HP Pavilion g4 Notebook PC

Maintenance and Service Guide

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Safety warning notice

⚠ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device 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 device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

Category	Description
Product Name	HP Pavilion g4 Notebook PC
Processors	**3rd Generation Intel® Core™ i7 processors:**
	Intel Core i7-3632QM (2.2 GHz, SC turbo up to 3.2 GHz, 1600 MHz/6 MB L3 cache, quad core, 35 W)
	3rd Generation Intel Core i5 processors:
	Intel Core i5-3230M (2.6 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
	Intel Core i5-3210M (2.5 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
	3rd Generation Intel Core i3 processors:
	Intel Core i3-3130M processor (2.6 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
	Intel Core i3-3120M processor (2.5 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
	Intel Core i3-3110M (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)
	3rd Generation Intel Pentium® processors:
	Pentium 2030M processor (2.5 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)
	Pentium 2020M processor (2.4 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)
	2nd Generation Intel Core i5 processors:
	Intel Core i5-2450M processor (2.5 GHz, SC turbo up to 3.1 GHz, 1333 MHz/ 3 MB L3 cache, dual core, 35 W)
	2nd Generation Intel Core i3 processors:
	Intel Core i3-2370M (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)
	Pentium processors:
	Pentium B980 processor (2.4 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
	Pentium B970 processor (2.3 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
	Pentium B960 processor (2.2 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
	Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
Chipset	Intel HM76 Express Chipset

Category	Description
Graphics	**Internal Graphics (UMA):** • Intel HD Graphics 4000 on computer models equipped with a 3rd Generation Intel Core processor (Intel Core i7, i5, i3) • Intel HD Graphics 3000 on computer models equipped with a 2nd Generation Intel Core processor (Intel Core i5-2450M or i3), supports DX10 • Intel HD Graphics on computer models equipped with a Pentium processor, supports DX10
	Switchable Discrete Graphics: • AMD Radeon HD 7670M with 2048 MB of dedicated video memory (128 MB × 16 DDR3 @ 900 MHz × 8 pcs); 128 bit M2 package, supports HD Decode, DX11, HDMI, and PX5 • AMD Radeon HD 7670M with 1024 MB of dedicated video memory (64 MB × 16 DDR3 @ 900 MHz × 8 pcs); 128 bit M2 package, supports HD Decode, DX11, HDMI, and PX5
Display panel	**35.6 cm** (14.0 in), high-definition (HD), light-emitting diode (LED), SVA, BrightView (1366×768) display; typical brightness: 200 cd/m^2 (nits) All display assemblies include two wireless local area network (WLAN) antenna cables Supports 16:9 ultra-wide aspect ratio
Memory	Two customer-accessible/upgradable SODIMM memory module slots
	Supports dual-channel memory
	Supports up to 8 GB of system RAM
	DDR3-1600 MHz Dual Channel support for a 3rd Generation Intel Core processor
	DDR3-1333 MHz support (DDR3-1600 downgrade to DDR3-1333), for a 2nd Generation Intel Core processor (Intel Core i5-2450M or Intel Core i3) or Pentium processor
	Supports the following configurations: • 8192 MB total system memory (4096 MB × 2) (no support for 32 bit operating systems) • 6144 MB total system memory (4096 MB × 1 + 2048 MB × 1) (no support for 32 bit operating systems) • 4096 MB total system memory (4096 MB × 1 or 2048 MB × 2) • 2048 MB total system memory (2048 MB × 1)
Hard drives	Supports **6.35 cm** (2.5 in) hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses
	Customer-accessible
	Serial ATA (SATA)
	Supports HP 3D Drive Guard

Category	Description
	Supports the following single hard drive configurations: • 1 TB, 5400 rpm, 9.5 mm • 750 GB, 7200 rpm, 9.5 mm • 750 GB, 5400 rpm, 9.5 mm • 640 GB, 5400 rpm, 9.5 mm • 500 GB, 7200 rpm, 9.5 mm • 500 GB, 5400 rpm, 9.5 mm • 320 GB, 5400 rpm, 7.0 mm
Optical drive	Fixed
	SATA
	12.7 mm tray load
	Customer-accessible
	Supports Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive
	Supports DVD±RW Super Multi Double-Layer Combination Drive
	Supports zero-power optical drive
Audio and video	One digital microphone
	HD audio
	Supports Dolby Advanced Audio v2
	Two Altec Lansing speakers
	Supports Microsoft® Premium requirements
	HP TrueVision HD camera (fixed, no tilt) with activity LED, USB 2.0, M-JPEG, 1280 x 720 by 30 frames per second
Ethernet	Integrated 10/100 network interface card (NIC)
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module
	Two WLAN antennas built into display assembly
	Support for Intel Wireless Display
	Customer-accessible

Category	Description
	Support for the following WLAN formats: • Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter • Atheros 9485GN 802.11b/g/n 1×1 WiFi Adapter and 3012 Bluetooth 4.0 Combo Adapter (select models only) • Ralink RT5390BC8 802.11b/g/n 1×1 WiFi and Bluetooth 3.0+HS Combo Adapter • Broadcom 4313GN 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS Combo Adapter • Ralink RT5390F 802.11b/g/n 1×1 WiFi Adapter • Intel Centrino® Wireless-N 2230 802.11 b/g/n 2×2 WiFi and Bluetooth 4.0 Combination Adapter • Qualcomm Atheros AR9485 802.11 b/g/n 1×1 WiFi Adapter (select models only) • Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter (select models only) • Ralink RT5390R 802.11 b/g/n 1×1 WiFi
External media card	HP Multi-Format Digital Media Reader slot with push-push technology, supporting the following digital card formats: • Secure Digital (SD) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • Secure Digital Extended Capacity (SDXC) Memory Card • MultiMediaCard (MMC)
Internal media card	One half-size Mini Card slot for WLAN
Ports	• Audio-in (digital microphone) • Audio-out (stereo headphone) • HDMI version 1.4 supporting up to 1920×1200 @ 60Hz, 24 bits per pixel (bpp) • HP Smart Pin AC power adapter • RJ-45 (Ethernet, includes link and activity lights) • USB 3.0 (two ports) • USB 2.0 (one port) • VGA (Dsub 15 pin) supporting: ◦ 2048 × 1536 external resolution @ 75Hz ◦ Hot plug and unplug and auto-detection for correct output to wide-aspect versus standard aspect video
Keyboard/pointing devices	Full-size, island-style keyboard: • Textured black • 3-coat paint white

Category	Description
	TouchPad with two buttons: • Multitouch gesture support enabled as default • Taps enabled by default • Supports edge-swipe gestures
Power requirements	**HP Smart AC adapter:** • 90 W RC V AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) (for computer models equipped with a graphics subsystem with switchable discrete memory only) • 65 W RC V AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) (for computer models equipped with a graphics subsystem with UMA memory only)
	Support for the following batteries: • 6 cell, 47 Whr, 2.20 Ah, Li-ion battery • 6 cell, 55 Whr 2.55 Ah, Li-ion battery (select models only) Supports fast charge
Security	Security cable slot
Operating system	**Preinstalled:** • Windows® 8 Professional 64 bit • Windows 8 Standard 64 bit • Ubuntu Linux • FreeDOS 1.0
Serviceability	**End-user replaceable parts:** • AC adapter • Battery • Hard drive • Keyboard • Memory modules (2) • Optical drive • WLAN module

2 External component identification

Finding your hardware and software information

Locating hardware

To find out what hardware is installed on your computer:

1. From the Start screen, type c, and then select **Control Panel**.
2. Select **System and Security**, and then in the System area, click **Device Manager**.

   A list displays all the devices installed in your computer.

Locating software

- To find out what software is included on your computer, from the Start screen, right-click using the mouse to display the apps, and select the **All apps** icon.

Display

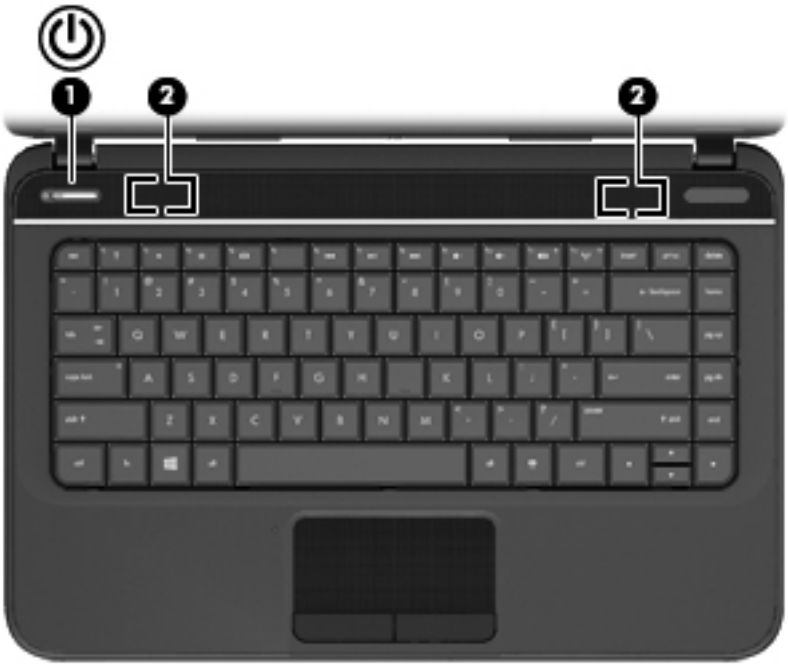
Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLAN devices.

Item	Component	Description
(2)	Internal microphone	Records sound.
(3)	Webcam	Records video and captures still photographs. To use the webcam, from the Start screen type c, and then select **CyberLink YouCam**.
(4)	Webcam light	On: The webcam is in use.

*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access this guide, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select **User guides**.

Top

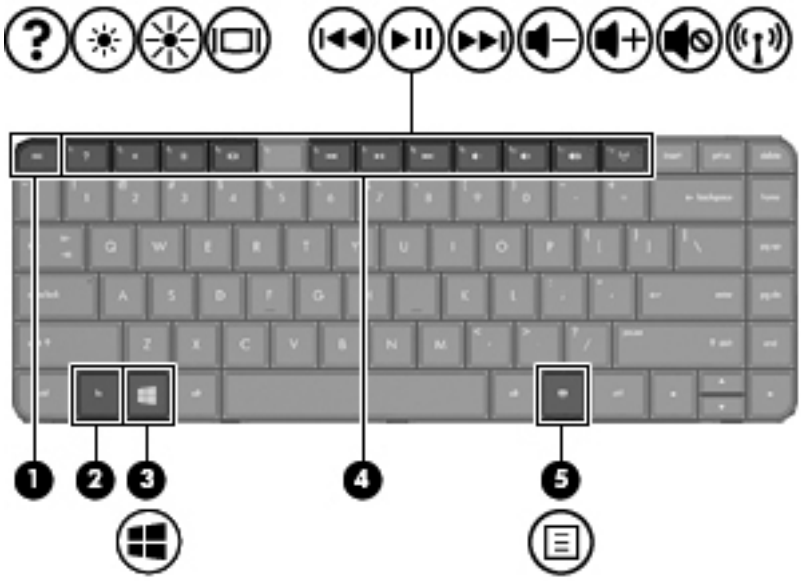
Buttons and speakers



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

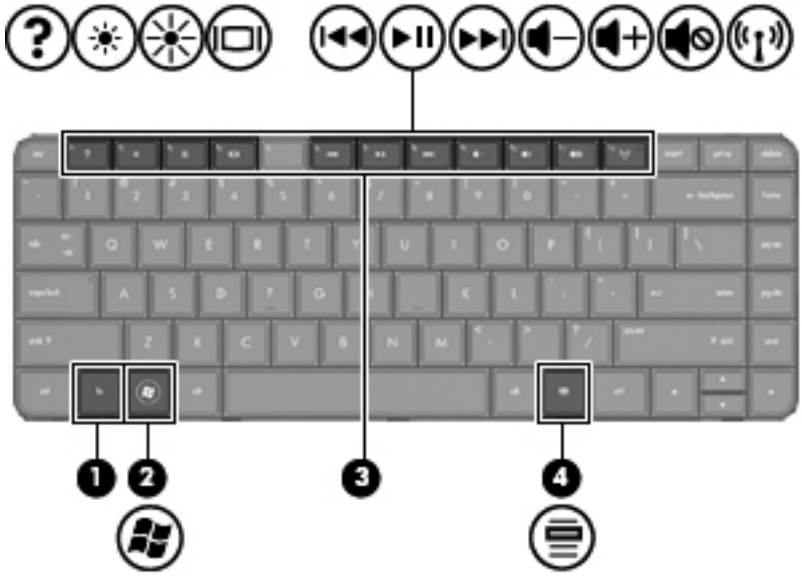
Component		Description
		To learn more about your power settings: In Windows 8: • From the Start screen, type `power options`. Click **Settings**, and then select **Power Options** from the options displayed. In Ubuntu Linux: • Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Power** icon.
(2)	Speakers (2)	Produce sound.

Keys - Windows systems



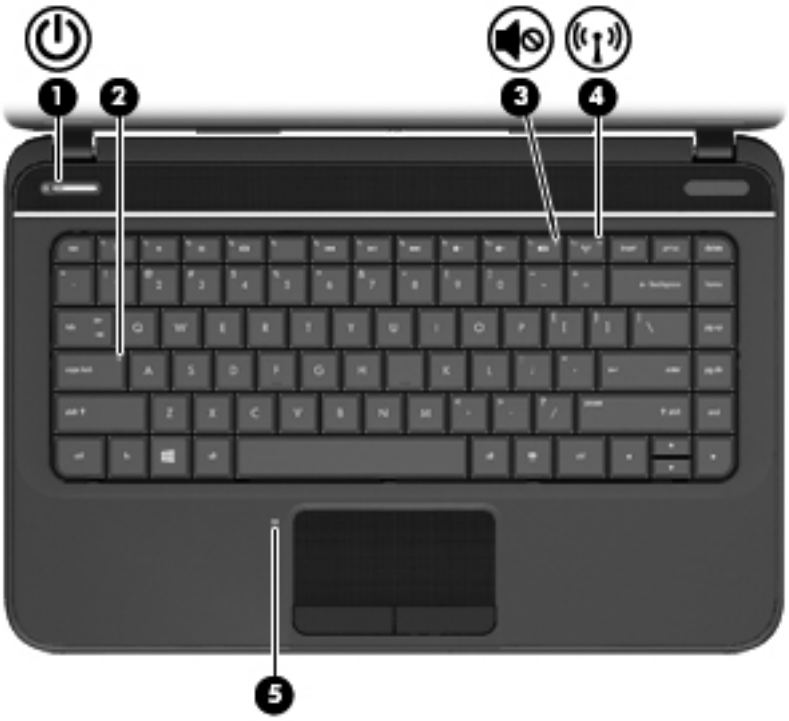
Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Displays system information when pressed in combination with the esc key.
(3)	Windows 8 logo key	Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	Windows 8 applications key	Displays the App bar.

Keys - Ubuntu Linux systems



Component		Description
(1)	fn key	Displays system information when pressed in combination with the esc key.
(2)	Operating system logo key	Displays the Operating system menu.
(3)	Action keys	Execute frequently used system functions.
(4)	Operating system applications key	Displays a shortcut menu for items beneath the cursor.

Lights

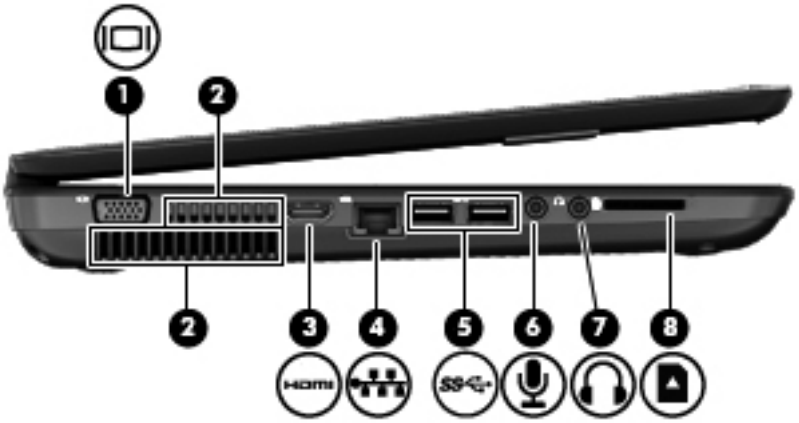


Component		Description
(1)	Power light	• White: The computer is on. • Blinking white: The computer is in the Sleep/Suspend state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.
(2)	Caps lock light	White: Caps lock is on, which switches the keys to all capital letters.
(3)	Mute light	• Amber: Computer sound is off. • Off: Computer sound 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)	TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.

TouchPad

Component		Description
(1)	TouchPad on/off button	Turns the TouchPad on or off.
(2)	TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.
(3)	TouchPad zone	Moves the on-screen pointer and selects or activates items on the screen. The TouchPad also supports edge-swipe gestures.
(4)	Left TouchPad button	Functions like the left button on an external mouse.
(5)	Right TouchPad button	Functions like the right button on an external mouse.

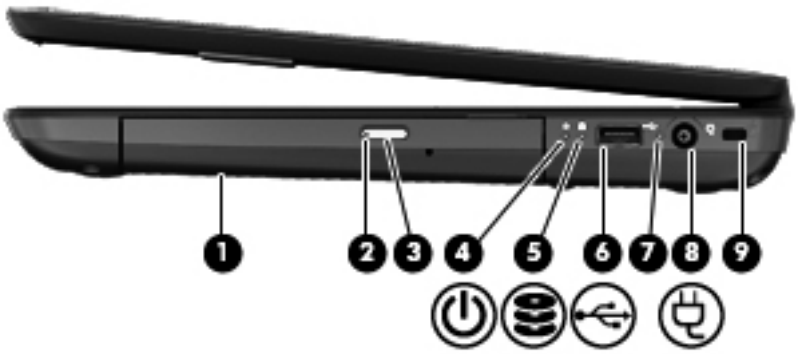
Left side



Component			Description
(1)		External monitor port	Connects an external VGA monitor or projector.
(2)		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.
(3)		HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(4)		RJ-45 (network) jack	Connects a network cable.
(5)		USB 3.0 ports (2)	Connect optional USB 3.0 compatible devices and provide enhanced USB power performance.
(6)		Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

Component		Description
(7)	Audio-out (headphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. **WARNING!** To reduce the risk of personal injury, adjust the volume before using headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety and Environmental Notices*. **NOTE:** When a device is connected to a headphone jack, the computer speakers are disabled.
(8)	Digital Media Slot	Supports the following digital card formats: • Secure Digital (SD) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • Secure Digital Extended Capacity (SDxC) Memory Card • MultiMediaCard (MMC)

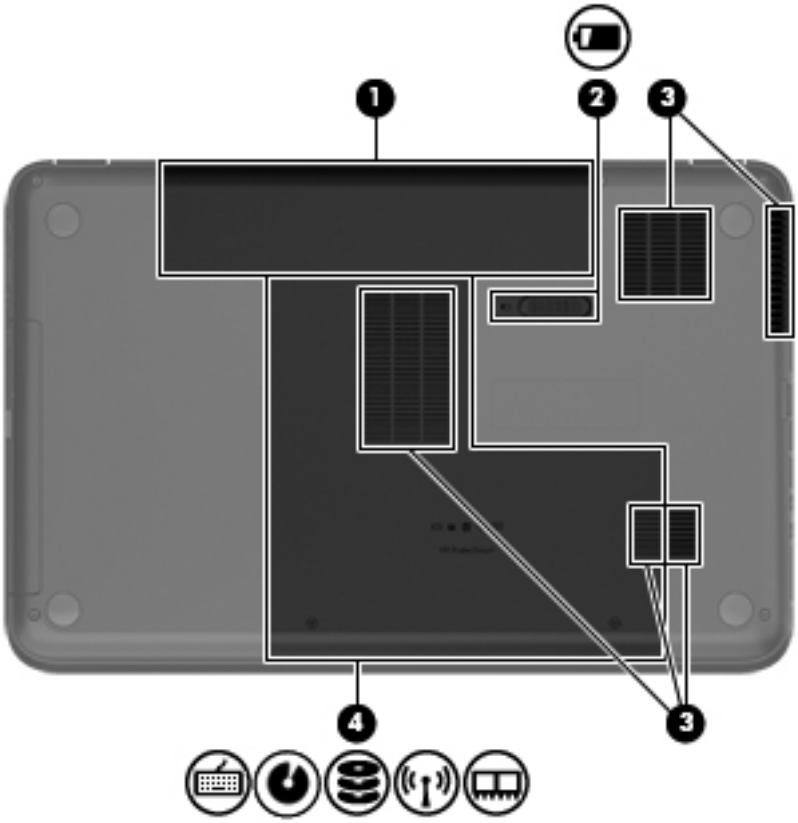
Right side



Component		Description
(1)	Optical drive	Reads and writes to an optical disc.
(2)	Optical drive light	• Green or amber: The optical drive is being accessed. • Off: The optical drive is idle.
(3)	Optical drive eject button	Releases the disc tray.
(4)	Power light	• White: The computer is on. • Blinking white: The computer is in the Sleep/Suspend state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.

Component		Description
(5)	Hard drive light	• Blinking white: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(6)	USB 2.0 port	Connects an optional USB 2.0 compatible device.
(7)	AC adapter light	• White: The AC adapter is connected and the battery is charged. • Blinking white: The battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The computer is using DC power.
(8)	Power connector	Connects an AC adapter.
(9)	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.

Bottom components

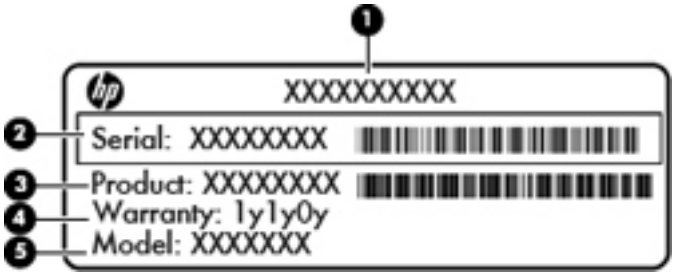


Component		Description
(1)	Battery bay	Holds the battery.
(2)	Battery release latch	Releases the battery from the battery bay.
(3)	Vents (5)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Service door	The service door provides access to the keyboard, optical drive, hard drive bay, wireless compartment and memory module compartment. **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 through Help and Support. From the Start screen, type h, and then select **Help and Support**.

3 Illustrated parts catalog

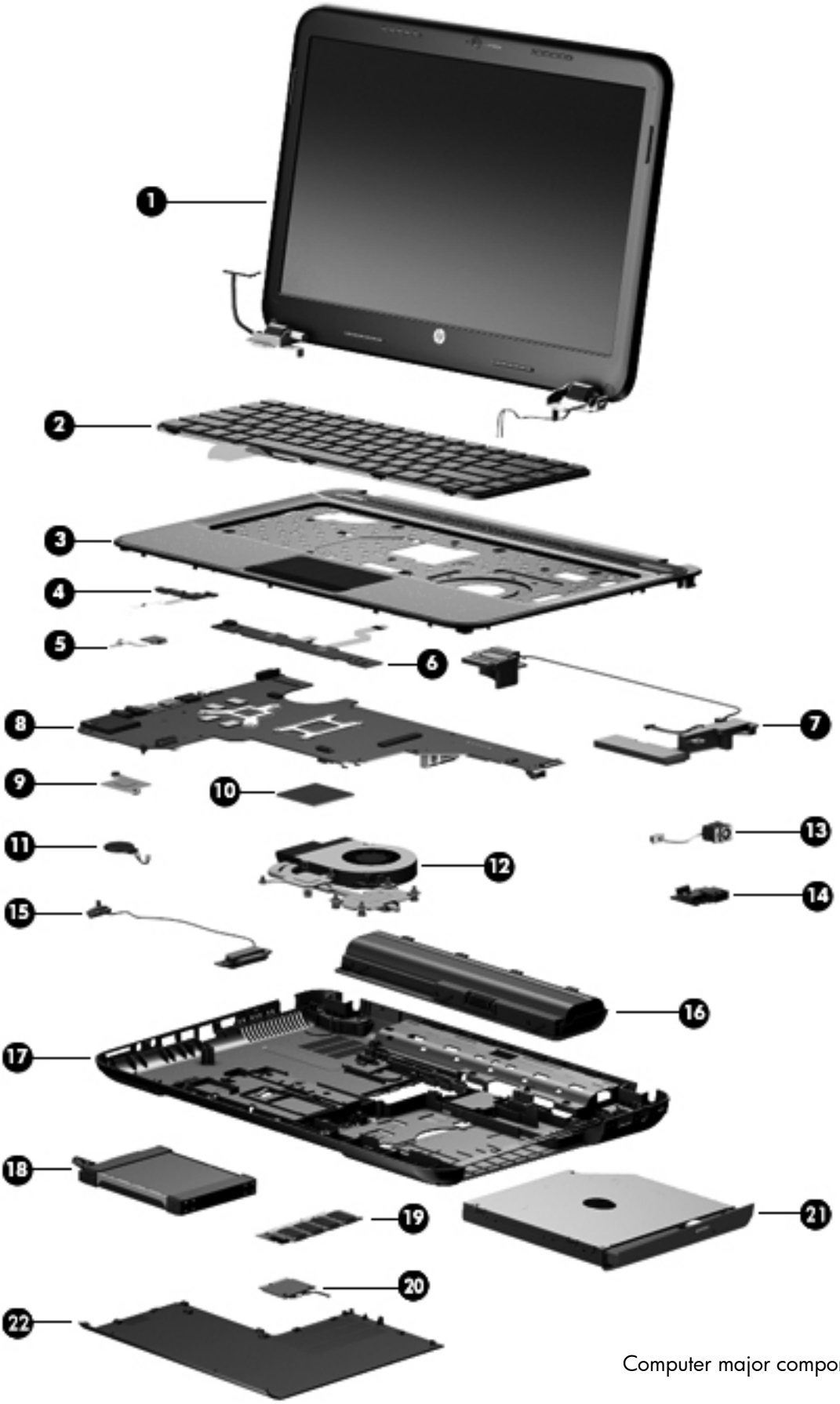
Service label

When ordering parts or requesting information, provide the computer serial number and model description provided on the service label. The service label is located inside the battery bay. It is necessary to remove the battery to obtain these numbers. See Battery on page 40 for battery removal instructions.



Item	Description	Function
(1)	Product name	This is the model name for the computer.
(2)	Serial number	This is an alphanumeric identifier that is unique to each product.
(3)	Product part number	This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model description (select models only)	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer.

Computer major components



Item	Component	Spare part number
(1)	**35.6 cm (14.0 in), high definition (HD), LED, SVA, BrightView display assembly** (includes webcam, microphone, wireless antenna transceivers and cable, and display cable):	
	Supports HD and VGA:	
	• Bright purple (modern mesh pattern)	683844-001
	• Ruby red (modern mesh pattern)	683845-001
	• Sparkling black	683847-001
	• Linen white (butterfly blossom pattern)	689462-001
	Supports HD Only:	
	• Bright purple (modern mesh pattern)	707888-001
	• Ruby red (modern mesh pattern)	707889-001
	• Winter blue (modern mesh pattern)	707890-001
	• Sparkling black	707891-001
	• Linen white (modern mesh pattern)	707892-001
	NOTE: For more display assembly spare part information, see Display assembly subcomponents on page 24.	
(2)	**Keyboard** (includes keyboard cable):	
	Keyboard with black finish:	
	• For use in Brazil	698188-201
	• For use in Canada	698188-DB1
	• For use internationally	698188-B31
	• For use in Japan	698188-291
	• For use in Latin America	698188-161
	• For use in Saudi Arabia	698188-171
	• For use in South Korea	698188-AD1
	• For use in Taiwan	698188-AB1
	• For use in Thailand	698188-281
	• For use in the United States	698188-001
	Keyboard with white finish:	
	• For use in Latin America	698189-161
	• For use in Thailand	698189-281
	• For use in Taiwan	698189-AB1
	• For use in the United States	698189-001
(3)	**Top cover** (includes TouchPad):	
	• Bright purple (modern mesh pattern)	680573-001

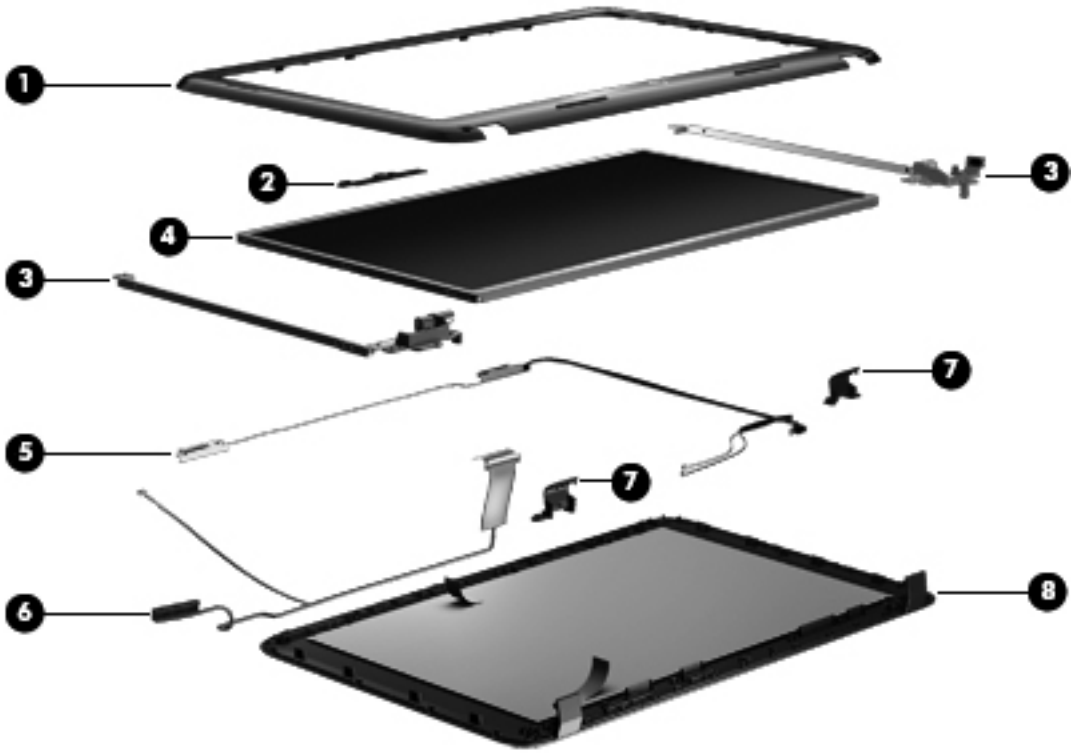
Item	Component	Spare part number
	• Linen white (modern mesh pattern)	684474-001
	• Linen white (butterfly blossom pattern)	689467-001
	• Ruby red (modern mesh pattern)	680574-001
	• Sparkling black	680576-001
	• Winter blue (modern mesh pattern)	680575-001
(4)	**Power button board** (includes cable)	680560-001
(5)	**TouchPad LED board** (includes cable)	683848-001
(6)	**TouchPad button board** (includes cable)	680559-001
(7)	**Speaker Kit** (includes left and right speakers and cable)	680567-001
(8)	**System board** (includes replacement thermal material):	
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Professional	710874-601
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Standard	710874-501
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and FreeDOS 1.0	710874-001
	• For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Professional	710873-601
	• For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Standard	710873-501
	• For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and FreeDOS 1.0	710873-001
	• For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and Windows 8 Professional	680570-601
	• For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and Windows 8 Standard	680570-501
	• For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and FreeDOS 1.0	680570-001
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and Windows 8 Professional	680569-601
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and Windows 8 Standard	680569-501
	• For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and FreeDOS 1.0	680569-001
	• For use only with computer models equipped with UMA video memory and Windows 8 Professional	680568-601
	• For use only with computer models equipped with UMA video memory and Windows 8 Standard	680568-501

Item	Component	Spare part number
	• For use only with computer models equipped with UMA video memory and FreeDOS 1.0	680568-001
(9)	**Intel Platform Controller Hub (PCH) heat sink**	683843-001
(10)	**Processor** (includes replacement thermal material):	
	3rd Generation Intel Core processor:	
	• Intel Core i7-3632QM (2.2 GHz, SC turbo up to 3.2 GHz, 1600 MHz/6 MB L3 cache, quad core, 35 W)	701658-001
	• Intel Core i5-3230M (2.6 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	711903-001
	• Intel Core i5-3210M (2.5 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	680645-001
	• Intel Core i3-3130M (2.6 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	713163-001
	• Intel Core i3-3120M (2.5 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	700627-001
	• Intel Core i3-3110M (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)	682417-001
	3rd Generation Pentium processors:	
	• Pentium 2030M processor (2.5 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)	713164-001
	• Pentium 2020M processor (2.4 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)	700628–001
	2nd Generation Intel Core processor:	
	• Intel Core i5-2450M processor (2.5 GHz, SC turbo up to 3.1 GHz, 1333 MHz/3 MB L3 cache, dual core, 35 W)	676359-001
	• Intel Core i3-2370M (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)	677152-001
	Pentium processor:	
	• Pentium B980 processor (2.4GHz,1333MHz/2M L3) dual 35W	692428-001
	• Pentium B970 processor (2.3 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	676785-001
	• Pentium B960 processor (2.2 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	664662-001
	• Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	653338-001
(11)	**RTC battery** (includes cable and double-sided tape)	637193-001
(12)	**Fan and heat sink** (includes replacement thermal material):	
	• Heat sink for use only with computer models equipped with UMA video memory for BGA-based systems	711471-001
	• Heat sink for use only with computer models equipped with UMA video memory	680549-001
	• Heat sink for use only with computer models equipped with switchable discrete video memory for BGA-based systems	711472-001
	• Heat sink for use only with computer models equipped with switchable discrete video memory	680550-001

Item	Component	Spare part number
	• Fan	680551-001
(13)	**Power connector** (includes cable)	680548-001
(14)	**USB board** (includes cable)	680558-001
(15)	**Optical drive cable** (includes optical drive connector)	680546-001
(16)	**Battery:**	
	• 6 cell, 47 Whr, 2.20 Ah, Li-ion battery	593553-001
	• 6 cell, 55 Whr, 2.55 Ah, Li-ion battery (select models only)	593554-001
(17)	**Base enclosure:**	
	• Base enclosure Windows 8	707887-001
	• Base enclosure	680544-001
	Rubber Feet Kit (not illustrated, includes four rubber feet)	680563-001
(18)	**Hard drive** SATA, (does not include hard drive bumpers, bracket, or cable):	
	9.5 mm (0.37 in) x **6.35 cm** (2.50 in):	
	• 1 TB, 5400 rpm	676521-001
	• 750 GB, 7200 rpm	633252-001
	• 750 GB, 5400 rpm	634250-001
	• 640 GB, 5400 rpm	669300-001
	• 500 GB, 7200 rpm	634925-001
	• 500 GB, 5400 rpm	669299-001
	7.0 mm (0.28 in) × **6.35 cm** (2.50 in):	
	• 320 GB, 5400 rpm	645193-001
	Hard Drive Hardware Kit not illustrated (includes hard drive bracket and bracket screws, cable, and two bumpers)	682745-001
(19)	**Memory modules** (two, DDR3-1600 MHz, PC3-12800):	
	• 4 GB	641369-001
	• 2 GB	652972-001
(20)	**WLAN module:**	
	• Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	600370-001
	• Atheros 9485GN 802.11b/g/n 1×1 WiFi Adapter and 3012 Bluetooth 4.0 Combo Adapter (select models only)	655795-001
	• Ralink RT5390BC8 802.11b/g/n 1×1 WiFi and Bluetooth 3.0+HS Combo Adapter	656120-001
	• Broadcom 4313GN 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS Combo Adapter	657325-001

Item	Component	Spare part number
	• Ralink RT5390F 802.11b/g/n 1×1 WiFi Adapter	670691-001
	• Intel Centrino Wireless-N 2230 802.11 b/g/n 2×2 WiFi and Bluetooth 4.0 Combination Adapter	670290-001
	• Qualcomm Atheros AR9485 802.11 b/g/n 1×1 WiFi Adapter (select models only)	675794-001
	• Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter (select models only)	690020-001
	• Ralink RT5390R 802.11 b/g/n 1×1 WiFi	691415-001
(21)	**Optical drive** (includes bezel and bracket):	
	• Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	680557-001
	• DVD±RW Super Multi Double-Layer Combination Drive	680556-001
(22)	**Service door** (includes one captive screw) — available in the Plastics Kit	680561-001

Display assembly subcomponents



Item	Component	Spare part number
(1)	**Display bezel:**	
	• Black	680545-001
(2)	**Webcam/microphone module, HD**	703461-001

Item	Component	Spare part number
(3)	**Display Hinge Kit** (includes left and right display hinges and brackets)	680554-001
(4)	**35.6 cm (14.0 in), HD, LED, SVA, BrightView display panel**	680562-001
(5)	**Antenna Kit** (includes left and right wireless antenna cables and transceivers)	680539-001
(6)	**Display Panel Cable Kit** (includes display panel cable and webcam/microphone module cable)	680547-001
(7)	**Display hinge covers (2)**	680553-001
(8)	**Display enclosure:**	
	• Bright purple (modern mesh pattern)	680540-001
	• Ruby red (modern mesh pattern)	680541-001
	• Winter blue (modern mesh pattern)	680542-001
	• Sparkling black	680543-001
	• Linen white (modern mesh pattern)	684472-001
	• Linen white (butterfly blossom pattern)	689460-001
	Display Screw Kit (not illustrated)	680565-001

Mass storage devices

Item	Component	Spare part number
(1)	**Optical drive** (includes bezel and bracket):	
	• Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	680557-001
	• DVD±RW Super Multi Double-Layer Combination Drive	680556-001

Item	Component	Spare part number
(2)	**Hard drive** SATA, does not include hard drive bumpers, bracket, or cable:	
	9.5 mm (0.37 in) × **6.35 cm** (2.50 in):	
	• 1 TB, 5400 rpm	676521-001
	• 750 GB, 7200 rpm	633252-001
	• 750 GB, 5400 rpm	634250-001
	• 640 GB, 5400 rpm	669300-001
	• 500 GB, 7200 rpm	634925-001
	• 500 GB, 5400 rpm	669299-001
	7.0 mm (0.28 in) × **6.35 cm** (2.50 in):	
	• 320 GB, 5400 rpm	645193-001
	Hard Drive Hardware Kit, (not illustrated) includes:	682745-001
	• Hard drive bumpers (2)	
	• Hard drive bracket and screws	
	• Hard drive cable	

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter:	
• 90-W HP Smart AC adapter (PFC, EM, 3-wire)	693713-001
• 90-W HP Smart AC adapter (PFC, 3-wire)	693712-001
• 65-W HP Smart AC adapter (non-PFC, 3-wire)	693711-001
• 65-W HP Smart AC adapter (RC/V, EM, 3-wire)	693710-001
Power cord, AC, 3-wire, black, 1.83-m:	
• For use in Argentina	490371-D01
• For use in Brazil	490371-202
• For use in Europe	490371-021
• For use in India	490371-D61
• For use in Italy	490371-061
• For use in Japan	490371-291
• For use in North America	490371-001
• For use in the People's Republic of China	490371-AA1

Component	Spare part number
• For use in South Korea	490371-AD1
• For use in Taiwan	490371-AB1
• For use in Thailand	490371-201
• For use in the United Kingdom and Singapore	490371-031
Screw Kit	680566-001
Thermal Material Kit	680571-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in North America (black, 3-pin, 1.83 m)
490371-021	Power cord for use in Europe (black, 3-pin, 1.83 m)
490371-031	Power cord for use in the United Kingdom and Singapore (black, 3-pin, 1.83 m)
490371-061	Power cord for use in Italy (black, 3-pin, 1.83 m)
490371-201	Power cord for use in Thailand (black, 3-pin, 1.83 m)
490371-202	Power cord for use in Brazil (black, 3-pin, 1.83 m)
490371-291	Power cord for use in Japan (black, 3-pin, 1.83 m)
490371-AA1	Power cord for use in the People's Republic of China (black, 3-pin, 1.83 m)
490371-AB1	Power cord for use in Taiwan (black, 3-pin, 1.83 m)
490371-AD1	Power cord for use in South Korea (black, 3-pin, 1.83 m)
490371-D01	Power cord for use in Argentina (black, 3-pin, 1.83 m)
490371-D61	Power cord for use in India (black, 3-pin, 1.83 m)
593553-001	6 cell, 47 Whr, 2.20 Ah, Li-ion battery
593554-001	6 cell, 55 Whr, 2.55 Ah, Li-ion battery (select models only)
600370-001	Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter
633252-001	750 GB, 7200 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
634250-001	750 GB, 5400 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
634925-001	500 GB, 7200 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
637193-001	RTC battery (includes cable and double-sided tape)
641369-001	4 GB memory module (DDR3-1600 MHz, PC3-12800)

Spare part number	Description
645193-001	320 GB, 5400 rpm hard drive (7.0 mm (0.28 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
652972-001	2 GB memory module (DDR3-1600 MHz. PC3-12800)
653338-001	Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W, includes replacement thermal material)
655795-001	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter and AR3012 Bluetooth 4.0 combination adapter (select models only)
656120-001	Ralink RT5390BC8 802.11b/g/n 1×1 WiFi and Bluetooth 3.0+HS combination adapter
657325-001	Broadcom 4313 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS combination adapter
677152-001	Intel Core i3-2370M processor (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)
664662-001	Pentium B960 processor (2.2 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W; includes replacement thermal material)
669299-001	500 GB, 5400 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
669300-001	640 GB, 5400 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
670290-001	Intel Centrino Wireless-N 2230 802.11 b/g/n 2×2 WiFi and Bluetooth 4.0 combination adapter
670691-001	Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter
675794-001	Qualcomm Atheros AR9485 802.11 b/g/n 1×1 WiFi Adapter (select models only)
676359-001	Intel Core i5-2450M processor (2.5 GHz, turbo up to 3.1 GHz; 1333 MHz/3 MB L3 cache, dual core, 35 W; includes replacement thermal material)
676521-001	1 TB, 5400 rpm hard drive (9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA, does not include hard drive bumpers, bracket, or cable)
676785-001	Pentium B970 processor (2.3 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
677152-001	Intel Core i3-2370M processor (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)
680539-001	Antenna Kit (includes left and right wireless antenna cables and transceivers)
680540-001	Display enclosure, bright purple (modern mesh pattern)
680541-001	Display enclosure, ruby red (modern mesh pattern)
680542-001	Display enclosure, winter blue (modern mesh pattern)
680543-001	Display enclosure, sparkling black
680544-001	Base enclosure
680545-001	Display bezel, black
680546-001	Optical drive cable (includes optical drive connector)
680547-001	Display Panel Cable Kit (includes display panel cable and webcam/microphone module cable)
680548-001	Power connector (includes cable)

Spare part number	Description
680549-001	Heat sink for use only with computer models equipped with a graphics subsystem with UMA video memory (includes replacement thermal material)
680550-001	Heat sink for use only with computer models equipped with a graphics subsystem with switchable discrete video memory (includes replacement thermal material)
680551-001	Fan
680553-001	Display hinge covers (2)
680554-001	Display Hinge Kit (includes left and right display hinges and brackets)
680556-001	DVD±RW Super Multi Double-Layer Combination Drive (includes bezel and bracket)
680557-001	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive (includes bezel and bracket)
680558-001	USB board (includes cable)
680559-001	TouchPad button board (includes cable)
680560-001	Power button board (includes cable)
680561-001	Plastics Kit (includes service door)
680562-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display panel
680563-001	Rubber Feet Kit (includes four rubber feet)
680565-001	Display Screw Kit
680566-001	Screw Kit
680567-001	Speaker Kit (includes left and right speakers and cable)
680568-001	System board for use only with computer models equipped with UMA video memory and FreeDOS 1.0 (includes replacement thermal material)
680568-501	System board for use only with computer models equipped with UMA video memory and Windows 8 Standard (includes replacement thermal material)
680568-601	System board for use only with computer models equipped with UMA video memory and Windows 8 Professional (includes replacement thermal material)
680569-001	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory and FreeDOS 1.0 (includes replacement thermal material)
680569-501	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory and Windows 8 Standard (includes replacement thermal material)
680569-601	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory and Windows 8 Professional (includes replacement thermal material)
680570-001	System board for use only with computer models equipped with a graphics subsystem with 2 GB of switchable discrete video memory and FreeDOS 1.0 (includes replacement thermal material)
680570-501	System board for use only with computer models equipped with a graphics subsystem with 2 GB of switchable discrete video memory and Windows 8 Standard (includes replacement thermal material)

Spare part number	Description
680570-601	System board for use only with computer models equipped with a graphics subsystem with 2 GB of switchable discrete video memory and Windows 8 Professional (includes replacement thermal material)
680571-001	Thermal Material Kit (includes replacement thermal paste and pads)
680573-001	Top cover, bright purple (modern mesh pattern), (includes Touchpad)
680574-001	Top cover, ruby red (modern mesh pattern), (includes TouchPad)
680575-001	Top cover, winter blue (modern mesh pattern), (includes TouchPad)
680576–001	Top cover, sparkling black (includes TouchPad)
680645-001	Intel Core i5-3210M processor (2.5 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
682417-001	Intel Core i3-3110M processor (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)
682745-001	Hard Drive Hardware Kit (includes hard drive bracket and bracket screws, cable, and 2 bumpers)
683843-001	PCH heat sink
683844-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, bright purple (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
683845-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, ruby red (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
683847-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, sparkling black (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
683848-001	TouchPad LED board (includes cable)
684472-001	Display enclosure, linen white (modern mesh pattern)
684474-001	Top cover, linen white (modern mesh pattern), (includes TouchPad)
689460-001	Display enclosure, linen white (butterfly blossom pattern)
689462-001	35.6 cm (14.0 in), HD, LED, SVA BrightView display assembly, linen white (butterfly blossom pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
689467-001	Top cover, linen white (butterfly blossom pattern), includes TouchPad
690020-001	Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter (select models only)
691415-001	Ralink RT5390R 802.11 b/g/n 1×1 WiFi Adapter
692428-001	Pentium B980 processor (2.4GHz,1333MHz/2M L3. dual core 35W; includes replacement thermal material)
693710-001	65-W HP Smart AC adapter (RC/V, EM, 3-wire)
693711-001	65-W HP Smart AC adapter (non-PFC, 3-wire)
693712-001	90-W HP Smart AC adapter (PFC, 3-wire)
693713-001	90-W HP Smart AC adapter (PFC, EM, 3-wire)

Spare part number	Description
698188-001	Keyboard with black finish for use in the United States (includes cable)
698188-161	Keyboard with black finish for use in Latin America (includes cable)
698188-171	Keyboard with black finish for use in Saudi Arabia (includes cable)
698188-201	Keyboard with black finish for use in Brazil (includes cable)
698188-281	Keyboard with black finish for use in Thailand (includes cable)
698188-291	Keyboard with black finish for use in Japan (includes cable)
698188-AB1	Keyboard with black finish for use in Taiwan (includes cable)
698188-AD1	Keyboard with black finish for use in South Korea (includes cable)
698188-B31	Keyboard with black finish for use internationally (includes cable)
698188-DB1	Keyboard with black finish for use in Canada (includes cable)
698189-001	Keyboard with white finish for use in the United States (includes cable)
698189-161	Keyboard with white finish for use in Latin America (includes cable)
698189-281	Keyboard with white finish for use in Thailand (includes cable)
698189-AB1	Keyboard with white finish for use in Tiawan (includes cable)
700627-001	Intel Core i3-3120M (2.5 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
700628–001	Pentium 2020M processor (2.4 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)
701658-001	Intel Core i7-3632QM (2.2 GHz, SC turbo up to 3.2 GHz, 1600 MHz/6 MB L3 cache, quad core, 35 W)
703461-001	Webcam/microphone module, HD
707887-001	Base enclosure Windows 8
707888-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, bright purple (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
707889-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, ruby red (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
707890-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, winter blue (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
707891-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, sparkling black, (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
707892-001	35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly, linen white (modern mesh pattern), (includes webcam, microphone, wireless antenna transceivers and cable, and display cable)
710873-001	System board for use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and FreeDOS 1.0 (includes replacement thermal material)
710873-501	System board for use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Standard (includes replacement thermal material)

Spare part number	Description
710873-601	System board for use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Professional (includes replacement thermal material)
710874-001	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory, Intel Core i3-3110M processor, and FreeDOS 1.0 (includes replacement thermal material)
710874-501	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Standard (includes replacement thermal material)
710874-601	System board for use only with computer models equipped with a graphics subsystem with 1 GB of switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Professional (includes replacement thermal material)
711471-001	Heat sink for use only with computer models equipped with a graphics subsystem with UMA video memory for BGA-based systems (includes replacement thermal material)
711472-001	Heat sink for use only with computer models equipped with a graphics subsystem with switchable discrete video memory for BGA-based systems (includes replacement thermal material)
711903-001	Intel Core i5-3230M processor (2.6 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
713163-001	Intel Core i3-3130M (2.6 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
713164-001	Pentium 2030M processor (2.5 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

You will need the following tools to complete the removal and replacement procedures:

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers

Service considerations

The following sections include some of the considerations that you must keep in mind during disassembly and assembly procedures.

NOTE: As you remove each subassembly from the computer, place the subassembly (and all accompanying screws) away from the work area to prevent damage.

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and connectors

CAUTION: When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠ **CAUTION:** To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

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

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

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

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

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ **CAUTION:** A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels			
	Relative humidity		
Event	**10%**	**40%**	**55%**
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

Material	Use	Voltage protection level
Antistatic plastics	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

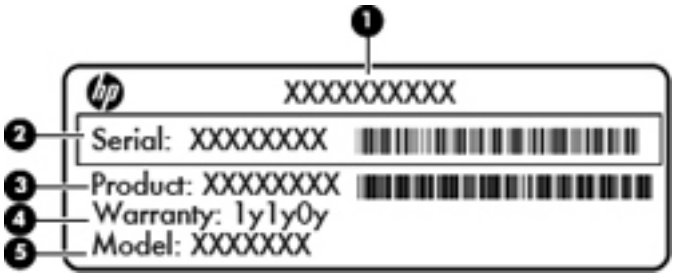
Component replacement procedures

This chapter provides removal and replacement procedures.

IMPORTANT: There may be as many as 67 screws that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

Service label

When ordering parts or requesting information, provide the computer serial number and model number provided on the service label. The service label is located inside the battery bay. It is necessary to remove the battery to obtain these numbers. See Battery on page 40 for battery removal instructions.

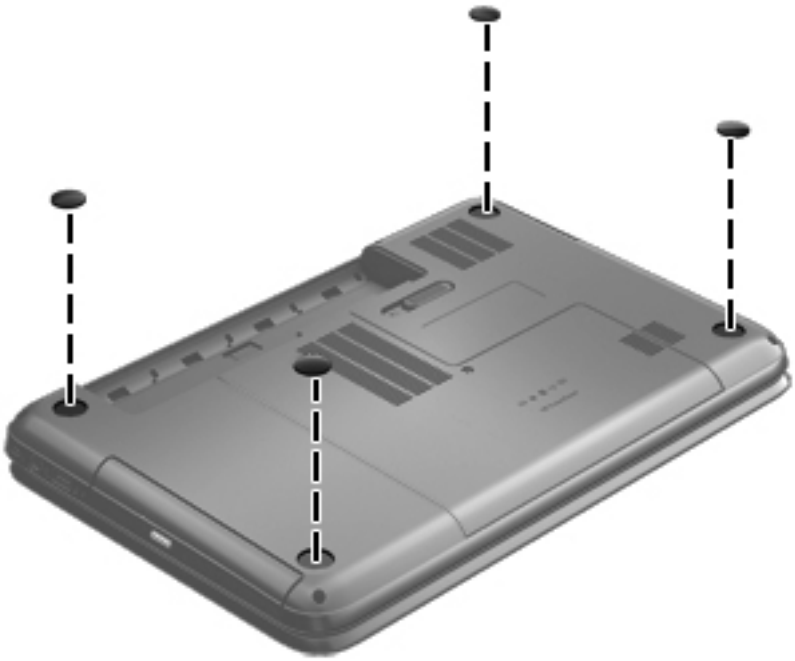


Item	Description	Function
(1)	Product name	The name affixed to the front of the computer.
(2)	Serial number	This is an alphanumeric identifier that is unique to each product.
(3)	Product part number	This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
(4)	Warranty period	This number describes the duration of the warranty period for the computer.
(5)	Model description (select models only)	This is the alphanumeric identifier needed to locate documents, drivers, and support for the computer.

Computer feet

Description	Spare part number
Rubber Feet Kit	680563-001

The computer feet are adhesive-backed rubber pads. There are four rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

Description	Spare part number
6 cell, 55 Whr, 2.55 Ah, Li-ion battery (select models only)	593554-001
6 cell, 47 Whr, 2.20 Ah, Li-ion battery	593553-001

Before disassembling the computer, follow these steps:

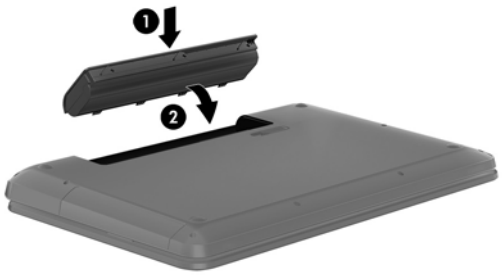
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

Remove the battery:

1. Slide the battery release latch **(1)** to release the battery.
2. Pivot the front edge of the battery **(2)** up and back.
3. Remove the battery **(3)** from the computer.

To insert the battery:

1. Align the tabs on the rear edge of the battery **(1)** with the notches on the rear edge of the battery bay.
2. Pivot the front edge of the battery **(2)** down into the battery bay until it is fully seated. (The battery release latch will automatically lock into place.)



Service door

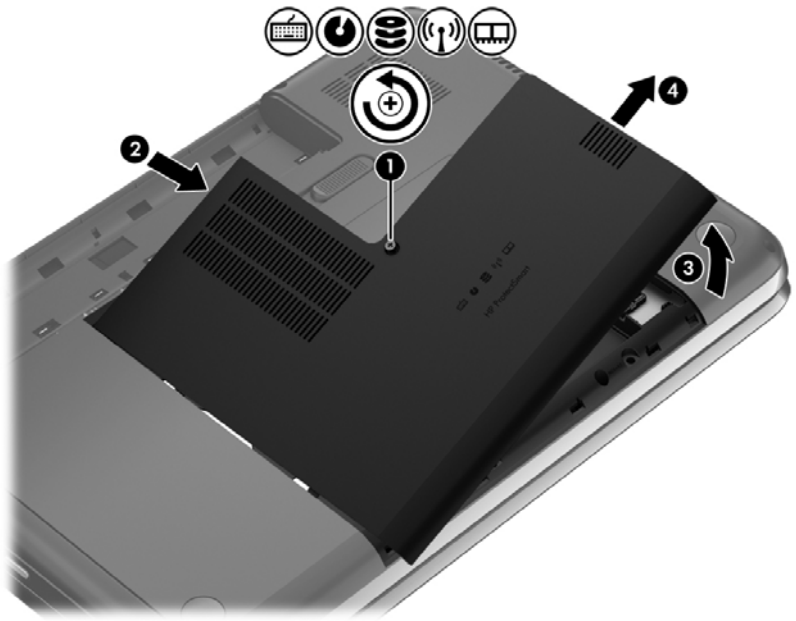
Description	Spare part number
Plastics Kit (contains the service door)	680561-001

Before removing the service door, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).

Remove the service door:

1. Using a small Phillips screwdriver, loosen the service door screw **(1)**.
2. Slide the service door **(2)** forward slightly and lift the front right corner **(3)** to tilt the service door.
3. Remove the service door **(4)** at an angle.



Reverse this procedure to replace the service door.

Optical drive

NOTE: The optical drive spare part kit includes a bezel and bracket.

Description	Spare part number
Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	680557-001
DVD±RW and CD-RW Super Multi Double-Layer Combination Drive	680556-001

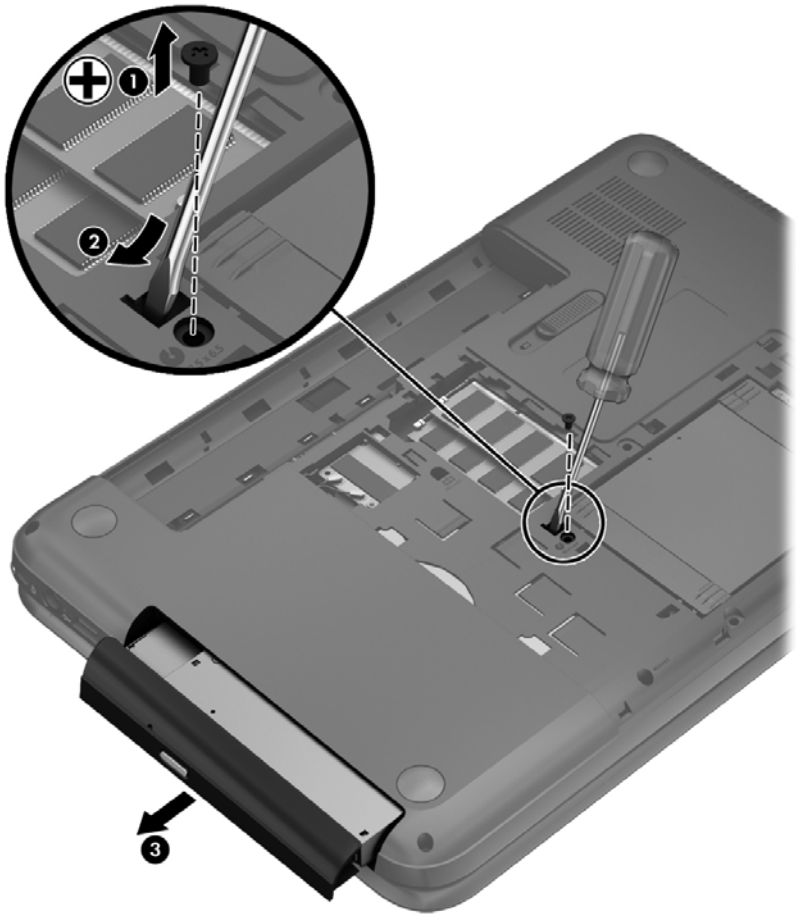
Before removing the optical drive, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).

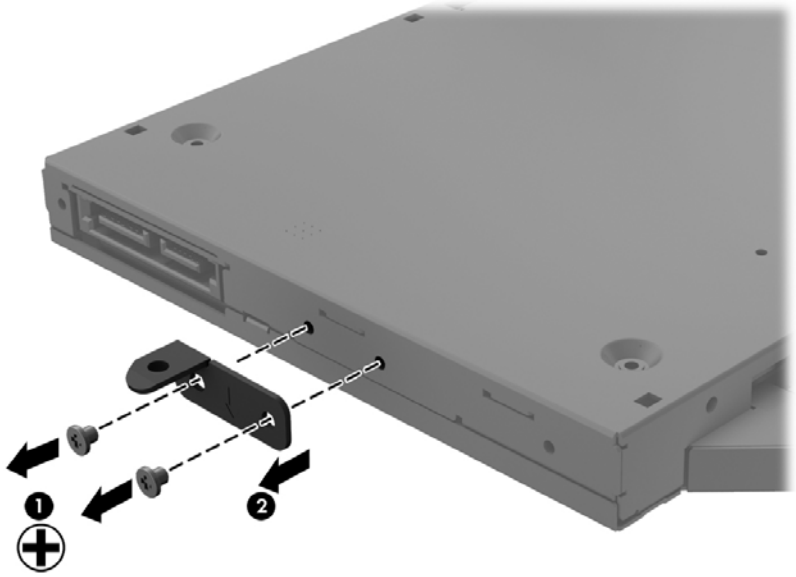
Remove the optical drive:

1. Using a small Phillips screwdriver, remove the Phillips M2.5 x 6.5 screw **(1)** that secures the optical drive to the computer.
2. Insert a screwdriver or other narrow tool through the release access hole **(2)** in the bottom of the computer. Push the rear of the optical drive until it is released.

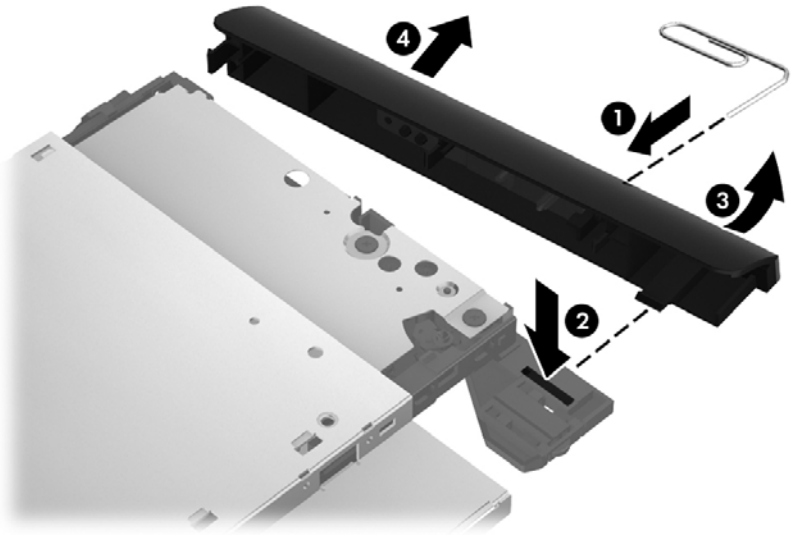
3. Pull the optical drive **(3)** out from the front until the optical drive is completely removed from the computer.



4. Remove the two Phillips M2.0 x 3.0 screws **(1)** that secure the optical drive bracket to the optical drive and then remove the bracket **(2)** from the optical drive.



5. Insert a straightened paper clip into the release access opening **(1)** in the bezel.
6. Press the release tab **(2)** and remove the bezel from the tab side **(3)**.
7. Remove the bezel **(4)** from the optical drive.



Reverse this procedure to reassemble and install the optical drive.

Hard drive

NOTE: The hard drive spare part kit does not include the hard drive cable, hard drive bumpers, or hard drive bracket and screws.

Description	Spare part number
9.5 mm (0.37 in) × 6.35 cm (2.50 in) SATA	
1 TB, 5400 rpm	676521-001
750 GB, 7200 rpm	633252-001
750 GB, 5400 rpm	634250-001
640 GB, 5400 rpm	669300-001
500 GB, 7200 rpm	634925-001
500 GB, 5400 rpm	669299-001
7.0 mm (0.28 in) × 6.35 cm (2.50 in) SATA	
320 GB, 5400 rpm	645193-001
Hard Drive Hardware Kit (includes hard drive cable, hard drive bumpers, and hard drive bracket and screws)	682745-001

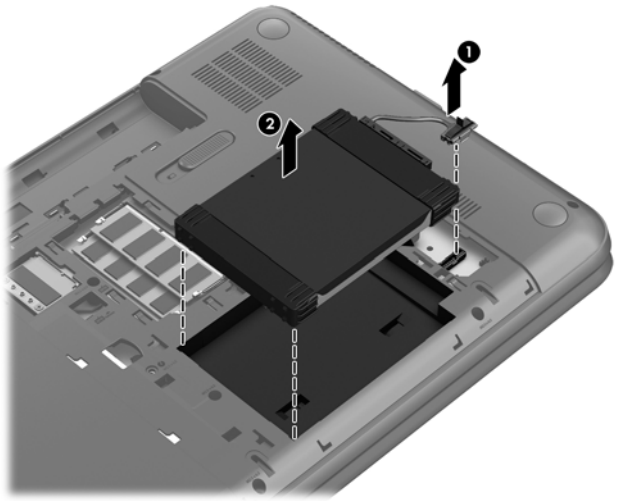
Before removing the hard drive, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).

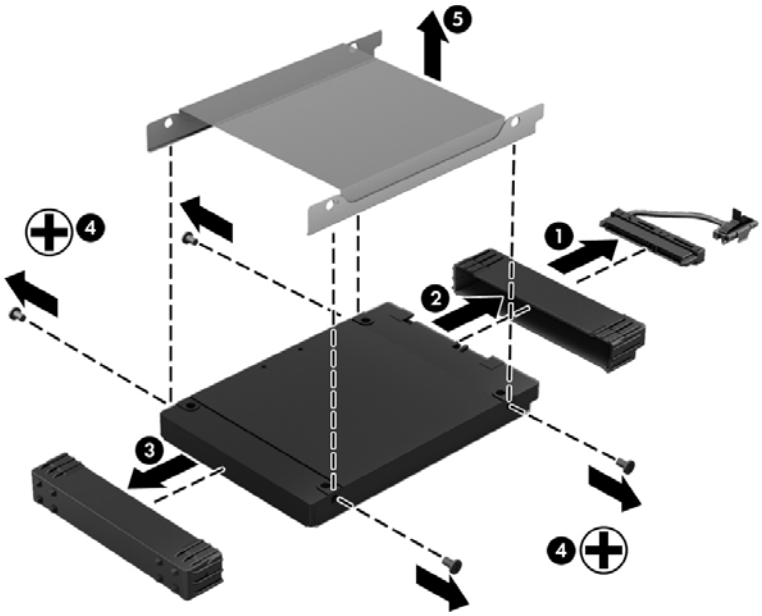
Remove the hard drive:

1. Disconnect the hard drive cable **(1)** from the computer.

2. Lift the hard drive **(2)** to remove.



3. Disconnect the hard drive cable **(1)**. Remove the front bumper **(2)** and back bumper **(3)**.
4. Remove the four Phillips M3.0×3.5 screws **(4)**, and then remove the bracket **(5)** from the hard drive.



To install a hard drive, reverse the removal procedure.

Memory module

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

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

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

Description	Spare part number
4 GB (DDR3-1600 MHz, PC3-12800)	641369-001
2 GB (DDR3-1600 MHz, PC3-12800)	652972-001

Before removing a memory module, follow these steps:

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 or in the Sleep/Suspend state.

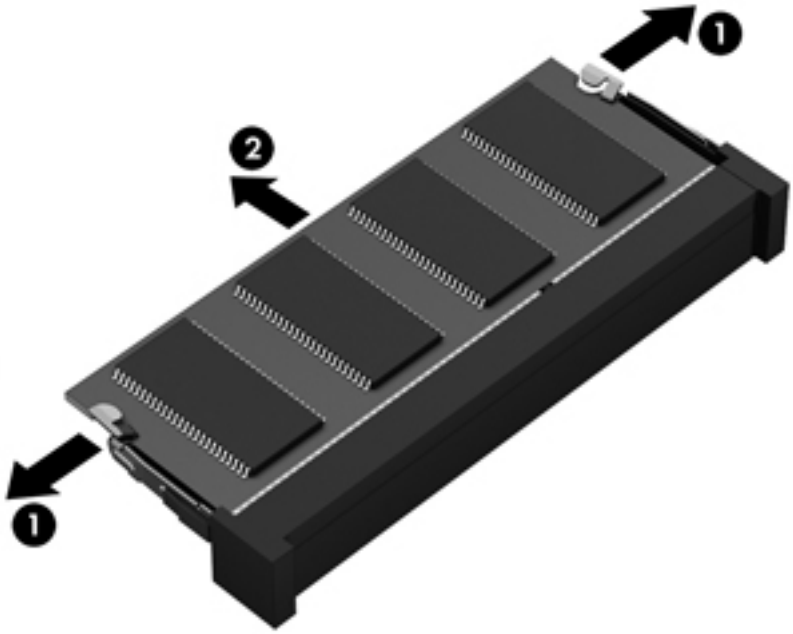
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).

To add or replace a memory module:

1. Spread the retention clips **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)

2. Remove the memory module **(2)** by pulling it away from the slot at an angle.

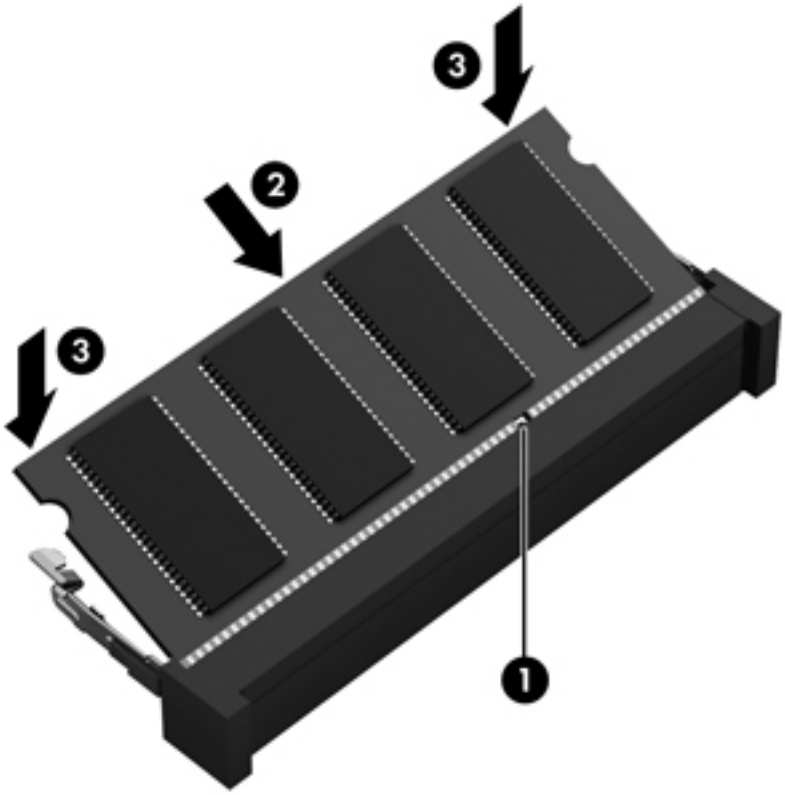
CAUTION: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



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

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

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



6. Replace the service door.
7. Replace the battery.
8. Turn the computer right-side up, and then reconnect external power and external devices.
9. Turn on the computer.

WLAN module

Description	Spare part number
Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	600370-001
Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter and AR3012 Bluetooth 4.0 combination adapter (select models only)	655795-001
Broadcom 4313GN 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS Combo Adapter	657325-001
Ralink RT5390BC8 802.11b/g/n 1×1 WiFi and Bluetooth 3.0+HS Combo Adapter	656120-001
Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter	670691-001
Intel Centrino Wireless-N 2230 802.11 b/g/n 2×2 WiFi and Bluetooth 4.0 Combination Adapter	670290-001
Qualcomm Atheros AR9485 802.11 b/g/n 1×1 WiFi Adapter (select models only)	675794-001
Ralink RT3290LE 802.11 b/g/n 1x1 WiFi and Bluetooth 4.0 Combo Adapter (select models only)	690020-001
Ralink RT5390R 802.11 b/g/n 1×1 WiFi Adapter	691415-001

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 device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).

Remove the WLAN module:

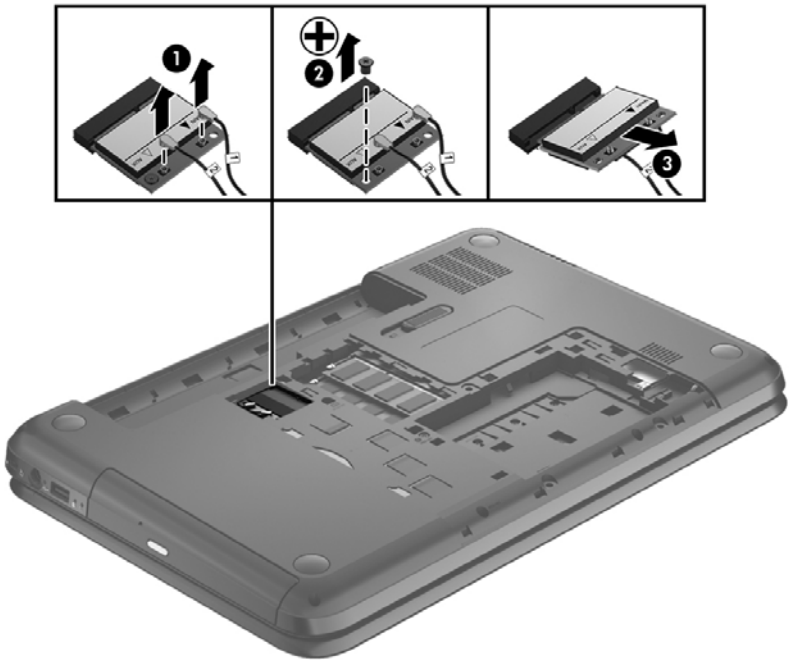
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: The 1/black WLAN antenna cable is connected to the WLAN module 1/Main terminal. The 2/gray WLAN antenna cable is connected to the WLAN module 2/Aux terminal.

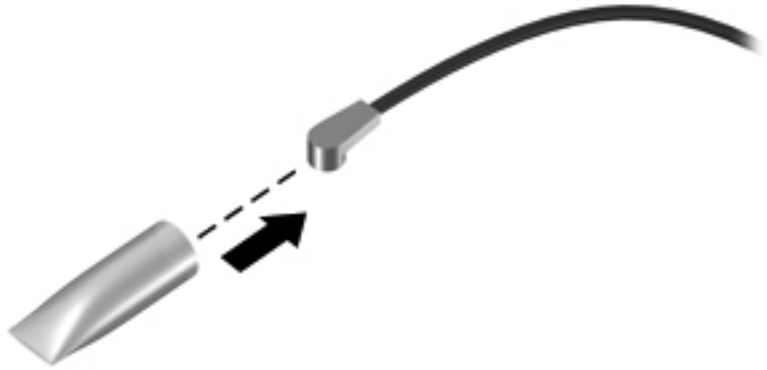
2. Remove the Phillips M2.5×2.5 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

3. Remove the WLAN module by pulling the module away from the slot at an angle **(3)**.

NOTE: The WLAN module is designed with a notch to prevent incorrect installation into the WLAN module socket.



NOTE: If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Keyboard

NOTE: The keyboard spare part kit includes a keyboard cable.

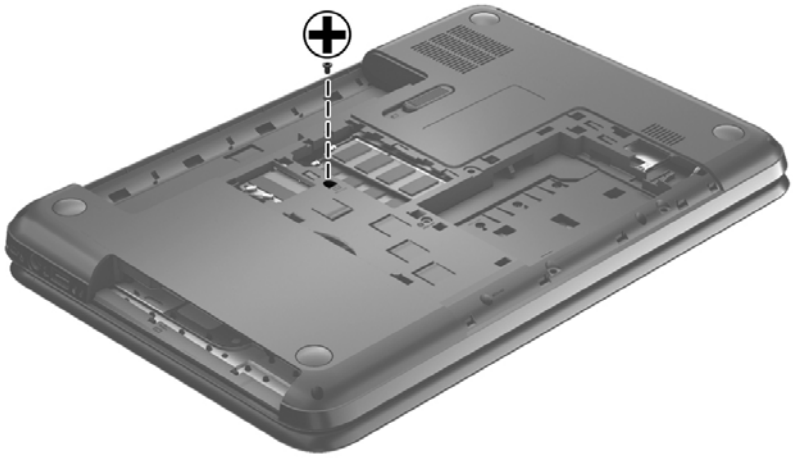
Description	Spare part number
Keyboard with black finish:	
For use in Brazil	698188-201
For use in Canada	698188-DB1
For use internationally	698188-B31
For use in Japan	698188-291
For use in Latin America	698188-161
For use in Saudi Arabia	698188-171
For use in South Korea	698188-AD1
For use in Taiwan	698188-AB1
For use in Thailand	698188-281
For use in the United States	698188-001
Keyboard with white finish:	
For use in Latin America	698189-161
For use in Thailand	698189-281
For use in Taiwan	698189-AB1
For use in the United States	698189-001

Before removing the keyboard, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).

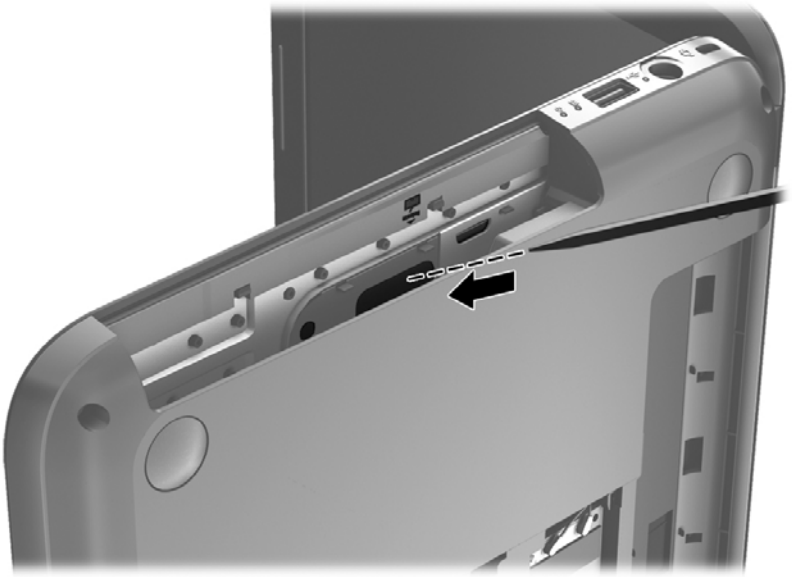
Remove the keyboard:

1. Remove the Phillips M2.5×6.5 screw that secures the keyboard to the computer.



2. Turn the computer right-side up with the front toward you and open the display.
3. Stand the computer on its left side.
4. Insert a finger or thin tool into the optical drive bay, and then press on the back of the keyboard until the keyboard disengages from the computer.

NOTE: The keyboard icon in the optical drive bay indicates the point to apply pressure.



5. Turn the computer right-side up with the front toward you.

6. Lift the rear edge **(1)** of the keyboard, and then move the keyboard **(2)** toward the display panel.

7. Tilt the keyboard forward **(1)** onto the palm rest. Release the zero insertion force (ZIF) connector **(2)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(3)** from the system board.

8. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

NOTE: The top cover spare part kit includes the TouchPad.

Description	Spare part number
Bright purple (modern mesh pattern)	680573-001
Linen white (modern mesh pattern)	684474-001
Linen white (butterfly blossom pattern)	689467-001
Ruby red (modern mesh pattern)	680574-001
Sparkling black	680576-001
Winter blue (modern mesh pattern)	680575-001

Before removing the top cover, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).

When replacing the top cover, be sure that the following components are removed from the defective top cover and installed on the replacement top cover:

- Power button board and cable (see Power button board on page 59).
- TouchPad button board and cable (see TouchPad button board on page 61).
- TouchPad LED board and cable (see TouchPad LED board on page 63).
- Speakers and cable (see Speakers on page 58).

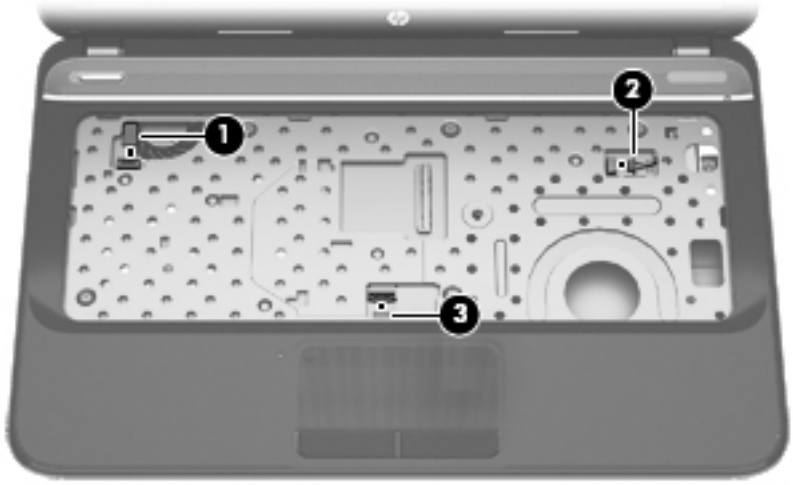
Remove the top cover:

1. Disconnect these cables from the system board:

   (1) Power button board ZIF cable

   (2) Speaker cable

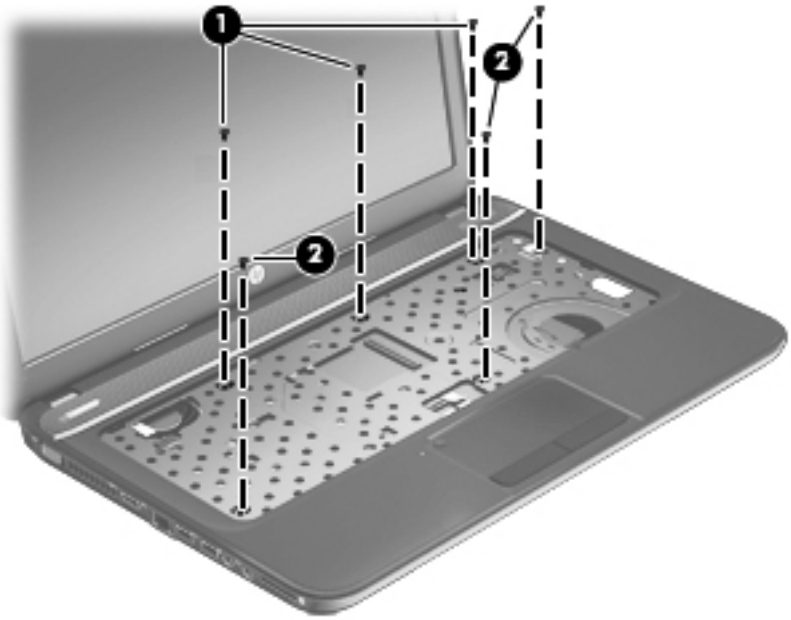
   (3) TouchPad button board ZIF cable



2. Remove the following screws under the keyboard:

   (1) Three Phillips M2.5 x 3.0

   (2) Three Phillips M2.5 x 6.5

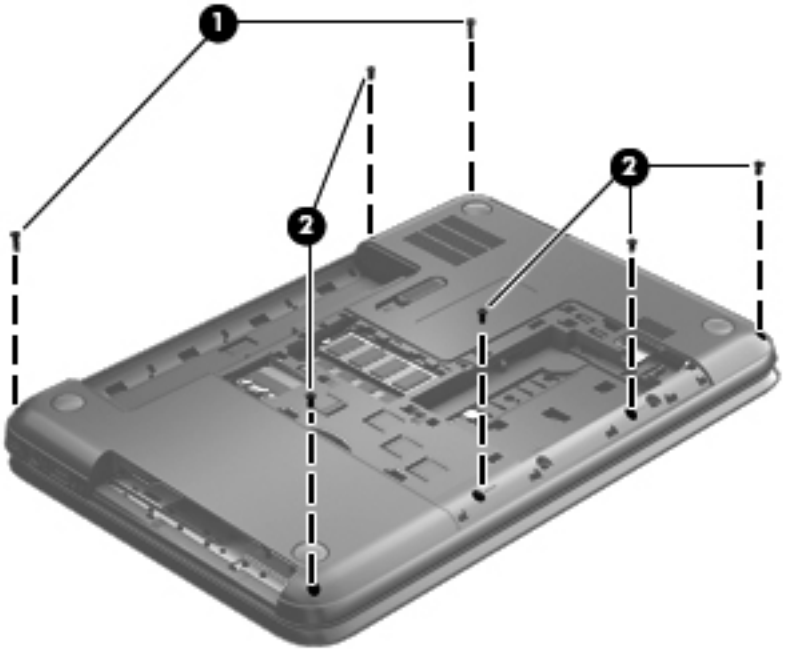


3. Close the computer.
4. Turn the computer upside down, with the front toward you.

5. Remove the following screws that secure the top cover to the computer:

   (1) Two Phillips M2.5 x 7.5

   (2) Five Phillips M2.5 x 6.5



6. Turn the computer right-side up, with the front toward you.
7. Open the computer.
8. Lift the front edge of the top cover **(1)** until the left and right sides disengage from the base enclosure.
9. Remove the top cover **(2)**.

Reverse this procedure to install the top cover.

Speakers

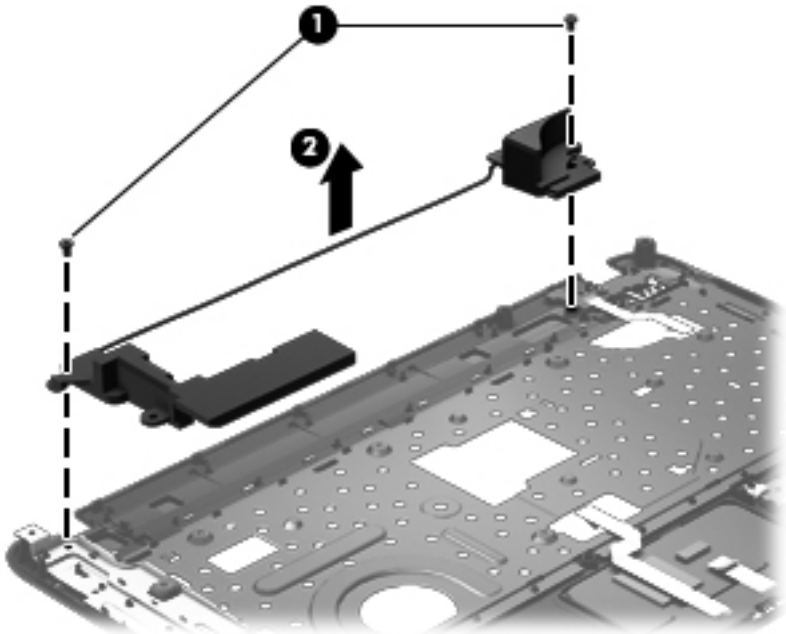
Description	Spare part number
Speaker Kit (includes left and right speakers and cable)	680567-001

Before removing the speakers, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

Remove the speakers:

1. Remove the Phillips M2.5 x 4 screw **(1)** from the left speaker and the Phillips M2.5 x 3 screw **(1)** from the right speaker.
2. Release the speaker cable from the clips built into the top cover **(2)**.
3. Lift the speakers from the top cover.



Reverse this procedure to install the speakers.

Power button board

Description	Spare part number
Power button board (includes cable)	680560-001

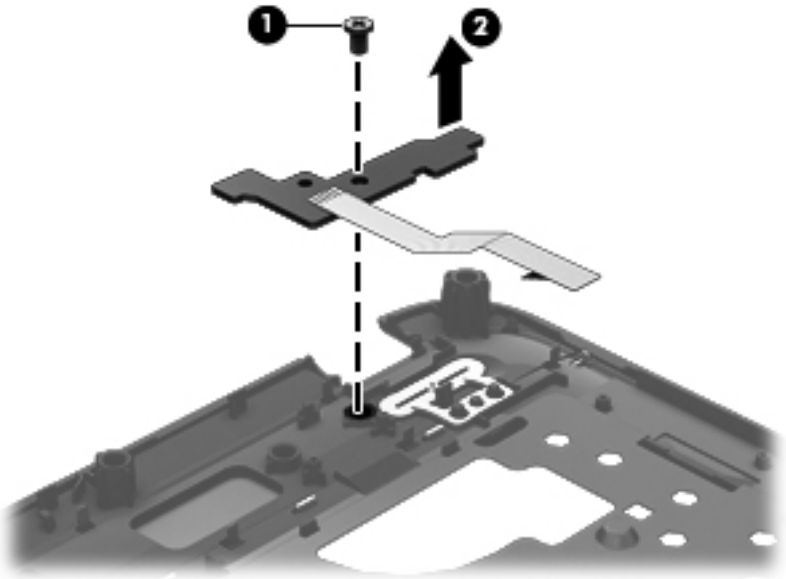
Before removing the power button board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).
10. Remove the speakers (see Speakers on page 58).

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the Phillips M2.5 × 2.5 screw **(1)** that secures the power button board to the top cover.

3. Remove the power button board and cable **(2)**.



Reverse this procedure to install the power button board.

TouchPad button board

Description	Spare part number
TouchPad button board (includes cable)	680559-001

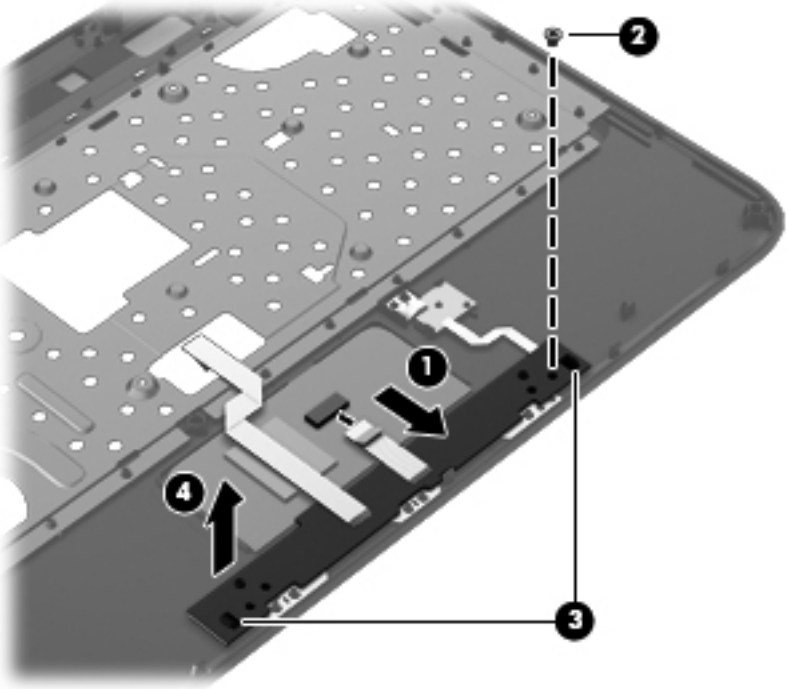
Before removing the TouchPad button board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

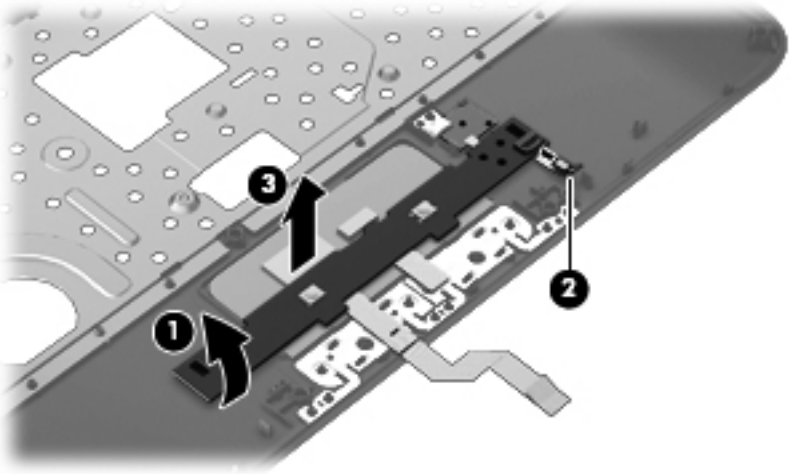
Remove the TouchPad button board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Release the ZIF connector to which the TouchPad button board cable is connected, and then disconnect the TouchPad button board cable **(1)** from the back of the TouchPad.
3. Remove the Phillips M2.5 x 2.5 screw **(2)** that secures the TouchPad button board cable to the top cover.
4. Lift the front edge of the TouchPad button board **(3)** until it is released from the clips built into the top cover.

5. Lift the TouchPad button board **(4)** slightly to perform the next step.



6. Carefully invert the TouchPad button board **(1)**.
7. Release the ZIF connector to which the TouchPad LED board cable is connected, and then disconnect the TouchPad LED board cable **(2)** from the TouchPad button board.
8. Lift the TouchPad button board away from the top cover **(3)**.



Reverse this procedure to install the TouchPad button board and cable.

TouchPad LED board

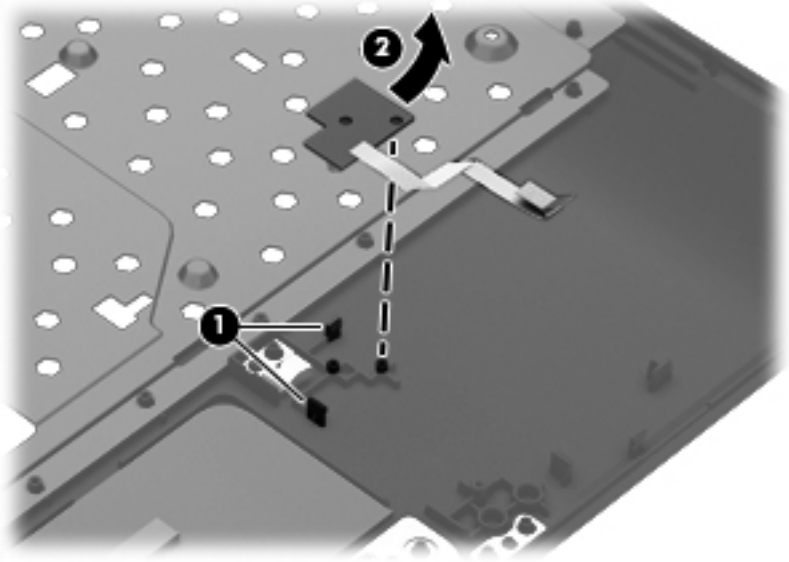
Description	Spare part number
TouchPad LED board (includes cable)	683848-001

Before removing the TouchPad LED board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).
10. Remove the TouchPad button board (see TouchPad button board on page 61).

Remove the TouchPad LED board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Apply slight pressure to the retaining clips **(1)** of the top cover.
3. Lift the TouchPad LED board on the right front corner **(2)** up and away from the top cover.



4. Remove the TouchPad LED board and cable.

Reverse this procedure to install the TouchPad LED board and cable.

Display assembly

NOTE: The display assembly spare part kit includes webcam, two microphones, and wireless antenna transceivers and cables.

Description	Spare part number
35.6 cm (14.0 in), HD, LED, SVA, BrightView display assembly	
Supports HD and VGA:	
• Bright purple (modern mesh pattern)	683844-001
• Ruby red (modern mesh pattern)	683845-001
• Sparkling black	683847-001
• Linen white (butterfly blossom pattern)	689462-001
Supports HD Only:	
• Bright purple (modern mesh pattern)	707888-001
• Ruby red (modern mesh pattern)	707889-001
• Winter blue (modern mesh pattern)	707890-001
• Sparkling black	707891-001
• Linen white (modern mesh pattern)	707892-001

Before removing the display assembly, follow these steps:

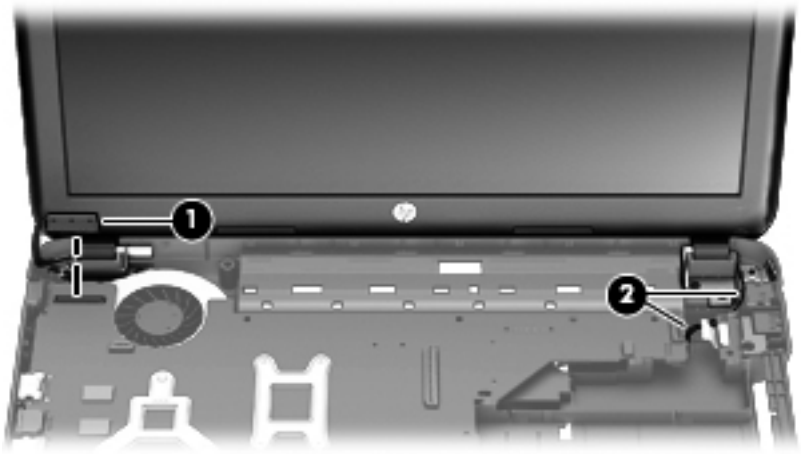
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

Remove the display assembly:

1. Disconnect the display panel cable **(1)** from the system board.

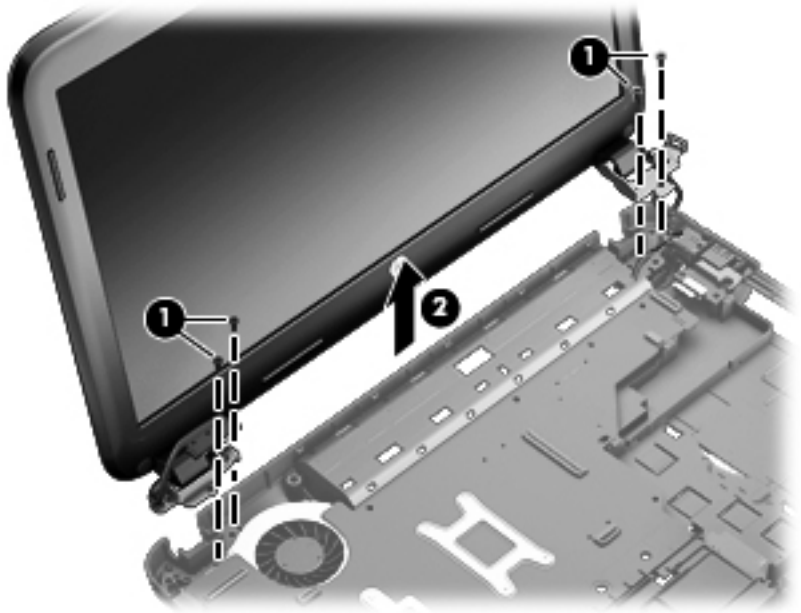
2. Release the wireless antenna cables **(2)** from the clips and the opening in the base enclosure.

NOTE: It may be necessary to release the USB board ZIF cable to remove the wireless antenna cables.



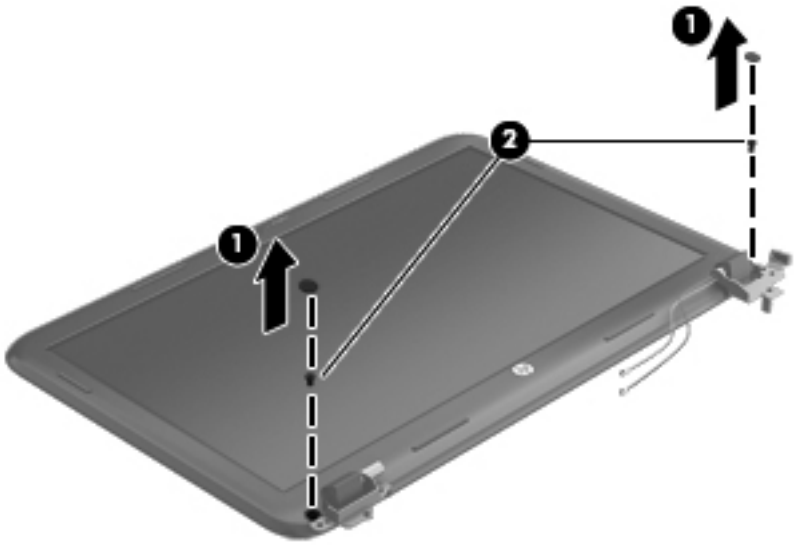
CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the four Phillips M2.5 × 6.5 screws **(1)** that secure the display assembly to the computer.
4. Remove the display assembly by lifting straight up **(2)**.



5. If it is necessary to replace the display bezel or any of the display assembly subcomponents:

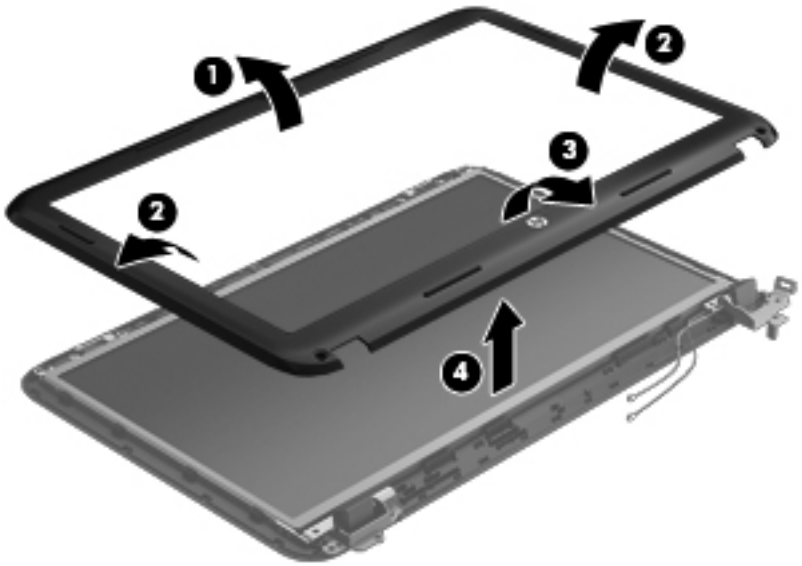
   a. Remove the plastic screw covers **(1)** and the two Phillips M2.5 × 3.5 screws **(2)** that secure the display bezel to the display assembly.



   b. Flex the inside edges of the top edge **(1)**, the left and right sides **(2)**, and the bottom edge **(3)** of the display bezel until the bezel disengages from the display enclosure.

   c. Remove the display bezel **(4)**.

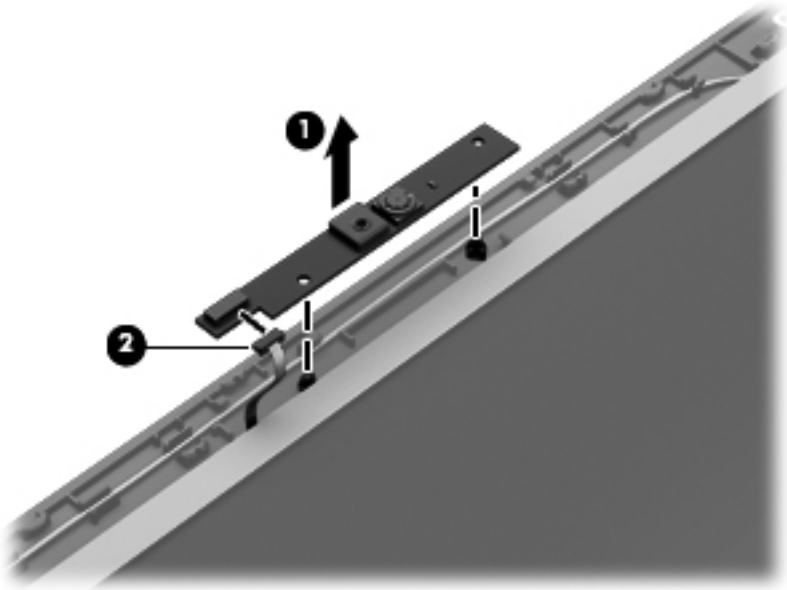
NOTE: The black display bezel is available using spare part number 680545-001.



6. If it is necessary to replace the webcam/microphone module:

   a. Detach and release the webcam/microphone module **(1)** as far as the webcam/microphone module cable allows. (The webcam/microphone module is attached to the display enclosure with double-sided tape.)

b. Disconnect the webcam/microphone cable **(2)** from the webcam/microphone module.



c. Remove the webcam/microphone module. The webcam/microphone module is available using spare part number 703461-001.

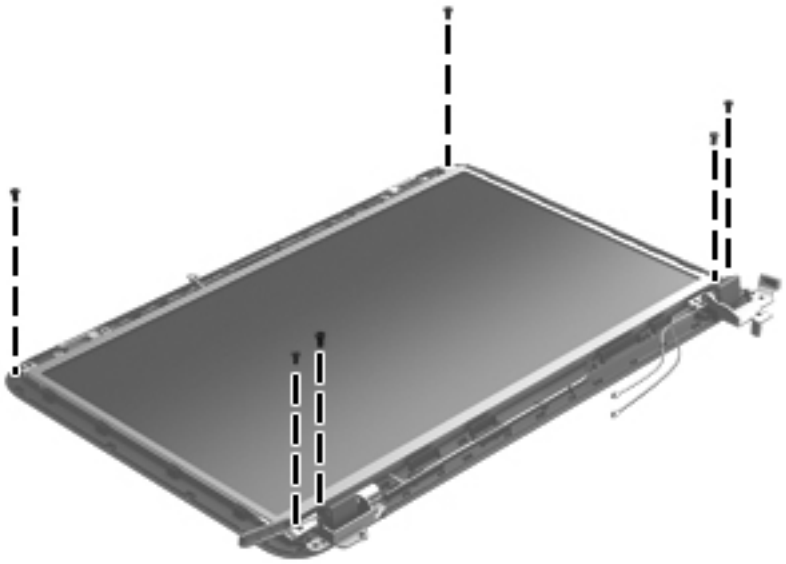
7. If it is necessary to replace the hinge covers:

a. The hinge covers are held in place by the same screws as the previously removed bezel.

b. Using a small tool to pry, remove the hinge covers. The hinge covers are available using spare part number 680553-001.

8. If it is necessary to replace the display panel:

   a. Remove the four bottom Phillips M2.5 × 3.5 screws and the two top Phillips M2.5 × 2.5 screws that secure the display panel to the display enclosure.



   b. Lift the top edge of the display enclosure, **(1)** and then swing it up and forward until it is perpendicular to the display panel.

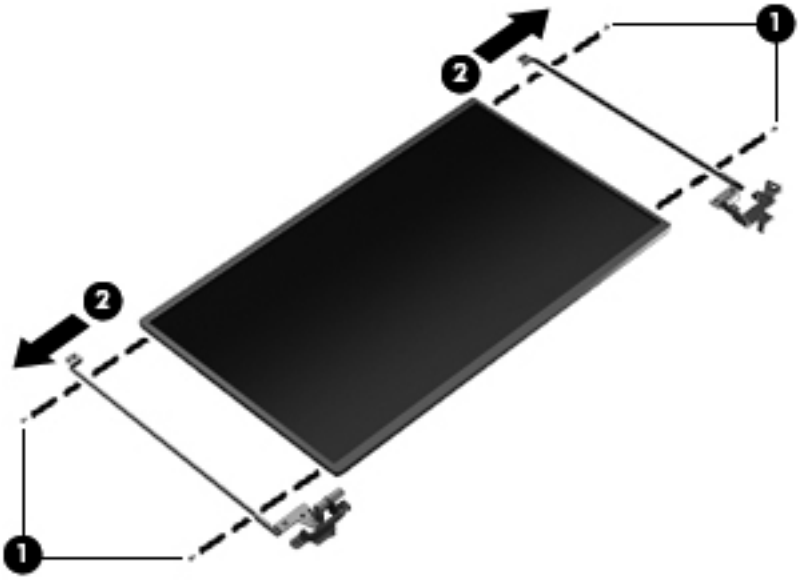
c. Release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the display panel cable **(3)** from the display panel.

d. Remove the display panel.

9. If it is necessary to replace the display hinges:

a. Remove the four Phillips M2.0 × 3.0 screws **(1)** that secure the display hinges to the display panel.

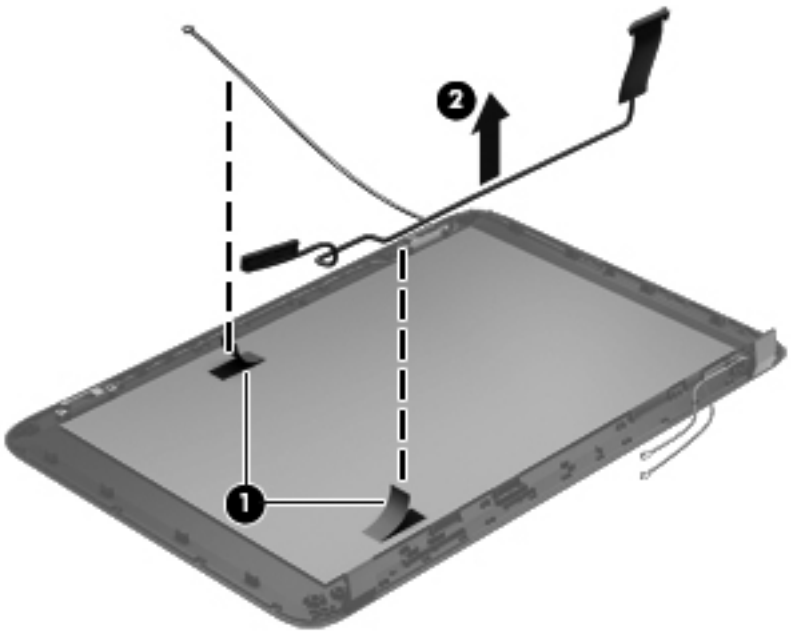
b. Remove the display hinges **(2)**. The display hinges include the display hinges and brackets and are available using spare part number 680554-001.



10. If it is necessary to replace the display panel cable:

a. Release the adhesive and tabs **(1)** on the display enclosure shielding that secure the display panel cable to the display enclosure.

b. Release the display panel cable from the clips and remove the display panel cable **(2)**. The display panel cable includes the webcam/microphone module cable and is available in the Display Panel Cable Kit, spare part number 680547-001.

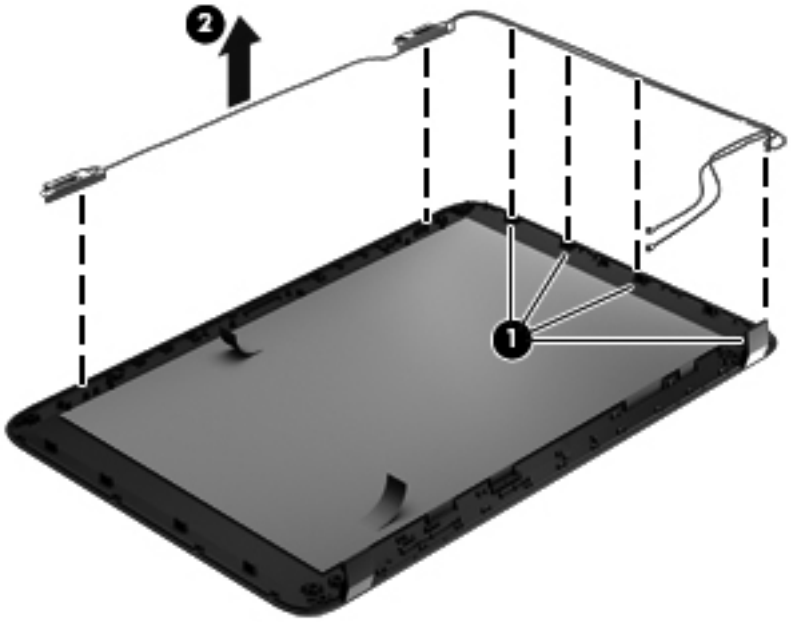


11. If it is necessary to replace the wireless antenna cables and transceivers:

    a. Release the wireless antenna cables from the clips **(1)** built into the display enclosure.

    b. Release the wireless antenna transceivers **(2)** from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)

    c. Remove the wireless antenna cables and transceivers. The wireless antenna cables and transceivers are available in the Antenna Kit, spare part number 680539-001.



The display panel is available using spare part number 680562-001.

Reverse this procedure to reassemble and install the display assembly.

Optical drive cable

Description	Spare part number
Optical drive cable (includes optical drive connector)	680546-001

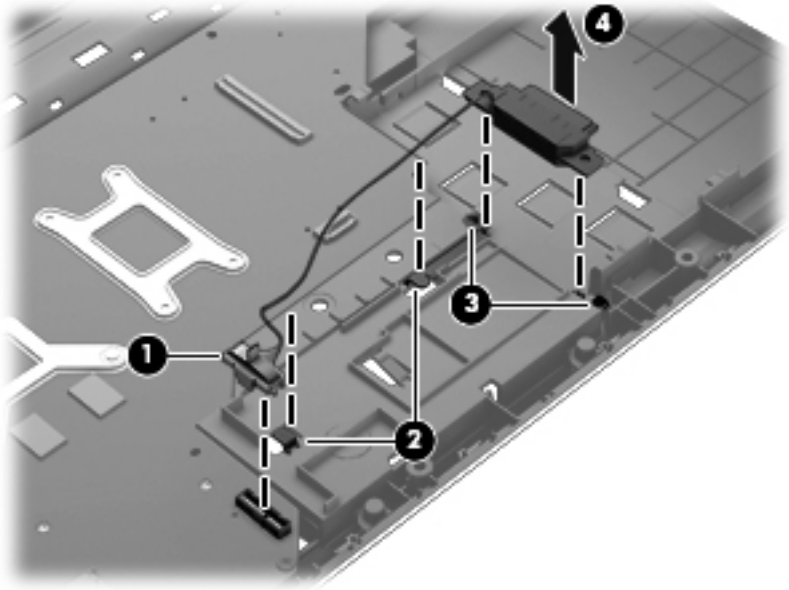
Before removing the optical drive cable, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).

7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

Remove the optical drive cable:

1. Disconnect the optical drive cable **(1)** from the system board.
2. Release the optical drive cable **(2)** from the clips built into the base enclosure.
3. Release the optical drive connector from the base enclosure by prying the clips **(3)** that secure the optical drive connector to the base enclosure.
4. Remove the optical drive cable from the base enclosure **(4)**.



Reverse this procedure to install the optical drive cable.

USB board

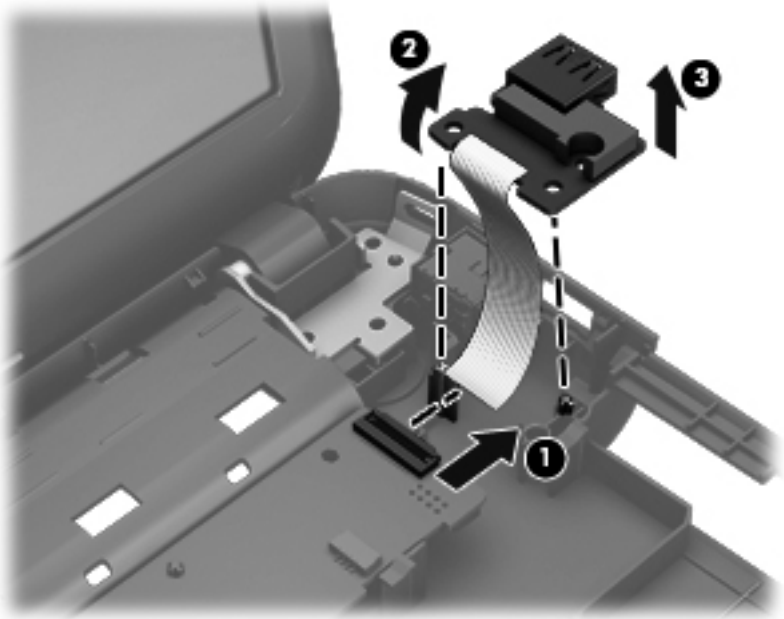
Description	Spare part number
USB board (includes cable)	680558-001

Before removing the USB board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

Remove the USB board:

1. If not released already, release the ZIF connector **(1)** to which the USB board cable is connected, and then disconnect the USB board cable from the system board.
2. Pry the clip **(2)** that secures the USB board to the base enclosure.
3. Remove the USB board and cable by lifting straight up **(3)**.



Reverse this procedure to install the USB board.

Power connector

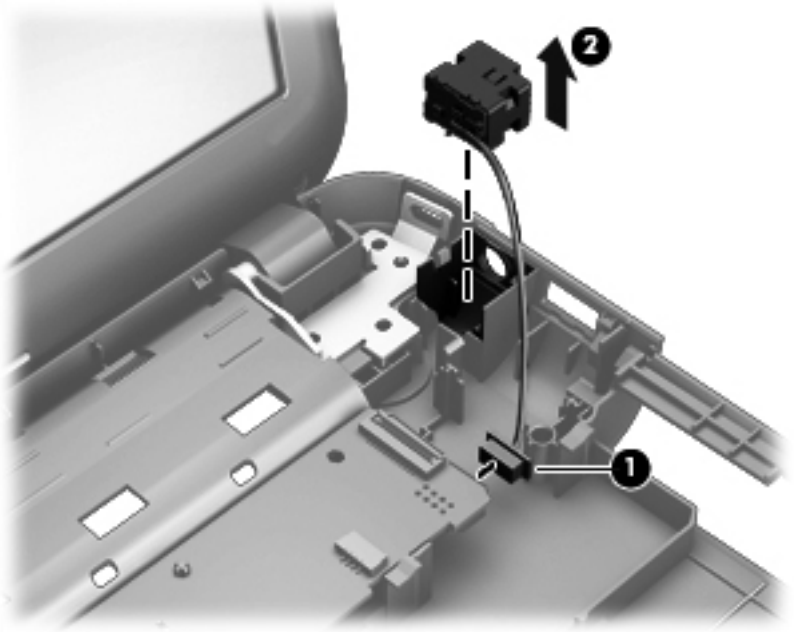
Description	Spare part number
Power connector (includes cable)	680548-001

Before removing the power connector, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

Remove the power connector:

1. Disconnect the power connector cable **(1)** from the system board.
2. Remove the power connector from the base enclosure **(2)**.



Reverse this procedure to install the power connector.

System board

NOTE: The system board Thermal Material Kit, part number 680571-001, includes replacement thermal paste and pads.

Description	Spare part number
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Professional	710874-601
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and Windows 8 Standard	710874-501
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory, Intel Core i3-3110M processor, and FreeDOS 1.0	710874-001
For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Professional	710873-601
For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and Windows 8 Standard	710873-501
For use only with computer models equipped with UMA video memory, Intel Core i3-3110M processor, and FreeDOS 1.0	710873-001
For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and Windows 8 Professional	680570-601
For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and Windows 8 Standard	680570-501
For use only with computer models equipped with 2 GB of dedicated switchable discrete video memory and FreeDOS 1.0	680570-001
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and Windows 8 Professional	680569-601
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and Windows 8 Standard	680569-501
For use only with computer models equipped with 1 GB of dedicated switchable discrete video memory and FreeDOS 1.0	680569-001
For use only with computer models equipped with UMA video memory and Windows 8 Professional	680568-601
For use only with computer models equipped with UMA video memory and Windows 8 Standard	680568-501
For use only with computer models equipped with UMA video memory and FreeDOS 1.0	680568-001

Before removing the system board, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).

5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see Memory module on page 47)
- RTC battery (see RTC battery on page 79)
- Fan and heat sink (see Fan and heat sink on page 81).
- PCH heat sink (see PCH heat sink on page 84)
- Processor (see Processor on page 86)

Remove the system board:

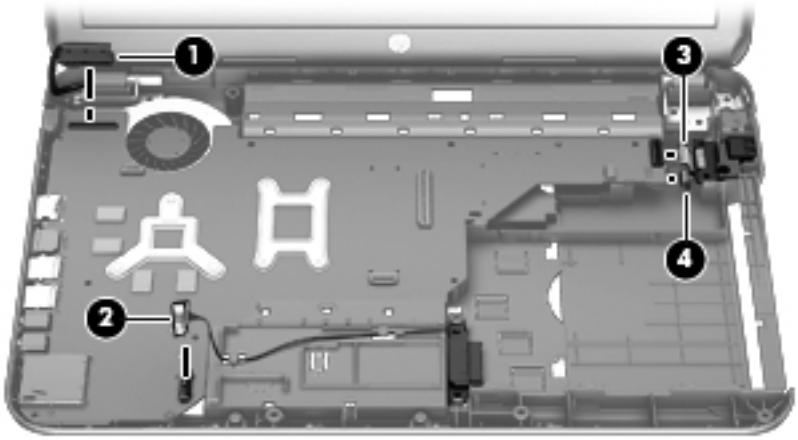
1. Disconnect the following cables from the system board:

   (1) Display panel cable

   (2) Optical drive cable

   (3) USB board cable

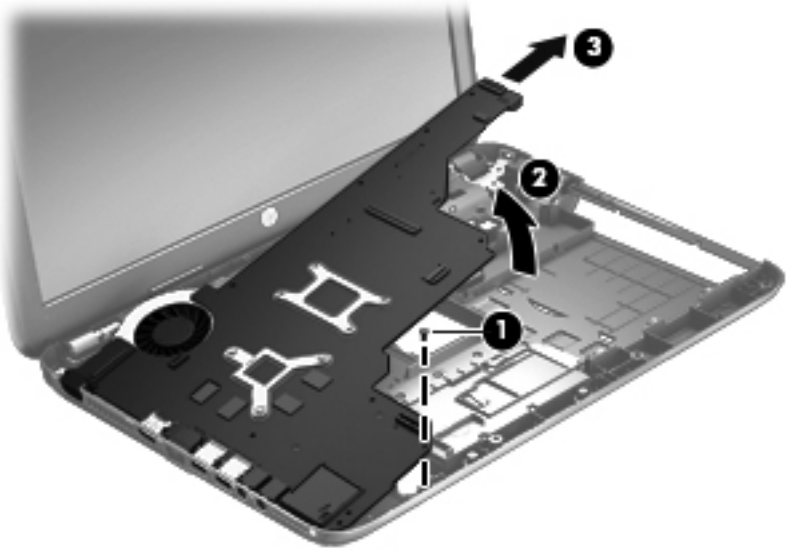
   (4) Power connector cable



2. Remove the Phillips M2.5 × 4.5 screw **(1)** that secures the system board to the base enclosure.
3. Lift the right side of the system board **(2)** until it rests at an angle.

4. Remove the system board **(3)** by sliding it up and to the right at an angle.

NOTE: Your computer's system board may look different from the illustration.



Reverse this procedure to install the system board.

RTC battery

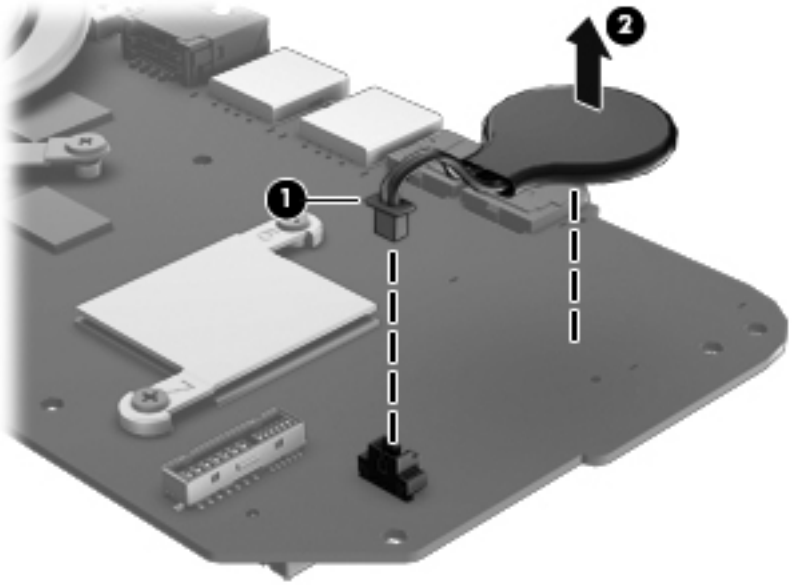
Description	Spare part number
RTC battery (includes cable and double-sided tape)	637193-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).
10. Remove the system board (see System board on page 76).

Remove the RTC battery:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the RTC battery cable **(1)** from the system board.
3. Remove the RTC battery **(2)** from the system board. (The RTC battery is attached to the system board with double-sided tape.)



Reverse this procedure to install the RTC battery.

Fan and heat sink

NOTE: The fan and heat sink spare part kits include replacement thermal material.

Description	Spare part number
Fan	680551-001
Heat sink for use only with computer models equipped with UMA video memory for BGA-based systems	711471-001
Heat sink for use only with computer models equipped with UMA video memory	680549-001
Heat sink for use only with computer models equipped with switchable discrete video memory for BGA-based systems	711472-001
Heat sink for use only with computer models equipped with switchable discrete video memory	680550-001

NOTE: To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

Before removing the fan and heat sink, follow these steps:

1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).
10. Remove the system board (see System board on page 76).

Remove the fan and heat sink:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the fan cable **(1)** from the system board.

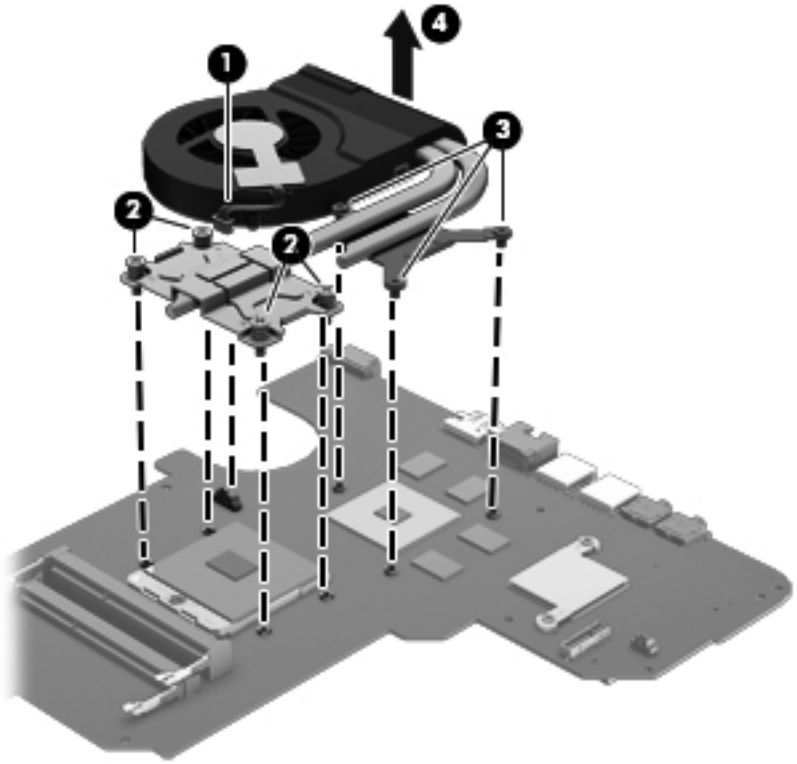
CAUTION: To prevent damage to heat sinks and/or processors, loosen/tighten captive screws in sequence as numerically labeled.

NOTE: The heat sink and fan appearance and the number of screws may be different from the heat sink and fan pictured.

3. Loosen the four captive screws **(2)** and the three captive screws **(3)** that secure the heat sink to the system board.

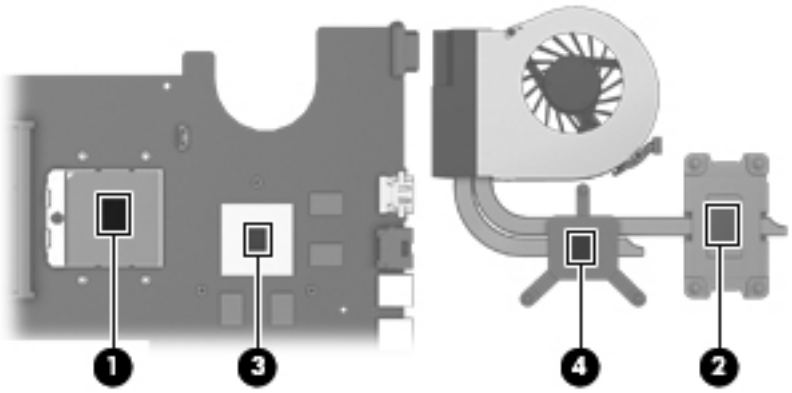
NOTE: Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

4. Remove the fan and heat sink **(4)**.

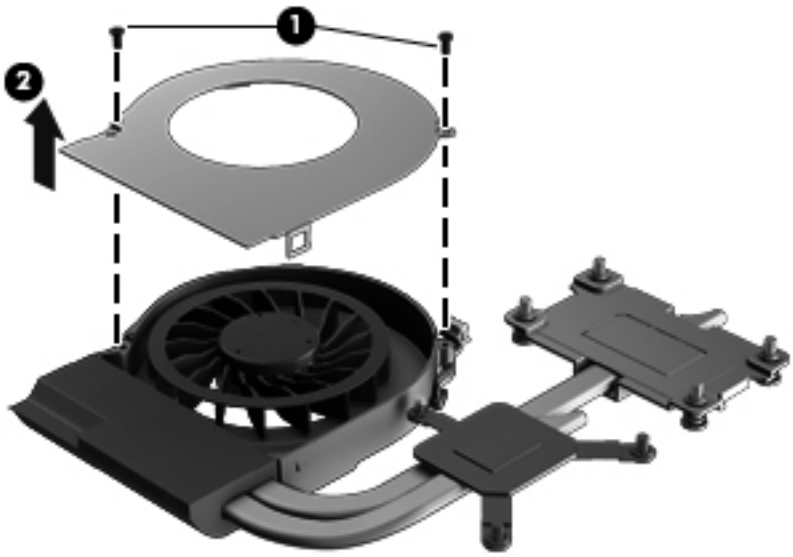


NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the base enclosure, heat sink, processor, and system board spare part kits.

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it
- A thermal pad is used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it (only on computer models equipped with a graphics subsystem with switchable discrete memory)



1. If it is necessary to replace the fan, turn the fan and heat sink upside down with the fan toward you.
2. Remove the two Phillips M1.5 × 2.5 screws **(1)** that secure the fan to the heat sink.
3. Disengage the two clips that secure the fan to the heat sink and remove the heat sink **(2)** from the fan.



Reverse this procedure to reassemble and install the fan and heat sink.

PCH heat sink

Description	Spare part number
PCH heat sink	683843-001

Before removing the PCH heat sink, follow these steps:

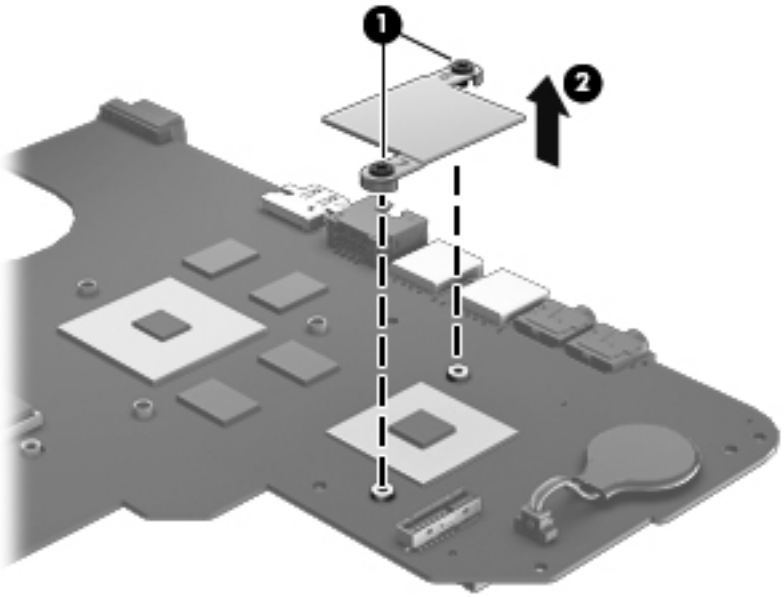
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).
10. Remove the system board (see System board on page 76).

Remove the PCH heat sink:

1. Remove the two Phillips M2.0 x 3.0 screws **(1)** that secure the PCH heat sink to the system board.

2. Remove the PCH heat sink by lifting straight up **(2)**.

NOTE: Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the base enclosure, heat sink, processor, and system board spare part kits.

Reverse this procedure to install the PCH heat sink.

Processor

NOTE: The processor spare part kit includes replacement thermal material.

Description	Spare part number
Intel Core i7-3632QM (2.2 GHz, SC turbo up to 3.2 GHz, 1600 MHz/6 MB L3 cache, quad core, 35 W)	701658-001
Intel Core i5-3230M (2.6 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	711903-001
Intel Core i5-3210M (2.5 GHz, SC turbo up to 3.1 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	680645-001
Intel Core i3-3130M (2.6 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	713163-001
Intel Core i3-3120M (2.5 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	700627-001
Intel Core i3-3110M (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)	682417-001
Intel Core i5-2450M(2.5 GHz, SC turbo up to 3.1 GHz, 1333 MHz/3 MB L3 cache, dual core, 35 W)	676359-001
Intel Core i3-2370M (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)	677152-001
Pentium 2030M (2.5 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)	713164-001
Pentium 2020M (2.4 GHz, 1600 MHz/2 MB L3 cache, dual core, 35 W)	700628-001
Pentium B980 (2.4 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	692428-001
Pentium B970 (2.3 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	676785-001
Pentium B960 (2.2 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	664662-001
Pentium B950 (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	653338-001

Before removing the processor, follow these steps:

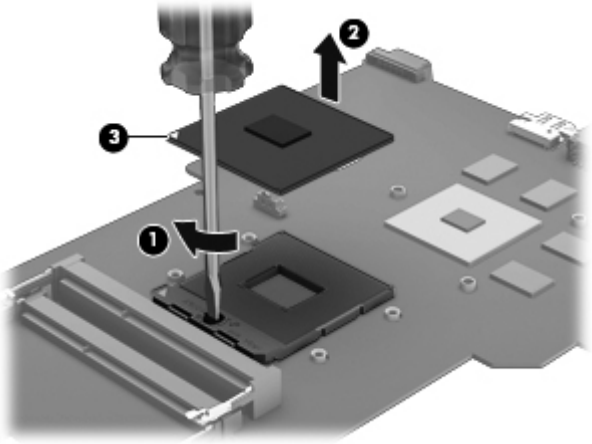
1. Shut down the computer.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the service door (see Service door on page 41).
6. Remove the optical drive (see Optical drive on page 42).
7. Remove the hard drive (see Hard drive on page 45).
8. Remove the keyboard (see Keyboard on page 52).
9. Remove the top cover (see Top cover on page 55).

10. Remove the system board (see System board on page 76).
11. Remove the heat sink (see Fan and heat sink on page 81).

Remove the processor:

1. Use a flat-bladed screw driver **(1)** to turn the processor locking screw one-half turn counterclockwise, until you hear a click.
2. Lift the processor **(2)** straight up, and remove it.

NOTE: The gold triangle on the processor **(3)** must be aligned with the triangle icon embossed on the processor socket when you install the processor.



Reverse this procedure to install the processor.

5 Using Setup Utility (BIOS) and System Diagnostics (Windows 8)

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

Starting Setup Utility (BIOS)

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

Information about how to navigate in Setup Utility (BIOS) is located at the bottom of the screen.

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

Updating the BIOS

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

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

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

Determining the BIOS version

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

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

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 88.
2. Use the arrow keys to select **Main**.
3. To exit Setup Utility (BIOS) without saving your changes, use the arrow keys to select **Exit**, select **Exit Discarding Changes**, and then press **enter**.

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

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

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

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

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

1. From the Start screen, type e, and then select **File Explorer**.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

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

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

Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly.

To start System Diagnostics:

1. Turn on or restart the computer, quickly press esc, and then 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 diagnostic test while it is running, press esc.

6 Using Setup Utility (BIOS) and System Diagnostics (Ubuntu Linux)

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

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

Starting Setup Utility

- Turn on or restart the computer. While the "Press the ESC key for Startup Menu" message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f10.

Using Setup Utility

Changing the language of Setup Utility

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

Your change takes effect immediately.

Navigating and selecting in Setup Utility

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

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

Displaying system information

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

Restoring factory default settings in Setup Utility

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

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

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

Exiting Setup Utility

- To exit Setup Utility and save your changes from the current session:

  If the Setup Utility menus are not visible, press esc to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press enter.

- To exit Setup Utility without saving your changes from the current session:

  If the Setup Utility menus are not visible, press esc to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

Updating the BIOS

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

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

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

Determining the BIOS version

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

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

1. Start Setup Utility.
2. If the system information is not displayed, use the arrow keys to select the **Main** menu.

   BIOS and other system information is displayed.
3. To exit Setup Utility, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Suspend or Hibernation.

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

1. Access the page on the HP website that provides software for your computer.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

      Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.

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

BIOS installation procedures vary. Follow any instructions that are displayed on the screen after the download is complete.

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

Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly.

To start System Diagnostics:

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

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

7 Specifications

Computer specifications

	Metric	U.S.
Dimensions:		
Width	**34.7 cm**	13.67 in
Depth	**23.1 cm**	9.10 in
Height (front to back)	**3.0 cm to 3.6 cm**	1.9 in to 1.4 in
Weight:	**2.19 kg**	4.83 lbs
Input power		
Operating voltage and current	18.5 V dc @ 3.5 A or 19.5 V dc @ 3.33 A – 65 W 19 V dc @ 4.74 A or 19.5 V dc @ 4.62 A – 90 W	
Temperature		
Operating (writing to optical disc)	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	**-15 m to 12,192 m**	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.

35.6 cm (14.0 in), display specifications

	Metric	U.S.
Dimensions		
Width	**32.4 cm**	12.8 in
Height	**19.3 cm**	7.6 in
Diagonal	**35.6 cm**	14.0 in
Number of colors	262K (6 bit)	
Contrast ratio	500:1 (typical)	
Brightness	200 cd/m^2 (nits) (typical)	
Backlight	LED	
Total power consumption	3.2 W (max)	
Viewing angle	±45° horizontal, +15° up & -35° down vertical (typical)	

Hard drive specifications

	1 TB*	750 GB*	640 GB*	500 GB*	320 GB*
Dimensions					
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm	7.0 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	107 g max	107 g max	107 g max	107 g max	107 g max
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate	300 MB/sec	300 MB/sec	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	1.5 ms	1.0 ms	1.0 ms	1.5 ms	2.0 ms
Average	11.0 ms	14.0 ms	14.0 ms	12.0 ms	12.0 ms
Maximum	22.0 ms	24.0 ms	22.0 ms	22.0 ms	22.0 ms
Logical blocks	1,953,525,168	1,465,128,359	1,250,242,867	976,752,240	625,121,433
Disk rotational speed	5400 rpm	7200 and 5400 rpm	5400 rpm	7200 and 5400 rpm	5400 rpm
Operating temperature	**5°C to 55°C** (41°F to 131°F)				

	1 TB*	750 GB*	640 GB*	500 GB*	320 GB*
*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.					
NOTE: Certain restrictions and exclusions apply. Contact support for details.					

DVD±RW SuperMulti Double-Layer Combination Drive specifications

Applicable disc	
Read	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM
Write	CD-R and CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Random access time	
DVD	< 230 ms
CD	< 175 ms
Cache buffer	2 MB
Data transfer rate	
24X CD-ROM	3,600 KB/sec
8X DVD-ROM	10,800 KB/sec
24X CD-R	3,600 KB/sec
16X CD-RW	2,400 KB/sec
8X DVD+R	10,800 KB/sec
4X DVD+RW	5,400 KB/sec
8X DVD-R	10,800 KB/sec
4X DVD-RW	5,400 KB/sec
2.4X DVD+R(9)	2,700 KB/sec
5X DVD-RAM	6,750 KB/sec
Transfer mode	Multiword DMA Mode

BD ROM DVD±R/RW Super Multi Double-Layer Drive specifications

Applicable disc	
Read	BD-ROM, BD-ROM-DL, BD-R, BD-R-DL, BD-RE, BD-RE-DL, DVD-ROM, DVD+R, DVD+R-DL, DVD+RW, DVD-R, DVD-R-DL, DVD-RW, DVD-RAM (Ver.2), CD-DA, CD-ROM (mode 1 and mode 2), CD-ROM XA (mode 2, form 1 and form 2), Photo CD (single and multiple sessions), CD Extra, CD-R, CD-RW, and CD-TEXT
Write	DVD-RAM (Ver.2), DVD+R, DVD-R, CD-R, and CD-ROM
Random access time	
BD	< 230 ms
DVD	< 180 ms
CD	< 180 ms
Cache buffer	4.5 MB
Data transfer rate	
24X CD-ROM	3,600 KB/sec
8X DVD-ROM	10,800 KB/sec
4X BD	18,000 KB/sec
24X CD-R	3,600 KB/sec
16X CD-RW	2,400 KB/sec
8X DVD+R	10,800 KB/sec
4X DVD+RW	5,400 KB/sec
8X DVD-R	10,800 KB/sec
4X DVD-RW	5,400 KB/sec
2.4X DVD+R(9)	2,700 KB/sec
5X DVD-RAM	6,750 KB/sec
1X BD-ROM	4,500 KB/sec
1X BD-R read	4,500 KB/sec
1X BD-RE read	4,500 KB/sec
Transfer mode	Multiword DMA Mode

8 Backing up, restoring, and recovering (Windows 8)

Your computer includes tools provided by HP and the operating system to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state or even back to the original factory state, all with simple steps.

This chapter provides information about the following processes:

- Creating recovery media and backups
- Restoring and recovering your system

NOTE: This guide describes an overview of backing up, restoring and recovering options. For more details about the tools provided, see Help and Support. From the Start screen, type h, and then select **Help and Support**.

Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the computer, create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced.

   HP Recovery media you create will provide the following recovery options:

   - System Recovery—Reinstalls the original operating system and the programs that were installed at the factory.
   - Minimized Image Recovery—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
   - Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

   See Creating HP Recovery media on page 100.

2. As you add hardware and software programs, create system restore points. A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A system restore point contains information that Windows uses, such as registry settings. Windows creates a system restore point for you automatically during a Windows update and during other system maintenance (such as a software update, security scanning, or system diagnostics). You can also manually create a system restore point at any time. For more information and steps for creating specific system restore points, see Help and Support. From the Start screen, type h, and then select **Help and Support**.

3. As you add photos, video, music, and other personal files, create a backup of your personal information. Windows File History can be set to regularly and automatically back up files from

libraries, desktop, contacts, and favorites. If files are accidentally deleted from the hard drive and they can no longer be restored from the Recycle Bin, or if files become corrupted, you can restore the files that you backed up using File History. Restoring files is also useful if you ever choose to reset the computer by reinstalling Windows or choose to recover using HP Recovery Manager.

NOTE: File History is not enabled by default, so you must turn it on.

For more information and steps for enabling Windows File History, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

Creating HP Recovery media

HP Recovery Manager is a software program that offers a way to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory, and then configures the settings for the programs. HP Recovery media can also be used to customize the system or aid in the replacement of a hard drive.

- Only one set of HP Recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the blank USB flash drive or the number of blank DVD discs that will be required.
- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or instead you can use a high-quality blank USB flash drive.
- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take up to an hour or more. Do not interrupt the creation process.
- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 103.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

- If you need to restore your personal files and data, you can use Windows File History to restore your information from the backups you created. For more information and steps for using File History, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
- If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

  From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.
- If you want to restore the system to a previous state without losing any personal information, Windows System Restore is an option. System Restore allows you to restore without the requirements of Windows Refresh or a reinstallation. Windows creates system restore points automatically during a Windows update and other system maintenance events. Even if you did not manually create a restore point, you can choose to restore to a previous point, automatically created. For more information and steps for using Windows System Restore, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
- If you want a quick and easy way to recover the system without losing your personal information, settings, or apps that came preinstalled on your computer or were purchased from the Windows Store, consider using Windows Refresh. This option does not require backing up data to another drive. See Using Windows Refresh for quick and easy recovery on page 102.
- If you want to reset your computer to its original state, Windows provides an easy way to remove all personal data, apps, and settings, and reinstall Windows.

  For more information, see Remove everything and reinstall Windows on page 102.
- If you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition (select models only) or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

  For more information, see Recovering using HP Recovery Manager on page 103.
- If you want to recover the computer's original factory partitioning and content, you can choose the System Recovery option from the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 103.
- If you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media to restore the factory image to the replacement drive. For more information, see Recovering using HP Recovery Manager on page 103.
- If you wish to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition on page 104.

Using Windows Refresh for quick and easy recovery

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

IMPORTANT: Refresh removes any traditional applications that were not originally installed on the system at the factory.

NOTE: During Refresh, a list of removed traditional applications will be saved so that you have a quick way to see what you might need to reinstall. See Help and Support for instructions on reinstalling traditional applications. From the Start screen, type h, and then select **Help and Support**.

NOTE: You may be prompted for your permission or password when using Refresh. See Help and Support for more information. From the Start screen, type h, and then select **Help and Support**.

To start Refresh:

1. From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Under **Refresh your PC without affecting your files**, select **Get started**, and then follow the on-screen instructions.

Remove everything and reinstall Windows

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, apps, and settings from your computer, and reinstalls Windows.

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 or from the Start screen.

To use the f11 key:

1. Press f11 while the computer boots.

   – or –

   Press and hold f11 as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **Reset your PC**, and then follow the on-screen instructions.

To use the Start screen:

1. From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms.
2. Click **Settings**.

3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Under **Remove everything and reinstall Windows**, select **Get started**, and follow the on-screen instructions.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state. Using the HP Recovery media you created, you can choose from one of the following recovery options:

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Minimized Image Recovery—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows Minimized Image Recovery.

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.
- Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.
- HP Recovery media must be used if the computer hard drive fails.
- To use the Factory Reset or System Recovery options, you must use HP Recovery media.
- If the HP Recovery media do not work, you can obtain recovery media for your system from the HP website. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you wish to retain.

Using the HP Recovery partition to recover a minimized image (select models only)

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

To start HP Recovery Manager from the HP Recovery partition:

1. Press f11 while the computer boots.

   – or –

   Press and hold f11 as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **HP Recovery Manager**, and follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.
2. Insert the first HP Recovery disc you created into the optical drive on your computer or into an optional external optical drive, and then restart the computer.

   – or –

   Insert the HP Recovery USB flash drive you created into a USB port on your computer, and then restart the computer.

NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 104.

3. Follow the on-screen instructions.

Changing the computer boot order

If computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media you created.
2. Restart the computer.
3. Press and hold esc while the computer is restarting, and then press f9 for boot options.
4. Select the optical drive or USB flash drive you want to boot from.
5. Follow the on-screen instructions.

Removing the HP Recovery partition

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: Removing the HP Recovery partition means you can no longer use Windows Refresh, the Windows Remove everything and reinstall Windows option, or the HP Recovery Manager option for minimized image recovery. Create HP Recovery media before removing the Recovery partition to ensure you have recovery options; see Creating HP Recovery media on page 100.

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

9 Backing up, restoring, and recovering (Ubuntu Linux)

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

Performing a system recovery

The Deja Dup Restore Tool allows you to repair or restore the computer to its original factory state. You can create an image restore DVD using a DVD±RW optical drive. You can also create a restore image on a USB storage device.

CAUTION: Using Restore 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 programs and drivers that were installed at the factory. Software, drivers, and updates not installed at the factory must be manually reinstalled. Personal files must be restored from a backup.

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

Creating the restore DVDs

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

To create restore DVDs:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup**.
2. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup Location**, and select the DVD from the drop-down list.
3. Select **Overview** from the panel on the left side of the window, and then click **Back Up Now**.
4. Follow the on-screen instructions.

Creating a restore image on a USB device

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

Verify the exact amount of free space on your storage device before you begin the creation process. For most models, you will need at least 8 GB of free space on the storage device. However, depending

on the drivers and software installed on your computer, you may need slightly more than 8 GB of space. **HP recommends that you use a 16 GB device or above for best results.**

IMPORTANT: Remember to insert your USB device into the USB port on the computer before starting this procedure.

To create the restore image:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup**.
2. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup location**, and select the USB device from the drop-down list.

   NOTE: If the USB device is not listed in the drop-down list for Backup Location, select **Local Folder**, and then click the **Choose Folder** button. Select the USB device from the panel on the left side of the Choose Folder window, and click **OK**.
3. Select **Overview** from the panel on the left side of the window, and then click **Backup Now**.
4. Follow the on-screen instructions.

Performing recovery using the restore DVD

NOTE: The following procedure uses the F11 BIOS Recovery feature to perform the recovery.

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

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

Backing up your information

You should back up your computer files on a regular schedule to maintain a current backup. You can manually back up your information to an optional external drive, a network drive, discs, or the Ubuntu One website. 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 to the Ubuntu One website using the Deja Dup Backup Tool:

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

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup** icon.
2. Select **Folders** from the panel on the left side of the window, and beneath **Folders to back up**, select the folders to back up.
3. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup Location**, and select **Ubuntu One** from the drop-down list.
4. Select **Overview** from the panel on the left side of the window, and then click **Back Up Now**.

NOTE: The first time you back up your files to Ubuntu One, you will need to create an account to sign into Ubuntu One. Enter your email address and password into the account sign-in boxes and follow the on-screen instructions to complete the sign-in process.

To restore backup files:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup** icon.
2. Click **Restore**, select the location of the backup files and the folder name, and then click **Forward**.
3. Under **Restore from When?**, select the date of the files to be restored, and then click **Forward**.
4. Select the location and folder where the files are to be restored, and then click **Forward**.
5. Follow the instructions on the screen.
6. Click **Restore** to start restoring the files, or click **Cancel** to cancel the operation.

NOTE: You may also back up to cloud storage services provided by various companies. For a small fee, they will keep your backup for you. A cloud service is recommended, since it is an easy way to keep your backups off-site and safe.

10 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 V ac, or from 220 to 240 V ac.

The 3-conductor power cord set included with the computer meets the requirements for use in the country or region where the equipment is purchased.

Power cord sets for use in other countries or regions must meet the requirements of the country and region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1

Country/region	Accredited agency	Applicable note number
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

11 Recycling

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for battery disposal. HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries.

For more information about recycling programs, see the HP website at www.hp.com/recycle.

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