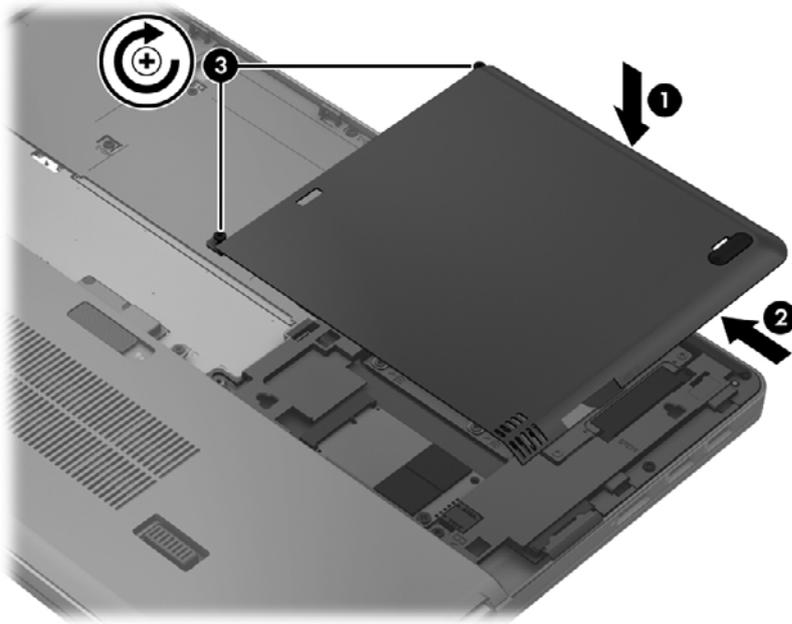
Replacing the hard drive cover

Replace the hard drive cover after accessing the hard drive.

1. Align the tabs on the hard drive cover **(1)** with the notches on the computer.

2. Slide the hard drive cover **(2)** into place, and then tighten the 2 screws **(3)**.

3. Insert the battery (see <u>Inserting or removing the battery on page 31</u>).

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 Suspend, or in Hibernation.

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

Removing the hard drive

To remove a hard drive:

1. Save your work and shut down the computer.

2. Disconnect AC power and external devices connected to the computer.

3. Remove the battery (see <u>Inserting or removing the battery on page 31</u>).

4. Remove the hard drive cover (see <u>Removing or replacing the hard drive cover on page 38</u>).

5. Loosen the 4 hard drive screws **(1)**. Pull the hard drive tab **(2)** upward to disconnect the hard drive.

6. Lift the hard drive, and then pull the hard drive out of the hard drive bay.
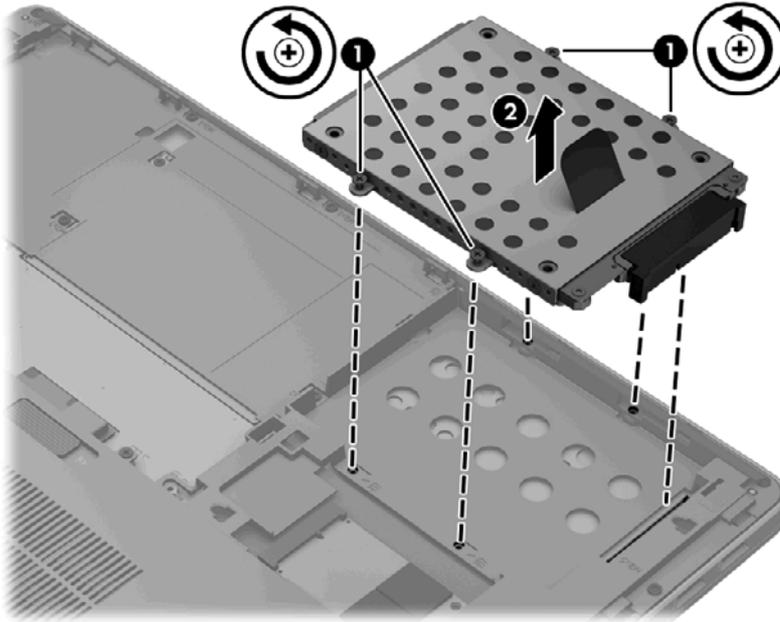
Installing a hard drive

To install the hard drive:

1. Align the hard drive in the hard drive bay, and then lower the hard drive **(1)** into the hard drive bay until the hard drive connector is seated.

2. Tighten the 4 screws **(2)** to secure the hard drive.
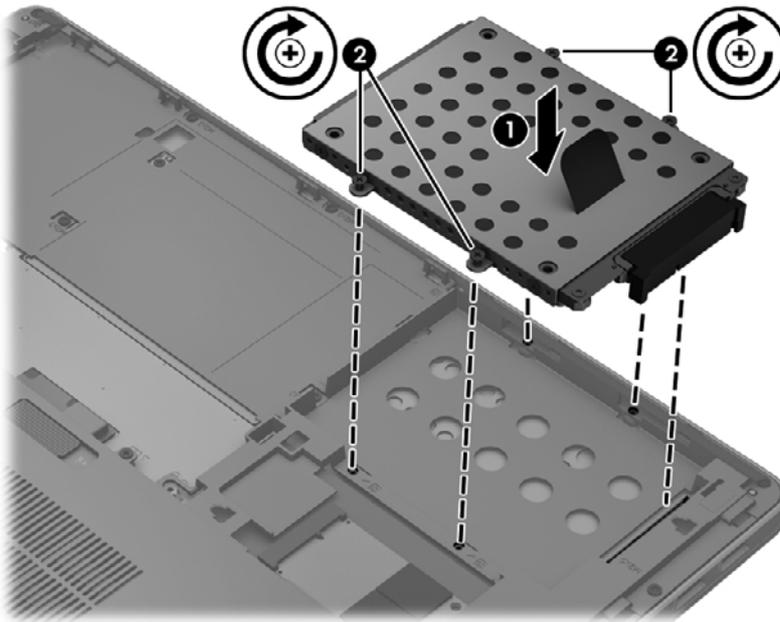
3. Replace the hard drive cover (see Removing or replacing the hard drive cover on page 38).

4. Insert the battery (see Inserting or removing the battery on page 31).

5. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.

6. Turn on the computer.

Using optional external optical drives

Identifying the installed optional external optical drive

▲ Select **Computer > YaST > Hardware Information**.

NOTE: When accessing YaST, you are prompted for the root password.

A list of all the devices installed in your computer, including your optical drive, is displayed.

Inserting an optical disc

Slot-load

CAUTION: Do not insert **8-cm** optical discs into a slot-load optical drive. It may cause damage to the optical drive.

1. Turn on the computer.

2. Hold the disc by the edges to avoid touching the flat surfaces and position the disc label-side up.

3. Gently slide the disc into the slot-load optical drive.

Tray-load

1. Turn on the computer.

2. Press the eject button **(1)** on the drive bezel to release the disc tray.

3. Pull out the tray **(2)**.

4. Hold the disc by the edges to avoid touching the flat surfaces and position the disc label-side up over the tray spindle.

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

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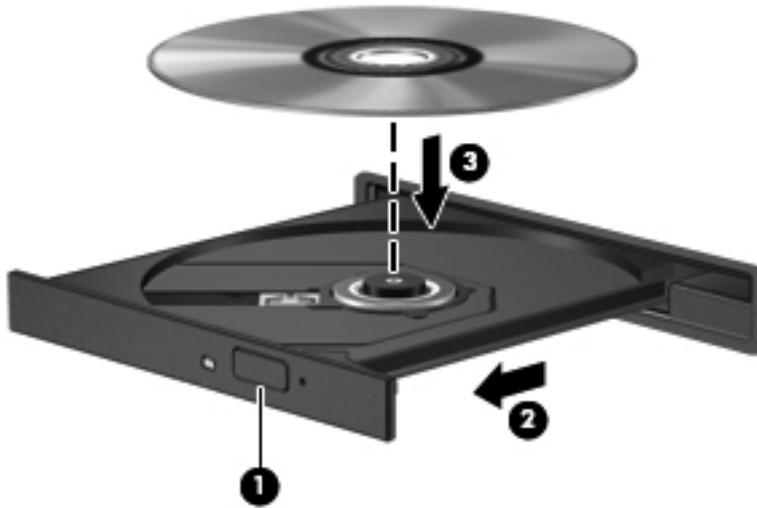
6. Close the disc tray.

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

Removing an optical disc

Slot-load

1. Press the release button **(1)** next to the drive.

2. Remove the disc **(2)** by holding it by the edges and avoid touching the flat surfaces.

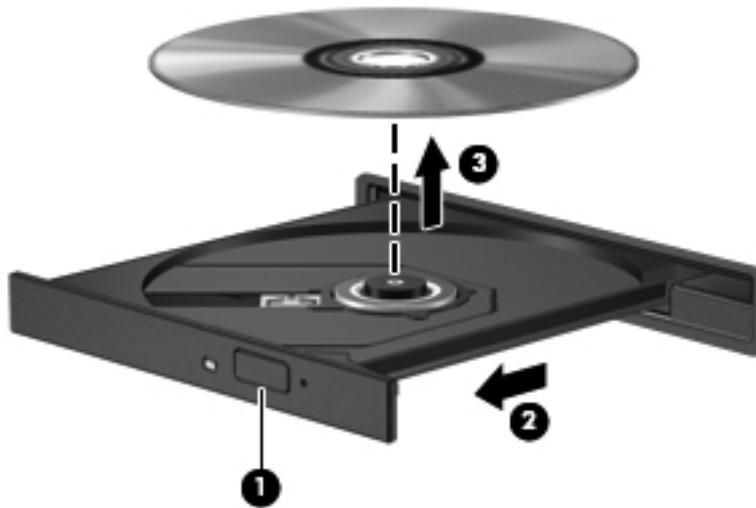3. Place the disc in a protective case.

Tray-load

There are 2 ways to remove a disc, depending on whether the disc tray opens normally or not.

When the disc tray opens normally

1. Press the release button **(1)** on the drive bezel to release the disc tray, and then gently pull out the tray **(2)** until it stops.

2. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

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

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

When the disc tray fails to open

1. Insert the end of a paper clip **(1)** into the release access in the front bezel of the drive.

2. Press in gently on the paper clip until the tray is released, and then pull out the tray **(2)** until it stops.

3. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

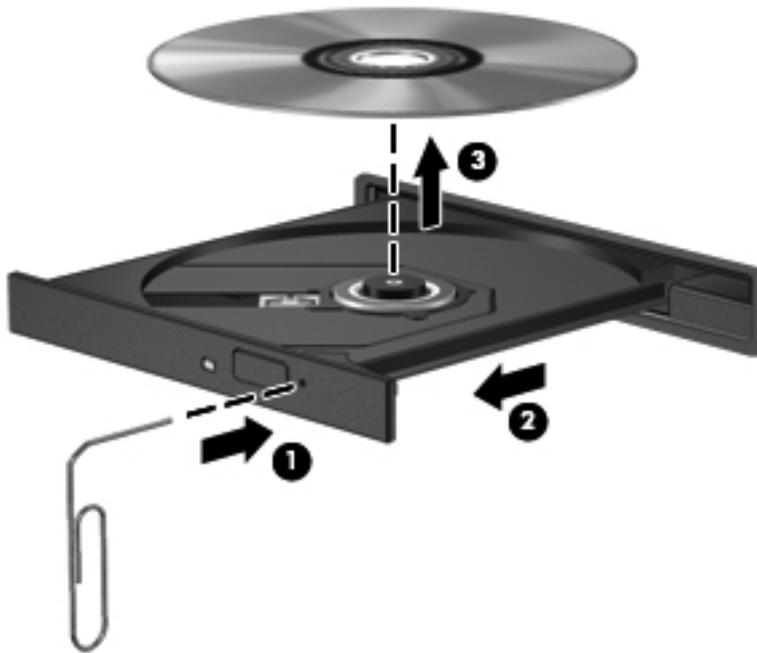**NOTE:** If the tray is not fully accessible, tilt the disc carefully as you remove it.

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

8 External cards and devices

## Using Media Card Reader cards (select models only)

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

To determine which digital card formats that are supported on your computer, see Getting to know your computer on page 4.

Inserting a digital card

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

1. Hold the digital card label-side up, with the connectors facing the computer.

2. Insert the card into the Media Card Reader, and then press in on the card until it is firmly seated.
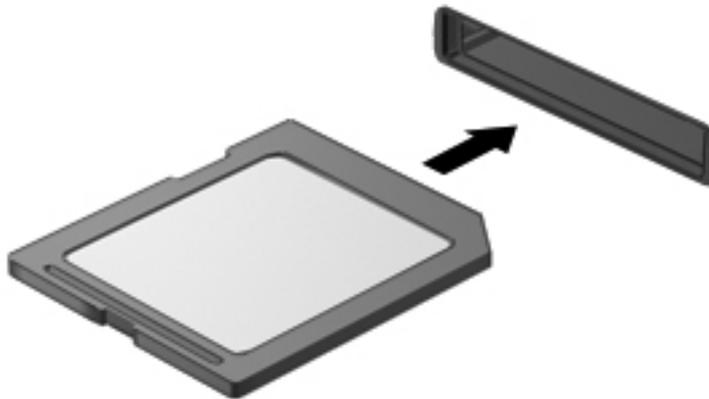
Removing a digital card

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

Save your information and close all programs associated with the digital card.

To remove a digital card:

1. Open File Browser by selecting **Computer > Nautilus**.

2. In the **Places** list in the left pane of File Browser, click the **Eject** icon next to the name of the digital card.

NOTE: You are prompted that it is safe to remove the hardware device.

3. Press in on the card **(1)**, and then remove it from the slot **(2)**.
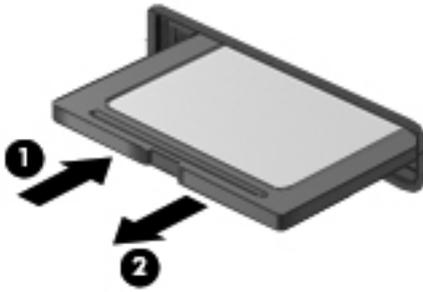
NOTE: If the card is not ejected, pull the card out of the slot.
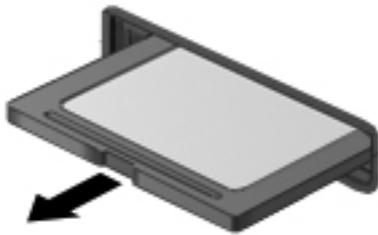
Using a USB device

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.

Connecting a USB device

CAUTION: To prevent damage to a USB connector, use minimal force to connect a USB device.

▲ To connect a USB device to the computer, connect the USB cable for the device to the USB port.

NOTE: When you connect a USB storage device, you may see a message in the notification area to let you know that the device is recognized by the system.

Removing a USB device

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

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

To remove a USB device:

1. Open File Browser by selecting **Computer > Nautilus**.

2. In the **Places** list in the left pane of File Browser, click the **Eject** icon next to the name of the device.

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 on the computer.

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

USB drives include the following types:

- 1.44-megabyte diskette drive

- External hard drive (a hard drive with an adapter attached)

- External optical drive (CD and DVD)

- MultiBay device

Using the docking connector

The docking connector connects the computer to an optional docking device. An optional docking device provides additional ports and connectors that can be used with the computer.

To connect the computer to a docking device:

1. Pull out the connect button **(1)** on the docking device to retract the locking mechanism.

2. Align the docking posts on the docking device with the receptors on the bottom of the computer and lower the computer into the docking device **(2)** until the computer is seated.

3. Push in the connect button **(1)** on the docking device to secure the docking device to the computer. The connect light **(2)** turns on when the computer is fully docked.

9 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.

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

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

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

To add or replace a memory module:

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

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

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

1. Save your work and shut down the computer.

2. Disconnect AC power and external devices connected to the computer.

3. Remove the hard drive cover. (See Removing the hard drive cover on page 38.)

4. To remove the memory module compartment door:

    a. Turn the computer upside down on a flat surface, with the memory module compartment door toward you.

    b. Loosen the 3 screws **(1)**.

c. Tilt the door up from the computer slightly **(2)** and slide the door toward the front of the unit. Lift the door **(3)** up and away from the computer.
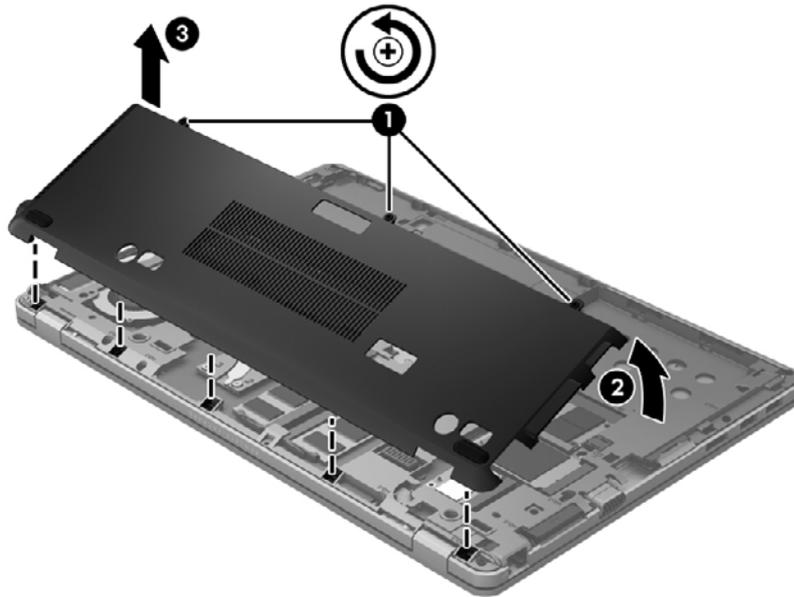
5. If you are replacing a memory module, remove the existing memory module:

a. Pull away the retention clips **(1)** on each side of the memory module.

The memory module tilts up.

⚠ **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.

b. Grasp the edge of the memory module **(2)**, and gently pull the module out of the memory module slot.
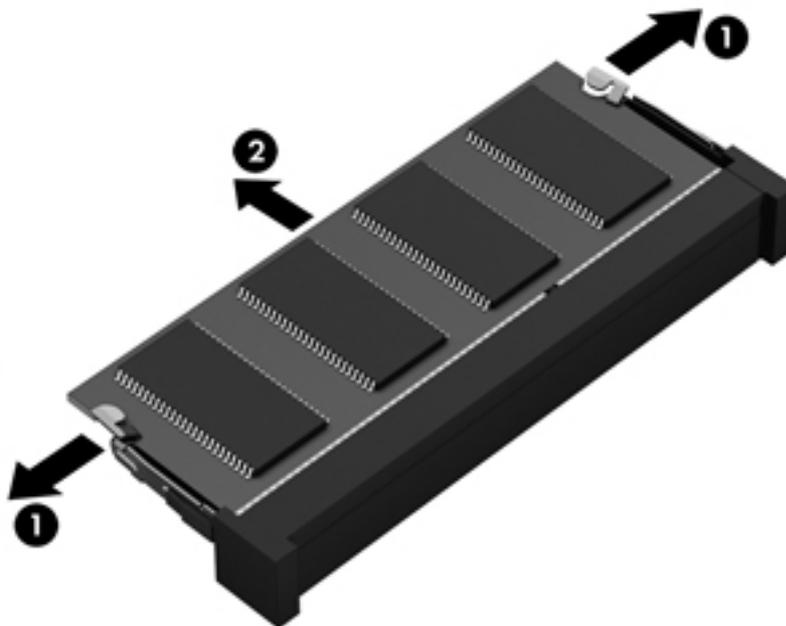
To protect a memory module after removal, place it in an electrostatic-safe container.

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.
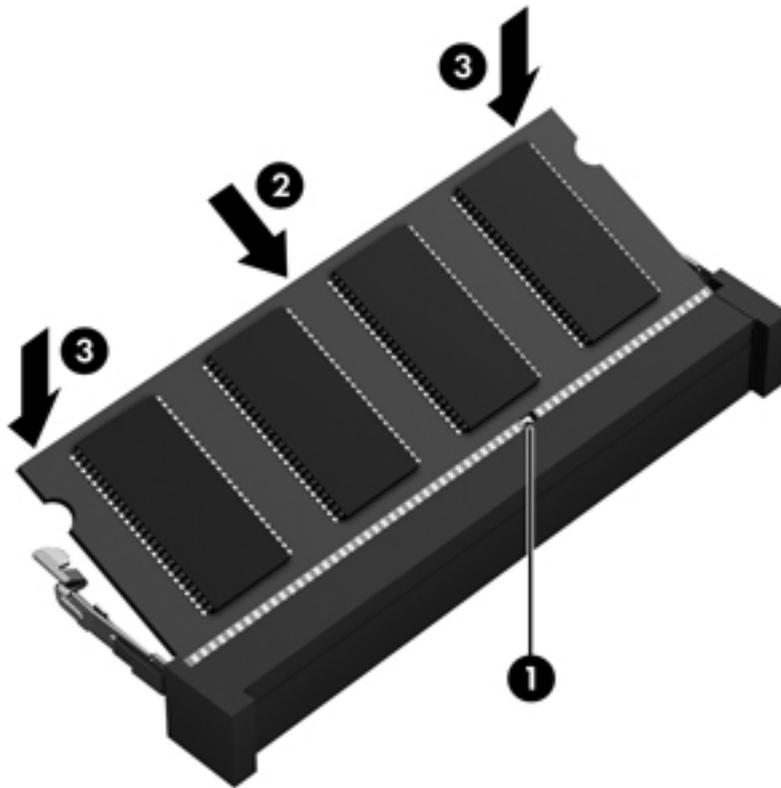
7. To replace the memory module compartment door:

   a. Turn the computer upside down on a flat surface, with the memory module compartment toward you.

   b. Align the door tabs with the edge of the computer and slide the door toward the back of the computer at a slightly tilted angle **(1)**.

c. Rotate the door down **(2)**, and then tighten the 3 screws **(3)**.
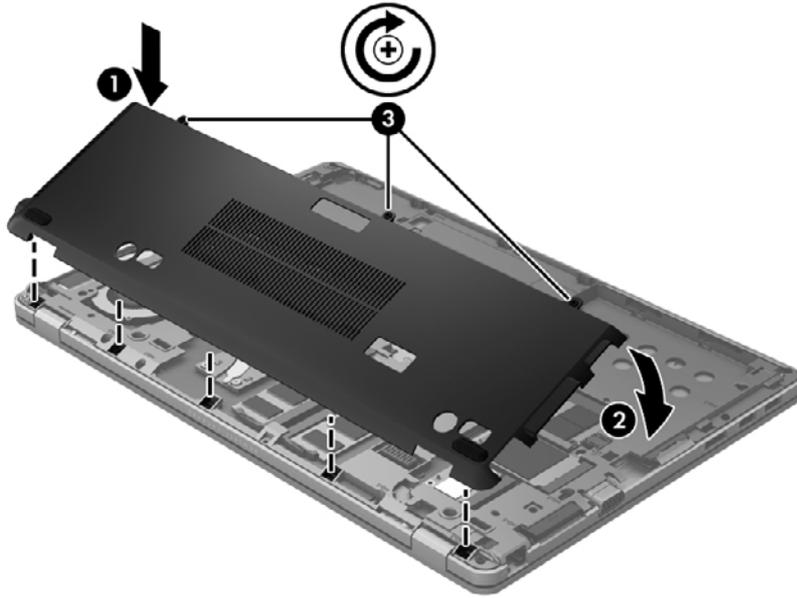
8. Replace the hard drive cover. (See <u>Replacing the hard drive cover on page 38</u>.)

9. Turn the computer right-side up, and then reconnect AC power and external devices to the computer.

10. Turn on the computer.

10 Security

Protecting the computer

📝 **NOTE:** Security solutions are designed to act as deterrents, but they may not deter software attacks or prevent the computer from being mishandled or stolen.

Security features provided with your computer can protect the computer, personal information, and data from a variety of risks. The way you use your computer will determine which security features you need to use.

The operating system offers certain security features. Additional security features are listed in the following table. Most of these additional security features can be configured in Computer Setup.

To protect against	Use this security feature
Unauthorized use of the computer	Authentication using passwords
Unauthorized access to Computer Setup (f10)	BIOS Administrator password in Computer Setup*
Unauthorized access to the contents of a hard drive	DriveLock password in Computer Setup*
Unauthorized startup from an optical drive, diskette drive, or internal network adapter	Boot options feature in Computer Setup*
Unauthorized access to data	• Firewall software • Operating system updates
Unauthorized access to Computer Setup settings and other system identification information	BIOS administrator password in Computer Setup*
Unauthorized removal of the computer	Security cable slot (used with an optional security cable)

*Computer Setup is a utility accessed by pressing f10 when the computer is turned on or restarted. When using Computer Setup, you must use the keys on your computer to navigate and make selections.

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 the Computer Setup utility that is preinstalled on the computer.

- Setup and DriveLock passwords are set in Computer Setup and are managed by the system BIOS.

- If you forget both the DriveLock user password and the DriveLock master password set in Computer Setup, the hard drive that is protected by the passwords is permanently locked and can no longer be used.

Use the following tips for creating and saving passwords:

- When creating passwords, follow requirements set by the program.
- Write down your passwords and store them in a secure place away from the computer.
- Do not store passwords in a file on the computer.

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

Setting passwords in the operating system

Operating system passwords	Function
Root password	Protects access to an operating system root-level account.
User password	Protects access to an operating system user account.

Setting passwords in Computer Setup

Computer Setup passwords	Function
BIOS administrator password*	Protects access to Computer Setup.
DriveLock master password*	Protects access to the internal hard drive that is protected by DriveLock. It is also used to remove DriveLock protection. This password is set under DriveLock Passwords during the enable process.
DriveLock user password*	Protects access to the internal hard drive that is protected by DriveLock, and is set under DriveLock Passwords during the enable process.
TPM embedded security password (select models only)	When enabled as a BIOS administrator password, protects access to the computer contents when the computer turns on, restarts, or exits Hibernation. This password requires the optional embedded security chip to support this security feature.

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

Managing a BIOS administrator password

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

1. Open Computer Setup by turning on or restarting the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f10.

2. Use a pointing device or the arrow keys to select **Security > Setup BIOS Administrator password**, and then press enter.

   - To set a BIOS administrator password, type your password in the **Enter New Password** and **Confirm New Password** fields, and then press enter.

   - To change a BIOS administrator password, type your current password in the **Enter Current Password** field, type a new password in the **Enter New Password** and **Confirm New Password** fields, and then press enter.

   - To delete a BIOS administrator password, type your current password in the **Enter Password** field, and then press enter 4 times.

3. To save your changes and exit Computer Setup, use the arrow keys to select **Exit > Exit Saving Changes**.

Your changes take effect when the computer restarts.

Entering a BIOS administrator password

At the **Enter password** prompt, type your administrator password, and then press enter. After 3 unsuccessful attempts to enter the administrator password, you must restart the computer and try again.

Using a Computer Setup DriveLock password

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

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

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

- After DriveLock protection is applied to a hard drive, the hard drive can be accessed only by entering either the user password or the master password.

- The owner of the user password should be the day-to-day user of the protected hard drive. The owner of the master password may be either a system administrator or the day-to-day user.

- The user password and the master password can be identical.

- You can delete a user password or master password only by removing DriveLock protection from the drive. DriveLock protection can be removed from the drive only with the master password.

Managing a DriveLock password

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

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

2. Press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Security > DriveLock Password**, and then press follow the on-screen instructions.

4. To confirm DriveLock protection on the drive you have selected, type `DriveLock` in the confirmation field, and then press enter.

NOTE: The DriveLock confirmation is case sensitive.

Your changes go into effect when the computer restarts.

Entering a DriveLock password

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

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

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

Using Computer Setup Automatic DriveLock

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

NOTE: You must have a BIOS administrator password before you can access the Automatic DriveLock features.

Managing an Automatic DriveLock password

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

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

2. Press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Security > Automatic DriveLock**, and then follow the on-screen instructions.

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.

1. To view or modify the firewall settings, select **Computer > YaST**.

    NOTE: When accessing YaST, you are prompted for the root password.

2. In the left pane, click **Security and Users**, and then click **Firewall** in the right pane.

NOTE: When modifying firewall settings, you are prompted for the root password.

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 different from the illustration in this section. See Getting to know your computer on page 4 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.
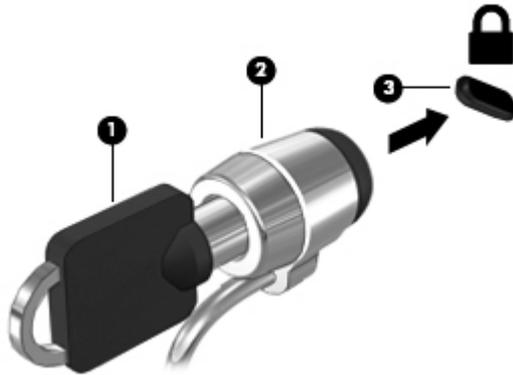
4. Remove the key and keep it in a safe place.

Using the fingerprint reader (select models only)

An integrated fingerprint reader is available on select computer models. In order to use the fingerprint reader, you must set up a user account with a password on the computer. This account allows you to log on to your computer with a swipe of a designated finger.

Enabling fingerprint authentication during logon

To enable fingerprint authentication during logon:

1. Select **Computer > YaST**.

2. Enter your root password, and then click **Continue**.

3. In the left pane, click **Hardware**, and then click **Fingerprint Reader** in the right pane.

4. Select the **Use Fingerprint Reader** option.

> **NOTE:** To enroll your fingerprint, you must open the user management utility. You can start this utility from the account setup dialog box by selecting the check box next to **Start user management after finish**.

Enrolling your fingerprint

If you did not enroll your fingerprint when you set up your fingerprint user account, you can open the user management utility to modify your fingerprint settings. To open the user management utility and enroll your fingerprint:

1. Select **Computer > YaST**.

2. Enter your root password, and then click **Continue**.

3. In the left pane, click **Security and Users**, and then click **User and Group Management** in the right pane.

4. Select the account that you want to modify, and then click **Edit**.

5. Click the **Plug-Ins** tab, click **Set the user's fingerprint**, and then click **Launch**.

6. Follow the on-screen instructions to enroll your fingerprint.

NOTE: After your fingerprint is enrolled, you can swipe your finger on the fingerprint reader when you turn on the computer, unlock the computer, or resume from the Suspend or Hibernation state, instead of typing a password.

11 Backup and Recovery

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

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

Creating backups

1. Create restore media immediately after you set up the computer. For more information, see Performing a system recovery on page 61.

2. As you add files, routinely create a backup of your system and personal information.

Backing up your information

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

- At regularly scheduled times

- Before the computer is repaired or restored

- Before you add or modify hardware or software

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

1. Select **Computer > More Applications > Tools > Backup Manager Settings**, and click **Backup my home directory**.

2. Click **Storage Destination Location**, and then select a location to back up your information.

3. Click **Schedule**, and then select a time schedule to perform backups at a regularly scheduled time.

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

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

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

To restore backup files:

1. Select **Computer > More Applications > Tools > Backup Manager Restore**.

2. Click **Backup Source**, and then select the location of the backup files.

3. Click **Restore Destination**, and then select the destination to restore the files.

4. To restore all files from the selected location, click **Restore all files**. To restore select files only, click **Restore selected files**, click **Select Files** and then select the files to be restored.

5. Under **Restore Point**, click the time and date of the backup.

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

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

Performing a system recovery

Recovery allows you to repair or restore the computer to its original factory state. You can create an HP Factory Image Restore DVD, using an installed or an external DVD±RW optical drive.

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

To restore the computer using the HP Factory Image Restore DVD, you must first create the recovery disc. To create the recovery disc:

NOTE: HP recommends that you create the HP Factory Image Restore DVD in the event of a system failure.

1. Select **Computer > More Applications**.

2. In the left pane, click **Tools**, and then click **Create HP Factory Image Restore DVD** in the right pane.

3. Follow the on-screen instructions to create an image file to burn a recovery disc.

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

1. If possible, back up all personal files.

2. Insert the HP Factory Image Restore DVD into the optical drive and restart the computer.

3. As the computer is restarting, press f9 to open the Computer Setup boot option menu.

4. Press the down arrow to select **Restore SLED HP-BNB preload image** from the **Linux boot** menu, and then press enter.

5. Using the arrow keys, select **Yes** when prompted: **Do you want to start the System-Restore?**

6. Follow the on-screen instructions.

USB Recovery option

The USB Recovery Disk On Key (flash drive) option allows you to create a backup image of the SLED operating system installed on select HP Business Notebooks. This Disk On Key may be used to restore the system to the original factory state when the F11 recovery option is not available. This process should be done on first obtaining the computer.

CAUTION: The USB recovery option does not preserve data present on the computer's hard drive or on the Disk On Key used for the recovery process. Back up any data on the Disk on Key or the notebook that will be recovered before starting.

NOTE: HP recommends that you create the USB Recovery Disk in the event of a system failure. The Disk On Key used for this process should be 4 GB or larger.

Creating a USB Recovery Disk On Key

1. Connect the USB Disk On Key to a USB port on the computer.

2. Select **Computer > More applications > Tools > Create Recovery USB**.

3. Enter the root password when prompted.

4. Select **USB Disk On Key** from the list.

5. Click **OK**.

6. A question dialog will remind you that the data on the USB key will be destroyed. To continue, click **OK**. Otherwise, click **Cancel** and back up the contents of the Disk On Key on another computer.

7. The backup process will display a status dialog box while the backup is in progress.

   NOTE: A file browser window with the Disk On Key Contents displayed will pop up when the key is mounted. You may close the file browser window if desired. Once the USB Recovery Key has been created, the status dialog will close. The USB Recovery Key is ready for use.

Recovering from a USB Recovery Disk On Key

CAUTION: Before starting the Recovery process, make sure any data on the system to be recovered has been backed up. The recovery process destroys all data on the system to be recovered.

1. Turn off the computer.

2. Connect the USB Disk On Key to a USB port on the computer.

3. Turn on the computer while holding down the f9 key.

4. Once the system has booted, the **Boot Options** menu should appear.

5. Using the arrow keys, select **USB Disk On Key** and press enter.

   NOTE: The description may vary from one USB key to another. Any entry other than Optical Disk Drive, Notebook Hard Drive or Notebook Ethernet should be the USB Recovery Disk On Key.

6. Once the USB Recovery Disk On Key has been selected, press enter. The USB Recovery Disk On Key will boot.

7. Once the USB Recovery Disk On Key has booted, a dialog box will prompt, "Do you want to start the System-Restore?" If data on the computer has not been backed up, use the tab key and select **No**. The system will reboot. Back up the system data and repeat the previous steps. If no data should be saved from the computer, use the tab key to select **Yes**. Press enter to begin the recovery process.

8. After the files are copied to the system, follow the on-screen instructions.

Remove everything and reinstall SLED

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, applications, and settings from your computer, and reinstalls the Linux operating system.

IMPORTANT: This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the f11 key.

To use the f11 key:

Press f11 while the computer boots.

– or –

Press and hold f11 as you press the power button.

The following options are available:

- Cancel/Reboot—Reboots the system. No recovery or restore activity is performed.

- Recover/Repair System—This option repairs a system that is not working properly and preserves user data.

- Restore Factory System—This option restores the system back to the original factory state. User data is not preserved.

Select an option and follow the on-screen instructions.

12 Computer Setup (BIOS) and Advanced System Diagnostics

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

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

Starting Computer Setup

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

To start Computer Setup, follow these steps:

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

2. Press f10 to enter Computer Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

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

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

   - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.

   - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.

   - To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

2. Press f10 to enter Computer Setup.

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

- To exit Computer Setup menus without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

    – or –

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

    – or –

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

    – or –

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

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

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

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

2. Press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.

4. Follow the on-screen instructions.

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

    – or –

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

Your changes go into effect when the computer restarts.

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

Updating the BIOS

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

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

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

Determining the BIOS version

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

BIOS version information (also known as *ROM date* and *System BIOS*) can be displayed as follows:

1. Start Computer Setup.

2. Use a pointing device or the arrow keys to select **File > System Information**.

3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

    – or –

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

NOTE: You can also determine the BIOS version by turning on or restarting the computer, pressing the esc key while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then pressing the f1 key. Follow the on-screen instructions to exit this screen.

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 Suspend or Hibernation.

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

1. Open your web browser. 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. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. Click the option for software and driver downloads, type your computer model number in the product box, and then press enter. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

4. Click your specific product from the models listed.

5. Click the appropriate operating system.

6. Go to the BIOS section and download the BIOS software package.

7. Follow the installation instructions as provided with the downloaded BIOS software package.

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

Using Advanced System Diagnostics

Advanced System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in Advanced System Diagnostics:

- Start-up test—This test analyzes the main computer components that are required to start the computer.

- Run-in test—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.

- Hard disk test—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.

- Memory test—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.

- Battery test—This test analyzes the condition of the battery and calibrates the battery if necessary. If the battery fails the test, contact support to report the issue and purchase a replacement battery.

- System Tune-Up—This group of additional tests checks your computer to make sure that the main components are functioning correctly. System Tune-Up runs longer and more comprehensive tests on memory modules, hard drive SMART attributes, the hard drive surface, the battery (and battery calibration), video memory, and the WLAN module status.

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

To start Advanced System Diagnostics:

1. Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f2.

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

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

13 MultiBoot

About the boot device order

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

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

The factory setting is for the computer to select the boot device by searching enabled boot devices and drive bay locations in the following order:

NOTE: Some of the boot devices and drive bay locations listed may not be supported on your computer.

- Notebook upgrade bay
- Optical drive
- Notebook hard drive
- USB diskette drive
- USB CD-ROM
- USB hard drive
- Notebook Ethernet
- Secure Digital (SD) Memory Card
- Docking station upgrade bay
- External SATA drive

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

Enabling boot devices in Computer Setup

The computer will boot to a USB device or a NIC device only if the device has first been enabled in Computer Setup.

To start Computer Setup and enable a USB device or a NIC device as a boot device, follow these steps:

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

2. Press f10 to enter Computer Setup.

3. To enable bootable media in USB drives or in drives inserted into an optional docking device (select models only), use a pointing device or the arrow keys to select **System Configuration > Device Configurations**. Confirm **USB legacy support** is selected.

   NOTE: The USB Port option must be enabled in order to use USB legacy support. It is enabled at the factory. If the port becomes disabled, reenable it by selecting **System Configuration > Port Options**, and then selecting **USB Port**.

   – or –

   To enable a NIC device, select **System Configuration > Boot Options**, and then select **PXE Internal NIC boot**.

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

   – or –

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

Your changes go into effect when the computer restarts.

NOTE: To connect a NIC to a Preboot eXecution Environment (PXE) or Remote Program Load (RPL) server without using MultiBoot, press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then quickly press f12.

Considering boot order changes

Before changing the boot order, note the following considerations:

- When the computer restarts after the boot order has been changed, the computer attempts to start using the new boot order.

- If there is more than one type of boot device, the computer attempts to boot using the first device of each type of boot device (except for optical devices). For example, if the computer is connected to an optional docking device that contains a hard drive, this hard drive will be shown in the boot order as a USB hard drive. If the system attempts to boot from this USB hard drive and fails, it will not attempt to boot to the hard drive in the hard drive bay. Instead, it will try to boot to the next type of device in the boot order. However, if there are two optical devices, and the first optical device does not boot (either because it does not contain media or the media is not a boot disc), the system will try to boot to the second optical device.

- Changing the boot order also changes the logical drive designations. For example, if you start up from a CD-ROM drive with a disc formatted as drive C, that CD-ROM drive becomes drive C and the hard drive in the hard drive bay becomes drive D.

- The computer will boot from a NIC device only if the device has been enabled in the Built-In Device Options menu of Computer Setup and if booting from the device has been enabled in the Boot Options menu of Computer Setup. Booting from a NIC does not affect logical drive designations because no drive letter is associated with the NIC.

- Drives in an optional docking device are treated like external USB devices in the boot order.

Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.

- To dynamically choose the boot device, by pressing esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then pressing f9 to enter the Boot Device Options menu.

- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

Setting a new boot order in Computer Setup

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

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

2. Press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select the **Legacy Boot Order** list, and then press enter.

4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the + key.

    – or –

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

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

    – or –

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

Your changes go into effect when the computer restarts.

Dynamically choosing a boot device using the f9 prompt

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

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. Press f9.

3. Use a pointing device or the arrow keys to select a boot device, and then press enter.

Your changes go into effect immediately.

Setting a MultiBoot Express prompt

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

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

2. Press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **System Configuration > Boot Options**, and then press enter.

4. In the **Multiboot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)

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

    – or –

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

Your changes go into effect when the computer restarts.

Entering MultiBoot Express preferences

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

*   To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press enter.

*   To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press enter.

*   To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

A Troubleshooting and support

Troubleshooting

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 Suspend state or in Hibernation. To exit Suspend or Hibernation, briefly press the power button. Suspend and Hibernation are energy-saving features that turn off the display. Suspend and Hibernation 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 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 fn+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 fn+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 by selecting **Computer > Shutdown > Restart**. If you cannot restart the computer using this procedure, see the next section,

The computer is on but is 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 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.

The optional external optical disc tray does not open for removal of a CD or DVD

1. Insert the end of a paper clip **(1)** into the release access in the front bezel of the drive.

2. Press in gently on the paper clip until the disc tray is released, and then pull out the tray **(2)** until it stops.

3. Remove the disc **(3)** from the tray by gently pressing down on the spindle while lifting the outer edges of the disc. Hold the disc by the edges and avoid touching the flat surfaces.

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

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

The computer does not detect the optional external optical drive

If your operating system does not detect an installed device, the device driver software may be missing or corrupted.

1. Remove any discs from the optical drive.

2. Click **Computer** and then click **System Monitor**.

3. On the **Hardware** tab, identify the Storage Controller in the **Type** column.

4. Click the triangle next to the devices until you locate your optical drive. If the drive is listed, it should be functioning correctly.

An optional external optical 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 Suspend mode before playing the disc.

  Do not initiate Hibernation or Suspend 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.

The process of burning an optional external disc does not begin, or it stops before completion

- Be sure that all other programs are closed.

- Turn off Suspend mode and Hibernation.

- 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.

Contacting support

If the information provided in this guide 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.

- E-mail support.

- Find support telephone numbers.

- Locate an HP service center.

Labels

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

- Service label—Provides important information, including the following:
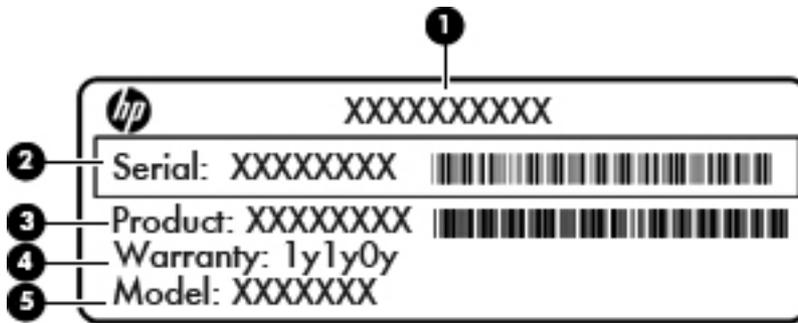
Component		
(1)	Product name	
(2)	Serial number	
(3)	Part number/product number	
(4)	Warranty period	
(5)	Model description (select models only)	

Have this information available when you contact support. Depending on your computer model, a service label is either affixed to the bottom of the computer or is located inside the battery bay or beneath the service door.

- Regulatory label—Provides regulatory information about the computer. The regulatory label is affixed inside the battery bay.

- Wireless certification label or labels (select models only)—Provide information about optional wireless devices and the approval markings of some of the countries or regions in which the devices have been approved for use. If your computer model includes one or more wireless devices, one or more certification labels are included with your computer. You may need this information when traveling internationally. Wireless certification labels are affixed inside the battery bay.

B   Cleaning your computer

Cleaning products

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

- Dimethyl benzyl ammonium chloride 0.3 percent maximum concentration (For example: germicidal disposable wipes. These wipes come in a variety of brand names.)

- Alcohol-free glass cleaning fluid

- Water with mild soap solution

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

- Static-free cloth wipes

⚠ **CAUTION:**   Avoid the following cleaning products:

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

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

Cleaning procedures

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

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

Turn off the computer.

Disconnect external power.

Disconnect all powered external devices.

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

Cleaning the display

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 computer.

Cleaning the sides and cover

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

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

Cleaning the TouchPad and keyboard

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

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

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

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

C Specifications

Input power

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

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

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

Input Power	Rating
Operating voltage and current	19.5 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	**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

D Electrostatic discharge

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

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

- If removal or installation instructions direct you to unplug the computer, unplug it after being properly grounded and before removing a cover.

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

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

- Use nonmagnetic tools.

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

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

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

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