HP Pavilion g6 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 computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).

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1 Product description

Category	Description
Product Name	**HP Pavilion g6 Notebook PC**
Processors	**Next Generation Intel® Core™ i7 processors:**
	Intel Core i7-3612QM processor (2.1 GHz, SC turbo up to 3.1 GHz, 6 MB L3 cache), Quad 35 W
	Intel Core i7-3520M processor (2.9 GHz, SC turbo up to 3.6 GHz, 4 MB L3 cache), Dual 35 W
	Next Generation Intel Core i5 processors:
	Intel Core i5-3320M processor (2.6 GHz, SC turbo up to 3.3GHz, 3MB L3 cache), Dual 35 W
	Intel Core i5-3210M processor (2.5 GHz, SC turbo up to 3.1GHz, 3MB L3 cache), Dual 35W
	Next Generation Intel Core i3 processors:
	Intel Core i3-3110M (2.4 GHz 1600 MHz/3 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, 3 MB L3 cache), Dual 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)
	Intel Core i3-2350M processor (2.3 GHz, 3 MB L3 cache) Dual 35 W
	Intel Core i3-2330M processor (2.2 GHz, 3 MB L3 cache) Dual 35 W
	Intel Pentium® processors:
	Intel Pentium B970 processor (2.3 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
	Intel Pentium B960 processor (2.2 GHz, 2 MB L3 cache) Dual 35 W
	Intel Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
Chipset	Intel HM76 Express Chipset
Graphics	**Internal Graphics (UMA):** • Intel HD Graphics 4000 on computer models equipped with a Next 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 an Intel Pentium processor, supports DX10

Category	Description
	Switchable Discrete Graphics: • AMD Radeon HD 7670M with 2 GB of dedicated video memory (128 MB×16 DDR3 @ 900 MHz × 8 modules); 128 bit M2 package, supports HD Decode, DX11, HDMI, and PX5 • AMD Radeon HD 7670M with 1 GB of dedicated video memory (64 MB×16 DDR3 @ 900 MHz × 8 modules); 128 bit M2 package, supports HD Decode, DX11, HDMI, and PX5
Panel	**39.6-cm** (15.6-in), high-definition (HD), light-emitting diode (LED), SVA BrightView (1366×768) display; typical brightness: 200 cd/m2 (nits) All display assemblies include 2 wireless local area network (WLAN) antenna cables Supports 16:9 ultra-wide aspect ratio
Memory	2 customer-accessible/upgradable SODIMM slots:
	DDR3-1600 MHz Dual Channel support for a Next Generation Intel Core processor
	DDR3-1333 MHz Dual Channel Support (DDR3-1600 MHz downgrade to DDR3-1333 MHz)
	Supports the following configurations up to 8 GB: • 8192 MB total system memory (4096×2) (No support for 32 bit OS) • 6144 MB total system memory (4096×1 + 2048×1) (No support for 32 bit OS) • 4096 MB total system memory (4096×1 or 2048×2) • 2048 MB total system memory (2048×1)
Hard drives	Supports **6.35 cm** (2.5 in) hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses
	Supports HP 3D Drive Guard
	Customer-accessible
	Serial ATA (SATA)
	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, 7200 rpm, 9.5 mm and 7.0 mm • 320 GB, 5400 rpm, 9.5 mm and 7.0 mm
Optical drive	Fixed
	Customer-accessible
	SATA
	12.7 mm tray load
	Supports Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive

Category	Description
	Supports DVD±RW Super Multi Double-Layer Combo Drive
	Supports zero-power optical drive
Webcam	VGA camera (640x480 by 24 frames per second), fixed angle (no tilt), with activity light and single digital microphone
Audio	High-definition audio supports: Microsoft® Premium requirements with HP Altec Lansing speakers (2) SRS Premium Sound technology
Ethernet	Integrated 10/100 network interface card (NIC)
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module
	Customer-accessible
	Two WLAN antennas built into display assembly
	Support for Intel Wireless Display and Wireless Music
	Support for the following WLAN formats: • Broadcom 4313GN 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combination Adapter • Broadcom 4313 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS combination adapter • Intel Centrino® Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combination Adapter • Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter and AR3012 Bluetooth 4.0 Combination Adapter (select models only) • Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only) • Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter • Ralink RT5390BC8 802.11b/g/n 1×1 WiFi and Bluetooth 3.0+HS Combo Adapter
External media card	HP Multi-Format Digital Media Reader supports the following digital card formats: • MultiMediaCard (MMC) • Secure Digital (SD) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • Secure Digital Extended Capacity (SDXC) Memory Card
Internal card	One half-size Mini Card slot for WLAN

Category	Description

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 AC power adapter
	• RJ-45 (Ethernet, includes link and activity lights)
	• USB 3.0 ports (two on left side)
	• USB 2.0 port (right side)
	• VGA (Dsub 15-pin) supporting:
	  ◦ 2048×1536 external resolution @ 75 Hz
	  ◦ Hot plug/unplug with auto-detect for correct output to wide-aspect vs. standard aspect video

Keyboard/pointing devices	Full size island style textured keyboard with numeric keypad (Black)
	TouchPad with 2 buttons • Multitouch gestures enabled • Taps enabled as default
Power requirements	Battery: • 6-cell, 2.22 Ah, 47 Wh battery • 6-cell, 2.55 Ah, 55 Wh battery (select models only) • Supports fast charge
	AC Smart pin adapter with localized cable plug support: • 65 W • 90 W
Security	Security lock slot
Operating system	Preinstalled: • Windows® 7 Professional (64 bit) • Windows 7 Home Premium (64 bit) • Windows 7 Home Basic (64 bit) • FreeDOS
Serviceability	End-user replaceable parts: • AC adapter • Battery (system) • Memory module • Hard drive • Optical drive • MiniCard components • Keyboard

2 External component identification

Display

Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLAN devices.
(2)	Internal microphone	Records sound.
(3)	Webcam	Records video and captures still photographs. To use the webcam, select **Start > All Programs > CyberLink YouCam > CyberLink YouCam**.
(4)	Webcam light	On: The webcam is in use.

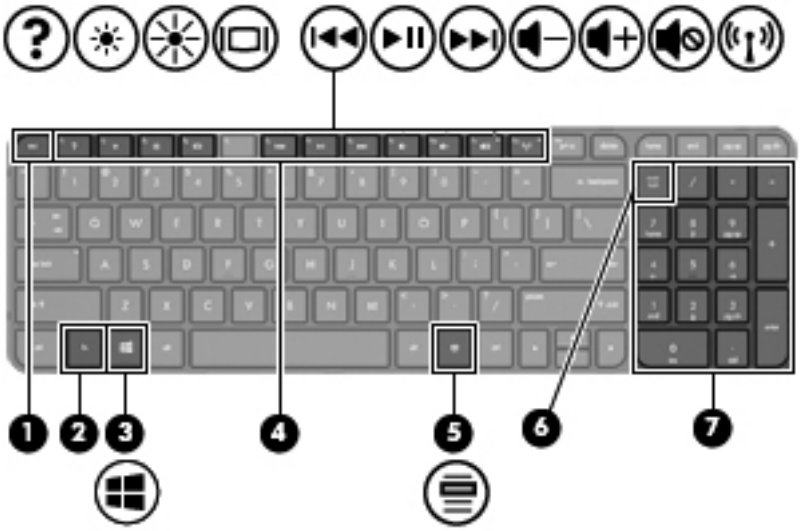
*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the Regulatory, Safety, and Environmental Notices that applies to your country or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

Top

Buttons and speakers

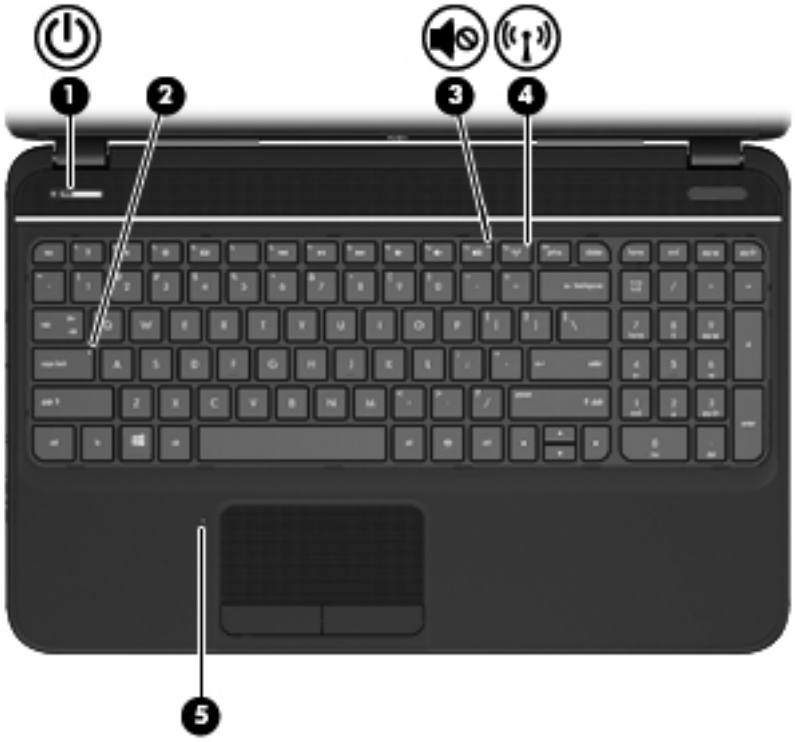
Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button down briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button will result in the loss of unsaved information. If the computer has stopped responding and Microsoft Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer. To learn more about your power settings, select **Start > Control Panel > System and Security > Power Options**, or see the *HP User Guide*.
(2)	Speakers (2)	Produce sound.

Keys



Component			Description
(1)		esc key	Displays system information when pressed in combination with the fn key.
(2)		fn key	Displays system information when pressed in combination with the esc key.
(3)		Windows logo key	Displays the Windows Start menu.
(4)		Action keys	Execute frequently used system functions.
(5)		Windows applications key	Displays a shortcut menu for items beneath the cursor.
(6)		num lock	Alternates between the navigational and numeric functions on the integrated numeric keypad. **NOTE:** The keypad function that is active when the computer is turned off remains on when the computer is turned back on.
(7)		Integrated numeric keypad	Can be used like an external numeric keypad.

Lights

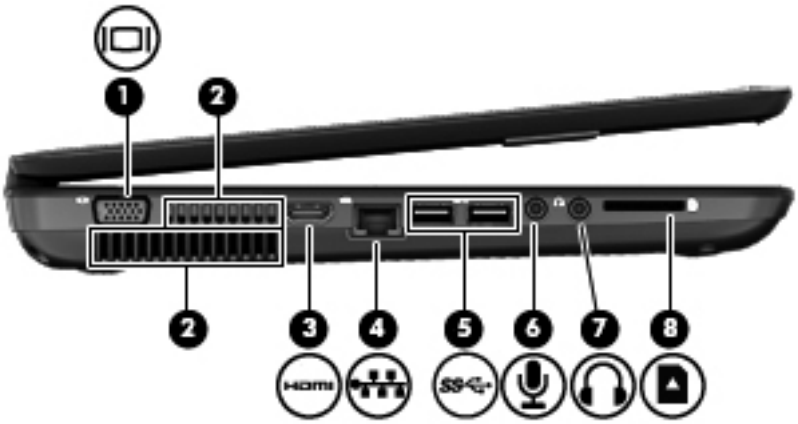


Component			Description
(1)		Power light	• White: The computer is on. • Blinking: The computer is in Sleep mode. • Off: The computer is off or in Hibernation mode.
(2)		Caps lock light	White: Caps lock is on, which switches the keys to all capital letters.
(3)		Mute light	• Amber: Computer sound is off. • 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

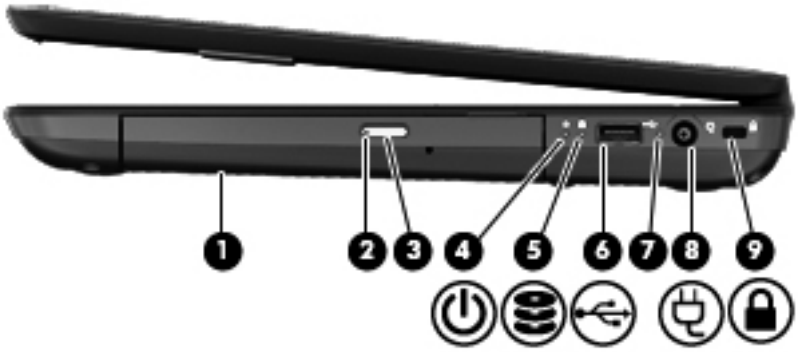
Component		Description
(1)	TouchPad on/off button	Turns the TouchPad on or off.
(2)	TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.
(3)	TouchPad zone	Moves the on-screen pointer and selects or activates items on the screen.
(4)	Left TouchPad button	Functions like the left button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

Left side



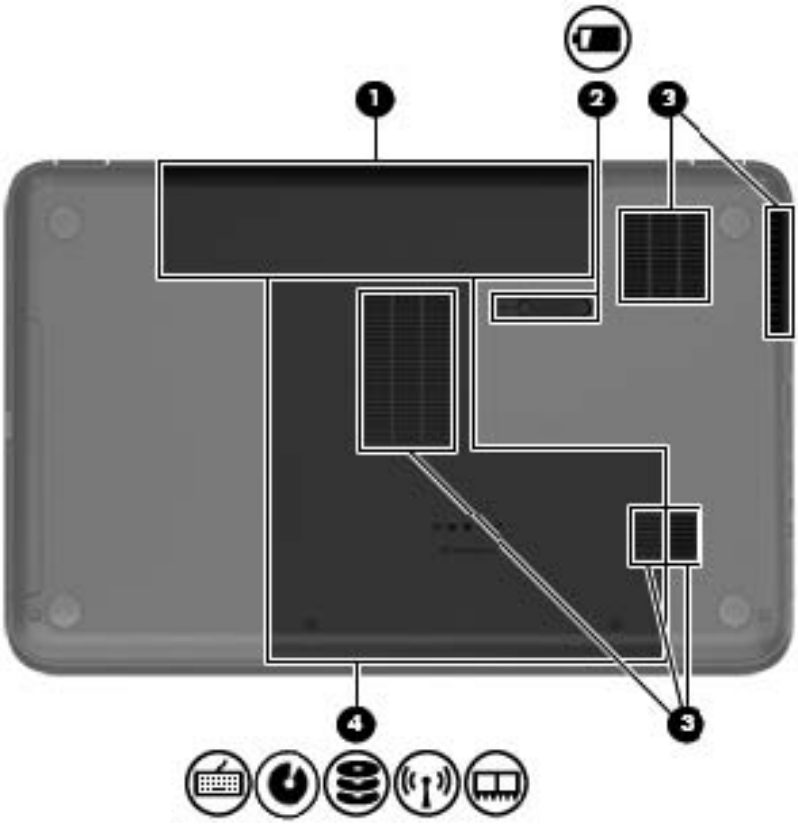
Component			Description
(1)		External monitor port	Connects an external VGA monitor or projector.
(2)		Vents (2)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle 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.
(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 Extended Capacity (SDxC) Memory Card • Secure Digital High Capacity (SDHC) 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 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.
(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

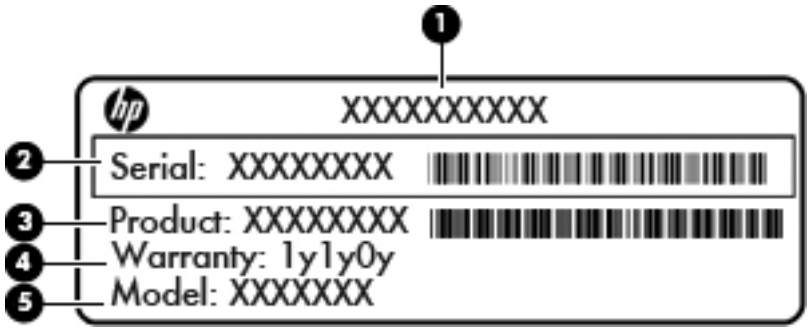


Component		Description
(1)	Battery bay	Holds the battery.
(2)	Battery release latch	Releases the battery from the battery bay.
(3)	Vents (5)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Service door	Provides access to the keyboard, optical drive, hard drive, wireless module, and memory modules. **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact customer support through Help and Support.

3 Illustrated parts catalog

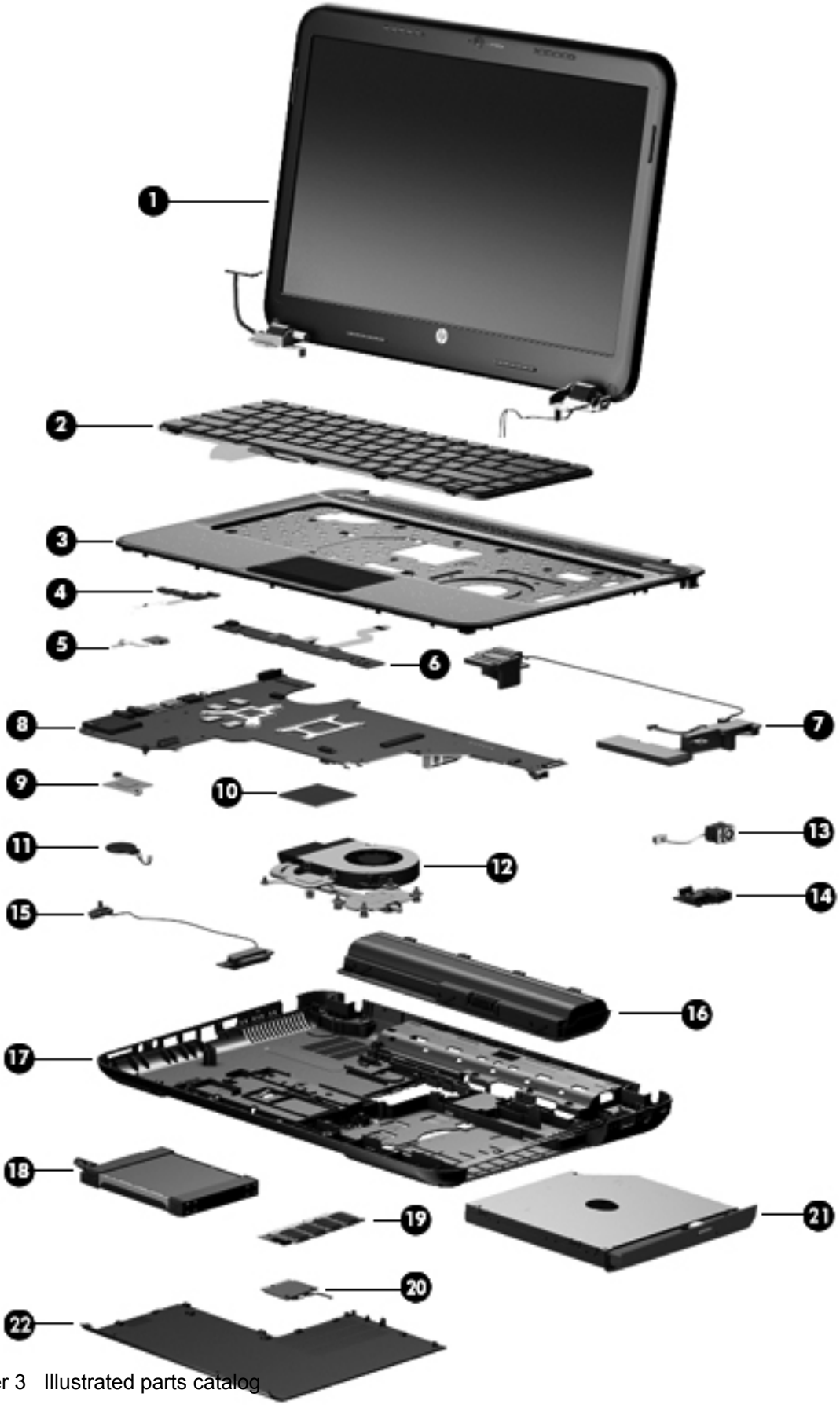
Serial number location

When ordering parts or requesting information, provide the computer serial number and model number located in the battery bay of the computer.



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

Computer major components



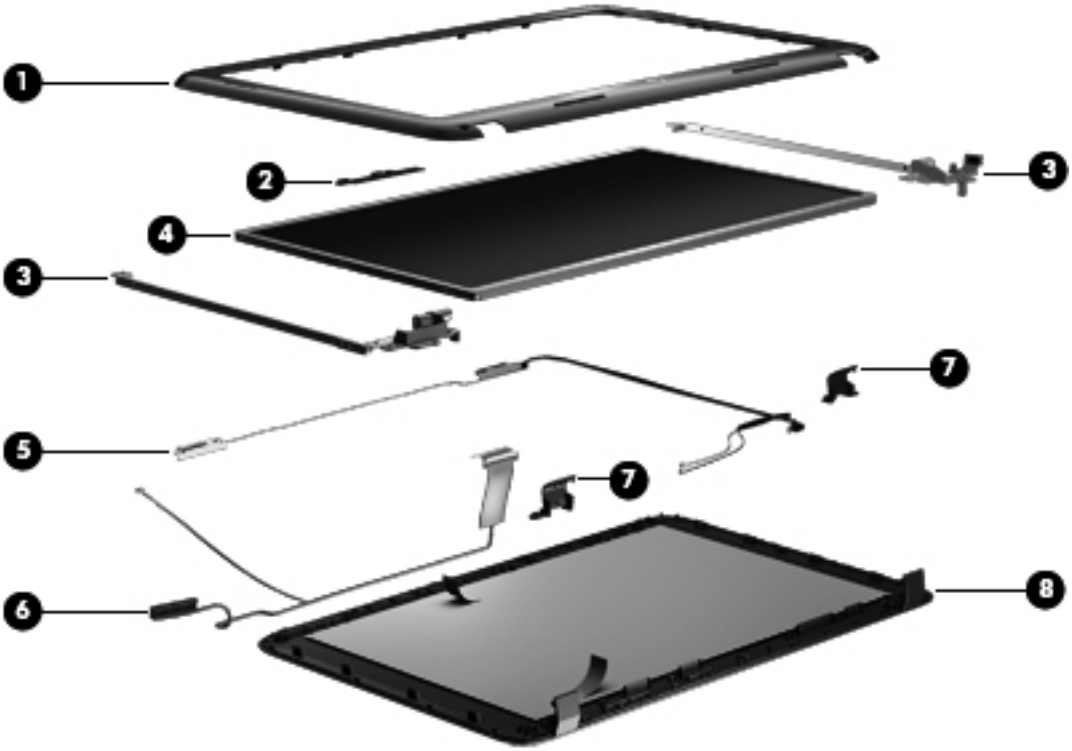
Item	Description	Spare part number
(1)	**39.6-cm (15.6-in) High Definition (HD), LED, BrightView (1366×768) display assembly:** **NOTE:** For more information on the display assembly internal component spare part information, see Display assembly components on page 19.	
(2)	**Keyboard** (includes keyboard cable):	
	Keyboard with black finish:	
	• For use in the United States	681800-001
	• For use in the United Kingdom	681800-031
	• For use in Germany	681800-041
	• For use in France	681800-051
	• For use in Italy	681800-061
	• For use in Spain	681800-071
	• For use in Portugal	681800-131
	• For use in Turkey	681800-141
	• For use in Greece	681800-151
	• For use in Saudi Arabia	681800-171
	• For use in Hungary	681800-211
	• For use in Russia	681800-251
	• For use in Bulgaria	681800-261
	• For use in Romania	681800-271
	• For use in Japan	681800-291
	• For use in Europe	681800-A41
	• For use in Taiwan	681800-AB1
	• For use in Korea	681800-AD1
	• For International use	681800-B31
	• For use in the Adriatics	681800-BA1
	• For use in Israel	681800-BB1
	• For use in Switzerland	681800-BG1
	• For use in India	681800-D61
	• For use in Canada	681800-DB1
	• For use in the Netherlands	681800-DH1
	• For use in the Czech Republic and Slovakia	681800-FL1
	Keyboard with white finish:	
	• For use in United States	684689-001
	• For use in the United Kingdom	684689-031

Item	Description	Spare part number
	• For use in Germany	684689-041
	• For use in France	684689-051
	• For use in Italy	684689-061
	• For use in Spain	684689-071
	• For use in Portugal	684689-131
	• For use in Turkey	684689-141
	• For use in Greece	684689-151
	• For use in Latin America	684689-161
	• For use in Saudi Arabia	684689-171
	• For use in Russia	684689-251
	• For use in Japan	684689-291
	• For use in Europe	684689-A41
	• For use in Taiwan	684689-AB1
	• For use in Korea	684689-AD1
	• For International use	684689-B31
	• For use in Israel	684689-BB1
	• For use in Switzerland	684689-BG1
	• For use in India	684689-D61
	• For use in Canada	684689-DB1
	• For use in the Netherlands	684689-DH1
	• For use in the Czech Republic and Slovakia	684689-FL1
(3)	**Top cover** (includes TouchPad board):	
	• For use in bright purple computer models	
	• For use in ruby red computer models	681823-001
	• For use in winter blue computer models	681824-001
	• For use in sparkling black computer models	681825-001
	• For use in linen white computer models	685583-001
(4)	**Power button board** (includes cable)	683549-001
(5)	**TouchPad LED board** (includes cable)	684061-001
(6)	**TouchPad button board** (includes cable)	683548-001
(7)	**Speaker assembly** (includes cable)	681821-001
(8)	**System board** (includes replacement thermal material):	
	• For use only with computer models equipped with UMA video memory	680568-001
	• For use only with computer models equipped with 1024 MB of dedicated discrete video memory	680569-001

Item	Description	Spare part number
	• For use only with computer models equipped with 2048 MB of dedicated discrete video memory	680570-001
(9)	**Intel Platform Controller Hub (PCH) heat sink**	683843-001
(10)	**Processor** (includes replacement thermal material):	
	• Intel Core i7-3612QM (2.1 GHz, SC turbo up to 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)	680647-001
	• Intel Core i7-3520M (2.9 GHz, SC turbo up to 3.6 GHz, 1600 MHz/4 MB L3 cache, dual core, 35 W)	681954-001
	• Intel Core i5-3320M (2.6 GHz, SC turbo up to 3.3 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	681952-001
	• 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 i3-3110M (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)	682417-001
	• Intel Core i5-2450M processor (2.5 GHz, SC turbo up to 3.1 GHz, 3 MB L3 cache), Dual 35 W	676359-001
	• Intel Core i3-2370M (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)	677152-001
	• Intel Core i3-2350M processor (2.3 GHz, 3 MB L3 cache) Dual 35 W	653340-001
	• Intel Core i3-2330M processor (2.2 GHz, 3 MB L3 cache) Dual 35 W	653339-001
	• Intel Pentium B970 processor 2.20 GHz processor (1333 MHz/2.0 MB L3 cache, dual core, 35 W)	676785-001
	• Intel Pentium B960 processor (2.2 GHz, 2 MB L3 cache) Dual 35 W	664662-001
	• Intel Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)	653338-001
(11)	**RTC battery** (includes mounting adhesive)	637193-001
(12)	**Heat sink assembly** (includes replacement thermal material):	
	• For use in Intel UMA computer models	680549-001
	• For use in Intel discrete computer models	680550-001
	• Fan (available separately)	680551-001
(13)	**Power connector** (includes cable)	682744-001
(14)	**USB board** (includes cable)	683547-001
(15)	**Optical drive cable**	682742-001
(16)	**Battery:**	
	• 6-cell Li-Ion, 2.20 Ah, 47 Wh	593553-001
	• 6-cell Li-Ion, 2.55 Ah, 55 Wh	593554-001
(17)	**Base enclosure**	681805-001
(18)	**Hard drive**:	
	Supports the following **9.5 mm**, **6.35 cm** (2.5 in) SATA hard drives:	
	• 1 TB, 5400 rpm, 9.5 mm	676521-001

Item	Description	Spare part number
	• 750 GB, 7200 rpm	633252-001
	• 750 GB, 5400 rpm	633250-001
	• 640 GB, 5400 rpm	669300-001
	• 500 GB, 7200 rpm	634925-001
	• 500 GB, 5400 rpm	669299-001
	• 320 GB, 7200 rpm	641672-001
	• 320 GB, 5400 rpm	622643-001
	Supports the following **7.0 mm**, **6.35 cm** (2.5 in) SATA hard drives:	
	• 320 GB, 7200 rpm	634862-001
	• 320 GB, 5400 rpm	645193-001
	• Hard Drive Hardware Kit (not illustrated, includes hard drive cable, hard drive bumpers, and hard drive bracket and screws)	682745-001
(19)	**Memory modules** (1066 MHz, DDR3):	
	• 4 GB PC3 12800 1600 MHz shared	641369-001
	• 2 GB PC3 12800 1600 MHz shared	652972-001
(20)	**Wireless (WLAN) module**:	
	• 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
	• Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter	670290-001
	• Ralink RT5390F 802.11b/g/n 1×1 WiFi Adapter	670691-001
	• Atheros HB125 802.11b/g/n 1×1 WiFi Adapter (select models only)	675794-001
(21)	**Optical drive** (includes optical drive bezel and bracket):	
	• DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	681814-001
	• Blu-ray Disc ROM and DVD±R/RW SuperMulti Double-Layer Drive	681815-001
(22)	**Service Door** (included in Plastics kit)	681816-001
	Rubber Kit (not illustrated, includes rubber feet)	680563-001

Display assembly components



Item	Description	Spare part number
(1)	**Display bezel**	681806-001
(2)	**Webcam/microphone module**	680577-001
(3)	**Display hinge kit** (includes left and right display hinges and brackets)	681812-001
(4)	**39.6 cm** (15.6-in) high-definition, BrightView LED display panel	681817-001
(5)	**Wireless antenna** (includes wireless antenna transceivers and cable)	681813-001
(6)	**Display cable** (included in the Display Cable Kit)	681808-001
(7)	**Display hinge covers**	681811-001
(8)	**Display back cover** (includes logo):	
	• For use in bright purple computer models	681801-001
	• For use in ruby red computer models	681802-001
	• For use in winter blue computer models	681803-001
	• For use in sparkling black computer models	681804-001
	• For use in linen white computer models	685582-001
	Display Screw Kit (not illustrated)	681819-001

Mass storage devices

Item	Description	Spare part number
(1)	**Optical drive** (12.7 mm, SATA, fixed, includes bezel and bracket)	
	• Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	681814-001
	• DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	681815-001
	• Optical drive cable	682742-001
(2)	**Hard drive**	
	Supports the following **9.50 mm**, **6.35 cm** (2.50 in) SATA hard drives:	
	• 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
	• 320 GB, 7200 rpm	641672-001
	• 320 GB, 5400 rpm	622643-001
	Supports the following **7.00 mm**, **6.35 cm** (2.50 in) SATA hard drives:	
	• 320 GB, 7200 rpm	634862-001
	• 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

Miscellaneous parts

Description	Spare part number
AC adapters	
• 90 W HP Smart AC adapter with Power Factor Correction (PFC) (for computer models equipped with a graphics subsystem with discrete memory only)	693712-001
• 65 W HP Smart AC adapter with PFC (for computer models equipped with a graphics subsystem with UMA memory only)	693711-001
• 90 W HP Smart AC adapter with PFC (for select computer models equipped with a graphics subsystem with discrete memory only)	693713-001
• 65 W HP Smart AC adapter (for select computer models equipped with a graphics subsystem with UMA memory only)	693710-001
Power cord, AC, 3 wire, black, 1.83-m	
• For use in North America	490371-001
• For use in Australia	490371-011
• For use in Europe	490371-021
• For use in the United Kingdom and Singapore	490371-031
• For use in Italy	490371-061
• For use in Denmark	490371-081
• For use in Switzerland	490371-111
• For use in Thailand	490371-201
• For use in Japan	490371-291
• For use in the People's Republic of China	490371-AA1
• For use in Taiwan	490371-AB1
• For use in South Korea	490371-AD1
• For use in South Africa	490371-AR1
• For use in Israel	490371-BB1
• For use in India	490371-D61
Thermal pad	680571-001
Display screw kit	681819-001
Screw kit	681820-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord, AC, 3 wire, black, 1.83 m for use in North America
490371-011	Power cord, AC, 3 wire, black, 1.83 m for use in Australia
490371-021	Power cord, AC, 3 wire, black, 1.83 m for use in Europe
490371-031	Power cord, AC, 3 wire, black, 1.83 m for use in the United Kingdom and Singapore
490371-061	Power cord, AC, 3 wire, black, 1.83 m for use in Italy
490371-081	Power cord, AC, 3 wire, black, 1.83 m for use in Denmark
490371-111	Power cord, AC, 3 wire, black, 1.83 m for use in Switzerland
490371-201	Power cord, AC, 3 wire, black, 1.83 m for use in Thailand
490371-291	Power cord, AC, 3 wire, black, 1.83 m for use in Japan
490371-AA1	Power cord, AC, 3 wire, black, 1.83 m for use in the People's Republic of China
490371-AB1	Power cord, AC, 3 wire, black, 1.83 m for use in Taiwan
490371-AD1	Power cord, AC, 3 wire, black, 1.83 m for use in Korea
490371-AR1	Power cord, AC, 3 wire, black, 1.83 m for use in South Africa
490371-BB1	Power cord, AC, 3 wire, black, 1.83 m for use in Israel
490371-D61	Power cord, AC, 3 wire, black, 1.83 m for use in India
593553-001	Battery, 6-cell, 2.20 Ah, 47 Wh
593554-001	Battery, 6-cell, 2.55 Ah, 55 Wh
622643-001	320 GB, 5400 rpm hard drive
633252-001	750 GB, 7200 rpm hard drive
634250-001	750 GB, 5400 rpm hard drive
634862-001	320 GB, 7200 rpm hard drive
634925-001	500 GB, 7200 rpm hard drive
637193-001	RTC battery (includes mounting adhesive)
641369-001	4 GB (PC3, 12800, 1600 MHz) memory module
641672-001	320 GB, 7200 rpm hard drive
645193-001	320 GB, 5400 rpm hard drive
652972-001	2 GB (PC3, 12800, 1600 MHz) memory module
653338-001	Intel Pentium B950 processor (2.1 GHz, 1333 MHz/2 MB L3 cache, dual core, 35 W)
653339-001	Intel Core i3-2330M processor (2.20 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
653340-001	Intel Core i3-2350M processor (2.30 GHz, 1333 MHz/3.0 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)

Spare part number	Description
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
664662-001	Intel Pentium B960 processor (2.20 GHz, 1333 MHz/2.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
669299-001	500 GB, 5400 rpm hard drive
669300-001	640 GB, 5400 rpm hard drive
670290-001	WLAN Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter
670691-001	Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter
675794-001	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only)
676359-001	Intel Core i5-2450M processor (2.50 GHz, turbo up to 3.10 GHz; 1333 MHz/3.0 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 (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)
680549-001	Heat sink for use only with computer models equipped with UMA video memory
680550-001	Heat sink for use only with computer models equipped with Discrete video memory
680551-001	Fan
680563-001	Rubber Kit (includes rubber feet)
680568-001	System board for use only with computer models equipped with UMA video memory (includes replacement thermal material)
680569-001	System board for use only with computer models equipped with a graphics subsystem with 1024 MB of discrete video memory (includes replacement thermal material)
680570-001	System board for use only with computer models equipped with a graphics subsystem with 2048 MB of discrete video memory (includes replacement thermal material)
680571-001	Thermal Material Kit (includes replacement thermal paste and pads)
680577-001	Webcam/microphone module
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)
680647-001	Intel Core i7-3612QM processor (2.1 GHz, SC turbo up to 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)
681800-001	Keyboard for use in the United States, black (includes cable)
681800-031	Keyboard for use in the United Kingdom, black (includes cable)
681800-041	Keyboard for use in Germany, black (includes cable)
681800-051	Keyboard for use in France, black (includes cable)
681800-061	Keyboard for use in Italy, black (includes cable)
681800-071	Keyboard for use in Spain, black (includes cable)
681800-131	Keyboard for use in Portugal, black (includes cable)

Spare part number	Description
681800-141	Keyboard for use in Turkey, black (includes cable)
681800-151	Keyboard for use in for use in Greece, Black (includes cable)
681800-161	Keyboard for use in for use in Latin America, Black (includes cable)
681800-171	Keyboard for use in Saudi Arabia, black (includes cable)
681800-211	Keyboard for use in Hungary, black (includes cable)
681800-251	Keyboard for use in Russia, black (includes cable)
681800-261	Keyboard for use in Bulgaria, black (includes cable)
681800-271	Keyboard for use Romania, black (includes cable)
681800-281	Keyboard for use Thailand, black (includes cable)
681800-291	Keyboard for use in Japan, black (includes cable)
681800-A41	Keyboard for use in Europe, black (includes cable)
681800-AB1	Keyboard for use in Taiwan, black (includes cable)
681800-AD1	Keyboard for use in Korea, black (includes cable)
681800-B31	Keyboard for International use, black (includes cable)
681800-BA1	Keyboard for use in the Adriatics, black (includes cable)
681800-BB1	Keyboard for use in Israel, black (includes cable)
681800-BG1	Keyboard for use in Switzerland, black (includes cable)
681800-D61	Keyboard for use in India, black (includes cable)
681800-DB1	Keyboard for use in Canada, black (includes cable)
681800-DH1	Keyboard for use in the Netherlands, black (includes cable)
681800-FL1	Keyboard for use in the Czech Republic and Slovakia, black (includes cable)
681801-001	Display back cover for use in bright purple computer models
681802-001	Display back cover for use in ruby red computer models
681803-001	Display back cover for use in winter blue computer models
681804-001	Display back cover for use in computer sparkling black computer models
681805-001	Base enclosure
681806-001	Display Bezel
681808-001	Display cable
681811-001	Display hinge covers
681812-001	Display bracket (with hinges)
681813-001	Wireless antenna (includes wireless antenna transceivers and cable)
681814-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive
681815-001	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive
681816-001	Service Door (included in Plastics kit)

Spare part number	Description
681817-001	**39.6 cm** (15.6-in) high-definition, BrightView LED display panel
681819-001	Display screw kit
681820-001	Screw kit
681821-001	Speaker assembly (includes cable)
681822-001	Top cover for use in brught purple computer models (includes Touchpad)
681823-001	Top cover for use in ruby red computer models (includes Touchpad)
681824-001	Top cover for use in winter blue computer models (includes Touchpad)
681825-001	Top cover for use in sparkling black computer models (includes Touchpad)
681952-001	Intel Core i5-3320M processor (2.6 GHz, SC turbo up to 3.3 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)
681954-001	Intel Core i7-3520M processor (2.9 GHz, SC turbo up to 3.6 GHz, 1600 MHz/4 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)
682742-001	Optical drive cable
682744-001	Power connector
682745-001	Hard drive hardware kit (includes hard drive cable, hard drive bumpers, and hard drive bracket and screws)
683547-001	USB board (includes cable)
683548-001	TouchPad button board
683549-001	Power button board
683843-001	PCH heat sink
684061-001	TouchPad LED board
684689-001	Keyboard for use in the United States, linen white (includes cable)
684689-031	Keyboard for use in the United Kingdom, linen white (includes cable)
684689-041	Keyboard for use in Germany, linen white (includes cable)
684689-051	Keyboard for use in France, linen white (includes cable)
684689-061	Keyboard for use in Italy, linen white (includes cable)
684689-071	Keyboard for use in Spain, linen white (includes cable)
684689-131	Keyboard for use in Portugal, linen white (includes cable)
684689-141	Keyboard for use in Turkey, linen white (includes cable)
684689-151	Keyboard for use in for use in Greece, linen white (includes cable)
684689-161	Keyboard for use in for use in Latin Amaerica, linen white (includes cable)
684689-171	Keyboard for use in Saudi Arabia, linen white (includes cable)
684689-251	Keyboard for use in Russia, linen white (includes cable)
684689-281	Keyboard for use Thailand, linen white (includes cable)

Spare part number	Description
684689-291	Keyboard for use in Japan, linen white (includes cable)
684689-A41	Keyboard for use in Europe, linen white (includes cable)
684689-AB1	Keyboard for use in Taiwan, linen white (includes cable)
684689-AD1	Keyboard for use in Korea, linen white (includes cable)
684689-B31	Keyboard for International use, linen white (includes cable)
684689-BB1	Keyboard for use in Israel, linen white (includes cable)
684689-BG1	Keyboard for use in Switzerland, linen white (includes cable)
684689-D61	Keyboard for use in India, linen white (includes cable)
684689-DB1	Keyboard for use in Canada, linen white (includes cable)
684689-DH1	Keyboard for use in the Netherlands, linen white (includes cable)
684689-FL1	Keyboard for use in the Czech Republic and Slovakia, linen white (includes cable)
685582-001	Display back cover for use in computer linen white computer models
685583-001	Top cover for use in linen white computer models (includes Touchpad)
693711-001	65 W HP Smart AC adapter with PFC (for computer models equipped with a graphics subsystem with UMA memory only)
693712-001	90 W HP Smart AC adapter with Power Factor Correction (PFC) (for computer models equipped with a graphics subsystem with discrete memory only)
693713-001	90 W HP Smart AC adapter with PFC (for select computer models equipped with a graphics subsystem with discrete memory only)
693711-001	65 W HP Smart AC adapter (for select computer models equipped with a graphics subsystem with UMA memory only)

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. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

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

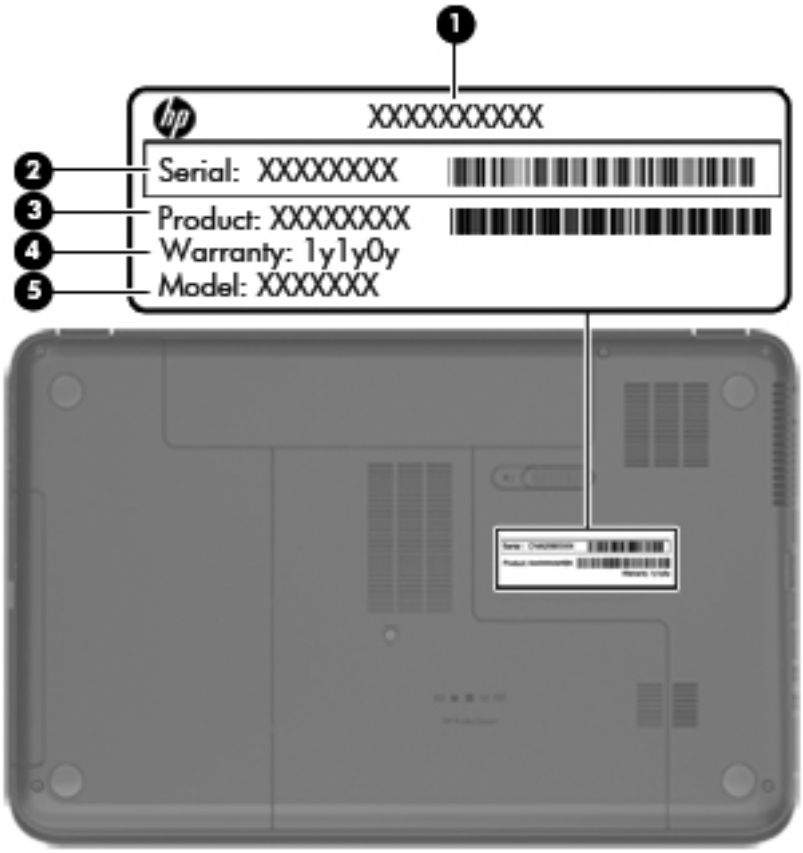
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 63 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.

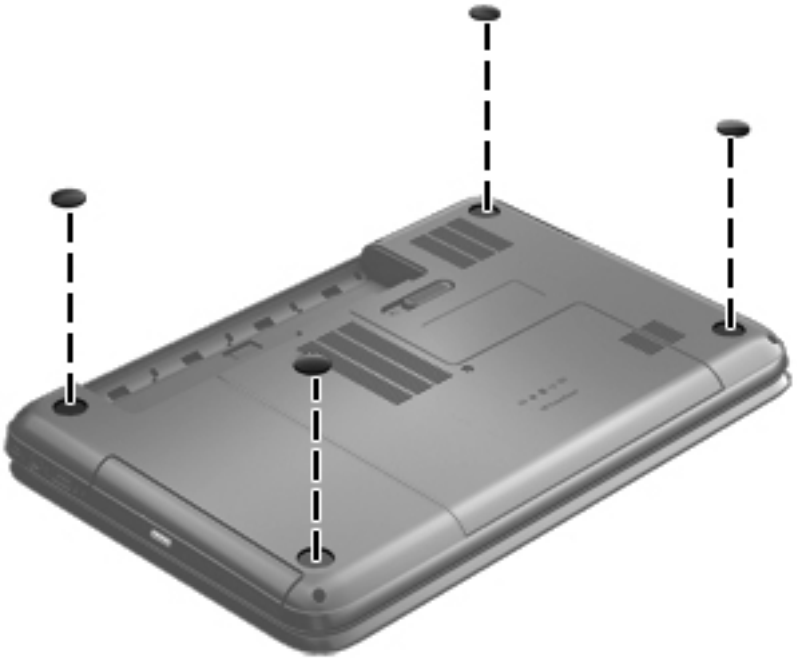


Item	Description	Function
(1)	Product name	The name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware components. 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 4 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

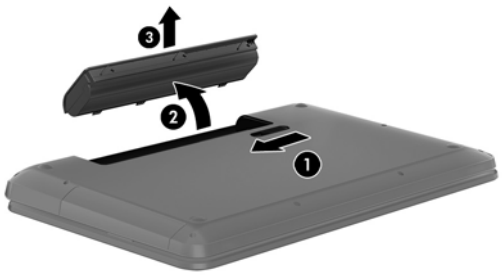
Description	Spare part number
6-cell, 55-Whr, 2.55-Ah Li-ion battery	593554-001
6-cell, 47-Whr, 2.20-Ah Li-ion battery	593553-001

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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.

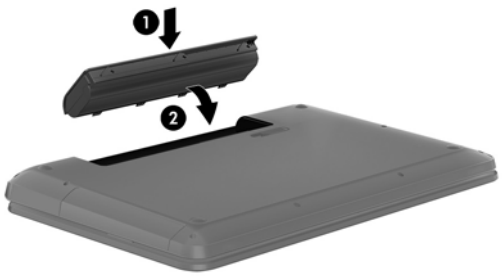
Remove the battery:

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 seated. (The battery release latch will automatically lock into place.)



Service door

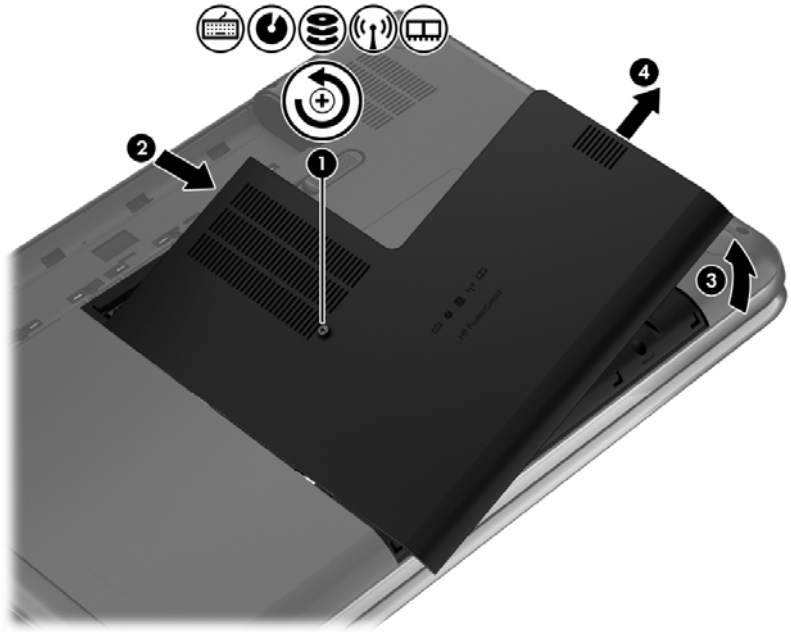
Description	Spare part number
Plastics Kit (contains the service door)	681816-001

Before removing the service door, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).

Remove the service door:

1. Using a small Phillips screwdriver, loosen the service door capture 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	681814-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	681815-001
Optical drive cable kit	682742-001

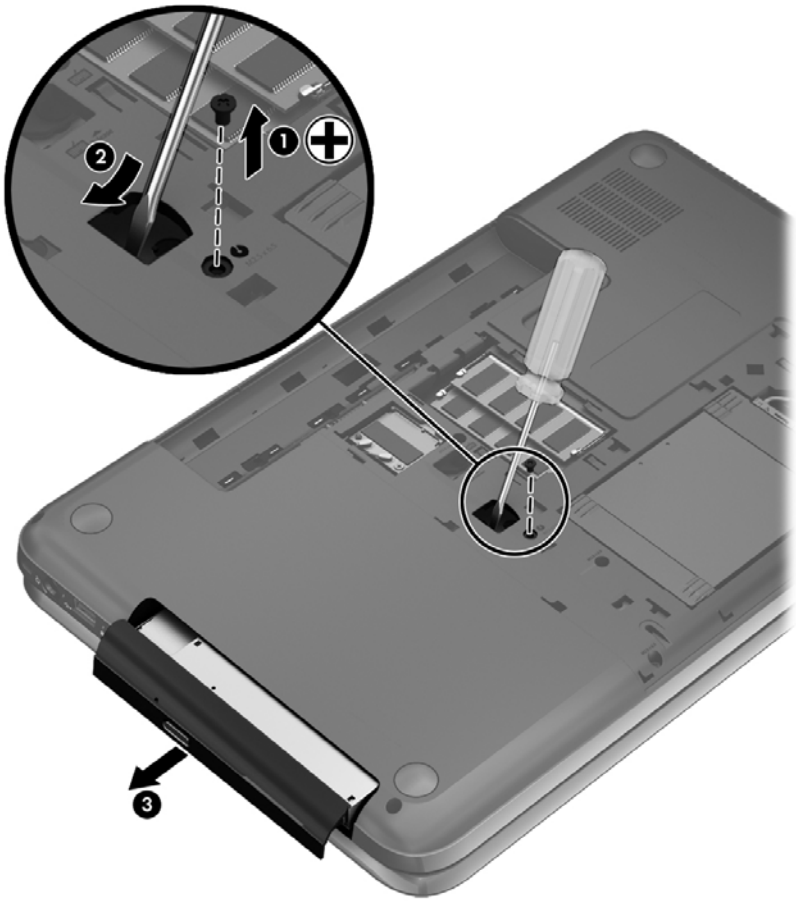
Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).

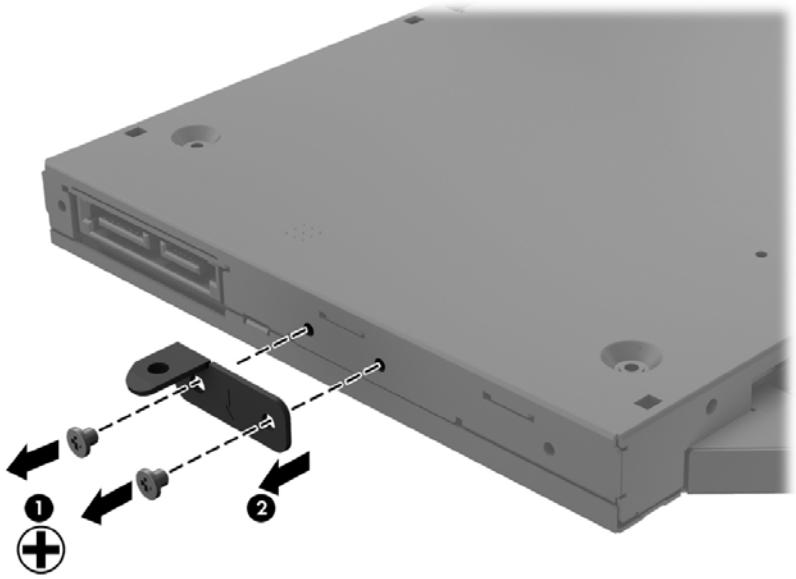
Remove the optical drive:

1. Using a small Phillips screwdriver, remove the PM 2.5 x 6.5 screw **(1)** that secures the ODD 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 ODD until it is released.

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

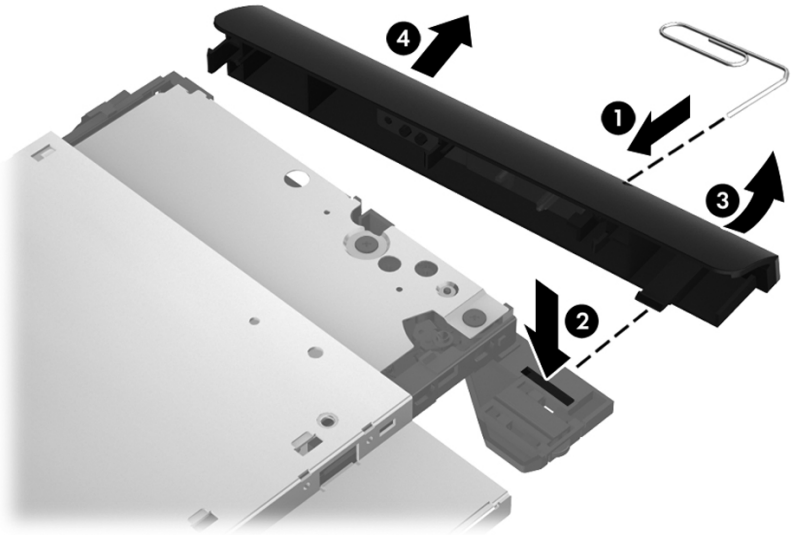


4. Remove the 2 PM 2.0 x 3.0 screws **(1)** that secure the ODD bracket to the ODD and then remove the bracket **(2)** from the ODD.



5. Insert a straightened paper clip **(1)** into the release access opening 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 ODD.



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.

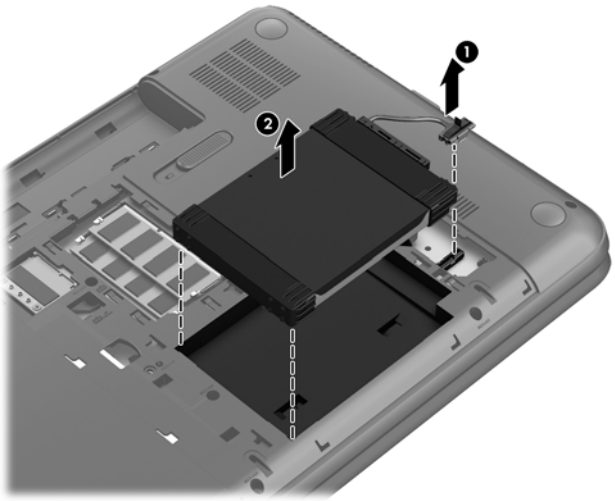
Description	Spare part number
Supports the following **9.50 mm**, **6.35 cm** (2.50 in) SATA hard drives:	
1 TB, 5400 rpm	676521-001
750 GB, 7200 rpm	633252-001
750 GB, 5400 rpm	634250-001
640 GB, 5400 rpm	669300-001
500 GB, 7200 rpm	634925-001
500 GB, 5400 rpm	669299-001
320 GB, 7200 rpm	641672-001
320 GB, 5400 rpm	622643-001
Supports the following **7.00 mm**, **6.35 cm** (2.50 in) SATA hard drives:	
320 GB, 7200 rpm	634862-001
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:

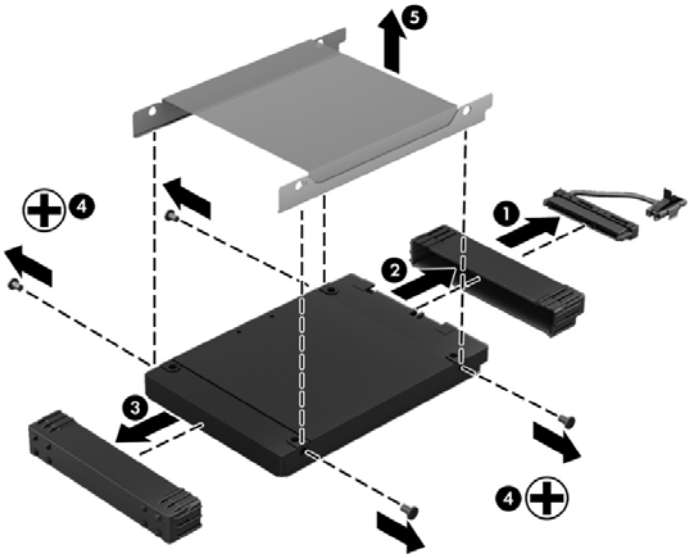
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the service door (see Service door on page 35).

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 4 PM 3.0 x 3.5 screws **(4)**, and then remove the bracket **(5)** from the hard drive.



Replacing the hard drive

Reverse this procedure to reassemble and install the hard drive.

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 (PC3, 12800, 1600 MHz)	641369-001
2 GB (PC3, 12800, 1600 MHz)	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, in the Sleep state, or in Hibernation.

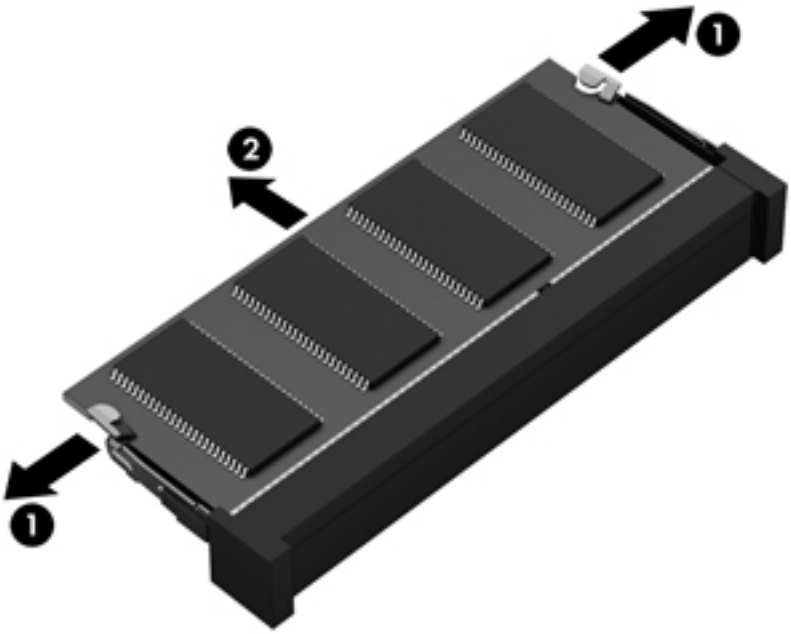
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the service door (see Service door on page 35).

To add or replace a memory module:

1. Spread the retaining 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.

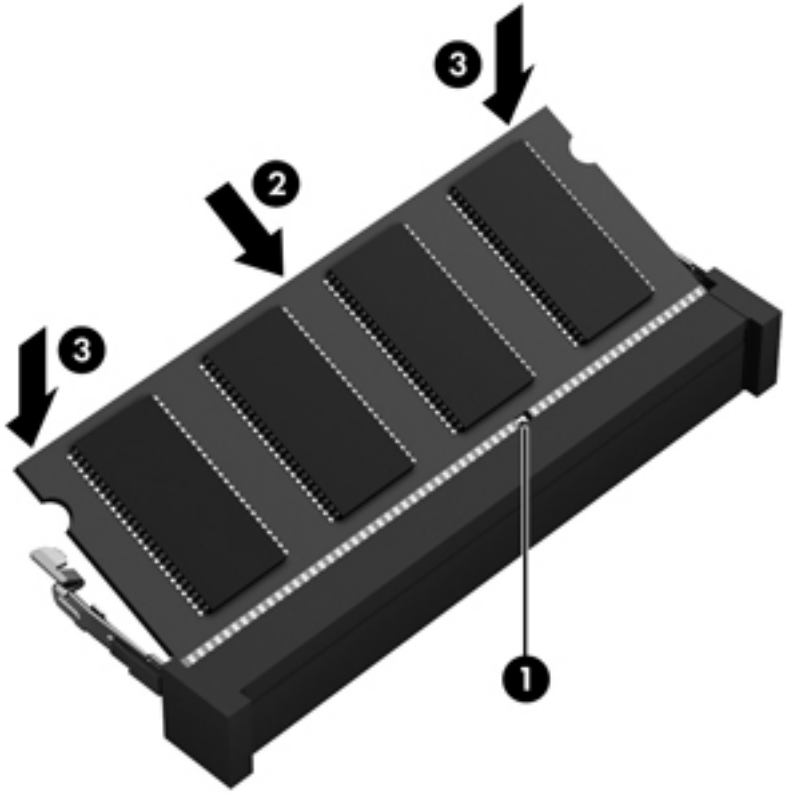
CAUTION: To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.



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 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.



WLAN module

Description	Spare part number
Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter and AR3012 Bluetooth 4.0 combination adapter (select models only)	655795-001
Atheros HB125 802.11b/g/n 1×1 WiFi Adapter (select models only)	675794-001
Broadcom 4313GN 802.11b/g/n 1×1 WiFi Adapter and 20702 Bluetooth 4.0+HS Combo Adapter	657325-001
Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter	670290-001
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

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. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).

Remove the WLAN module:

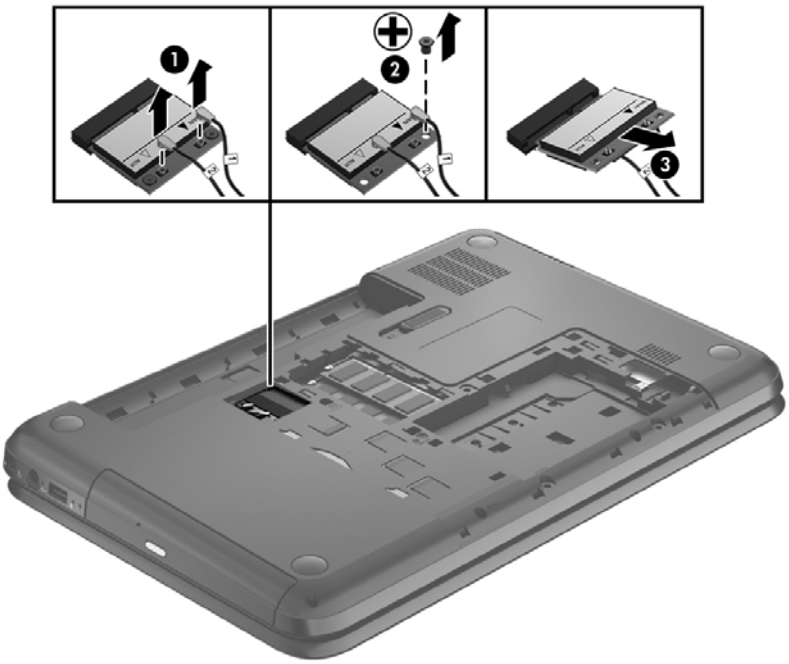
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

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.

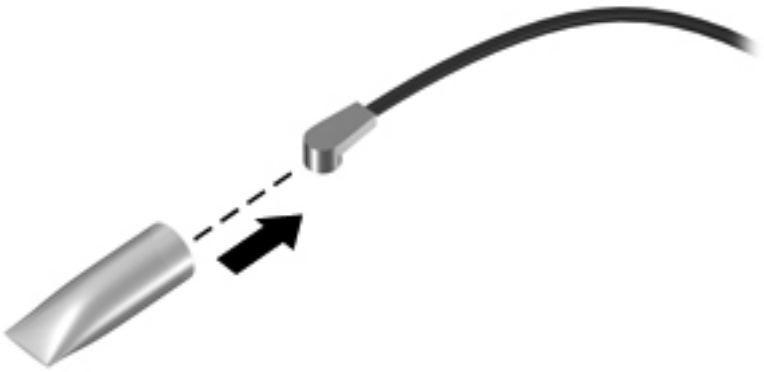
2. Remove the PM 2.0×4.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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 must be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Keyboard

NOTE: For spare part numbers, see Computer major components on page 14.

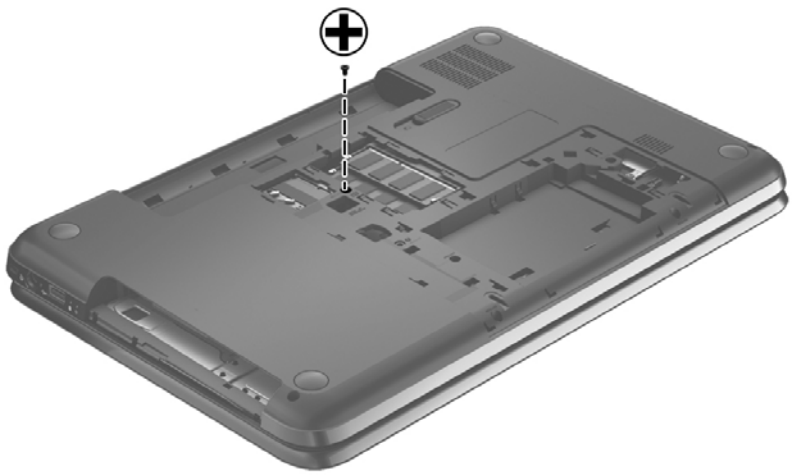
NOTE: The keyboard spare part kit includes a keyboard cable.

Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the hard drive (see Hard drive on page 38)

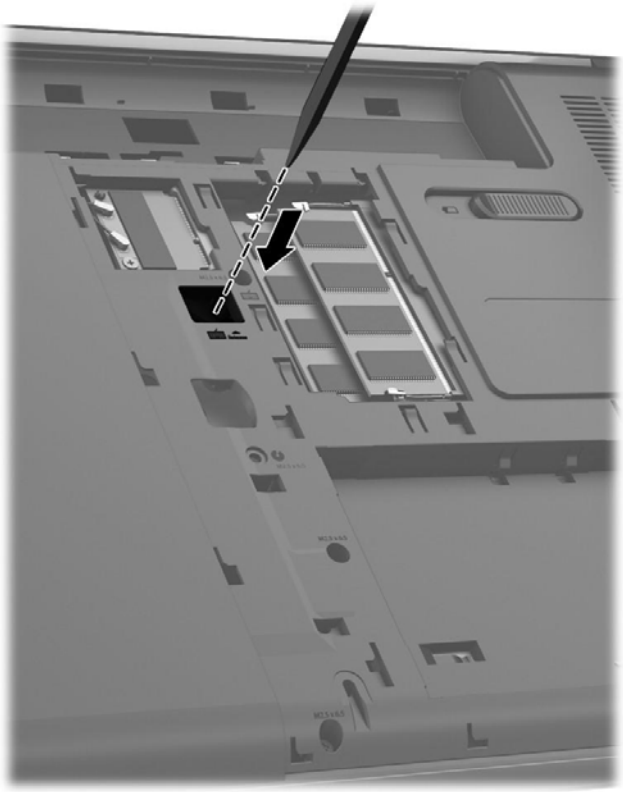
Remove the keyboard:

1. Remove the PM 2.5 × 6.5 screw that secures the keyboard to the computer.



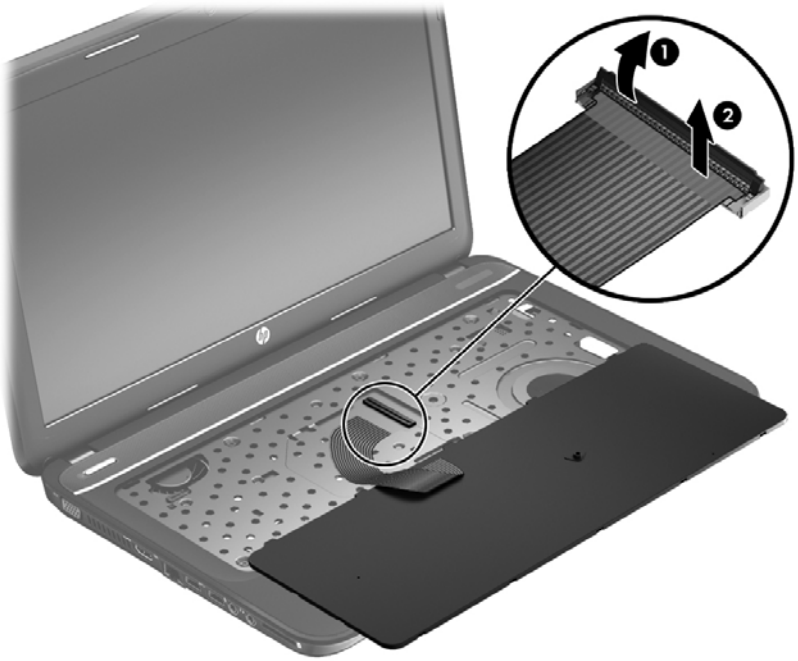
2. Rest the computer on its left side.
3. Open the computer.

4. Using a thin, non-conductive tool, press on the back of the keyboard through the release access hole until the keyboard disengages from the computer.



5. Turn the computer right-side up with the front toward you.
6. Lift the rear edge of the keyboard **(1)**, and then swing the keyboard **(2)** up and forward until it rests upside down on the palm rest.

7. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(2)** 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	681822-001
Ruby red	681823-001
Sparkling black	681825-001
Winter blue	681824-001
Linen white	685583-001

Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).

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 52).
- TouchPad button board and cable (see TouchPad button board on page 54).
- TouchPad LED board and cable (see TouchPad LED board on page 55).
- Speakers and cable (see Speakers on page 51).

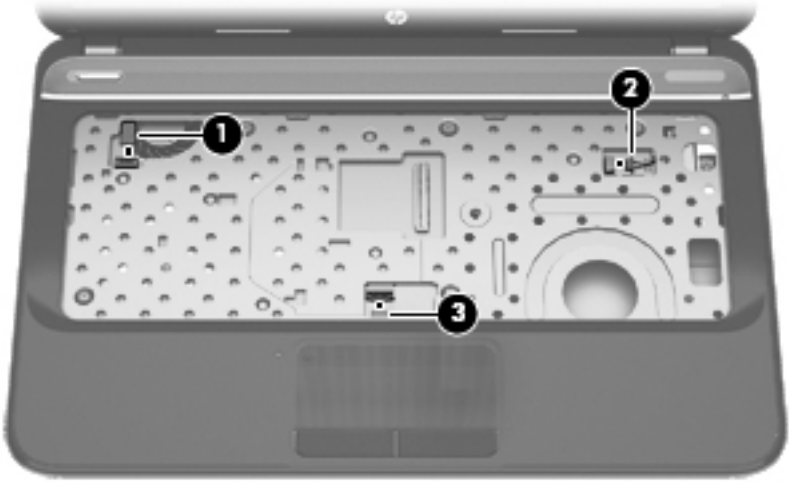
Remove the top cover:

1. Disconnect these cables from the system board:

   (1) Power button board ZIF cable

   (2) Speaker cable

   (3) TouchPad button board ZIF cable

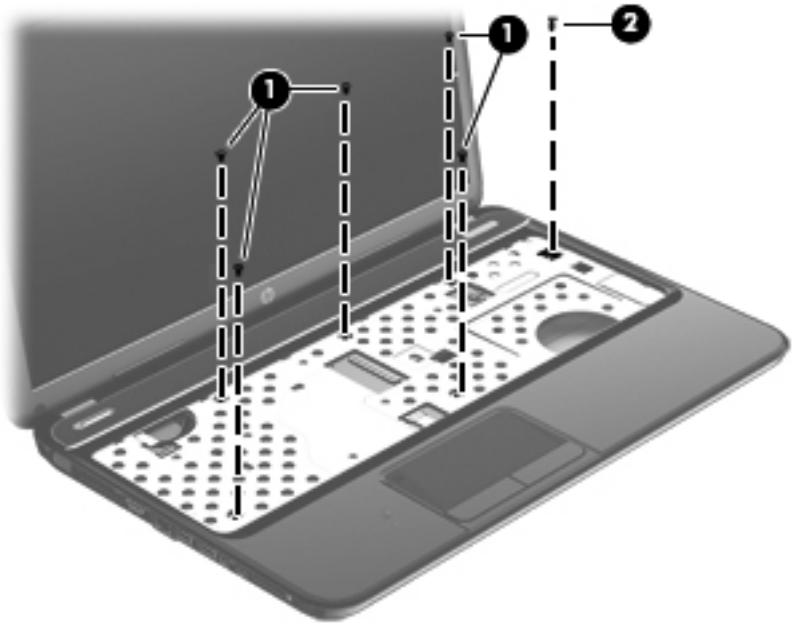


2. Remove the following screws under the keyboard:

   (1) Five PM 2.5 x 4.0

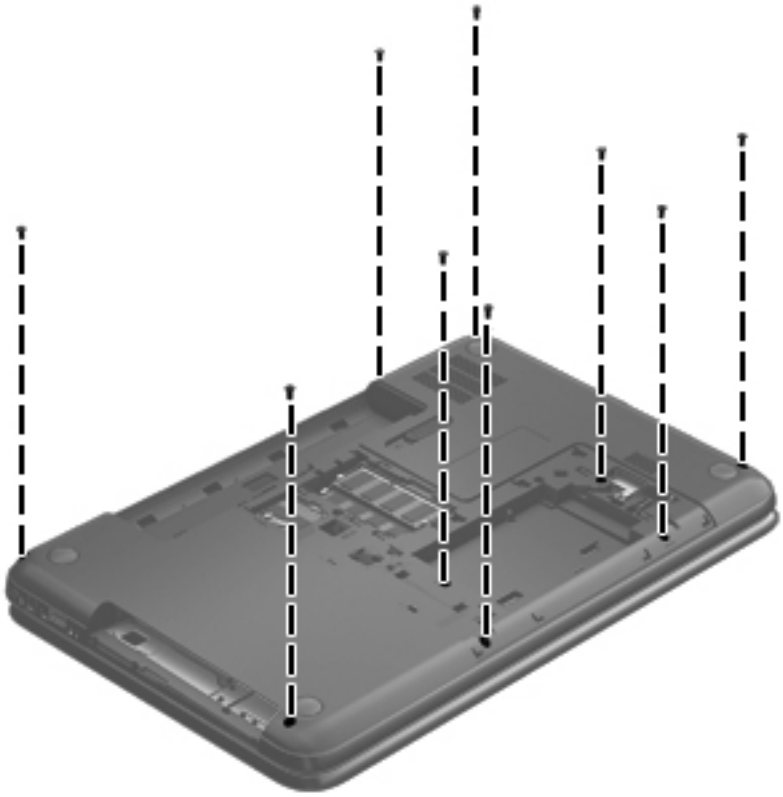
   (2) One PM 2.5 x 6.5

NOTE: This screw **(2)** also secures the speaker underneath the top cover.



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

5. Remove the following Nine PM 2.5 x 6.5 screws that secure the top cover to the computer.



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)	681821-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

Remove the speakers:

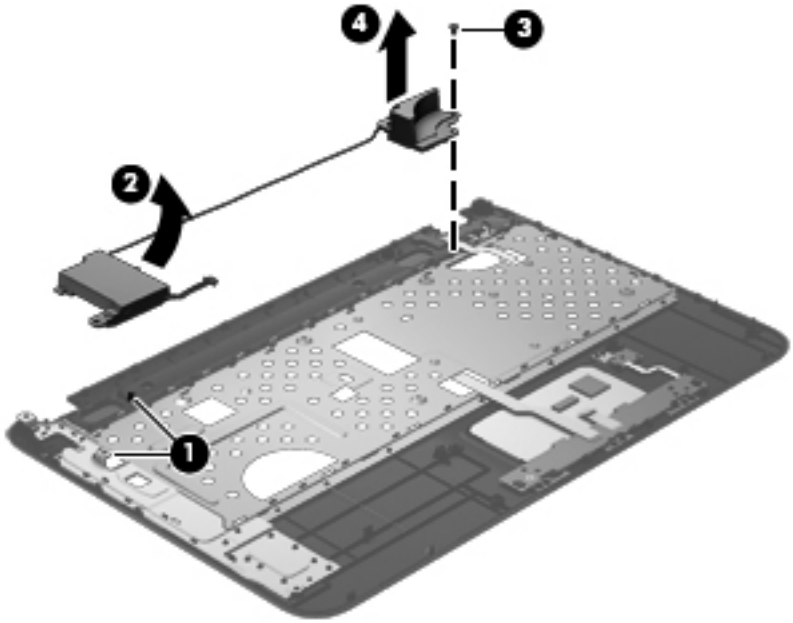
1. There are two clips that hold the left speaker in place **(1)**.

NOTE: A previously removed top cover screw also secures the right speaker in place.

2. Rotate and lift the left speaker from the top cover **(2)**. Release the speaker cable from the clips built into the top cover.
3. Remove one PM 2.5 x 3.5 screw **(3)** from the right speaker that secures it to the top cover **(2)**.

NOTE: This screw also secures the power button board to the top cover.

4. Lift the speakers from the top cover **(4)**.



Reverse this procedure to install the speakers.

Power button board

Description	Spare part number
Power button board	683549–001

Before removing the power button board, follow these steps:

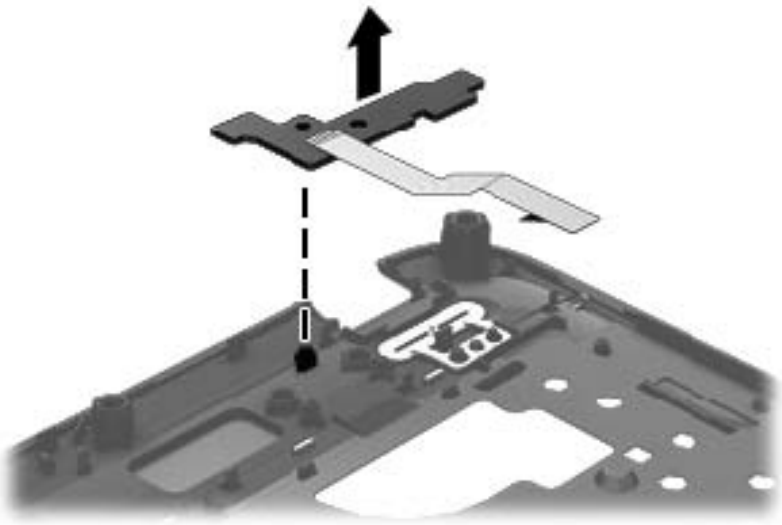
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the speakers (see Speakers on page 51).

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.

NOTE: The power button board is secured by a screw that was previously removed when releasing the speaker.

2. Release the tape securing the power button board cable and remove the power button board and cable.



Reverse this procedure to install the power button board.

TouchPad button board

Description	Spare part number
TouchPad button board (includes cable)	683548-001

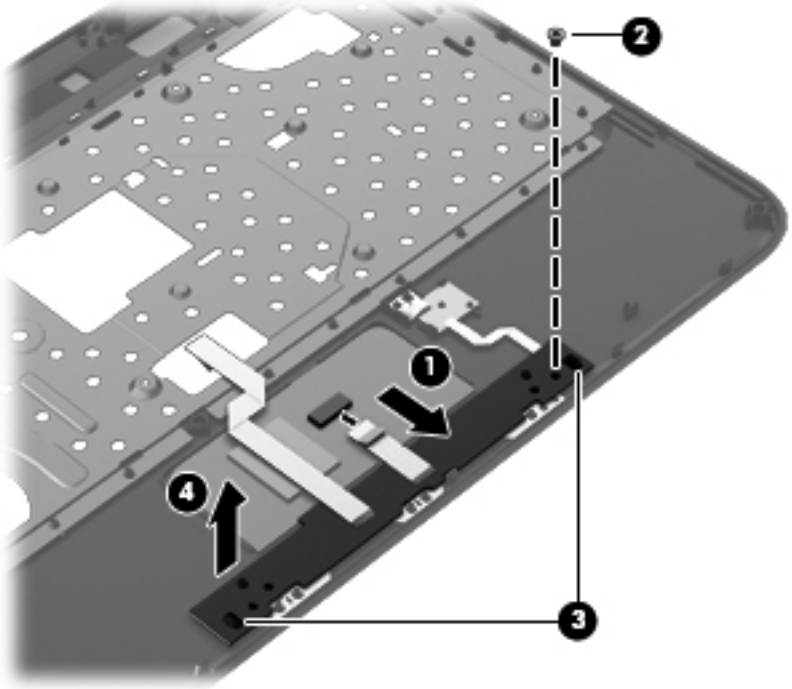
Before removing the TouchPad button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

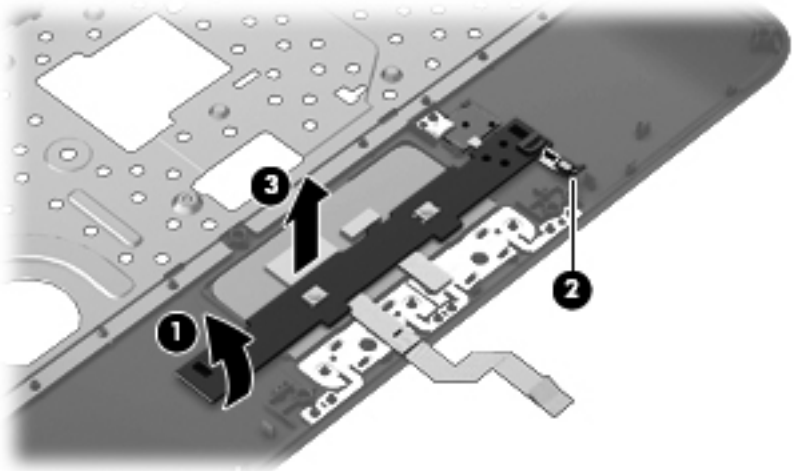
Remove the TouchPad button board and cable:

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 PM 2.5 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

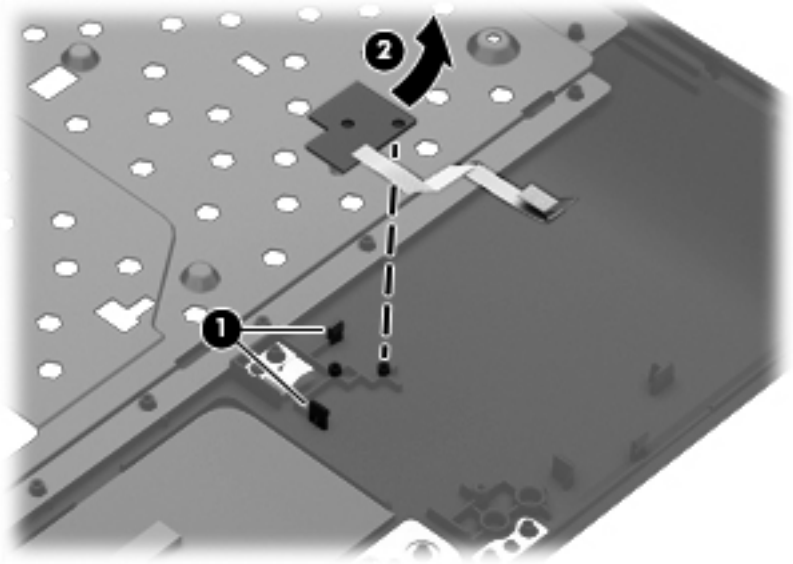
Description	Spare part number
TouchPad LED board (includes cable)	684061-001

Before removing the TouchPad LED board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the TouchPad button board (see TouchPad button board on page 54).

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

Description	Spare part number
Display back cover:	
• Bright purple	681801-001
• Ruby red	681802-001
• Sparkling black	681804-001
• Winter blue	681803-001
• Linen white	685582-001
Bezel	681806-001
Webcam/microphone module	680577-001
Hinge covers	681811-001
Display panel	681817-001
Display hinges.	681812-001
Display cable kit (includes webcam/microphone module cable)	681808-001
Antenna kit (includes the wireless antenna cables and transceivers).	681813-001

Before removing the display assembly, follow these steps:

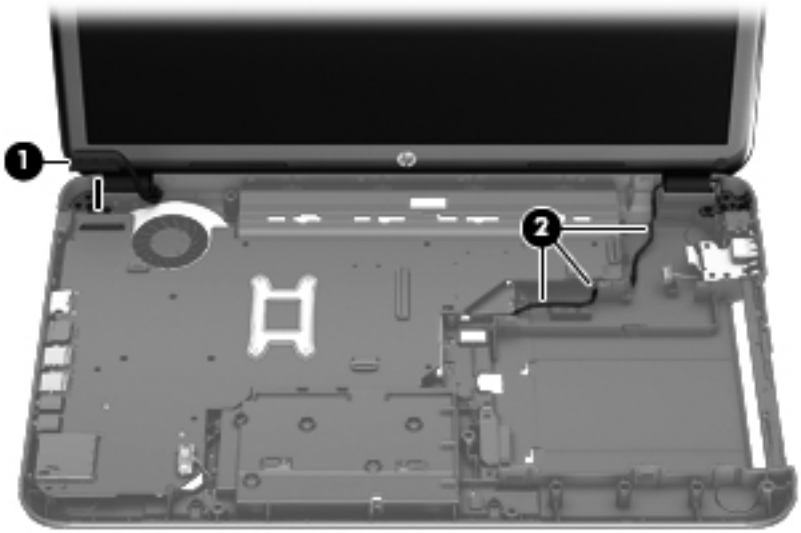
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

Remove the display assembly:

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

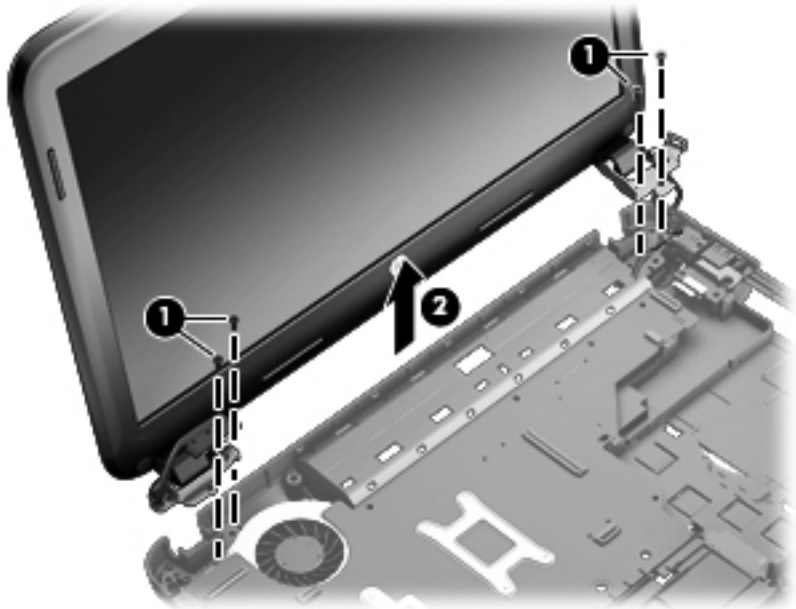
2. Release the wireless antenna cables **(2)** from the clips and the opening in the base enclosure.

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



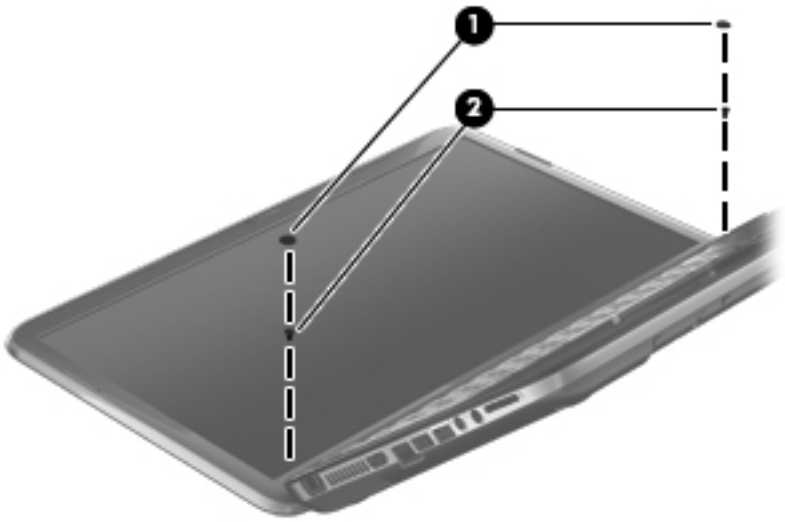
CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the four PM 2.5 × 6.0 screws **(1)** that secure the display assembly to the computer.
4. Remove the display assembly by lifting straight up **(2)**.



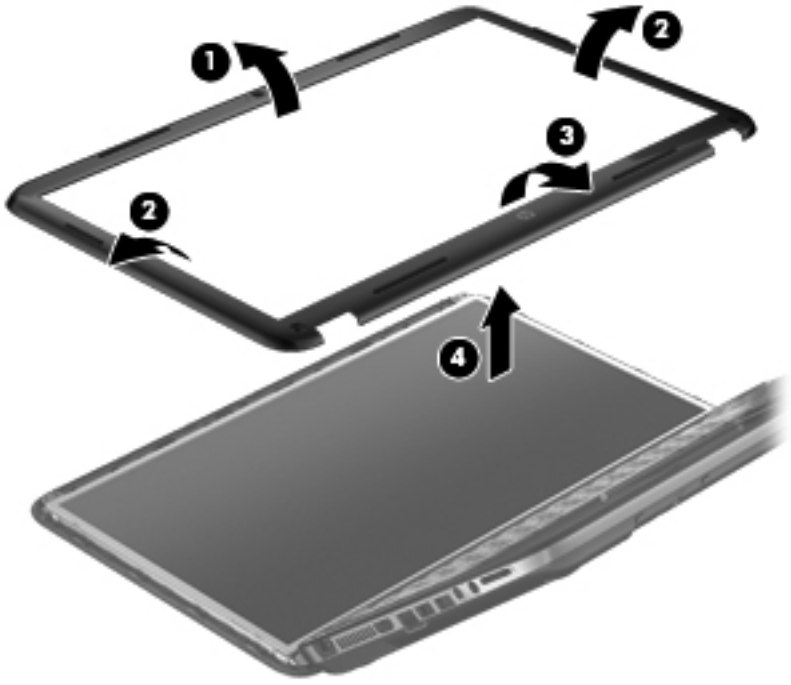
5. If it is necessary to replace the display bezel or any of the display assembly sub-components:

   a. Remove the plastic screw covers **(1)** and the two PM 2.5 × 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)**.

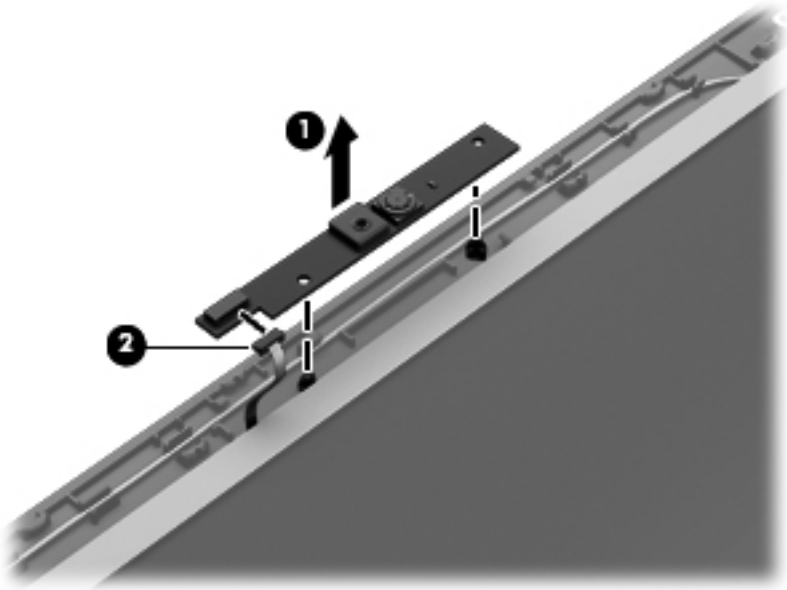


6. If it is necessary to replace the webcam/microphone module:

   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.)

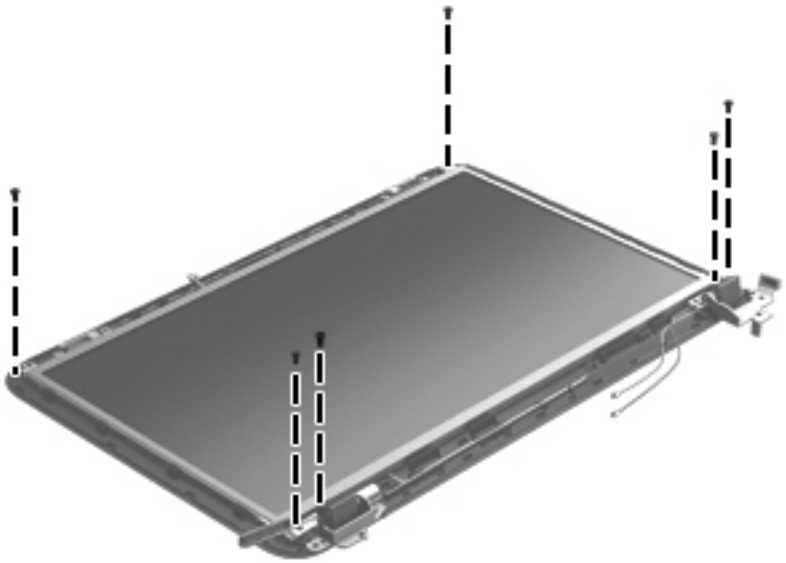
   b. Disconnect the webcam/microphone cable **(2)** from the webcam/microphone module.

c. Remove the webcam/microphone module.



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

a. Remove the six PM 2.5 × 6.0 screws that secure the display panel to the display enclosure.



b. The hinge covers are held in place by two of the same screws as the display hinges. Using a small tool to pry, remove the hinge covers.

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

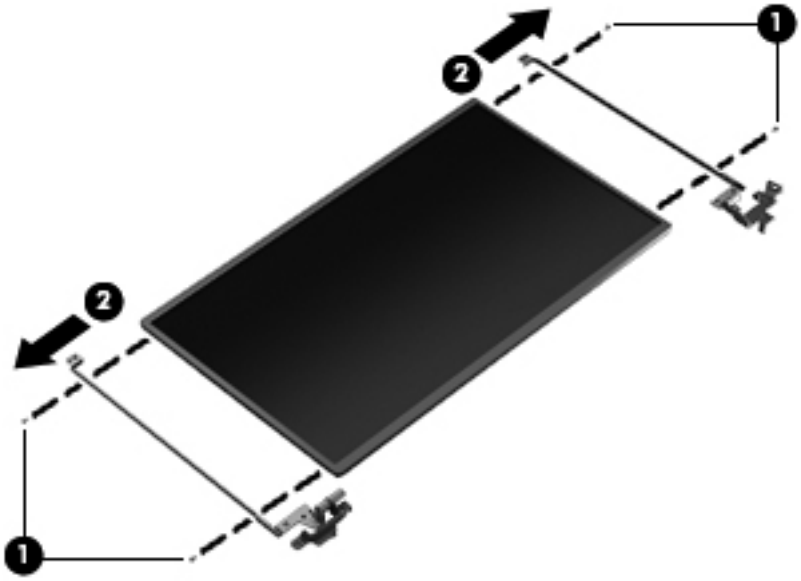
d. Release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the display panel cable **(3)** from the display panel.

e. Remove the display panel.

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

   a. Remove the four PM 2.0 × 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

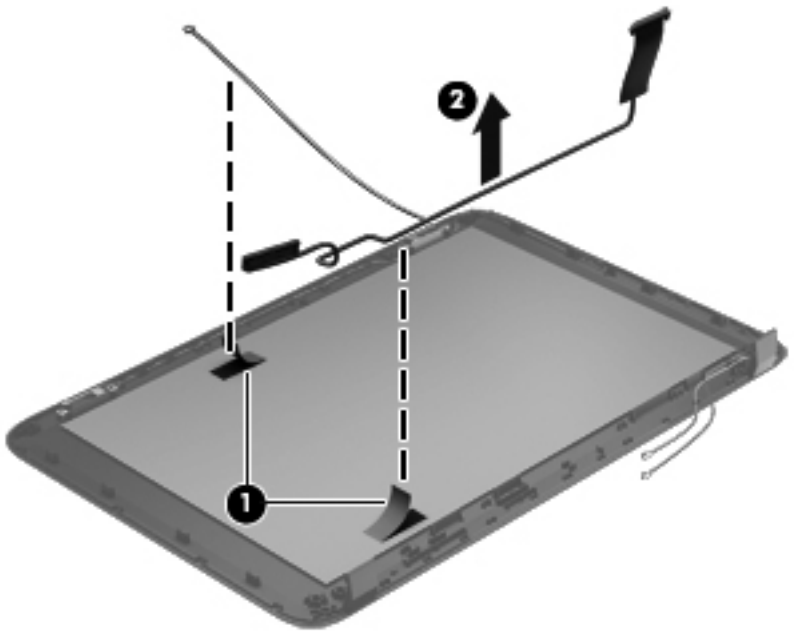


9. If it is necessary to replace the display panel cable:

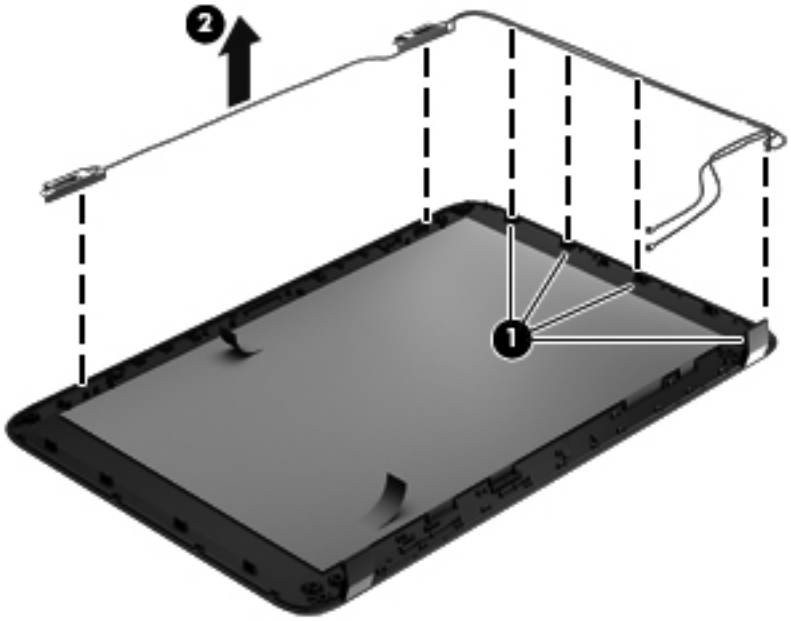
   a. Release the tabs **(1)** built into the display enclosure shielding that secure the display panel cable to the display enclosure.

   b. Release the display panel cable from the clips **(2)** built into the display enclosure.

   c. Remove the display panel cable. The display panel cable includes the webcam/microphone module cable and is available in the Display Cable Kit.



10. 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.



Reverse this procedure to reassemble and install the display assembly.

USB board

Description	Spare part number
USB board (includes cable)	683547-001

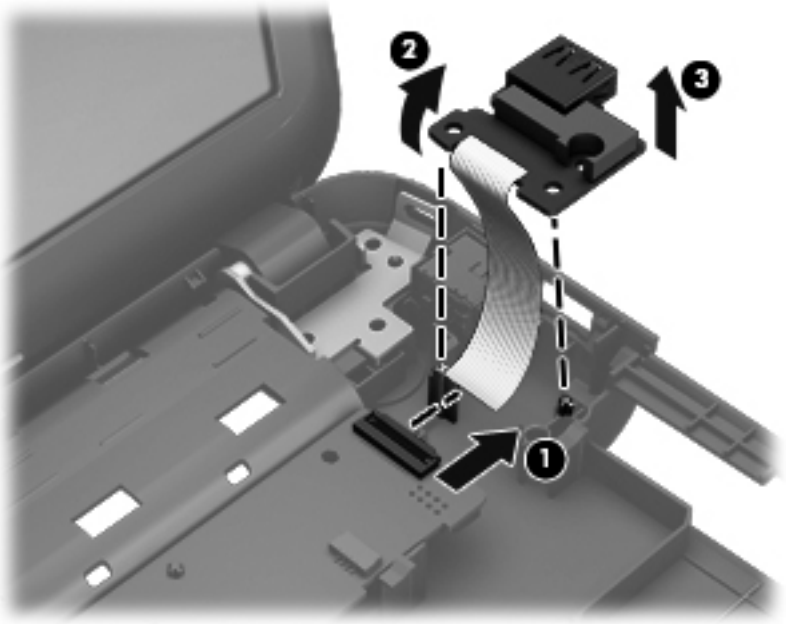
Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)

8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

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)	682744-001

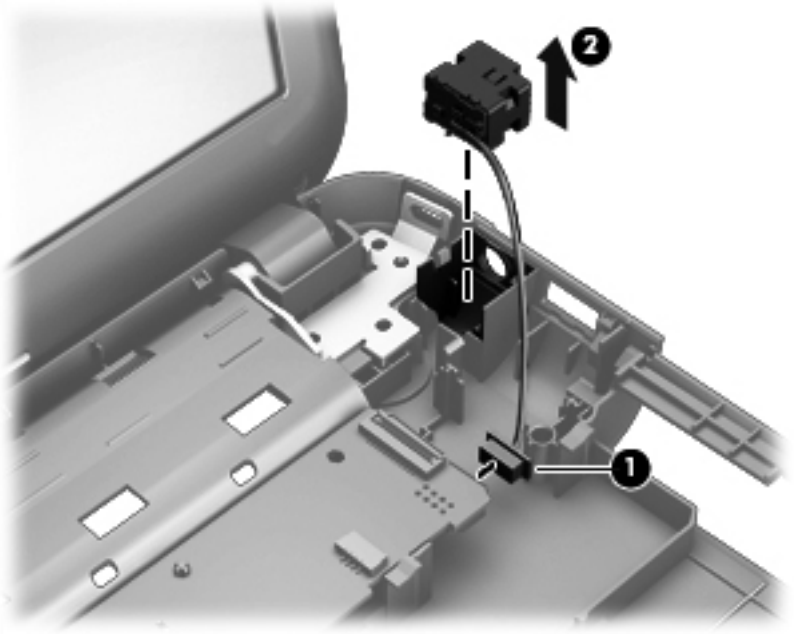
Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)

8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

Remove the power connector cable:

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



Reverse this procedure to install the power connector.

System board

Description	Spare part number
For use only with computer models equipped with HM76 UMA video memory	680568-001
For use only with computer models equipped with 2048 MB of dedicated discrete video memory	680570-001
For use only with computer models equipped with 1024 MB of dedicated discrete video memory	680569-001
System board thermal pad kit (includes replacement thermal material)	680571-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).

6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).

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 40)
- RTC battery (see RTC battery on page 68)
- Fan and heat sink (see Fan and heat sink on page 69)
- PCH heat sink (see PCH heat sink on page 72)
- Processor (see Processor on page 73)

Remove the system board:

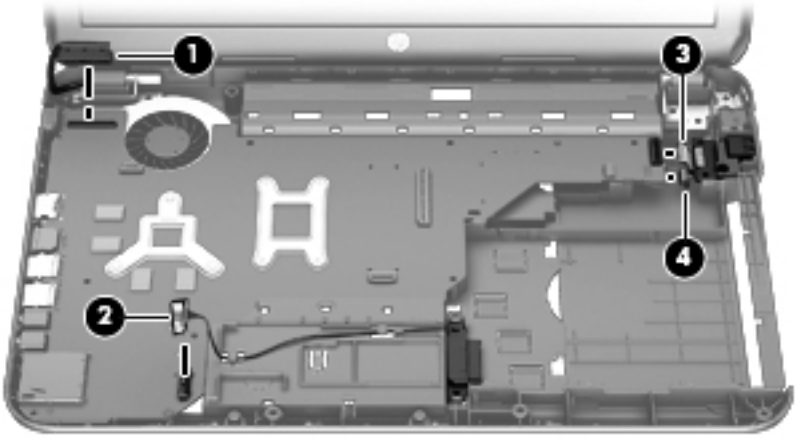
1. Disconnect the following cables from the system board:

   (1) Display panel cable

   (2) Optical drive cable

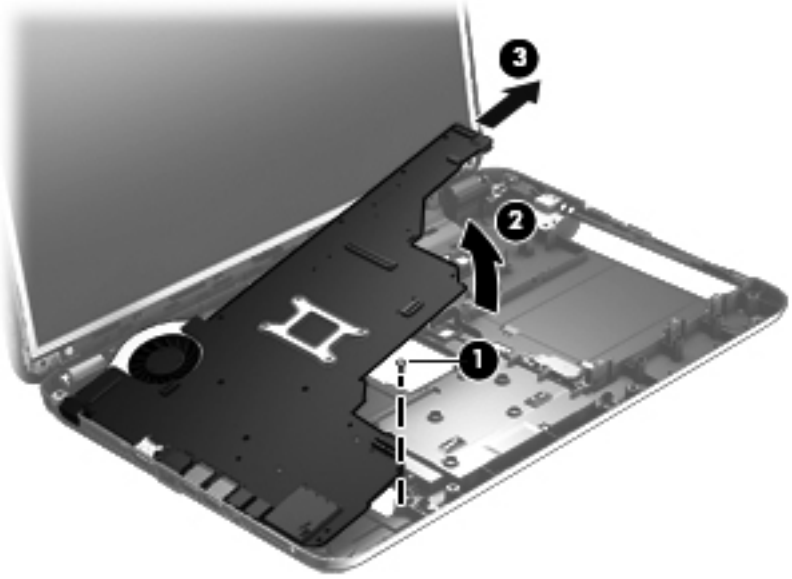
   (3) USB board cable

   (4) Power connector cable



2. Remove the PM 2.5 × 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.



Reverse this procedure to install the system board.

RTC battery

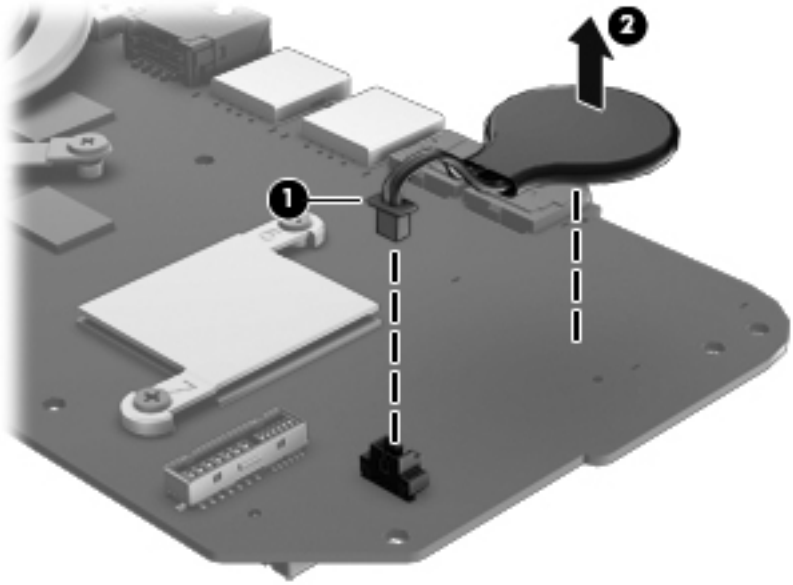
Description	Spare part number
RTC battery (includes cable and double-sided tape)	637193-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the system board (see System board on page 65).

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	680549-001
Heat sink for use only with computer models equipped with 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. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the system board (see System board on page 65).

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.

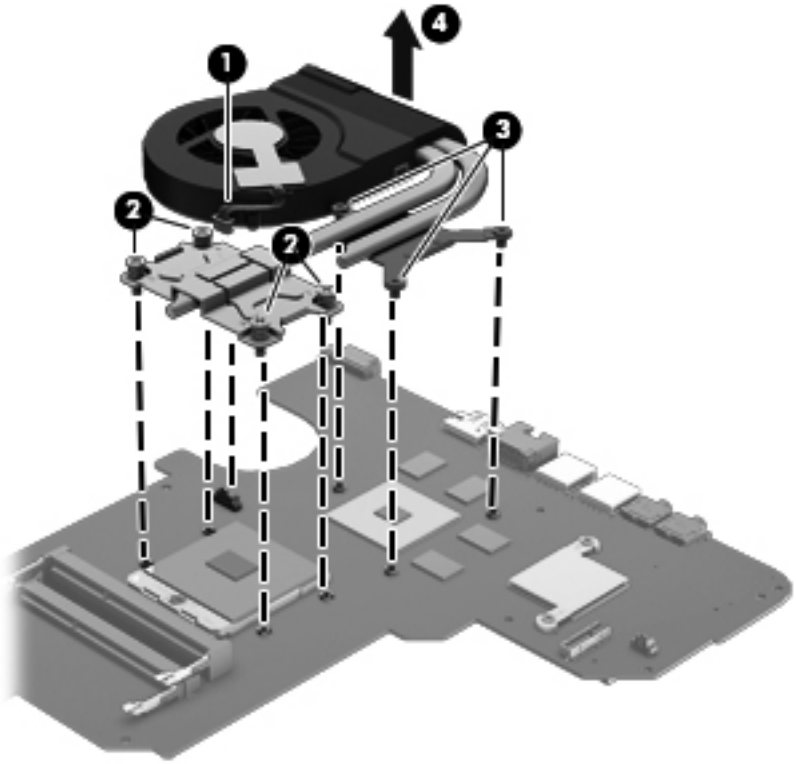
CAUTION: To prevent damage to heat sinks and/or processors, loosen/tighten captive screws in sequence as numerically labeled.

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

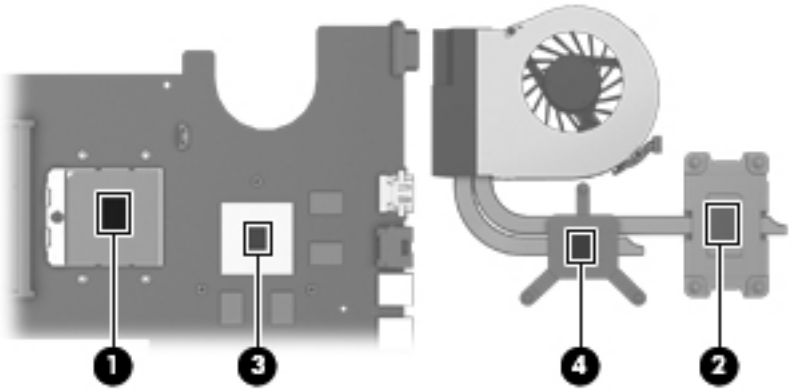
4. Remove the fan and heat sink **(4)**.

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.

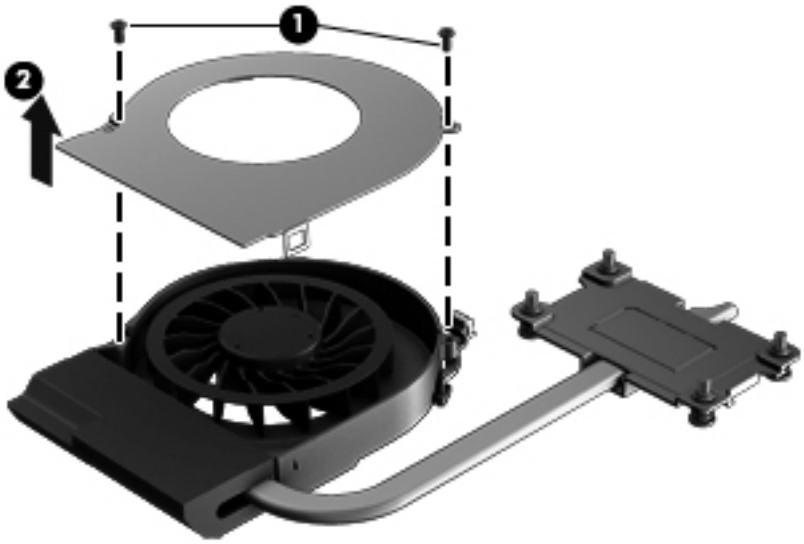


NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the base enclosure, heat sink, processor, and system board spare part kits.

- 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 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 PM 1.5 × 2.5 screws **(1)** that secure the fan to the heat sink and remove the two clips that secure the fan to the heat sink.
3. 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:

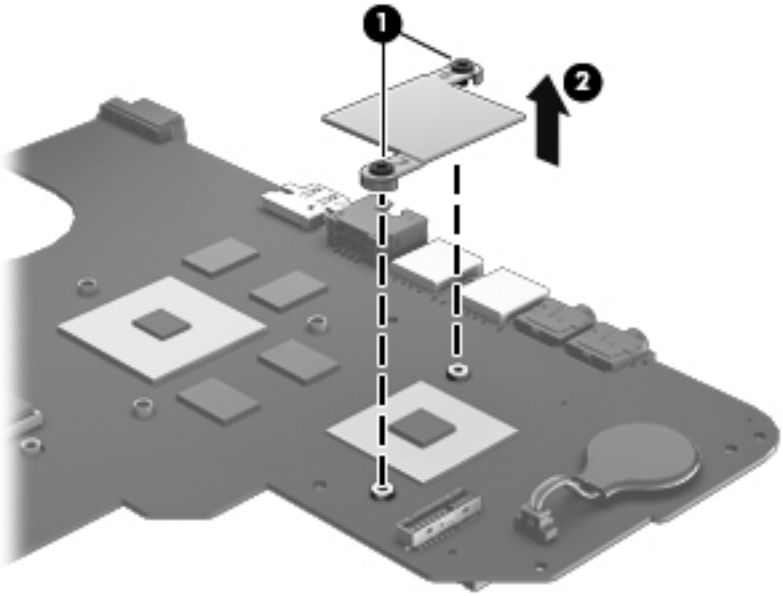
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the system board (see System board on page 65).

Remove the PCH heat sink:

1. Remove the two PM 2.0 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 i7-3612QM (2.1 GHz, SC turbo up to 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)	680647-001
Intel Core i7-3520M (2.9 GHz, SC turbo up to 3.6 GHz, 1600 MHz/4 MB L3 cache, dual core, 35 W)	681954-001
Intel Core i5-3320M (2.6 GHz, SC turbo up to 3.3 GHz, 1600 MHz/3 MB L3 cache, dual core, 35 W)	681952-001
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 i3-3110M (2.4 GHz 1600 MHz/3 MB L3 cache, dual core, 35 W)	682417-001
Intel Core i5-2450M processor (2.50 GHz, SC turbo up to 3.10 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W)	676359-001
Intel Core i3-2350M (2.30 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W)	653340-001
Intel Core i3-2370M (2.4 GHz, 1333 MHz/3 MB L3 cache, dual core 35 W)	677152-001

Description	Spare part number
Intel Core i3-2330M (2.20 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W)	653339-001
Pentium B970 processor 2.20 GHz processor (1333 MHz/2.0 MB L3 cache, dual core, 35 W)	676785-001
Pentium B960 processor (2.20 GHz, 1333 MHz/2.0 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

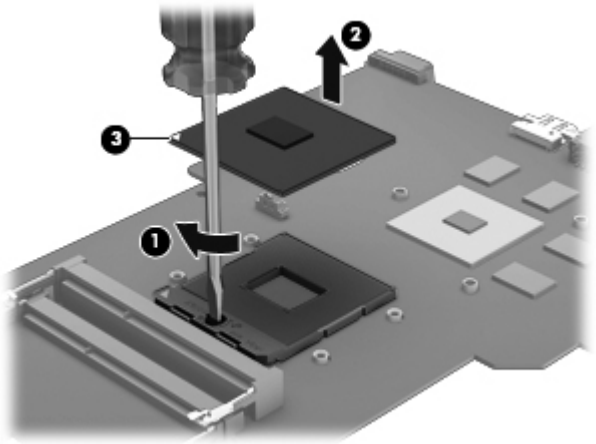
Before removing the processor, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the system board (see System board on page 65).
11. Remove the heat sink (see Fan and heat sink on page 69).

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.

Optical drive cable

Description	Spare part number
Optical drive cable	682742-001

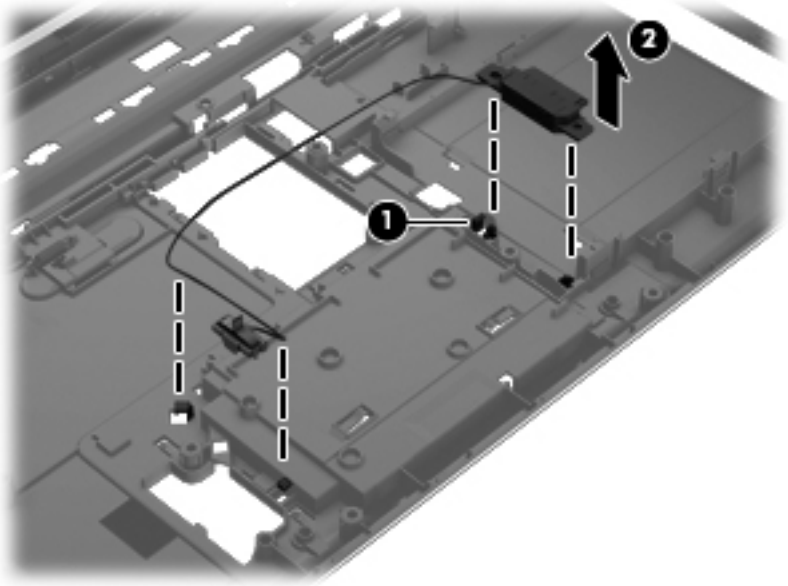
Before removing the optical drive cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
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 34).
5. Remove the service door (see Service door on page 35).
6. Remove the optical drive (see Optical drive on page 36).
7. Remove the hard drive (see Hard drive on page 38)
8. Remove the keyboard (see Keyboard on page 45).
9. Remove the top cover (see Top cover on page 48).
10. Remove the system board (see System board on page 65).

Remove the optical drive cable:

1. Release the optical drive cable from the clips built into the base enclosure.
2. Release the optical drive connector from the base enclosure by prying the clips **(1)** that secure the optical drive connector to the base enclosure.

3. Remove the optical drive cable from the base enclosure **(2)**.



Reverse this procedure to install the optical drive cable.

5 Specifications

Computer specifications

Dimensions	
Depth	**24.5 cm** (9.6 in)
Width	**37.4 cm** (14.7 in)
Height (front to rear)	**3.1 to 3.6 cm** (1.2 to 1.4 in)
Weight (lowest weight configuration)	< **2.5 kg** (5.5 lbs)
Input power	
Operating voltage	18.5 V dc @ 3.5 A - 65W
Operating current	3.5 A
Temperature	
Operating	**5°C to 35°C** (41°F to 95°F)
Nonoperating	**-20°C to 60°C** (-4°F to 140°F)
Relative humidity	
Operating	10% to 90%
Nonoperating	5% to 95%
Maximum altitude (unpressurized)	
Operating	**-15 m to 3,048 m** (-50 ft to 10,000 ft)
Nonoperating	**-15 m to 12,192 m** (-50 ft to 40,000 ft)

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

39.6-cm (15.6-in) display specifications

Dimensions	
Height	**21.0 cm** (8.27 in)
Width	**35.9 cm** (14.1 in)
Diagonal	**39.6 cm** (15.6)
Number of colors	Up to 16.8 million
Contrast ratio	300:1 (typical)
Brightness	200 cd/m² (typical)
Pixel resolution	
Pitch	0.259 × 0.259 mm
Format	1280 × 800; HD: 1366 × 768
Configuration	RGB vertical stripe
Backlight	LED
Character display	80 × 25
Total power consumption	4.0 W
Viewing angle	±40° horizontal, +120/-40° 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	9.5 mm and 7.0 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	107g max	107g max	107g max	107g max	107g 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	312,215,808	1,250,263,728	976,773,168	625,142,448	488,397,168
Disc rotational speed	5400 rpm	5400 and 7200 rpm	5400 rpm	5400 and 7200 rpm	5400 and 7200 rpm
Operating temperature	**5°C to 55°C** (41°F to 131°F)				

***Hard drive storage capacity**

When referring to hard drive storage capacity:

- 1 TB = 1 trillion bytes
- 1 GB = 1 billion bytes

Actual accessible capacity is less. Actual drive specifications may differ slightly.

NOTE: Certain restrictions and exclusions apply. Contact technical support for details.

DVD±RW and CD-RW SuperMulti Double-Layer Combo 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

Blu-ray Disc ROM and DVD±R/RW SuperMulti 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

6 Setup Utility (BIOS)

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.

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

Starting Setup Utility

NOTE: The fingerprint reader (select models only) cannot be used to access 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

Because Setup Utility is not Windows based, it does not support the TouchPad. Navigation and selection are by keystroke.

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

Displaying system information

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

Restoring factory default settings in Setup Utility

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

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

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

Exiting Setup Utility

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

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

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

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

Updating the BIOS

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

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

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

Determining the BIOS version

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

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

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

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

Downloading a BIOS update

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

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

1. Access the page on the HP Web site that provides software for your computer:

   Select **Start > Help and Support > Maintain**.
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. If no instructions are displayed, follow these steps:

1. **Windows-7**—Open Windows Explorer by selecting **Start > Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename*.exe).

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

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

7 Backing up, restoring, and recovering

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

Creating backups

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

Creating recovery media to recover the original system

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

What you need to know

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

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

Creating the recovery media

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

To recover, see Recovering the original system using HP Recovery Manager on page 89

Creating system restore points

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

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

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

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

What you need to know

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

Creating a system restore point

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

To restore, see Restoring to a previous system restore point on page 89.

Backing up system and personal information

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

Tips for a successful backup

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

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:

   To copy only the active window, press alt+prt sc.

   To copy the entire screen, press prt sc.
3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

What you need to know

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

Creating a backup using Windows Backup and Restore

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

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

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

To restore, see Restoring specific files using Windows Backup and Restore on page 89.

Restore and recovery

Restoring to a previous system restore point

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

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

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

Restoring specific files

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

Restoring specific files using Windows Backup and Restore

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

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

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

Recovering the original system using HP Recovery Manager

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

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the disc provided by the manufacturer.
- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see Restoring to a previous system restore point on page 89) and partial restores (see Restoring specific files on page 89), try them before using HP Recovery Manager to recover your system.
- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

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

Recovering using HP Recovery partition (select models only)

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

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

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

1. Access HP Recovery Manager in either of the following ways:
   - Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list.

     – or –
   - Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen. Then press f11 while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **HP Recovery Manager** window.
3. Follow the on-screen instructions.

Recovering using the recovery media

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

   – or –

   Insert the recovery flash drive into a USB port on your computer, and then restart the computer.

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 90.
3. Press f9 at system bootup.
4. Select the optical drive or the flash drive.
5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

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

To change the boot order for a recovery flash drive:

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

8 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 **1.5 m** (5.0 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.

9 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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