HP Pavilion dm4 Entertainment 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	Discrete	UMA
Product Name	**HP Pavilion dm4 Entertainment PC**	√	√
Processors	**Intel® Core™ i7 processor**		
	i7-2620M Dual-Core processor (2.7 GHz, SC turbo up to 3.40 GHz), 4 MB L3 cache, 35 W	√	√
	Intel Core i5 processors		
	i5-2540M Dual-Core processor (2.6 GHz, SC turbo up to 3.3 GHz), 3 MB L3 cache, 35 W	√	√
	i5-2520M Dual-Core processor (2.5 GHz, SC turbo up to 3.2 GHz), 3 MB L3 cache, 35 W	√	√
	i5-2430M Dual-Core processor (2.4 GHz, SC turbo up to 3.0 GHz), 3 MB L3 cache, 35 W	√	√
	i5-2410M processor (2.3 GHz, turbo up to 2.9 GHz), 3 MB L3 cache, 35 W	√	√
	Intel Core i3 processors		
	i3-2330M Dual-Core processor (2.2 GHz), 3 MB L3 cache, 35 W (soldered to system board)		√
	i3-2310M Dual-Core processor (2.1 GHz), 3 MB L3 cache, 35 W (soldered to system board)		√
Chipset	Intel HM65 Express	√	√
Graphics	**Switchable discrete graphics** (HD Decode, DX11, and HDMI) ATI Radeon™ HD 6470M) with 1024MB of dedicated video memory (128M x16 DDR3, 900 MHz x 4 PCs)	√	
	Internal Intel HD Graphics HD Graphics 3000 (Intel HM65)		√
Panel	**35.56 cm** (14.0 in) HD LED BrightView (1366 x 768 resolution)	√	√
	16:9 ultra wide aspect ratio	√	√
	Typical brightness: 200 nits	√	√
Memory	2 SODIMM slots	√	√

	Customer-accessible and upgradable	√	√
	Supports up to 8 GB of system memory	√	√
	DDR3-1333MHz dual channel support	√	√
	Supports the following configurations:	√	√
	• 8192 MB (4096 MB x 2) (No support for 32 bit operating systems)		
	• 6144 MB (2048 MB x 1 + 4096 MB x 1) (No support for 32 bit operating systems)		
	• 4096 MB (2048 MB x 2)		
	• 4096 MB (4096 MB x 1)		
	• 3072 MB (1024 MB x 1 + 2048 MB x 1)		
	• 2048 MB (2048 MB x 1)		
	• 2048 MB (1024 MB x 2)		
	• 1024 MB (1024 MB x 1) (No support for Microsoft Windows 7, 64 bit)		
Hard drives	HP ProtectSmart Hard Drive Protection	√	√
	Supports the following **9.5 mm**, **6.35 cm** (2.5 in) SATA hard drives	√	√
	• 750 GB, 7200 rpm		
	• 640 GB, 7200 rpm		
	• 500 GB, 7200 rpm		
	• 320 GB, 7200 rpm		
	Supports the following solid-state drive:	√	√
	• 160 GB	√	√
Optical drives	Supports the DVD±R/RW SuperMulti Double-Layer Drive (**9.5 mm** tray load, fixed, SATA) (select models only) Optical drive weight saver available for non-ODD models	√	√
Camera	HP TrueVision HD	√	√
	Fixed (no tilt), activity LED	√	√
	1280 × 800 by 30 frames per second	√	√
Microphone	One microphone, digital (software included)	√	√
	Echo cancellation and noise suppression	√	√
Audio	Dolby Home Theater, HD audio	√	√
	Supports Microsoft Premium requirements	√	√
	Altec Lansing speakers (2)	√	√
Ethernet	Integrated 10/100/1000 network interface card (NIC)	√	√

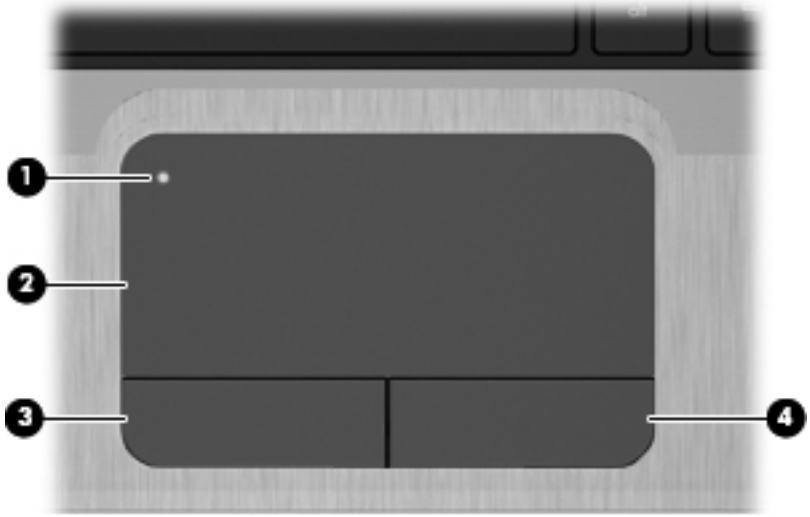
Wireless	**Integrated wireless local area network (WLAN) options by way of wireless module:**	√	√
	Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 with WiDi support	√	√
	Intel Centrino advanced wireless-N 1030 + Bluetooth® combo 802.11b/g/n 1x2 with WiDi support	√	√
	Intel Centrino Advanced–N + WiMAX 6150, 802.11 b/g/n with WiDi support	√	√
	Intel Centrino Advanced–N + WiMAX 6150 + Bluetooth 802.11 b/g/n with WiDi support	√	√
	Realtek RTL8191SE 802.11b/g/n 1x1 WiFi Adapter	√	√
	Ralink 5390GN 802.11b/g/n 1x1 WiFi Adapter	√	√
	Atheros AR9002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready)	√	√
	Realtek RTL8188CE 802.11b/g/n WiFi with Realtek CSRBC4 Bluetooth 2.1+EDR Adapter	√	√
	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	√	√
	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	√	√
External media card	Digital Media Slot; supports SD/SDHC/SDXC, MMC	√	√
Internal media card expansion	One half-size mini-card slot for WLAN	√	√
Ports	**VGA (Dsub 15-pin) supporting:** 2048 x 1536 resolution at 75 Hz	√	√
	Hot plug/unplug and auto detect for wide-aspect or standard-aspect video	√	√
	HDMI v1.4 supporting up to 1080p, 1920 x 1200 @ 60 Hz DVI mode	√	√
	USB 2.0 (4)	√	√
	RJ-45	√	√
	Audio in (microphone)	√	√
	Audio-out (headphone)	√	√
	Smart-pin AC adapter plug	√	√
Keyboard/pointing devices	**35.56 cm** (14.0 inch) full-size keyboard	√	√
	Dura-coat island style keyboard	√	√
	TouchPad with tab cover (taps and multitouch gestures (2-finger scrolling, taps, and pinch zoom enabled by default)	√	√
Power requirements	Batteries		

	Supports battery fast charge	√	
	9-cell (100 Whr) 3.0 Ah Li-ion battery	√	√
	6-cell (62-Whr) 2.80Ah Li-ion battery	√	√
	6-cell (55-Whr) 2.55 Ah Li-ion battery	√	√
AC Adapters			
	65 W AC adapter with Smart-Pin DC connector		√
	90 W AC adapter with Smart-Pin DC connector	√	
Security	Kensington Security Lock	√	√
	Fingerprint reader with Digital Persona Software Support	√	√
	OTP (VeriSign) support	√	√
	Intel AT-p ready support	√	√
Operating system	**Preinstalled:**		
	Microsoft Windows 7 Professional (32 and 64 bit)	√	√
	Microsoft Windows 7 Home Premium (32 and 64 bit)	√	√
	Microsoft Windows 7 Home Basic (32 and 64 bit)	√	√
	Microsoft Windows 7 Starter (32 bit), (No support for HDD 320 GB)	√	√
	FreeDOS	√	√
	RedFlag	√	√
Serviceability	**End-user replaceable parts:**	√	√
	AC adapter	√	√
	Battery (system)	√	√
	Hard drive	√	√
	Memory module	√	√
	Optical drive	√	√
	Mini-card device	√	√

2 External component identification

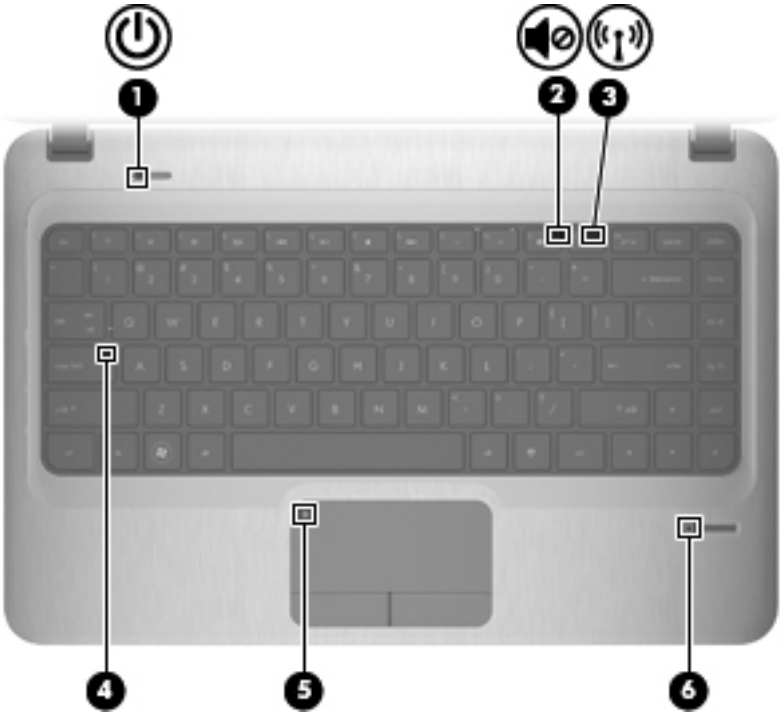
Top

TouchPad



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

Lights

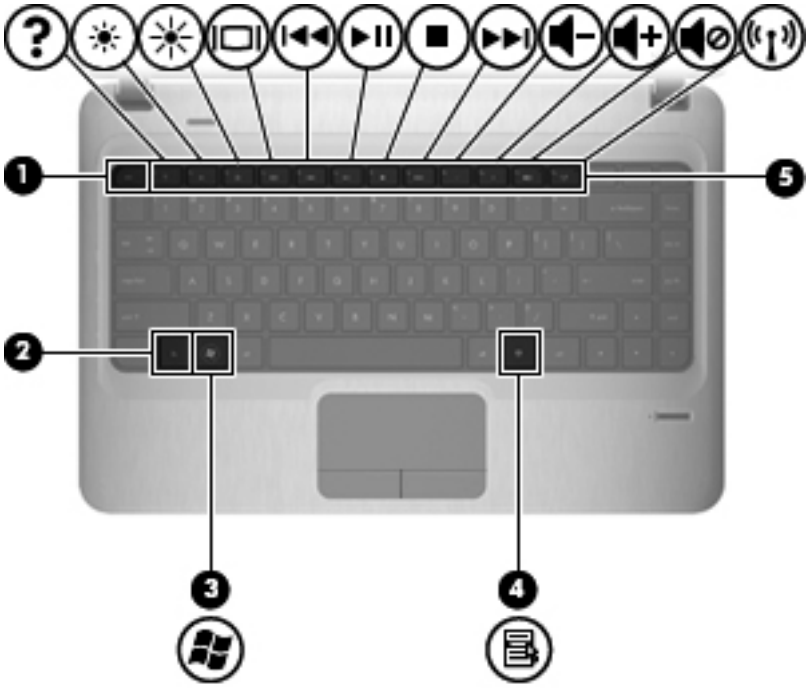


Component			Description
(1)		Power light	• White: Power is on. • Blinking white: The computer is in the Sleep state. • Off: The computer is off or in Hibernation. **NOTE:** Another power light is located on the left side of the computer.
(2)		Mute light	• Amber: Computer sound is off. • Off: Computer sound is on.
(3)		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.
(4)		Caps lock light	• White: Caps lock is on. • Off: Caps lock is off.
(5)		TouchPad light	• Amber: The TouchPad is off. • Off: The TouchPad is on.
(6)		Fingerprint reader light	• White: Fingerprint read is good. • Amber: Fingerprint read is bad.

Buttons

Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep. • When the computer is in Hibernation, press the button briefly to exit Hibernation. If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings, select **Start > Control Panel > System and Security > Power Options**, or refer to the *HP Notebook Reference Guide*.
(2)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon.

Keys

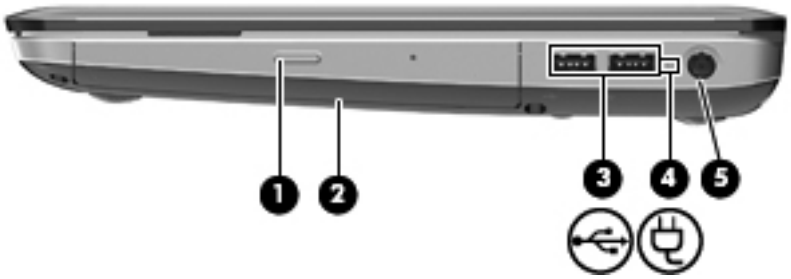


Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Windows applications key	Displays a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

Front

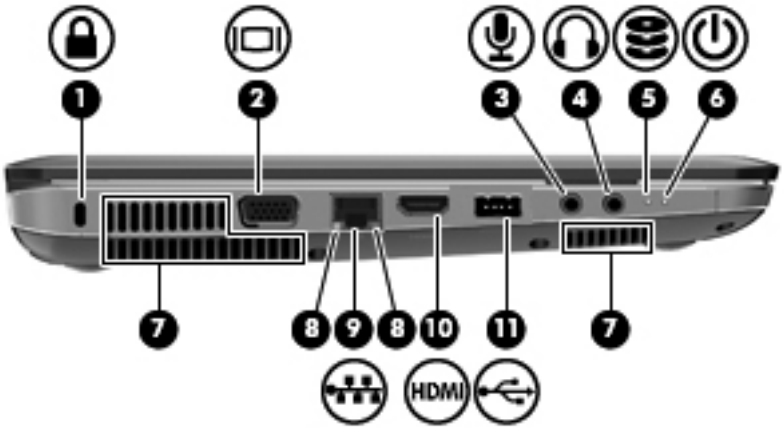
Component		Description
(1)	Digital Media Slot	Supports the following digital card formats: • MultiMedia card • Secure Digital (SD) card • Secure Digital High Capacity (SDHC) Memory card (standard and large size)
(2)	Speakers (2)	Produce sound.

Right side



Component		Description
(1)	Optical drive light	• On: The optical drive is being accessed. • Off: The optical drive is idle.
(2)	Optical drive (select models only) Optical drive weight saver option	Reads and writes to an optical disc.
(3)	USB ports (2)	Connect optional USB devices.
(4)	Battery light	• White: The computer is connected to external power and the battery is fully charged. • Amber: A battery is charging. • Blinking: The battery has reached a low or critical battery level or there is a battery error.
(5)	Power connector	Connects an AC adapter.

Left side



Component		Description
(1)	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.
(2)	External monitor port	Connects an external VGA monitor or projector.
(3)	Audio in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(4)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety and Environmental Notices*. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.
(5)	Drive light	• Blinking white: The hard drive is being accessed. • Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the hard drive. **NOTE:** For information on HP ProtectSmart Hard Drive Protection, refer to the *HP Notebook Reference Guide*.
(6)	Power light	• White: The computer is on. • Blinking white: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(7)	Vents (3)	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.

Component			Description
(8)		RJ-45 (network) lights	• White: The network is connected. • Amber: The network is showing activity.
(9)		RJ-45 (network) jack	Connects a network cable.
(10)	HDMI	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.
(11)		USB port	Connects optional USB devices.

Display

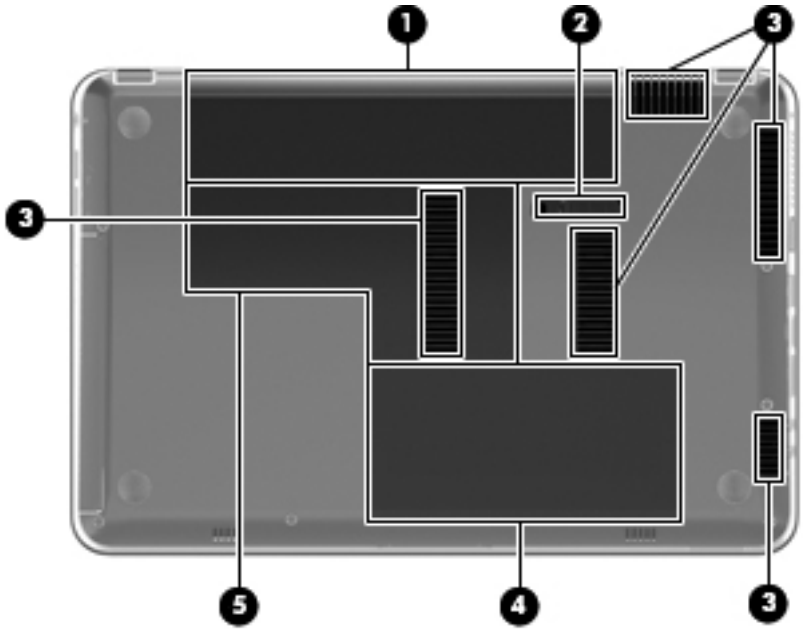
Component		Description
(1)	WLAN antennas (2)	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(2)	Internal microphone	Records sound.
(3)	Webcam	Records video and captures still photographs. To use the webcam, select **Start > All Programs > Cyberlink Youcam**.
(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.

Rear

Component	Description
Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Bottom

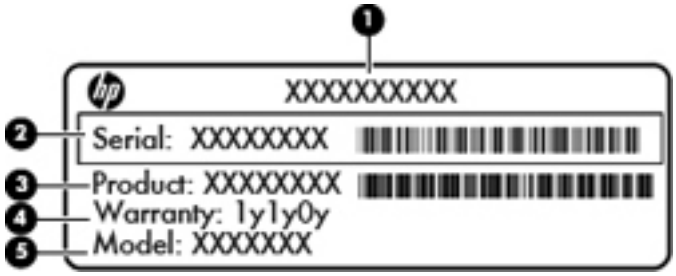


Component		Description
(1)	Battery bay	Holds the battery.
(2)	Battery release latch	Releases the battery from the battery bay.
(3)	Vents (5)	Enable airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Hard drive bay	Holds the hard drive.
(5)	Memory module compartment	Contains the memory module slots.

3 Illustrated parts catalog

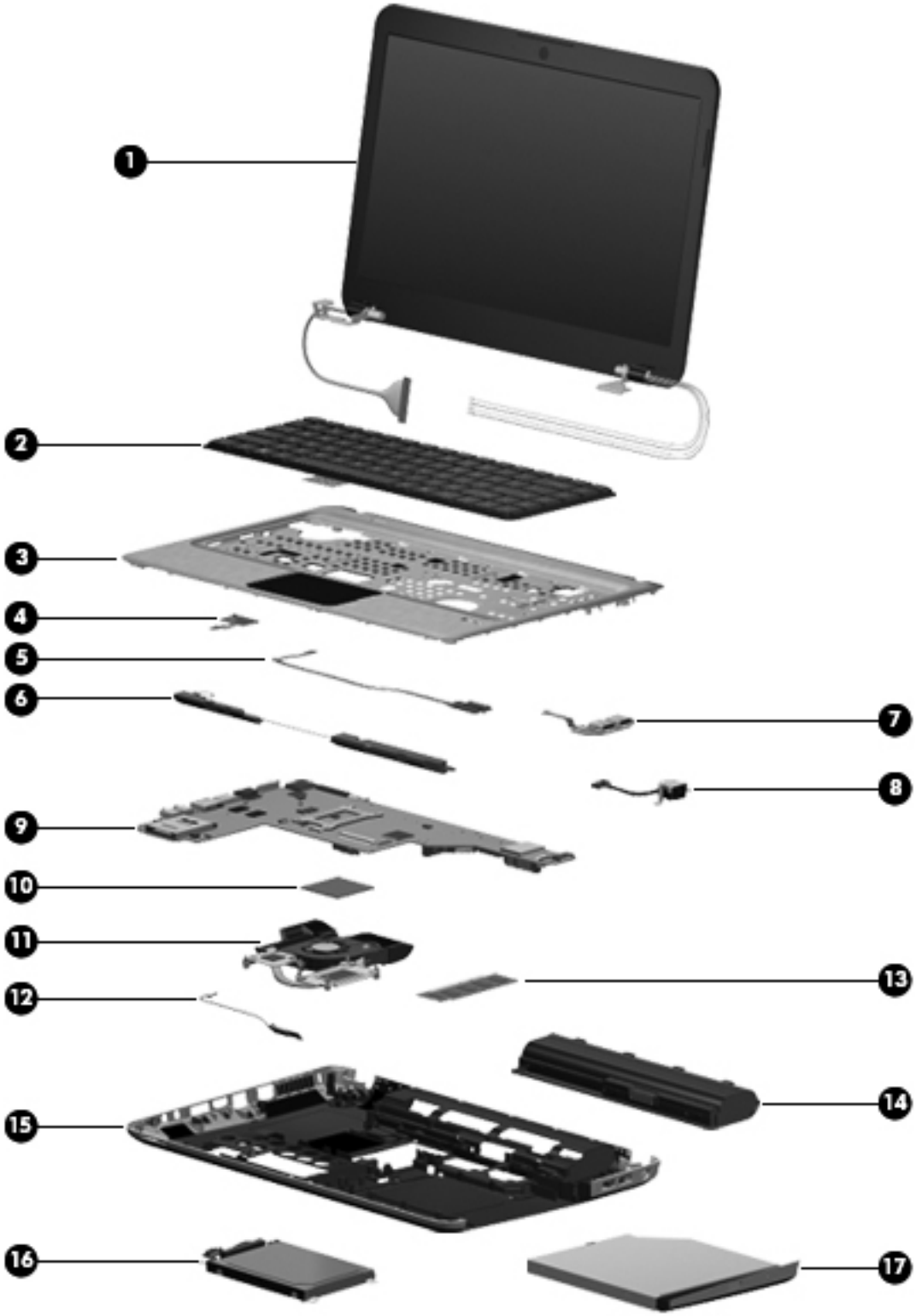
Serial number location

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



- Product name **(1)**. This is the product name affixed to the front of the computer.
- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.
- Part number/Product number (p/n) **(3)**. 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.
- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.
- Model description **(5)**. This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

Computer major components



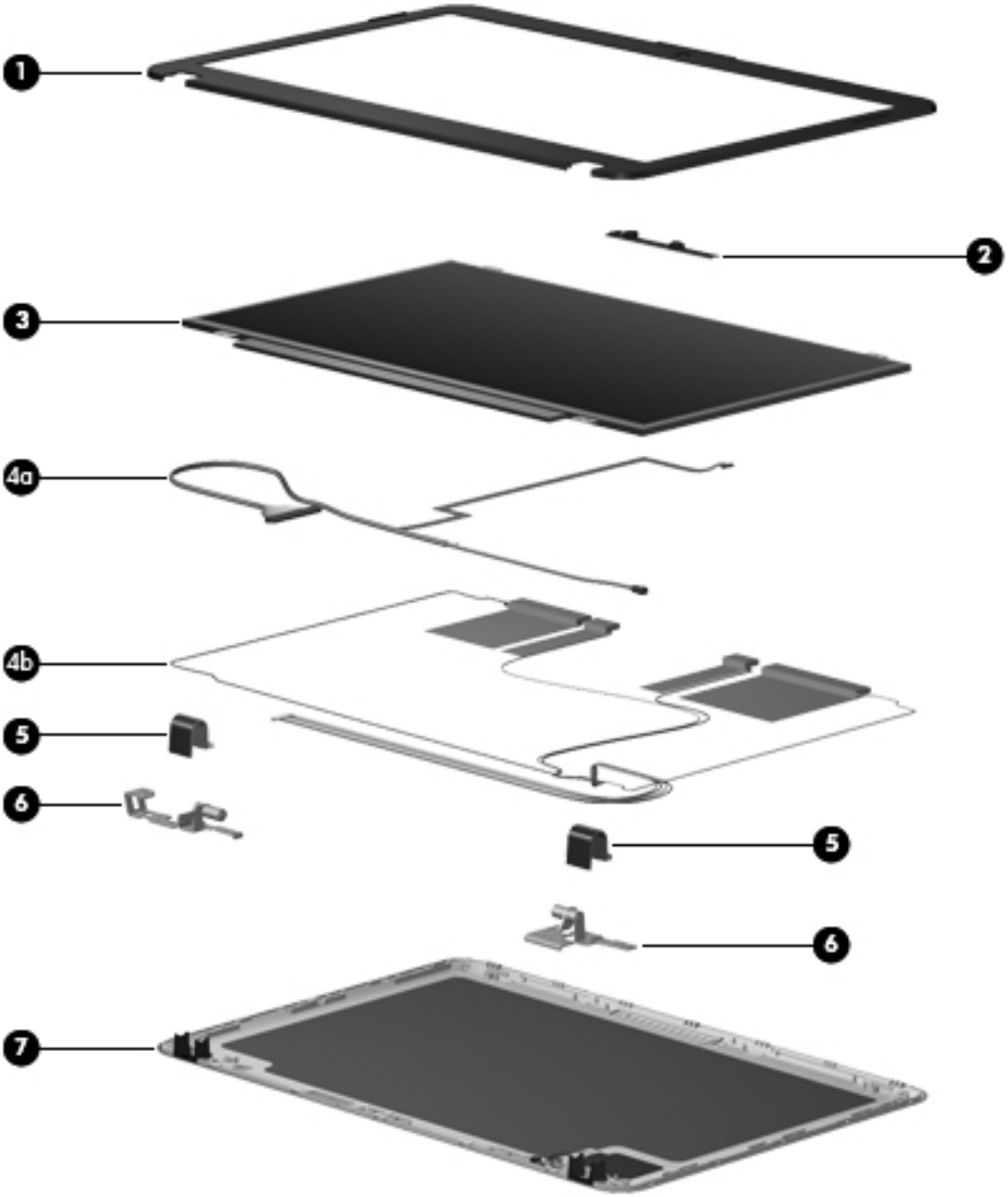
Item	Description	Spare part number
(1)	**35.56 cm** (14.0 in)**, SVA, high-definition (HD), BrightView LED display assembly** **NOTE:** See Display assembly components on page 19 for more display assembly internal component spare part information.	
	For use in Dark Umber models	636941-001
	For use in Steel Gray models	650675-001
(2)	**Keyboards** **NOTE:** For a detailed list of available keyboards, see Sequential part number listing on page 23.	
	Standard	608222-xxx
	QuickWeb	663563-xxx
(3)	**Top cover** (includes TouchPad)	
	For use in Dark Umber models	636946-001
	For use in Steel Gray models	650676-001
(4)	**Power button board** (includes cable)	658706-001
(5)	**Fingerprint reader board**	608225-001
(6)	**Speaker assembly** (includes cable)	608232-001
(7)	**USB board** (includes cable)	658707-001
(8)	**Power connector cable** (includes power connector and cable)	608273-001
(9)	**System board** (includes replacement thermal material)	
	For use in models equipped with 1 GB of discrete HD6470 graphics memory	636944-001
	For use in models equipped with HM65 UMA graphics memory	636945-001
	For use in models equipped with HM65 UMA graphics; includes Intel Core i3 2330M processor	642732-001
	For use in models equipped with HM65 UMA graphics memory; includes Intel Core i3 2310M processor	656092-001
(10)	**Processor** (includes replacement thermal material)	
	2nd Generation Intel Core i7 processor	
	• i7-2620M processor (2.7-Hz SC turbo up to 3.4 GHz), 4 MB L3 cache 35 W	631252-001
	Intel Core i5 processors	
	• i5-2540M processor (2.6 GHz, SC turbo up to 3.3 GHz), 3 MB L3 cache, 35 W	631255-001
	• i5-2520M processor (2.5 GHz, SC turbo up to 3.2 GHz), 3 MB L3 cache, 35 W	631253-001
	• i5-2430M processor (2.4 GHz, SC turbo up to 3.3 GHz), 3 MB L3 cache, 35 W	653341-001
	• i5-2410M processor (2.3 GHz, SC turbo up to 2.9 GHz), 3 MB L3 cache, 35 W	638039-001
(11)	**Fan/heatsink assembly** (includes replacement thermal material)	
	For use in UMA models in which the processor is not soldered to the system board	636940-001
	For use in UMA models in which the processor is soldered to the system board	642731-001

Item	Description	Spare part number
	For use in models equipped with discrete graphics	636939-001
(12)	**Bluetooth module** **NOTE:** The Bluetooth module cable is included in the Cable Kit, spare part number 608227-001.	537921-001
	WLAN modules (not illustrated)	
	Intel Centrino wireless-N 1000 802.11b/g/n 1x2 with WiDi support For use in Argentina, Bolivia, Brazil, Canada (French/English), Chile, Columbia, Costa Rica, Ecuador, El Salvador, Guadeloupe, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, Uruguay, and Venezuela.	593530-001
	Intel Centrino advanced wireless-N 1030 + Bluetooth® combo 802.11b/g/n 1x2 with WiDi support For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	631956-001
	Intel Centrino Advanced–N + WiMAX 6150, 802.11 b/g/n with WiDi support (+ Bluetooth For use in the United States.	633817-001
	Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	640926-001
	Ralink 5390GN 802.11 b/g/n 1x1 WiFi Adapter For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	630703-001

Item	Description	Spare part number
	Atheros AR9002WB-1NGB 802.11 b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready) For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	593127-001
	Realtek RTL8188CE 802.11 b/g/n WiFi with Realtek CSRBC4 Bluetooth 2.1+EDR Adapter For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	602993-001
	Broadcom 4313/2070 802.11b/g/n (1x1) and Bluetooth high-speed Half Mini Card For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	600370-001
	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
(13)	**Memory modules** (PC3-10600, 1333 MHz)	
	2 GB	621565-001

Item	Description	Spare part number
	4 GB	621569-001
(14)	**Battery**	
	9-cell, 100 WHr (3.0 Ah) Li-ion	636631-001
	6-cell, 62 WHr (2.80 Ah) Li-ion	593562-001
	6-cell, 55 WHr (2.55 Ah) Li-ion	593554-001
(15)	**Base enclosure** (includes modem cable and optical drive cable)	636937-001
(16)	**Hard drive** (includes hard drive bracket) **NOTE:** The hard drive cable is included in the Cable Kit, spare part number 608227-001.	
	750 GB, 7200 rpm	678103-001
	640 GB, 7200 rpm	678102-001
	500 GB, 7200 rpm	678101-001
	320 GB, 7200 rpm	678100-001
	160 GB solid-state drive	608215-001
(17)	**DVD±RW SuperMulti DL Drive** (12.7 mm optical drive, fixed) (select models only)	677742-001
	Optical drive weight saver (not illustrated)	660550-001

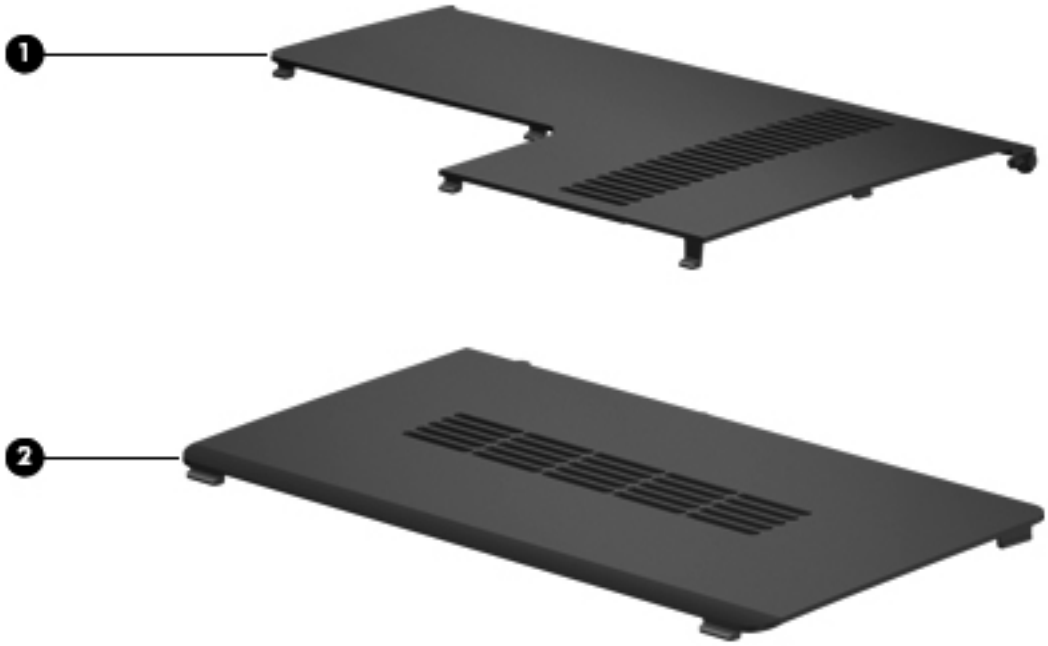
Display assembly components



Item	Description	Spare part number
(1)	**Display bezel**	636938-001
(2)	**Webcam module**	615744-001
(3)	**Display panel** (**35.56 cm** (14.0 in) Brightview, high-definition; includes display panel cable)	608206-001
	Display Cable Kit	608211-001
(4a)	Webcam cable	

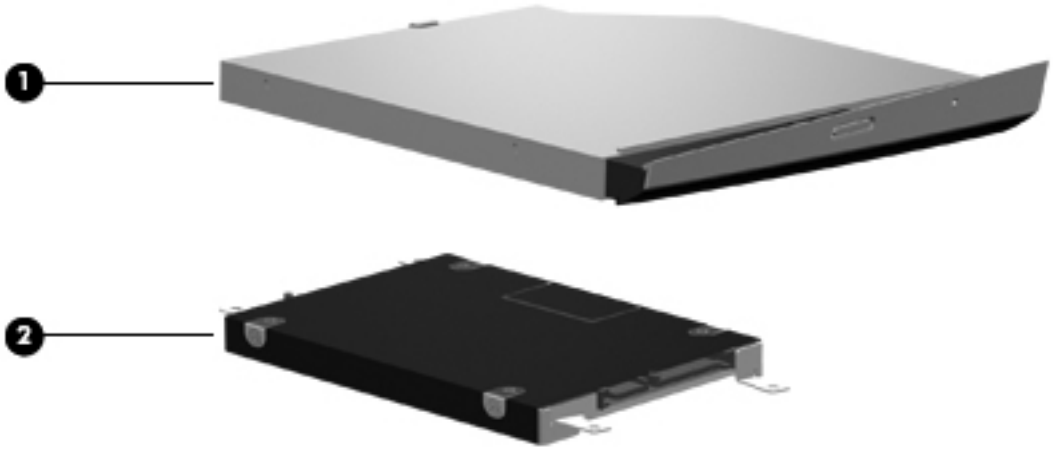
Item	Description	Spare part number
(4b)	Antennas and cables	
(5)	**Display hinge covers**	608210-001
(6)	**Display bracket**	608214-001
(7)	**Display back cover**	
	For use in Dark Umber computer models	636936-001
	For use in Steel Gray computer models	650674-001
	Display Screw Kit (not illustrated; includes screws and screw covers)	608212-001

Plastics Kit



Item	Description	Spare part number
	Plastics Kit	636942-001
(1)	Wireless/memory module mini-card compartment cover (includes captive screw)	
(2)	Hard drive bay cover (includes captive screws)	

Mass storage devices



Item	Description	Spare part number
(1)	**Optical drive** (12.7 mm, SATA, fixed)	
	DVD±RW SuperMulti DL Drive (select models only)	677742-001
	Optical drive weight saver	660550-001
(2)	**Hard drive** (include hard drive bracket) **NOTE:** The hard drive cable is included in the Cable Kit, spare part number 608227-001.	
	750 GB, 7200 rpm	678103-001
	640 GB, 7200 rpm	678102-001
	500 GB, 7200 rpm	678101-001
	320 GB, 7200 rpm	678100-001
	160 GB solid-state drive (not illustrated)	608215-001
	Hard drive mounting hardware	672516-001

Miscellaneous parts

Description	Spare part number
AC adapters	
90 W Smart AC adapter, RC/V 3W	609940-001
65 W Smart AC adapter, RC/V 3W	609939-001
Power cord, AC, 3 wire, black, 1.83 m	
For use in Argentina	490371-D01
For use in Brazil	490371-202
For use in the People's Republic of China	490371-AA1
For use in Denmark	490371-081
For use in Europe, the Middle East, and Africa	490371-021
For use in Italy	490371-061
For use in North America	490371-001
For use in Switzerland	490371-111
For use in the United Kingdom and Singapore	490371-031
Thermal pad kit	634366-001
RTC battery	449137-001
Rubber feet	608228-001
Screw Kit	608234-001
• Phillips M2.0x2.0 broadhead screw	
• Phillips M2.0x3.0 screw	
• Phillips M2.0x4.0 screw	
• Phillips M2.0x5.0 screw	
• Phillips M2.5x5.0 screw	
• Phillips M2.5x6.5 screw	
• Phillips M2.5x7.0 screw	
• Phillips M3.0x3.0 screw	

Sequential part number listing

Spare part number	Description
449137-001	RTC battery
490371-001	Power cord, AC, 3-pin, black, 1.83 m, for use in North America
490371-021	Power cord, AC, 3-pin, black, 1.83 m, for use in Europe, the Middle East, and Africa
490371-031	Power cord, AC, 3-pin, black, 1.83 m, for use in the United Kingdom and Singapore
490371-061	Power cord, AC, 3-pin, black, 1.83 m, for use in Italy
490371-081	Power cord, AC, 3-pin, black, 1.83 m, for use in Denmark
490371-111	Power cord, AC, 3-pin, black, 1.83 m, for use in Switzerland
490371-202	Power cord, AC, 3-pin, black, 1.83 m, for use in Brazil
490371-D01	Power cord, AC, 3-pin, black, 1.83 m, for use in Argentina
537921-001	Bluetooth module without cable (For use in the United States)
593127-001	Atheros AR9002WB-1NGB 802.11 b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready) For use in Albania, Algeria, Andorra, Angola, Argentina, Azerbaijan, Austria, Bahrain, Belarus, Belgium, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cameroon, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Gibraltar, Greece, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Hungary, Iceland, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Martinique, Mayotte, Mauritius, Mexico, Moldova, Monaco, Montenegro, Morocco, Nambia, Netherlands, Nicaragua, Nigeria, Norway, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Poland, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, San Marino, Sao Tome and principe, Saudi Arabia, Senegal, Slovenia, South Africa, Spain, St. Pierre et Miquel, Swaziland, Sweden, Switzerland, Tanzania, the United States, Tunisia, Turkey, UAE, Uganda, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.
593530-001	Intel Centrino wireless-N 1000 802.11b/g/n 1x2 with WiDi support For use in Argentina, Bolivia, Brazil, Canada (French/English), Chile, Columbia, Costa Rica, Ecuador, El Salvador, Guadeloupe, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, Uruguay, and Venezuela.
593554-001	6-cell, 55 WH (2.55 Ah) Li-ion battery
593562-001	6-cell, 62 WH (2.80 Ah) Li-ion battery

Spare part number	Description
600370-001	Broadcom 4313/2070 802.11b/g/n (1x1) and Bluetooth high-speed Half Mini Card for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
602993-001	Realtek RTL8188CE 802.11 b/g/n WiFi with Realtek CSRBC4 Bluetooth 2.1 + EDR Adapter For use in Albania, Algeria, Andorra, Angola, Argentina, Azerbaijan, Austria, Bahrain, Belarus, Belgium, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cameroon, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Gibraltar, Greece, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Hungary, Iceland, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Martinique, Mayotte, Mauritius, Mexico, Moldova, Monaco, Montenegro, Morocco, Nambia, Netherlands, Nicaragua, Nigeria, Norway, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Poland, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, San Marino, Sao Tome and principe, Saudi Arabia, Senegal, Slovenia, South Africa, Spain, St. Pierre et Miquel, Swaziland, Sweden, Switzerland, Tanzania, the United States, Tunisia, Turkey, UAE, Uganda, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen..
608206-001	Display panel, **35.56 cm** (14.0 in), high definition, Brightview
608210-001	Display hinge cover
608211-001	Display Cable Kit
608212-001	Display Screw Kit
608214-001	Display bracket (with hinges)
608215-001	Hard drive, 160 GB, solid state
677742-001	DVD±RW SuperMulti DL Drive (select models only)
608222-001	Keyboard for use in the United States
608222-031	Keyboard for use in the United Kingdom
608222-041	Keyboard for use in Germany
608222-051	Keyboard for use in France
608222-071	Keyboard for use in Spain

Spare part number	Description
608222-121	Keyboard for use in English and French Canada
608222-131	Keyboard for use in Portugal
608222-141	Keyboard for use in Turkey
608222-161	Keyboard for use in Latin America
608222-171	Keyboard for use in Saudi Arabia
608222-201	Keyboard for use in Brazil
608222–251	Keyboard for use in Russia
608222-B31	Keyboard for use in Europe, the Middle East, and Africa
608222-BG1	Keyboard for use in Switzerland
608222-DH1	Keyboard for use in the Netherlands
608225-001	Fingerprint reader board
608227-001	Cable Kit (includes Bluetooth module cable and hard drive cable)
608228-001	Rubber Feet Kit
608232-001	Speaker assembly (includes cable)
608234-001	Screw Kit
608273-001	Power connector with cable
609939-001	65 W Smart AC adapter, RC/V 3W
609940-001	90 W Smart AC adapter, RC/V 3W
615744-001	Webcam module
621565-001	Memory module, 2 GB (PC3 10600 1333 Mhz)
621569-001	Memory module, 4 GB (PC3 10600 1333 Mhz)
630703-001	Ralink 5390GN 802.11 b/g/n 1x1 WiFi Adapter For use in Albania, Algeria, Andorra, Angola, Argentina, Azerbaijan, Austria, Bahrain, Belarus, Belgium, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cameroon, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Gibraltar, Greece, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Hungary, Iceland, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Martinique, Mayotte, Mauritius, Mexico, Moldova, Monaco, Montenegro, Morocco, Nambia, Netherlands, Nicaragua, Nigeria, Norway, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Poland, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, San Marino, Sao Tome and principe, Saudi Arabia, Senegal, Slovenia, South Africa, Spain, St. Pierre et Miquel, Swaziland, Sweden, Switzerland, Tanzania, the United States, Tunisia, Turkey, UAE, Uganda, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.
631252-001	Intel Core i7 2620M Dual-Core processor (2.7 GHz, SC turbo up to 3.40 GHz, 4 MB L3 cache, 35 W)
631253-001	Intel Core i5 2520M Dual-Core processor (2.5 GHz,, SC turbo up to 3.20 GHz, 3 MB, L3 cache 35 W)
631255-001	Intel Core i5 2540M Dual-Core processor (2.6 GHz,, SC turbo up to 3.33 GHz, 3 MB, L3 cache 35 W)

Spare part number	Description
631956-001	Intel Centrino advanced wireless-N 1030 + Bluetooth® combo 802.11b/g/ n 1x2 with WiDi support For use in Albania, Algeria, Andorra, Angola, Argentina, Azerbaijan, Austria, Bahrain, Belarus, Belgium, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cameroon, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Gibraltar, Greece, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Hungary, Iceland, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Martinique, Mayotte, Mauritius, Mexico, Moldova, Monaco, Montenegro, Morocco, Nambia, Netherlands, Nicaragua, Nigeria, Norway, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Poland, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, San Marino, Sao Tome and principe, Saudi Arabia, Senegal, Slovenia, South Africa, Spain, St. Pierre et Miquel, Swaziland, Sweden, Switzerland, Tanzania, the United States, Tunisia, Turkey, UAE, Uganda, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.
633817-001	Intel Centrino Advanced-N + WiMAX 6150 with WIDI support (+ Bluetooth) For use in the United States.
634366-001	Thermal pad kit
636631-001	9-cell, 100 WH (3.0 Ah) Li-ion battery
636936-001	Display back cover for use in Dark Umber computer models
636937-001	Base enclosure
636938-001	Display bezel
636939-001	Fan/heat sink assembly for use in models with discrete graphics (includes replacement thermal material)
636940-001	Fan/heat sink assembly for use in UMA models in which the processor is not soldered to the system board (includes replacement thermal material)
636941-001	Display assembly, **35.56 cm** (14.0 in), SVA, high-definition (HD), BrightView LED for use in Dark Umber models
636942-001	Plastics Kit
636944-001	System board (includes replacement thermal material) for use in models equipped with 1 GB of HD6470 discrete graphics memory
636945-001	System board for use in models equipped with HM65 UMA graphics memory
636946-001	Top cover for use in Dark Umber models (includes TouchPad and bracket, button board, and cable)
638039-001	Intel Core i5-2410M processor (2.3 GHz, turbo up to 2.9 GHz, 3 MB, L3 cache 35 W)
640926-001	Realtek RTL8191SE 802.11 b/g/n WiFi Adapter For use in Albania, Algeria, Andorra, Angola, Argentina, Azerbaijan, Austria, Bahrain, Belarus, Belgium, Bolivia, Bosnia, Botswana, Brazil, Bulgaria, Cameroon, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Ecuador, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Ghana, Gibraltar, Greece, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Hungary, Iceland, Israel, Italy, Ivory Coast, Jordan, Kazakhstan, Kenya, Kuwait, Latvia, Lebanon, Liberia, Libya, Liechtenstein, Lithuania, Luxembourg, Macedonia, Martinique, Mayotte, Mauritius, Mexico, Moldova, Monaco, Montenegro, Morocco, Nambia, Netherlands, Nicaragua, Nigeria, Norway, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Poland, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, San Marino, Sao Tome and principe, Saudi Arabia, Senegal, Slovenia, South Africa, Spain, St. Pierre et Miquel, Swaziland, Sweden, Switzerland, Tanzania, the United States, Tunisia, Turkey, UAE, Uganda, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.

Spare part number	Description
642731-001	Fan/heat sink for use in UMA models in which the processor is soldered to the system board (includes replacement thermal material)
642732-001	System board for use in models equipped with HM65 UMA graphics memory; includes Intel Core i3-2330M processor
650674-001	Display back cover for use in Steel Gray computer models
650675-001	Display assembly, **35.56 cm** (14.0-in), SVA, high-definition (HD), BrightView, LED for use in Steel Gray models
650676-001	Top cover for use in Steel Gray models (includes TouchPad and bracket, button board, and cable)
653341-001	Intel Core i5-2430M processor (2.4 GHz, turbo up to 2.9 GHz), 3 MB, L3 cache 35 W
655795-001	Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter
656092-001	System board for use in models equipped with HM65 UMA graphics memory; includes Intel Core i3-2310M processor
657325-001	Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
658706-001	Power button board (includes cable)
658707-001	USB board with cable
660550-001	Optical drive weight saver
663563-001	QuickWeb keyboard for use in the United States
663563-031	QuickWeb keyboard for use in the United Kingdom
663563-041	QuickWeb keyboard for use in Germany
663563-051	QuickWeb keyboard for use in France
663563-061	QuickWeb keyboard for use in Italy
663563-071	QuickWeb keyboard for use in Spain
663563-121	QuickWeb keyboard for use in French Canada
663563-131	QuickWeb keyboard for use in Portugal
663563-141	QuickWeb keyboard for use in Turkey
663563-161	QuickWeb keyboard for use in Latin America
663563-171	QuickWeb keyboard for use in Saudi Arabia
663563-201	QuickWeb keyboard for use in Brazil
663563-251	QuickWeb keyboard for use in Russia
663563-A41	QuickWeb keyboard for use in Belgium
663563-B31	QuickWeb keyboard for use internationally
663563-BG1	QuickWeb keyboard for use in Switzerland
663563-DH1	QuickWeb keyboard for use in the Netherlands
672516-001	Hard drive mounting hardware
677742-001	DVD±RW SuperMulti DL Drive (select models only)

Spare part number	Description
678100-001	320 GB, 7200 rpm hard drive
678101-001	500 GB, 7200 rpm hard drive
678102-001	640 GB, 7200 rpm hard drive
678103-001	750 GB, 7200 rpm hard drive

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

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 a 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.

Use nonmagnetic tools.

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 strips 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 plastic	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 75 screws, in 12 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Serial number

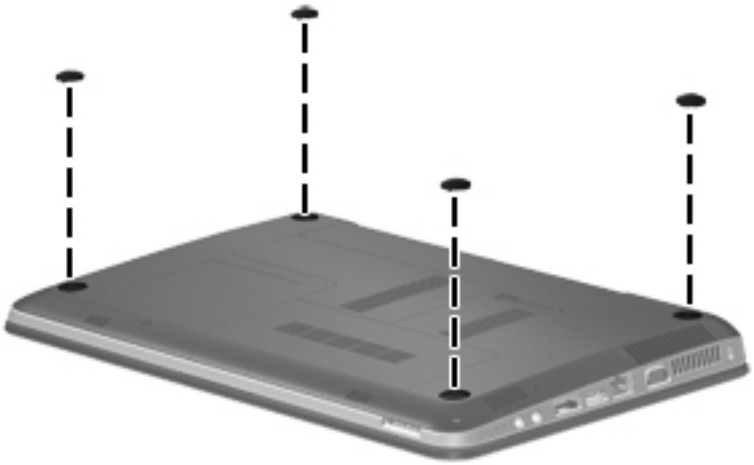
The serial number label, located in the battery bay of the computer, provides important information that you may need when contacting technical support.

- Product name **(1)**. This is the product name affixed to the front of the computer.
- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.
- Part number/Product number (p/n) **(3)**. 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.
- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.
- Model description **(5)**. This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.

Computer feet

Description	Spare part number
Rubber Feet Kit	608228-001

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



Battery

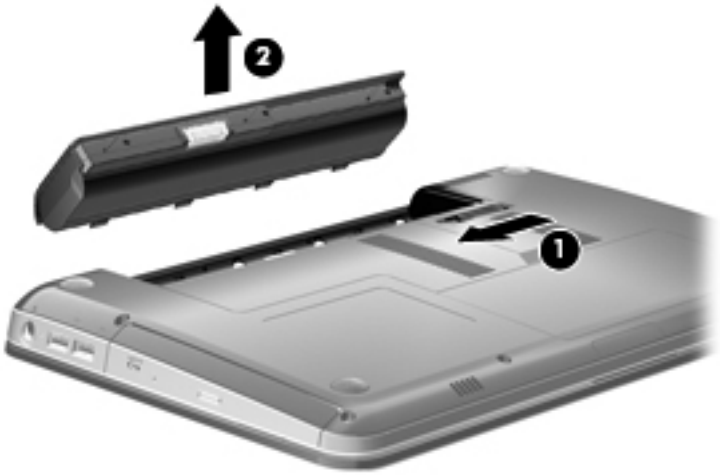
Description	Spare part number
9-cell, 100 WHr (3.0 Ah) Li-ion	636631-001
6-cell, 55 WHr (2.55 Ah) Li-ion	593554-001
6-cell, 62 WHr (2.80 Ah) Li-ion	593562-001

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. Turn the computer upside down on a flat surface.
2. Slide the battery release latch **(1)** to release the battery.
3. Pivot the battery **(2)** upward and lift it out of the computer.



To insert the battery, insert the rear edge of the battery into the battery bay and pivot the front edge downward until the battery is seated. The battery release latch automatically locks the battery into place.

Memory module

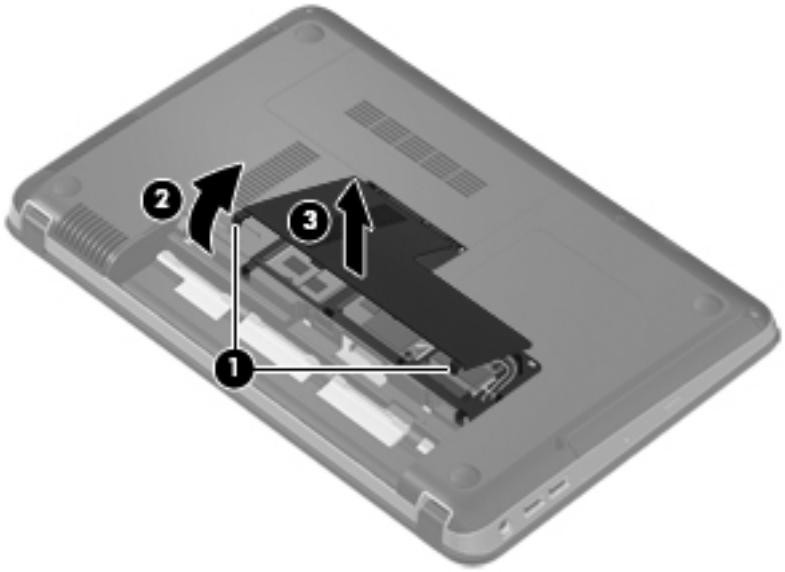
Description	Spare part number
2 GB (PC3-10600 1333 MHz)	621565-001
4 GB (PC3-10600 1333 MHz)	621569-001

Before removing the memory 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 36).

Remove the memory module:

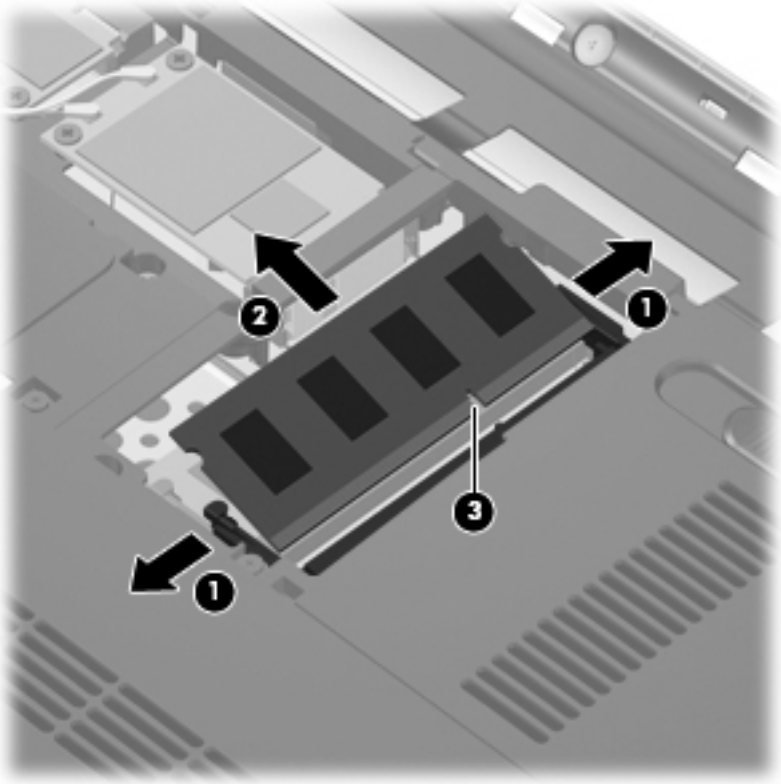
1. Turn the computer upside down with the front toward you.
2. Loosen the two Phillips M2.5×5.0 captive screws **(1)** that secure the memory/wireless module compartment cover to the computer.
3. Lift the left side of the cover **(2)**, swing it forward, and remove it **(3)**. The memory/wireless compartment cover is included in the plastics kit, spare part number 636942-001.



4. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The edge of the module opposite the slot rises away from the computer.)

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

NOTE: Memory modules are designed with a notch **(3)** to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install a memory module.

RTC battery

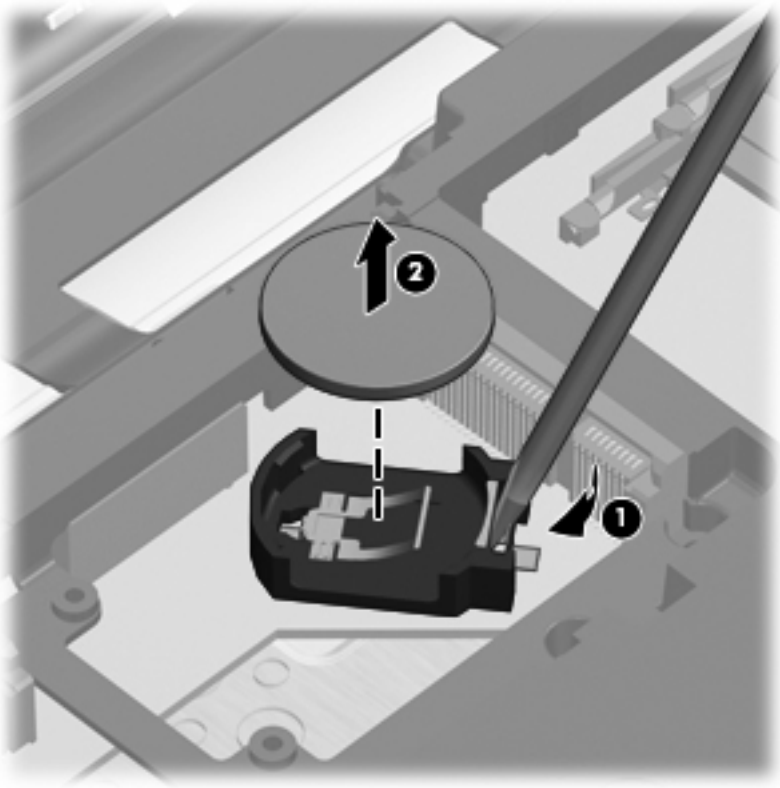
Description	Spare part number
RTC battery	449137-001

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 36).
5. Remove the memory/wireless module compartment cover (see Memory module on page 37)

Remove the RTC battery:

1. Release the RTC battery from the clips on the system board **(1)**.
2. Remove the RTC battery **(2)**.



Reverse this procedure to install the RTC battery.

WLAN module

Description	Spare part number
Intel Centrino wireless-N 1000 802.11b/g/n 1x2 with WiDi support For use in Argentina, Bolivia, Brazil, Canada (French/English), Chile, Columbia, Costa Rica, Ecuador, El Salvador, Guadeloupe, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the United States, Uruguay, and Venezuela.	593530-001
Intel Centrino advanced wireless-N 1030 + Bluetooth combo 802.11b/g/ n 1x2 with WiDi support For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, and Yemen.	631956-001
Intel Centrino Advanced–N + WiMAX 6150, 802.11 b/g/nwith WiDi support (+ bluetooth) For use in the United States.	633817-001
Realtek 8188GN 802.11b/g/n 1x1 WiFi adapter For use in For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, Yemen.	640926-001
Ralink 5390GN 802.11b/g/n 1x1 WiFi adapter For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, Yemen.	630703-001
Atheros AR9002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready) For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, Yemen.	593127-001

Description	Spare part number
Realtek RTL8188CE 802.11b/g/n WiFi with Realtek CSRBC4 Bluetooth 2.1+EDR Adapter For use in Algeria, Argentina, Bahrain, Belarus, Belgium, Bolivia, Brazil, Bulgaria, Cameron, Canada (French/English), Chad, Chile, Columbia, Costa Rica, Croatia, Cyprus, Ecuador, Egypt, El Salvador, Estonia, France, Guadeloupe, Guatemala, Guyane Francaise, Honduras, Ivory Coast, Jordan, Kuwait, Latvia, Lebanon, Martinique, Mayotte, Mexico, Montenegro, Morrocco, Nambia, Nicaragua, Nouvelle Caledoni, Oman, Panama, Paraguay, Peru, Polynesie Francais, Portugal, Qatar, Reunion, Romania, Russia, Sao Some & principe, Saudi Arabia, Senegal, South Africa, Spain, St. Pierre et Miquel, Switzerland, the United States, Tunisia, Turkey, UAE, United Kingdom, Uruguay, Venezuela, Wallis et Futuna, Yemen.	602993-001
Broadcom 4313/2070 802.11b/g/n (1x1) and Bluetooth high-speed Half Mini Card for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equitorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, the United States, Uruguay, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	600370-001
Atheros 9485GN 802.11b/g/n 1x1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Broadcom 4313GN 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001

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 36).

Remove the WLAN module:

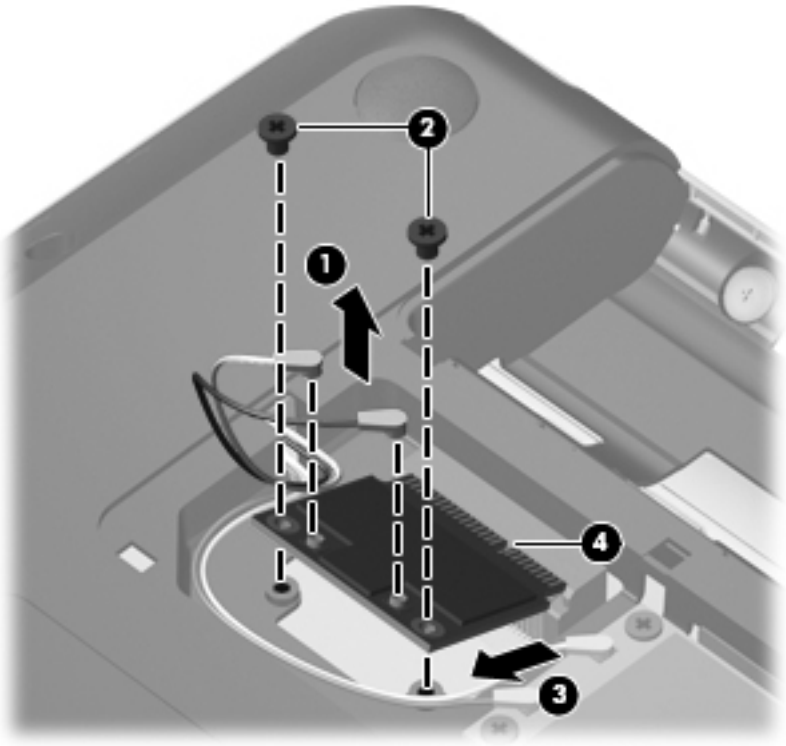
1. Turn the computer upside down with the front toward you.
2. Disconnect the two WLAN antenna cables **(1)** from the WLAN module.

3. Remove the two Phillips M2.0×4.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

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 technical support through Help and Support.

NOTE: WLAN modules are designed with a notch **(4)** to prevent incorrect insertion into the WLAN module slot.



Reverse this procedure to install a WLAN module.

Hard drive

NOTE: All hard drive spare part kits include a hard drive bracket.

NOTE: The hard drive cable is included in the Cable Kit, spare part number 608227-001.

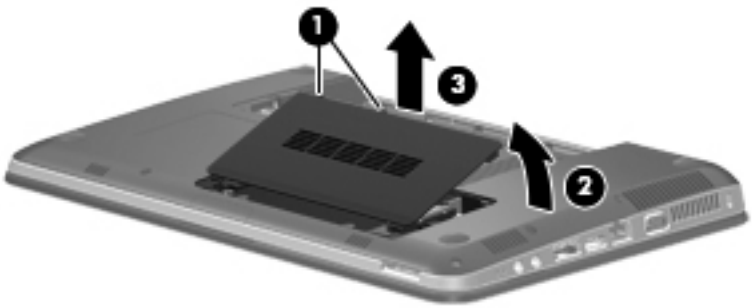
Description	Spare part number
750 GB, 7200 rpm	678103-001
640 GB, 7200 rpm	678102-001
500 GB, 7200 rpm	678101-001
320 GB, 7200 rpm	678100-001
160 GB solid-state drive	608215-001
Hard drive mounting hardware	672516-001

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 36).

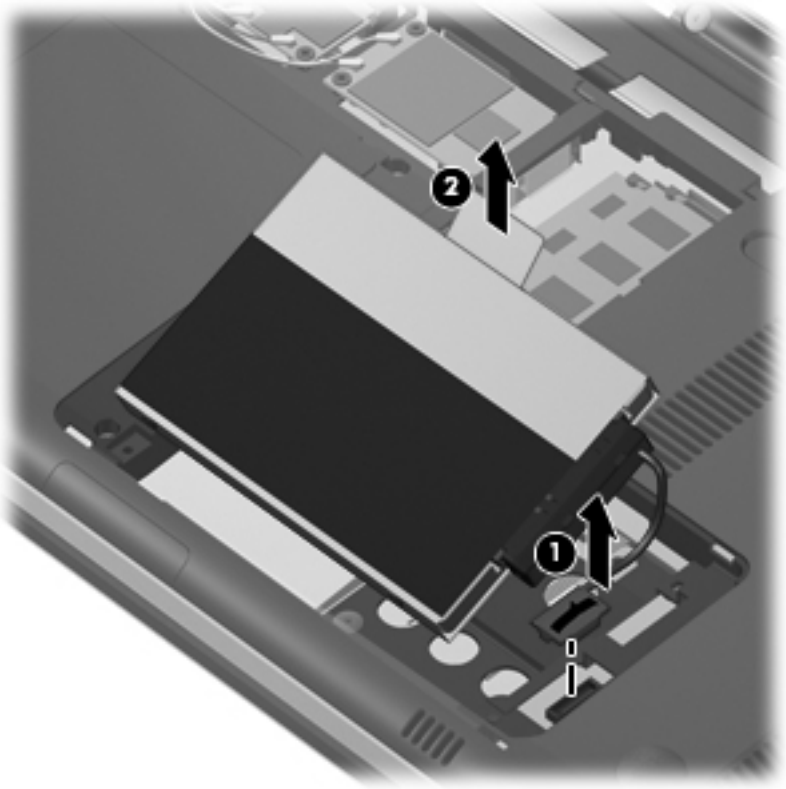
Remove the hard drive:

1. Position the computer with the front toward you.
2. Loosen the two captive Phillips M2.5×5.0 screws **(1)** that secure the hard drive cover to the computer.
3. Lift the cover up at an angle **(2)** and remove it **(3)**. The hard drive cover is included in the plastics kit, spare part number 636942-001.



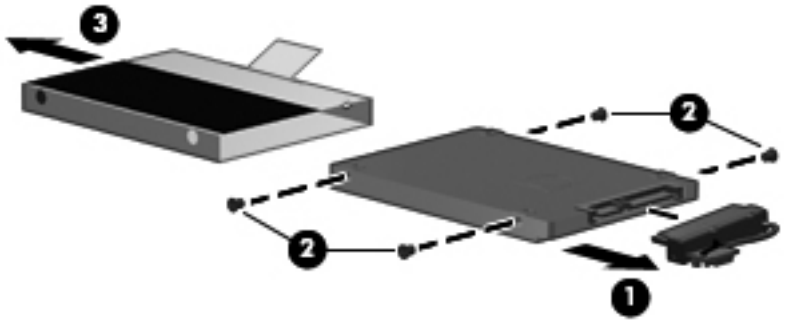
4. Disconnect the hard drive cable from the system board **(1)**.

5. Lift the hard drive out of the hard drive bay **(2)**.



6. If it is necessary to replace the hard drive bracket (also called the protective cover), disconnect the hard drive cable **(1)** from the hard drive.

7. Remove the four Phillips M3.0×3.0 screws **(2)** and cover **(3)** only If the hard drive does not already have these components preassembled.



Reverse this procedure to reassemble and install the hard drive.

Optical drive

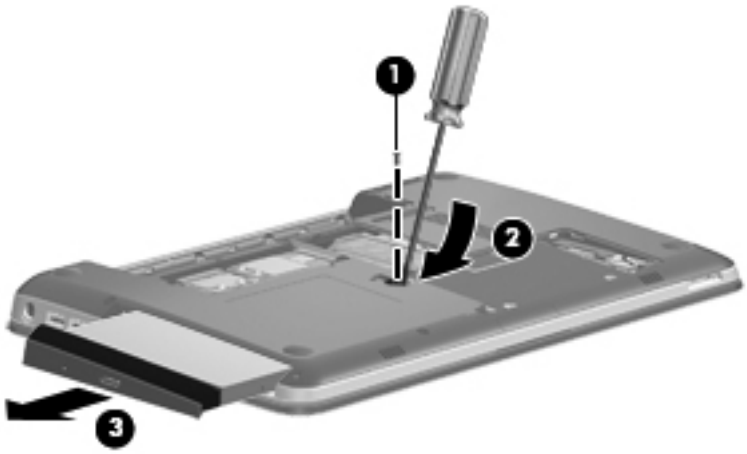
Description	Spare part number
DVD±RW SuperMulti DL Drive (select models only)	677742-001
Optical drive weight saver	660550-00

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 36).
5. Remove the hard drive cover (see Hard drive on page 43).

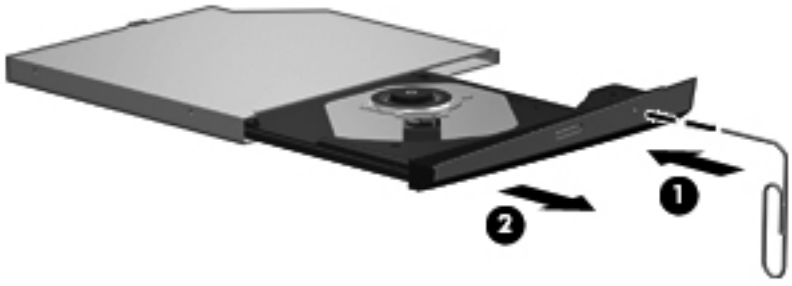
Remove the optical drive:

1. Position the computer upside down with the front toward you.
2. Remove the Phillips M2.5x5.0 screw **(1)** that secures the optical drive to the computer.
3. Use a flat-bladed screwdriver or similar tool to push the drive bracket **(2)** to release the optical drive.
4. Remove the optical drive **(3)**.

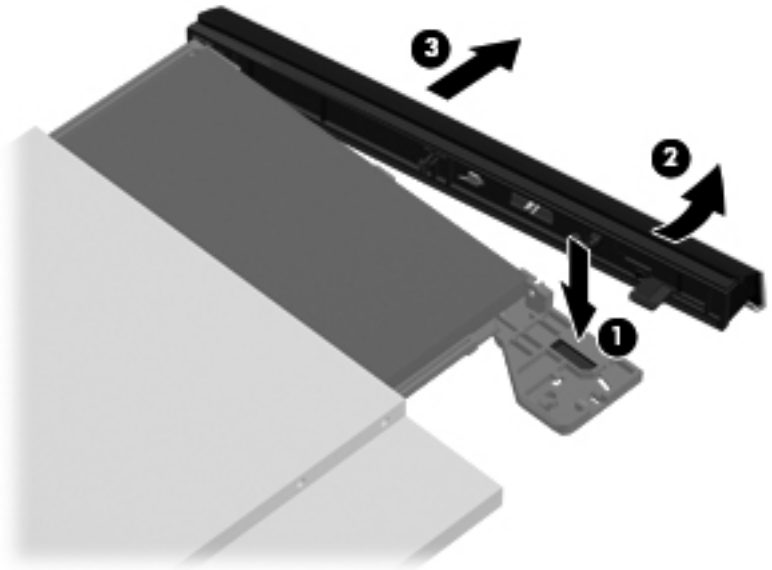


5. If it is necessary to remove the drive bezel, insert the end of a paper clip into the release access hole **(1)** in the optical drive bezel. Press in gently until the tray is released.

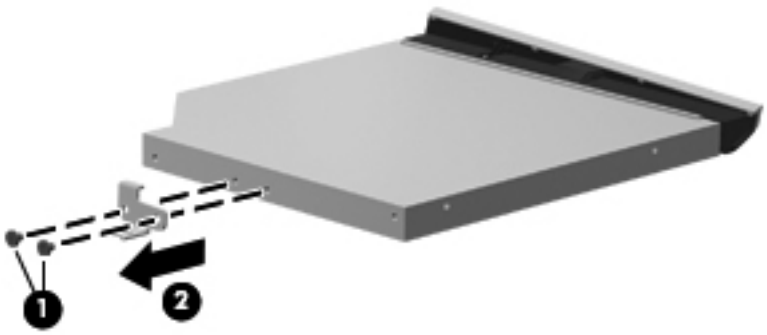
6. Firmly pull outward on the open tray **(2)** until the drive slides out.



7. Press the bezel release button **(1)**, lift the bezel at an angle **(2)**, and remove the bezel **(3)**.



8. If it is necessary to replace the optical drive bracket, position the optical drive with the optical drive bracket toward you.
9. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the optical drive bracket to the optical drive.
10. Remove the optical drive bracket **(2)**.



Reverse the above procedure to reassemble and install the optical drive.

Keyboard

NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 23.

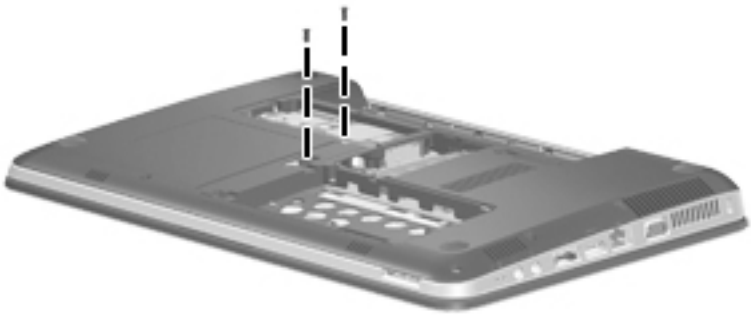
Description	Spare part number
Keyboard, standard	608222-xxx
Keyboard, QuickWeb	663563-xxx

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 36).
5. Remove the memory/wireless compartment cover (see Memory module on page 37).
6. Remove the hard drive cover (see Hard drive on page 43).

Remove the keyboard:

1. Turn the computer upside down with the front toward you.
2. Remove the two Phillips M2.5×6.5 screws that secure the keyboard to the computer.



3. Turn the computer right-side up with the front toward you.
4. Open the display as far as possible.
5. Release the top edge of the keyboard by lifting it up to disengage the keyboard from the tabs on the top cover **(1)**.
6. Rotate the keyboard over until it rests on the palm rest **(2)**.

7. Release the zero insertion force (ZIF) connector **(3)** to which the keyboard cable is attached and disconnect the keyboard cable **(4)** from the system board.

8. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

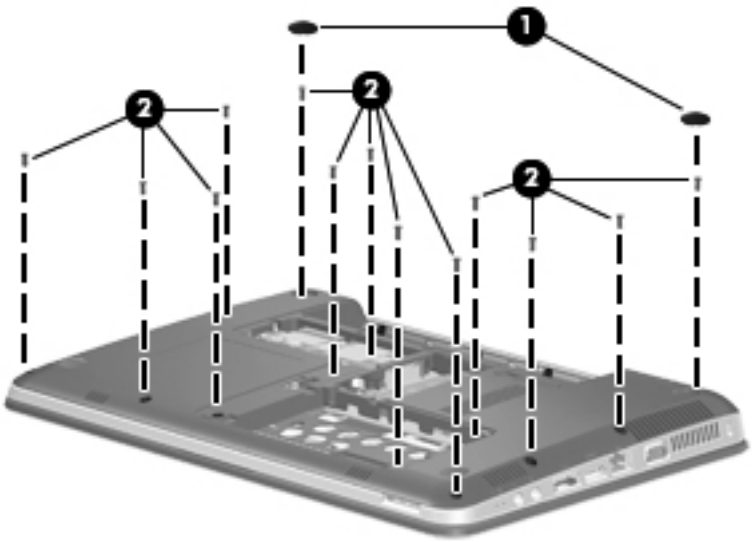
Description	Spare part number
Top cover, Dark Umber (includes TouchPad and bracket, button board, and cable)	636946-001
Top cover, Steel Gray (includes TouchPad and bracket, button board, and cable)	650676-001

Before removing the top cover, follow these steps:

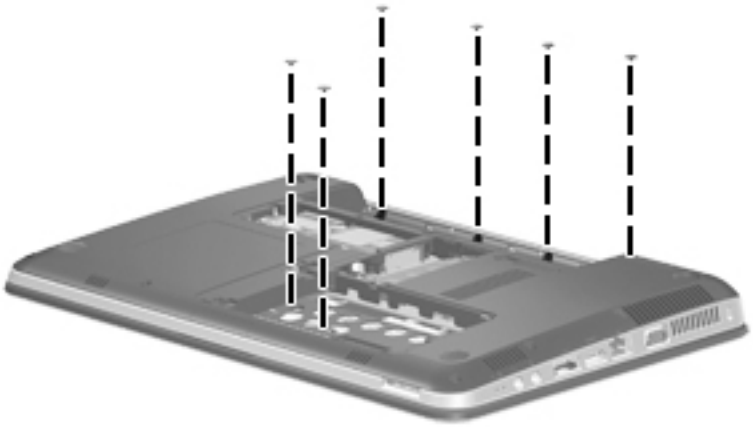
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the following components:
   a. Battery (see Battery on page 36)
   b. Hard drive (see Hard drive on page 43)
   c. Optical drive (see Optical drive on page 45)
   d. Keyboard (see Keyboard on page 47)

Remove the top cover:

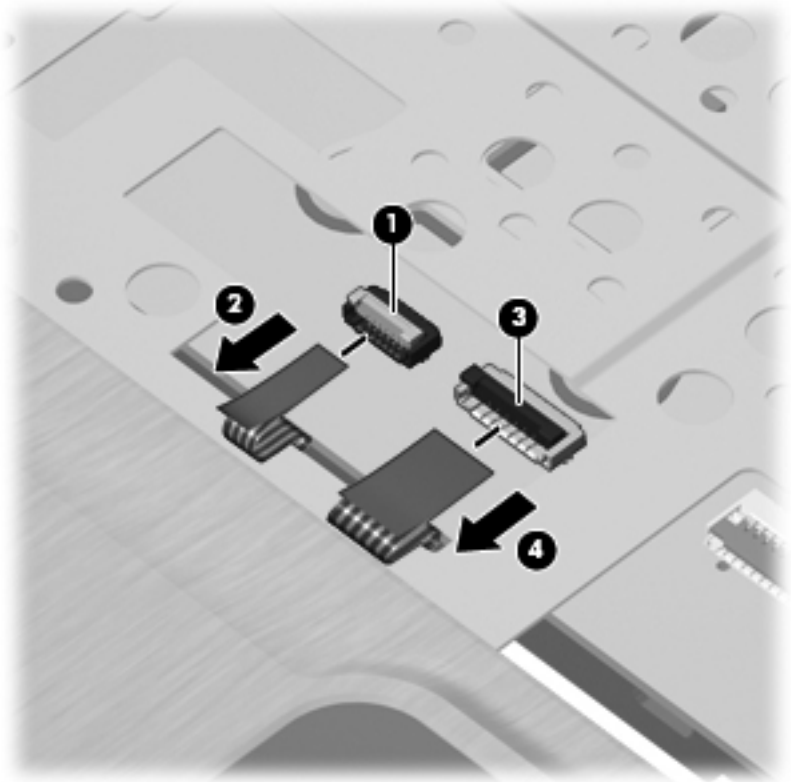
1. Turn the computer upside down with the front toward you.
2. Remove the two feet near the battery **(1)** and the 13 Phillips M2.5×7.0 screws **(2)** that secure the top cover to the base enclosure. Two of the screws are under the feet.



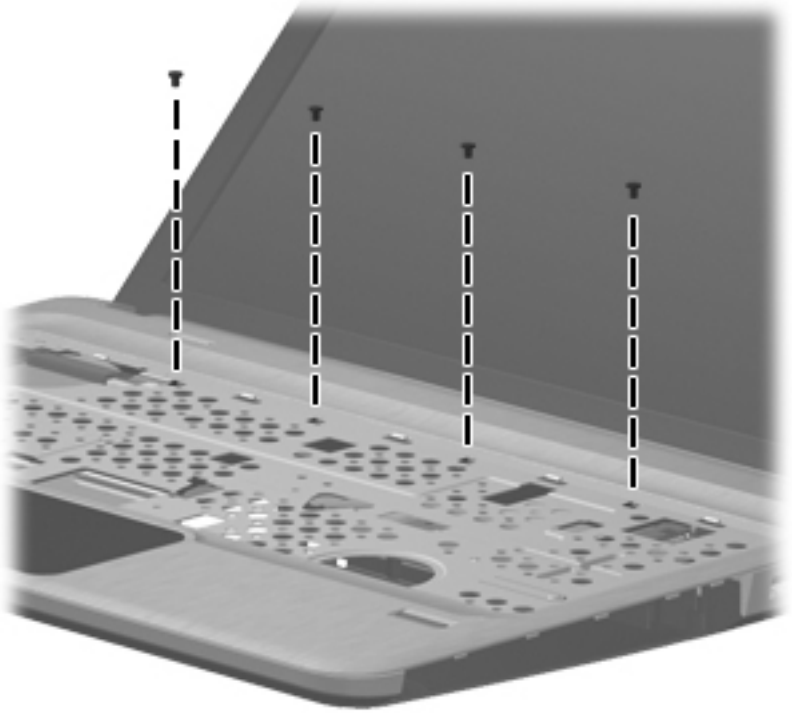
3. Remove the six Phillips M2.0x2.0 broadhead screws that secure the top cover to the base enclosure.



4. Turn the computer right-side up with the front toward you.
5. Open the display as far as possible.
6. Release the ZIF connector **(1)** to which the TouchPad button board cable is connected and then disconnect the cable from the system board **(2)**.
7. Release the ZIF connector **(3)** to which the fingerprint reader board cable is connected and disconnect the cable from the system board **(4)**.

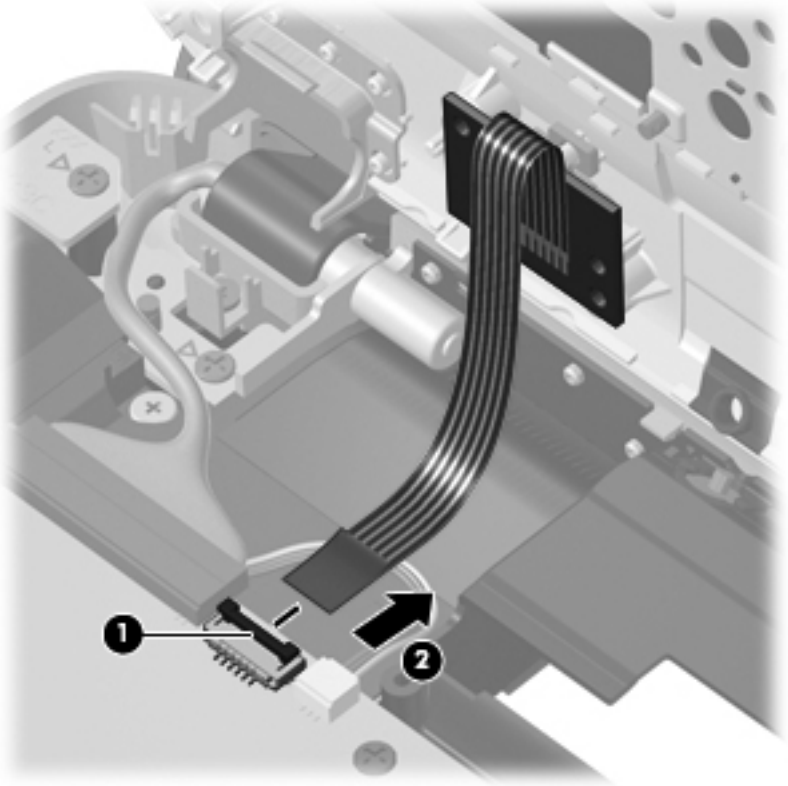


8. Remove the four Phillips M2.0 x 4.0 screws that secure the base enclosure and lift the enclosure.



9. Lift the top cover from the base enclosure to access the power button cable.

10. Release the ZIF connector **(1)** to which the power button board cable is connected and disconnect the cable from the system board **(2)**.



Reverse this procedure to install the top cover.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board	608225-001

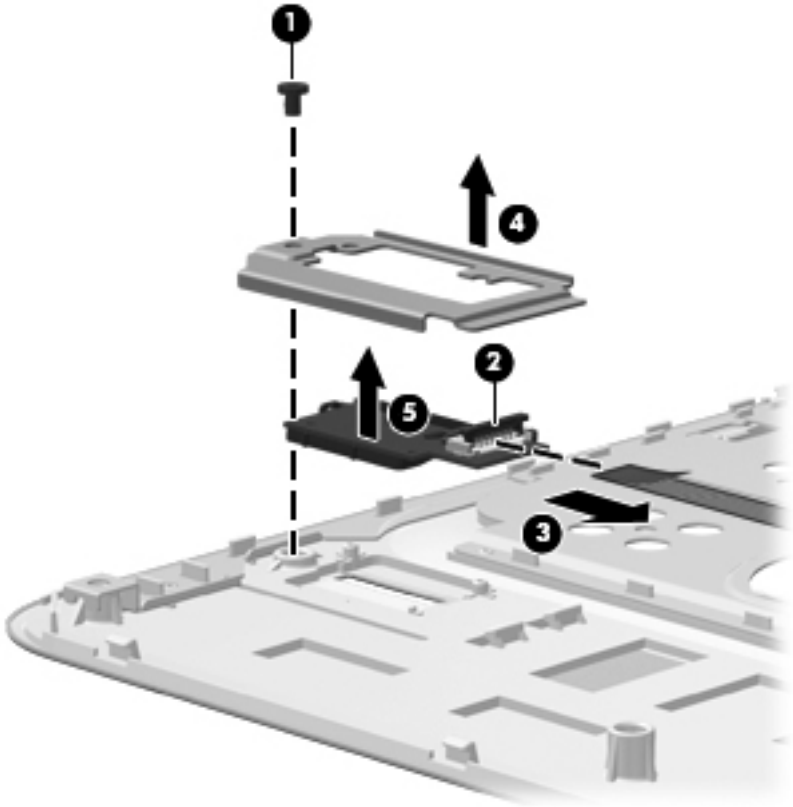
Before removing the fingerprint reader board, follow these steps:

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. Optical drive (see Optical drive on page 45)
   c. Keyboard (see Keyboard on page 47)
   d. Top cover (see Top cover on page 49)

Remove the fingerprint reader board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the Phillips M2.0×3.0 screw **(1)** that secures the fingerprint reader board and bracket to the top cover.
3. Release the ZIF connector **(2)** on the fingerprint reader board and disconnect the cable **(3)** from the connector.
4. Remove the fingerprint reader board bracket **(4)** from the top cover.

5. Remove the fingerprint reader board **(5)** from the top cover.



Reverse the above procedure to install the fingerprint reader board.

NOTE: To reinstall, place the board into the slot, and then place the bracket over it by setting the right side of bracket into the slots. Then replace the screw.

Power button board

Description	Spare part number
Power button board (includes cable)	658706-001

Before removing the power button board, follow these steps:

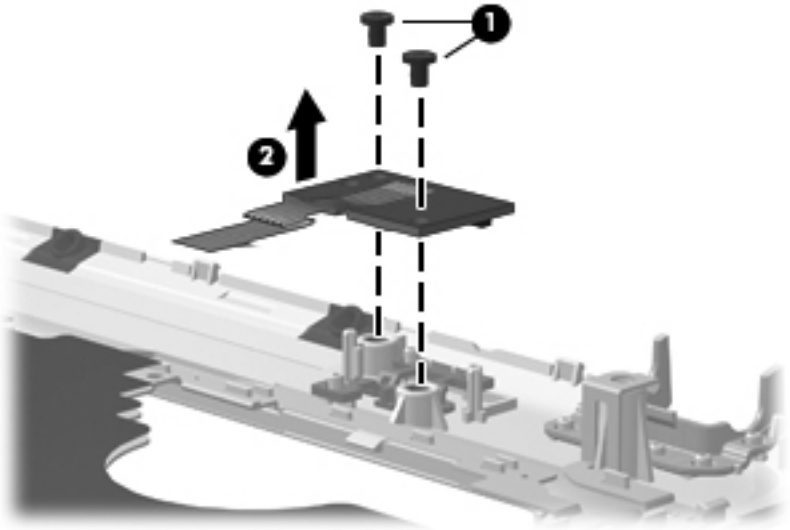
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. Optical drive (see Optical drive on page 45)
   c. Keyboard (see Keyboard on page 47)
   d. Top cover (see Top cover on page 49)

Reverse this procedure to install the power button board.

Remove the power button board:

1. Turn the top cover upside down with the rear edge toward you.
2. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the power button board to the top cover.

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



Reverse the above procedure to install the power button board.

Display assembly

Description	Spare Part Number
35.56 cm (14.0 in), SVA, high-definition (HD), BrightView LED display assembly for use in Dark Umber models	636941-001
35.56 cm (14.0 in), SVA, high-definition (HD), BrightView LED display assembly for use in Steel Gray models	650675-001

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 36).
5. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 40).
6. Remove the following components:
   a. WLAN module (see WLAN module on page 40)
   b. Keyboard (see Keyboard on page 47)

c. Optical drive (see Optical drive on page 45)

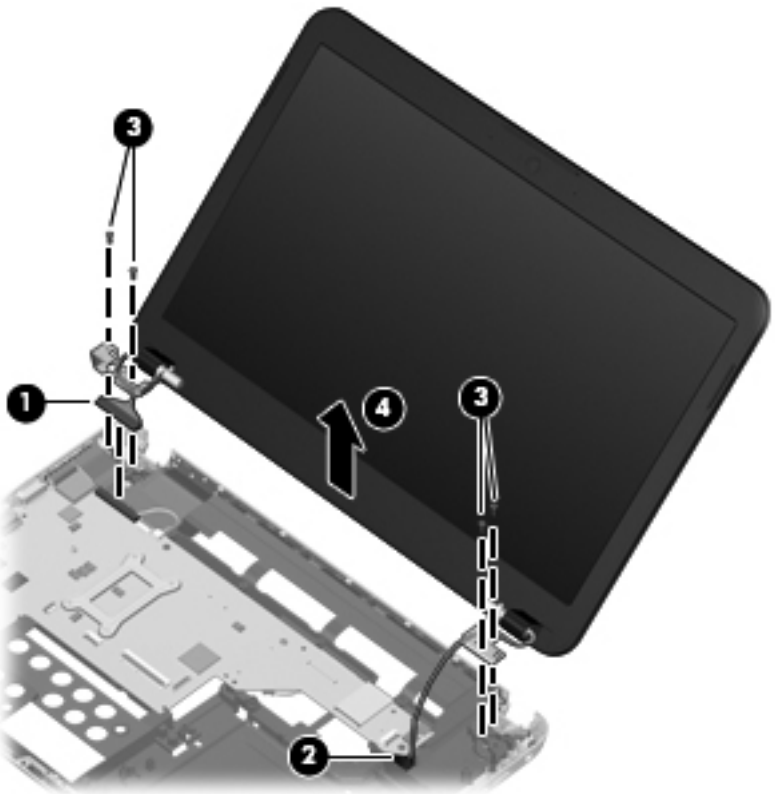
d. Top cover (see Top cover on page 49)

Remove the display assembly:

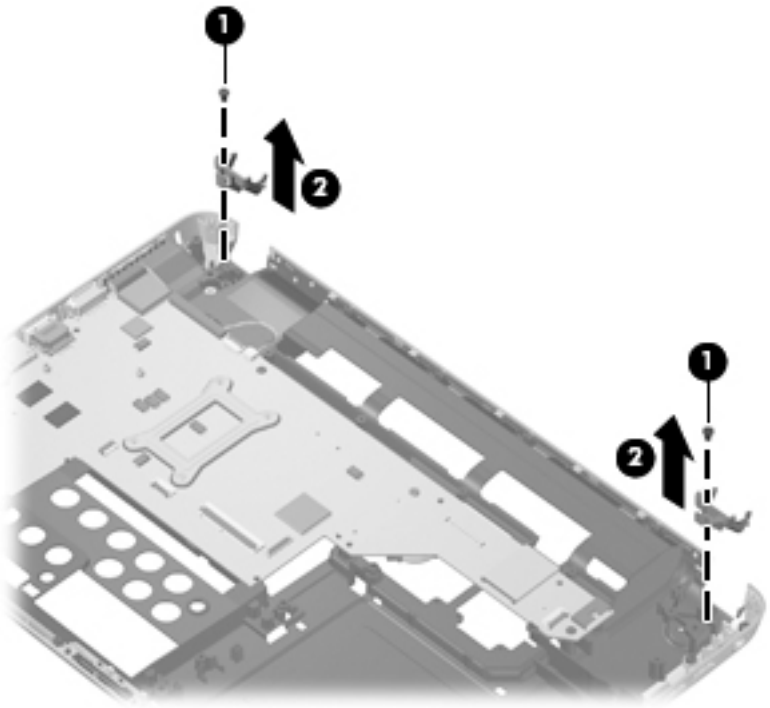
1. Turn the computer display-side up, with the front toward you.
2. Open the display as far as possible.
3. Disconnect the display panel cable **(1)** from the system board.
4. Remove the wireless antenna cables from the hole **(2)** built into the base enclosure.

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

5. Remove the four black Phillips M2.5×6.5 screws **(3)** that secure the display assembly to the computer.
6. Remove the display assembly **(4)**.



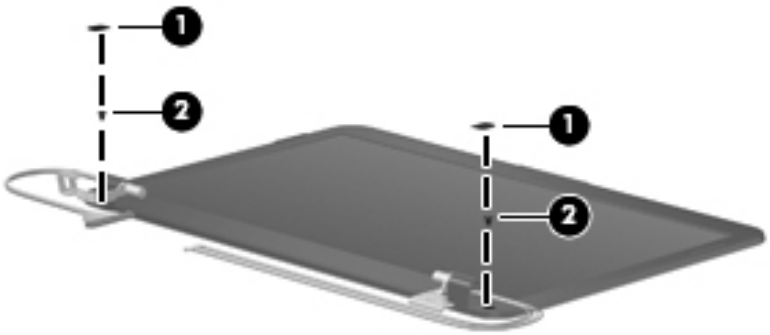
7. If it is necessary to remove the display brackets, remove the two Phillips M2.0×3.0 screws **(1)** that secure the brackets to the base enclosure, and the remove the brackets **(2)**.



8. If it is necessary to replace any of the display assembly internal components, remove the following screw covers and screws. The display screw covers are included in the Display Screw Kit, spare part number 608212-001.

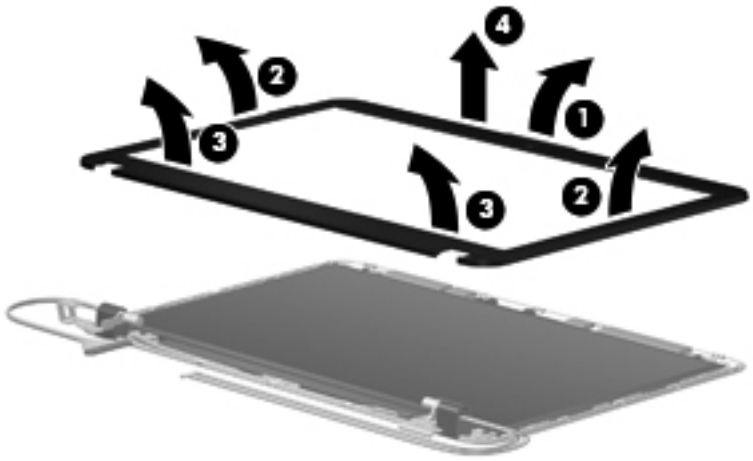
   (1) Two screw covers on the display bezel bottom edge

   (2) Two Phillips M2.5×5.0 screws

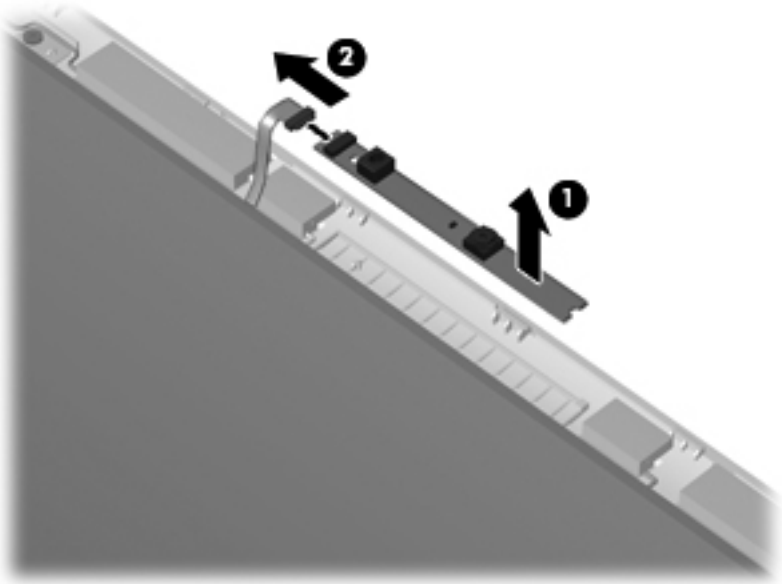


9. Flex the inside edge of the top **(1)**, the left and right sides **(2)**, and the bottom **(3)** of the display bezel until the bezel disengages from the display back cover.

10. Remove the display bezel **(4)**. The display bezel is available using spare part number 636938-001.

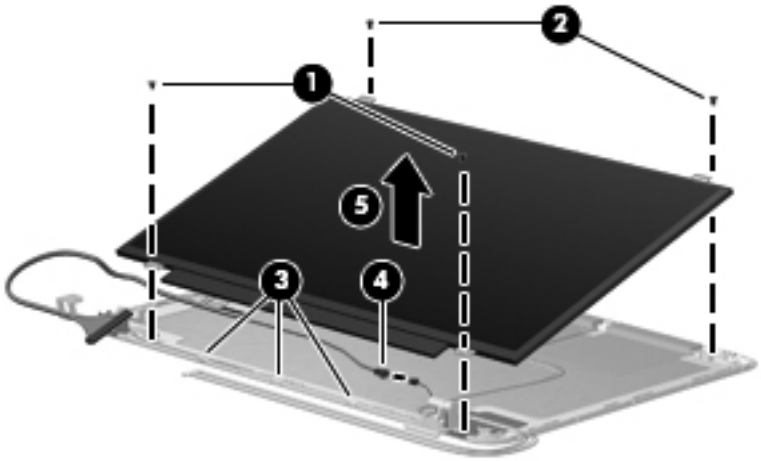


11. If it is necessary to replace the webcam module, lift the webcam from the double-sided tape on the display back cover **(1)**, disconnect the webcam cable **(2)** from the module, and remove the webcam. The webcam is available using spare part number 615744-001.



12. If it is necessary to replace the display panel, remove the two Phillips M2.0x3.5 screws **(1)** and the two Phillips M2.0x2.5 screws **(2)** that secure the display panel to the display enclosure.

13. Remove the cable from the routing path **(3)** along the bottom of the enclosure, disconnect the display panel cable from the HP logo light cable **(4)**, and then lift the panel from the enclosure **(5)**. The display panel is available using the spare part numbers 636941-001 or 650675-001.



14. If it is necessary to replace the display cable, follow these steps:

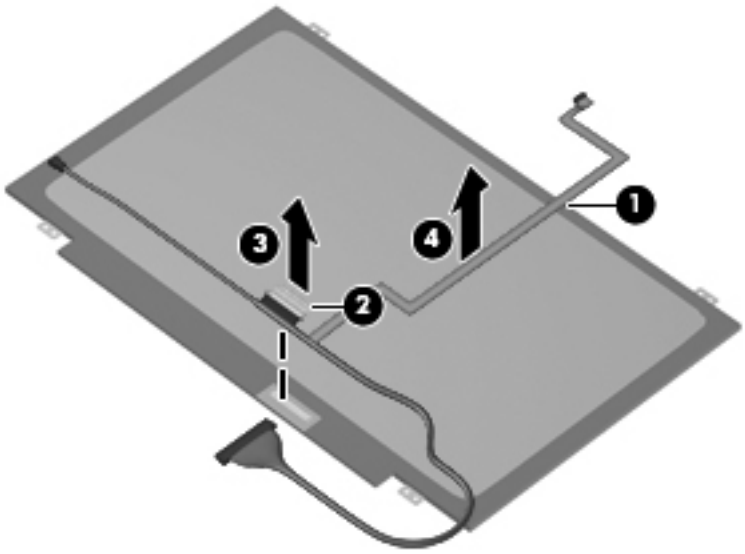
    a. Position the display panel upside down.

    b. Disengage the webcam cable from the glue securing it to the back of the display **(1)**.

    c. Peel back the tape that secures the display cable to the display **(2)**.

    d. Unplug the display cable from the display **(3)**.

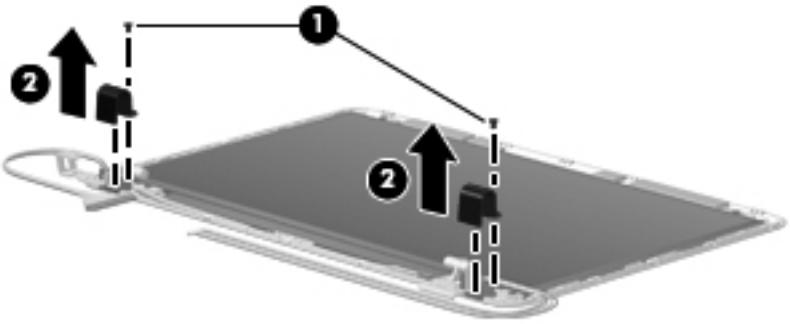
    e. Remove the display cable from the display **(4)**.



The display cable is available in the Display Cable Kit, spare part number 608211-001.

15. If it is necessary to replace the display bracket and hinges, remove the two Phillips M2.5×5.0 screws **(1)** that secure the brackets to the display.

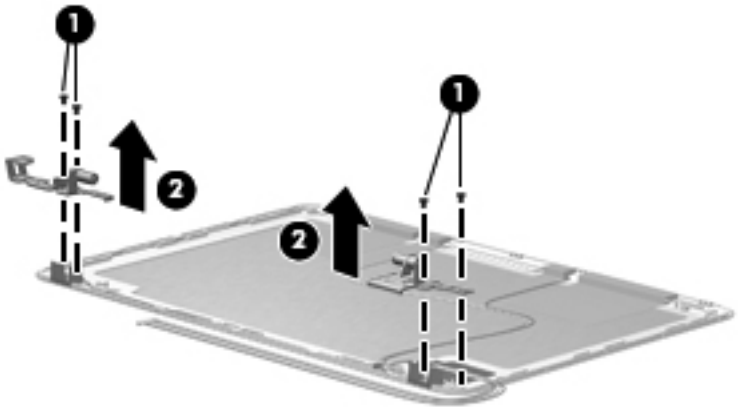
16. Use a tool to gently pry the display hinge covers **(2)** from the display.



17. Remove the four Phillips M2.5x3.0 screws **(1)** that secure the display brackets to the display. Remove the display brackets **(2)** from the display. The display bracket and hinge set are available using spare part number 608214-001.

NOTE: Note the WLAN antenna routing path through the right hinge for replacement.

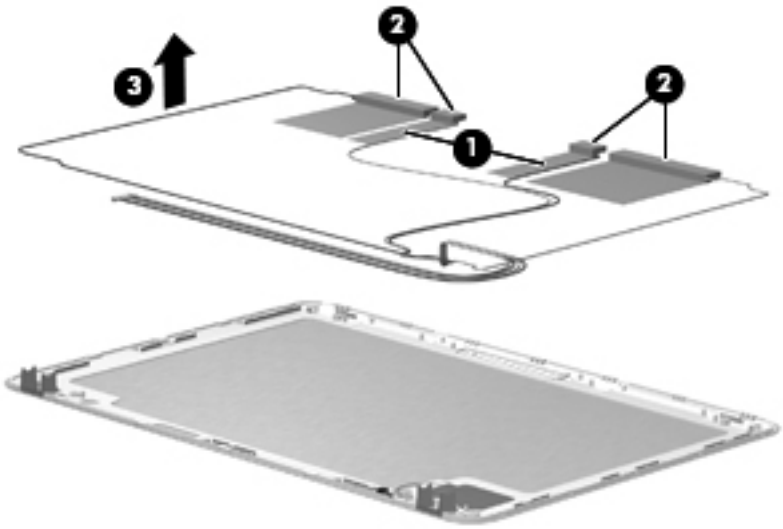
The silver screws go on the outside of the hinges.



18. If it is necessary to replace the wireless antennas and cables, remove the adhesive strip **(1)** that secures each antenna to the display back cover.

19. Remove the antennas from the clips **(2)** built into the top of the display enclosure.

20. Remove the wireless antennas and cables **(3)** from the display enclosure. The wireless antennas and cables are included in the Display Cable Kit, spare part number 608211-001.



Reverse this procedure to reassemble and install the display assembly.

USB board

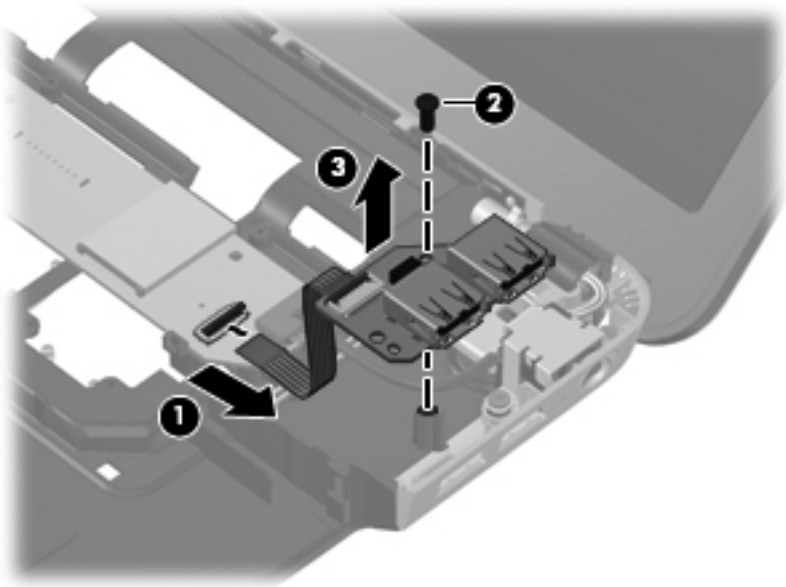
Description	Spare part number
USB board (includes cable)	658707-001

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. Optical drive (see Optical drive on page 45)
   c. Keyboard (see Keyboard on page 47)
   d. Top cover (see Top cover on page 49)

Remove the USB board:

1. Position the computer upright with the right side toward you.
2. Disconnect the USB board cable **(1)** from the system board.
3. Remove the Phillips M2.5×5.0 screw **(2)** that secures the USB board to the base enclosure.
4. Lift the USB board straight up **(3)** to remove it from the computer.



Reverse this procedure to install the USB board.

NOTE: When reinstalling note that the screw goes into the upper hole.

Power connector cable

Description	Spare part number
Power connector cable (includes cable and connector)	608273-001

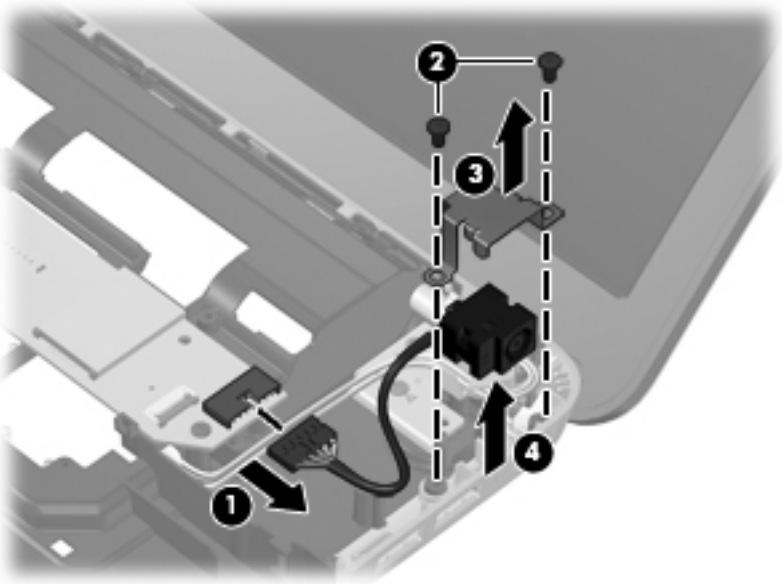
Before removing the power connector cable, follow these steps:

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. Optical drive (select models only) (see Optical drive on page 45)
   c. Keyboard (see Keyboard on page 47)
   d. Top cover (see Top cover on page 49)
   e. USB board (see USB board on page 63)

Remove the power connector cable:

1. Turn the computer upright with the right side toward you.
2. Disconnect the power connector cable **(1)** from the system board.
3. Remove the two Phillips M2.5×5.0 screws **(2)** that secure the power connector cable to the base enclosure.
4. Lift the bracket from the connector **(3)**.

5. Remove the power connector **(4)** from the base enclosure.



Reverse this procedure to install the power connector cable.

Bluetooth module

NOTE: The Bluetooth module cable is included in the Cable Kit, spare part number 608227-001.

Description	Spare part number
Bluetooth module	537921-001

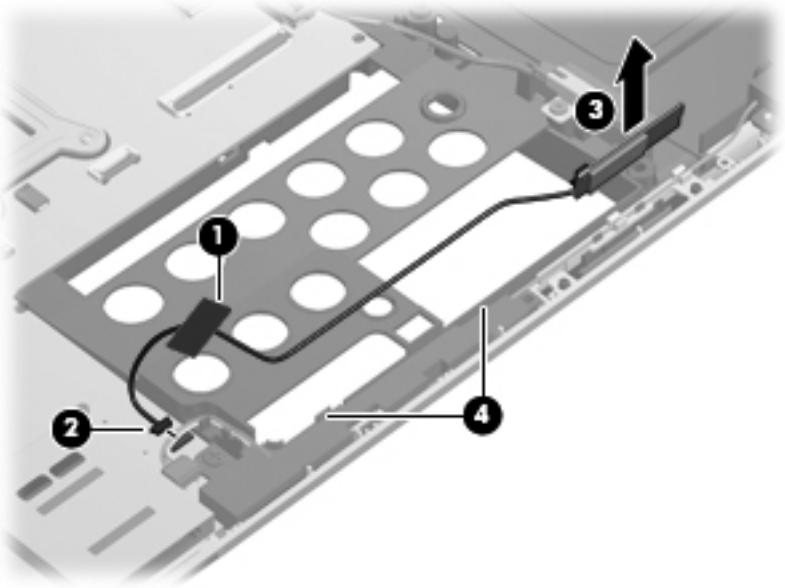
Before removing the Bluetooth module, follow these steps:

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. Optical drive (see Optical drive on page 45)
   c. Keyboard (see Keyboard on page 47)
   d. Top cover (see Top cover on page 49)

Remove the Bluetooth module:

1. Position the computer upright with the front toward you.
2. Lift the tape near the system board connector **(1)** that secures the Bluetooth module cable to the system board.
3. Disconnect the cable from the system board **(2)**.

4. Remove the Bluetooth module and cable from the slot in the base enclosure **(3)**, while noting the cable routing path atop the speaker **(4)**.



Reverse the above procedure to install the Bluetooth module.

Speaker assembly

Description	Spare part number
Speaker assembly	608232-001

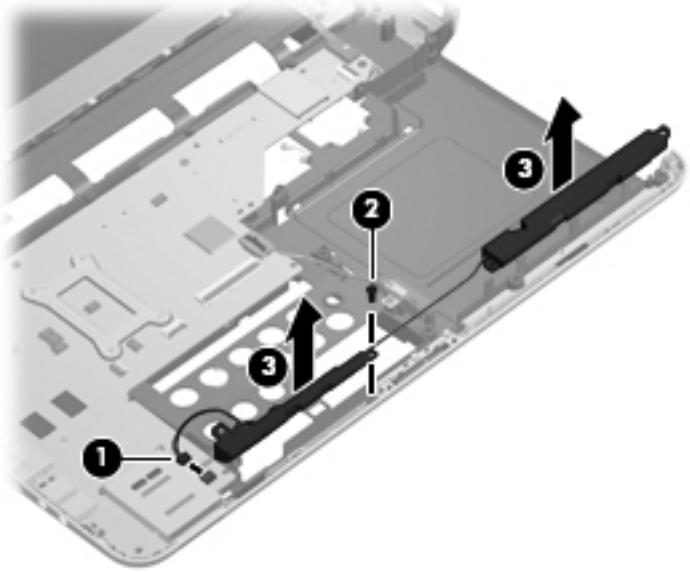
Before removing the speaker assembly, follow these steps:

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 36).
5. Remove the following components:
   a. Optical drive (see Optical drive on page 45)
   b. Keyboard (see Keyboard on page 47)
   c. Top cover (see Top cover on page 49)
   d. Bluetooth module (see Bluetooth module on page 66).

Remove the speaker assembly:

1. Position the computer upright with the front toward you.
2. Disconnect the speaker cable from the system board **(1)**.
3. Remove the Phillips M2.0×4.0 screw **(2)** that secures the speaker assembly to the base enclosure.

4. Lift the speaker assembly straight up **(3)** to remove it from the base enclosure.



Reverse this procedure to install the speaker assembly.

System board

NOTE: All system board kits include replacement thermal material.

NOTE: System boards with the processor already installed, as well as without the processor, are available for this computer.

Description	Spare part number
System board (includes replacement thermal material) for use in models equipped with 1 GB of HD6470 discrete graphics memory	636944-001
System board with HM65 UMA graphics memory	636945-001
System board with HM65 UMA graphics memory; includes Intel i3 2330M processor	642732-001
System board with HM65 UMA graphics memory; includes Intel i3 2310M processor	656092-001

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:

- RTC battery (see RTC battery on page 39)
- Memory modules (see Memory module on page 37)
- WLAN module (see WLAN module on page 40)
- Fan/heat sink assembly (see Fan/heat sink assembly on page 72)
- Processor (see Processor on page 77)

NOTE: Only for system boards that do not come with the processor installed.

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. WLAN module (see WLAN module on page 40)
   c. Optical drive (see Optical drive on page 45)
   d. Keyboard (see Keyboard on page 47)
   e. Top cover (see Top cover on page 49)
   f. Speaker assembly (see Speaker assembly on page 68)

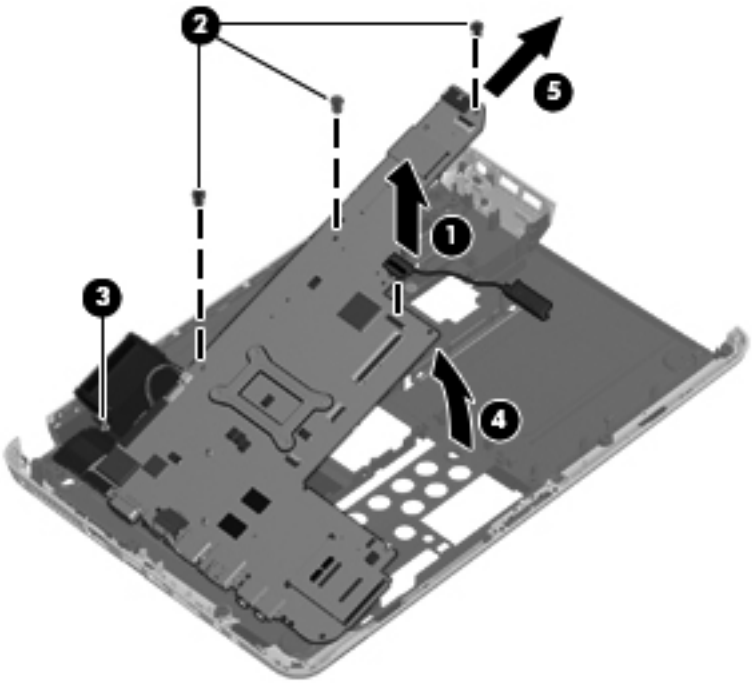
g. Display assembly (see Display assembly on page 56)

h. USB board (see USB board on page 63)

i. Power connector cable (see Power connector cable on page 64)

j. Bluetooth module (see Bluetooth module on page 66)

1. Turn the computer upright with the left side toward you.
2. Disconnect the optical drive connector cable **(1)** from the system board.
3. Remove the three Phillips M2.5×5.0 screws **(2)** that secure the system board to the computer.
4. Loosen the captive screw in the fan sink that secures the system board **(3)**.
5. Lift the right side of the system board **(4)**.
6. Release the system board by sliding it to the right at an angle **(5)** until the connectors on the left side of the system board clear the base enclosure, and then remove the system board.



Reverse the preceding procedure to install the system board.

Fan/heat sink assembly

NOTE: All fan/heat sink assembly kits include replacement thermal material.

Description	Spare part number
Fan/heat sink assembly for use in UMA models in which the processor is not soldered to the system board	636940-001
Fan/heat sink assembly for use in UMA models in which the processor is soldered to the system board	642731-001
Fan/heat sink assembly for use in models with discrete graphics	636939-001

NOTE: To properly ventilate the computer, allow at least a **7.6 cm** (3 inch) clearance on the right side and rear panel 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.

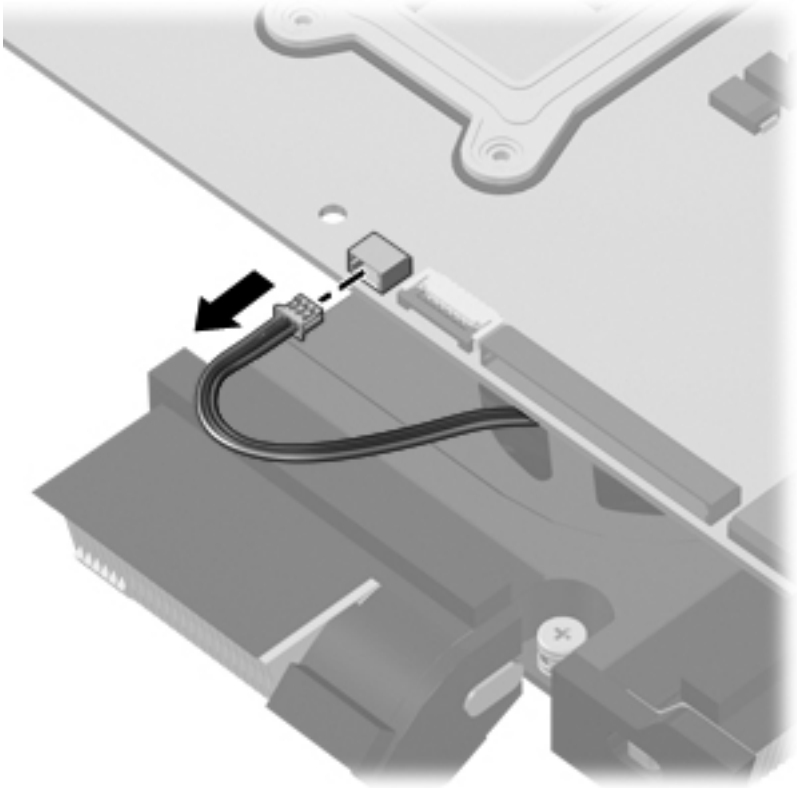
Before removing the fan/heat sink assembly, follow these steps:

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 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. WLAN module (see WLAN module on page 40)
   c. Optical drive (see Optical drive on page 45)
   d. Keyboard (see Keyboard on page 47)
   e. Top cover (see Top cover on page 49)
   f. Speaker assembly (see Speaker assembly on page 68)
   g. Power connector cable (see Power connector cable on page 64)
   h. USB board (see USB board on page 63).
   i. Display assembly (see Display assembly on page 56)
   j. Bluetooth module removal (see Bluetooth module on page 66)
   k. System board (see System board on page 70)

Remove the fan/heat assembly (fan/heat sink appearance may vary):

NOTE: Steps 1 through 4 apply to computers with discrete subsystem memory on the system board. Steps 5 through 7 apply to computers with UMA subsystem memory.

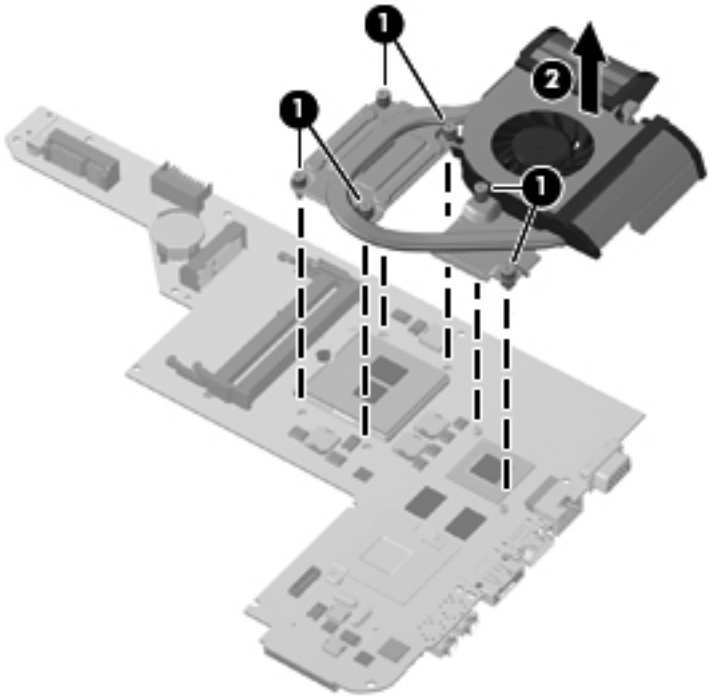
1. Turn the system board upside down.
2. Disconnect the fan cable from the system board.



3. Follow the sequence embossed on heat sink to loosen the six Phillips M2.5×7.0 captive screws **(1)** that secure the fan/heat sink assembly to the system board.

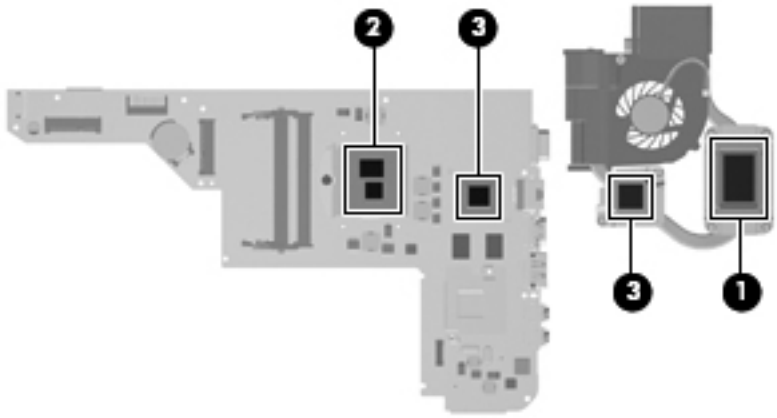
NOTE: Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it may be necessary to move the fan/heat sink assembly from side to side to detach the assembly.

4. Remove the fan/heat sink assembly **(2)**.



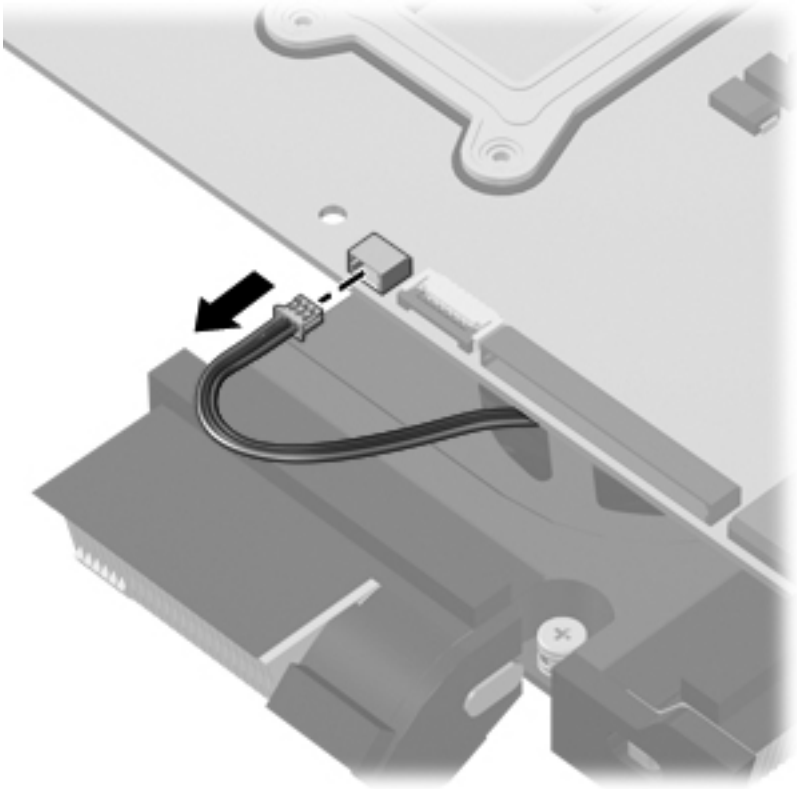
The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly **(1)**, the processor **(2)** and the graphics processor **(3)** on the system board each time the fan/heat sink assembly is removed. Thermal pads and thermal paste must be installed on all surfaces before the fan/heat sink assembly is reinstalled.

The following illustration shows the locations for thermal material on systems with discrete graphics subsystems.



NOTE: Steps 5 through 7 apply to computers with UMA subsystem memory on the system board. Steps 1 through 4 apply to computers with discrete subsystem memory.

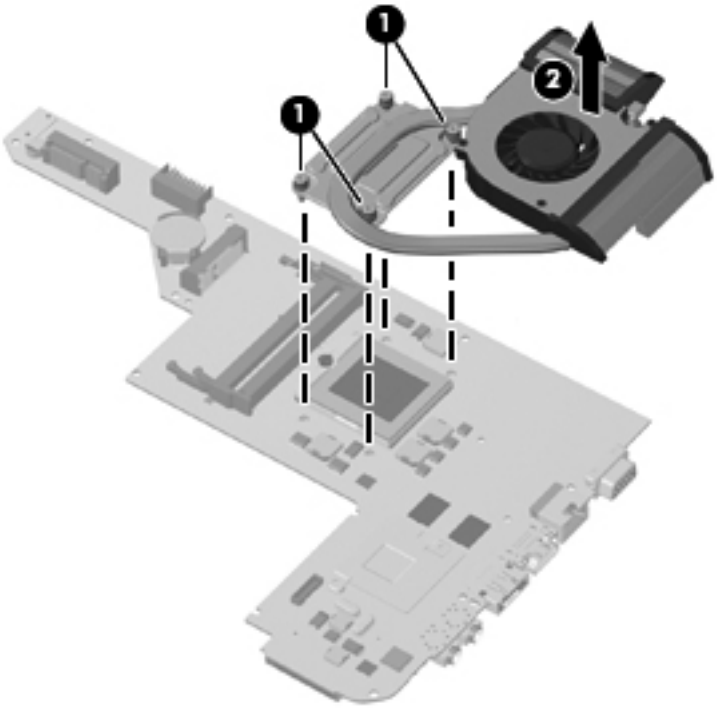
5. Disconnect the fan cable from the system board.



6. Follow the sequence embossed on heat sink to loosen the four Phillips M2.5×7.0 captive screws **(1)** that secure the fan/heat sink assembly to the system board.

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

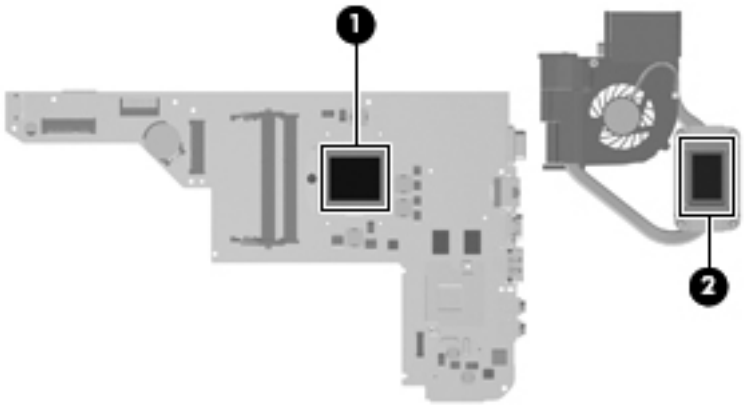
7. Remove the fan/heat sink assembly **(2)**.



The thermal material must be thoroughly cleaned from the surface of the processor component **(1)** and the fan/heat sink assembly **(2)** each time the fan/heat sink assembly is removed. Thermal pads and thermal paste must be installed on all surfaces before the fan/heat sink assembly is reinstalled.

NOTE: Thermal pads and thermal paste are included with all fan/heat sink assembly, system board, and processor spare part kits.

The following illustration shows the locations for thermal material on systems with UMA graphics subsystems.



Reverse this procedure to install the fan/heat sink assembly.

Processor

NOTE: All processor spare part kits include thermal material.

Description	Spare part number
Intel Core i7 2620M processor, 2.7 GHz (SC turbo up to 3.40 GHz), 4 MB L3 cache 35 W	631252-001
Intel Core i5 2520M processor, 2.5 GHz, (SC turbo up to 3.2 GHz), 3 MB L3 cache 35 W	631253-001
Intel Core i5 2540M processor, 2.6 GHz, (SC turbo up to 3.33 GHz), 3 MB L3 cache 35 W	631255-001
Intel Core i5 2430M Dual-Core processor, 2.4 GHz, (SC turbo up to 3.0 GHz), 3 MB L3 cache 35 W	653341-001
Intel Core i5 2460M processor, 2.53 GHz, 3 MB L3 cache)	626309-001

Before removing the processor, follow these steps:

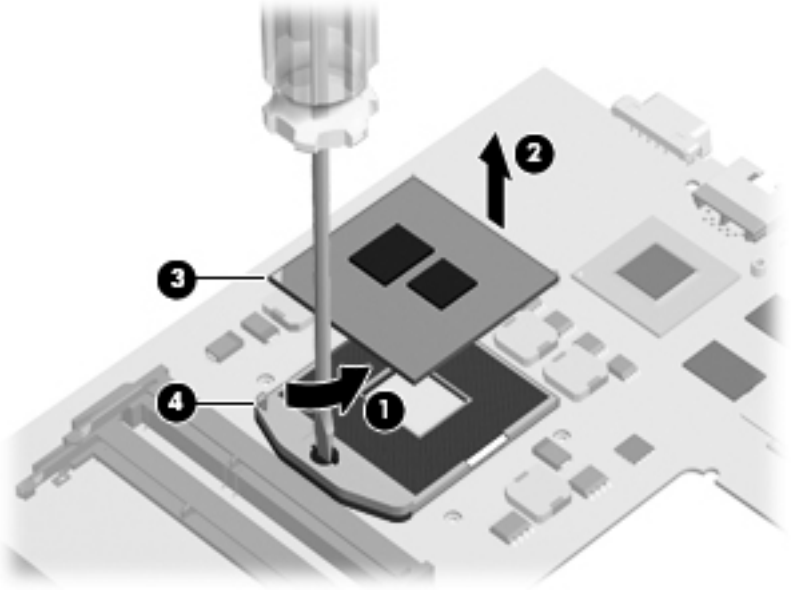
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 36).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 43)
   b. WLAN module (see WLAN module on page 40)
   c. Optical drive (see Optical drive on page 45)
   d. Keyboard (see Keyboard on page 47)
   e. Top cover (see Top cover on page 49)
   f. Speaker assembly (see Speaker assembly on page 68)
   g. Power connector cable (see Power connector cable on page 64)
   h. USB board (see USB board on page 63)
   i. Display assembly (see Display assembly on page 56)
   j. Bluetooth module (see Bluetooth module on page 66)
   k. System board (see System board on page 70)
   l. Fan/heat sink assembly (see Fan/heat sink assembly on page 72)

Remove the processor:

1. Turn the processor locking screw **(1)** one-half turn counterclockwise until you hear a click.

2. Lift the processor **(2)** straight up and remove it.

NOTE: The gold triangle **(3)** on the processor must be aligned with the triangle icon **(4)** embossed on the processor socket when you install the processor.



Reverse this procedure to install the processor.

5 Setup Utility

Starting Setup Utility

Setup Utility is a ROM-based information and customization utility that can be used even when your Windows operating system is not working.

NOTE: The fingerprint reader cannot be used to access Setup Utility.

The utility reports information about the computer and provides settings for startup, security, and other preferences.

To start Setup Utility:

- Open Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press f10.

– or –

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

Using Setup Utility

Changing the language of Setup Utility

The following procedure explains how to change the language of Setup Utility. If Setup Utility is not already running, begin at step 1. If Setup Utility is already running, begin at step 2.

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

   – or –

   Open Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f10.
2. Use 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 goes into 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 or 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

The following procedure explains how to display system information in Setup Utility. If Setup Utility is not open, begin at step 1. If Setup Utility is open, begin at step 2.

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

   – or –

   Open Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f10.
2. 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 default settings in Setup Utility

The following procedure explains how to restore the Setup Utility default settings. If Setup Utility is not already running, begin at step 1. If Setup Utility is already running, begin at step 2.

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

   – or –

   Open Setup Utility by turning on or restarting the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press esc. When the Startup Menu is displayed, press f10.
2. Use 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 default settings go into effect when the computer restarts.

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

Exiting Setup Utility

You can exit Setup Utility with or without saving changes.

- 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.

After either choice, the computer restarts in Windows.

Setup Utility menus

The menu tables in this section provide an overview of Setup Utility options.

NOTE: Some of the Setup Utility menu items listed in this chapter may not be supported by your computer.

Main menu

Select	To do this
System information	• View and change the system time and date. • View identification information about the computer. • View specification information about the processor, memory size, system BIOS, and keyboard controller version (select models only).

Security menu

Select	To do this
Administrator password	Enter, change, or delete an administrator password.
Power-On Password	Enter, change, or delete a power-on password.

System Configuration menu

Select	To do this
Language Support	Change the Setup Utility language.
Virtualization Technology (select models only)	Enable/disable the processor Virtualization Technology.
Fan Always On	Enable/disable Fan Always On. When enabled, the computer fan will always be on.

Select	To do this
Action Keys Mode	Enable/disable action keys.
Boot Options	Set the following boot options: • f10 and f12 Delay (seconds)—Set the delay for the f10 and f12 functions of Setup Utility in intervals of 5 seconds each (0, 5, 10, 15, 20). • CD-ROM boot—Enable/disable boot from CD-ROM. • Floppy boot—Enable/disable boot from diskette. • Internal Network Adapter boot—Enable/disable boot from Internal Network Adapter. • Boot Order—Set the boot order for: ◦ Hard drive ◦ Internal CD/DVD ROM drive ◦ USB Diskette on Key/USB hard disk ◦ USB CD/DVD ROM drive ◦ USB floppy ◦ Network adapter

Diagnostics menu

Select	To do this
Hard Disk Self Test	Run a comprehensive self test on the hard drive. **NOTE:** On models with two hard drives, this menu option is called **Primary Hard Disk Self Test**.
Secondary Hard Disk Self Test (select models only)	Run a comprehensive self test on a secondary hard drive.
Memory Test	Run a diagnostic test on the system memory.

6 Specifications

Computer specifications

Dimensions		
Factor	**Metric**	**U.S.**
Depth	**22.8 cm**	8.98 in
Width	**34.8 cm**	13.7 in
Height (front to rear)	**2.5 to 3.2 cm**	0.98 to 1.26 in
Weight (lowest weight configuration)	< **2.00 kg**	4.42 lbs
Input power		
Operating voltage	18.5 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Factor	**Metric**	**U.S.**
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	–4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	10% to 90%
Nonoperating	5% to 95%	5% to 95%
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

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

35.56 cm (14.0 in) display specifications

Dimensions	
Active diagonal size	**35.56 cm** (14.00 in)
Active area	309.399 x 173.952
Resolution	1366 × 768 (HD)
Weight	**320 g** (0.71 lbs)
Contrast ratio	500:1 (typical)
Luminance	200 nits (typical)
Luminance uniformity	1.4 (typical) 1.6 (max)
Lifetime (1/2 luminance)	12,000 hours
Backlight	LED
Response time	8 ms (typical)
Surface treatment	BV
Total power consumption	2.8 W
Viewing angle	SVA

Hard drive specifications

	750 GB*	640 GB*	500 GB*	320 GB*
Dimensions				
Height	9.5 mm			
Width	70 mm			
Weight	101 g			
Interface type	SATA			
Transfer rate	100 MB/sec			
Security	ATA security			
Seek times (typical read, including setting)				
Single track	1.0 ms	1.0 ms	1.0 ms	1.5 ms
Average	14.0 ms	14.0 ms	14.0 ms	12.0 ms
Maximum	22.0 ms	22.0 ms	22.0 ms	22.0 ms
Logical blocks	1,465,149,168	1,250,263,728	976,773,168	625,142,448
Disc rotational speed	7200 rpm	7200 rpm	7200 rpm	7200 rpm
Operating temperature	**5°C to 35°C** (41°F to 95°F)			
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.				
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.				

DVD±RW SuperMulti Double-Layer 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

System resource specifications

You can use Device Manager to get a graphical view of the system resources that control how the devices work on the computer. System resources you can access from Device Manager are direct memory access (DMA) channels, input/output (I/O) ports, interrupt request (IRQ) lines, and memory addresses.

If two devices require the same resource and create a device conflict, you can manually change the resource settings in Device Manager to be sure each setting is unique.

⚠ **CAUTION:** Improperly changing resource settings can disable your hardware and cause your computer to malfunction or become inoperable. Only users who have expert knowledge of computer hardware and hardware configurations should change resource settings.

To view resource settings in Windows 7:

1. Select **Start > Computer**.
2. Click **System properties** near the top of the Computer folder.
3. On the left, click **Device Manager**.
4. On the **View** menu, click one of the following:
   - **Resources by type**
   - **Resources by connection**

7 Backup and recovery

- Restore
- Creating restore media
- Performing a system restore
- Backing up and recovering your information

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

This chapter provides information on the following topics:

- Creating a set of recovery discs or a recovery flash drive (HP Recovery Manager software feature)
- Performing a system restore (from the partition, recovery discs, or a recovery flash drive)
- Backing up your information
- Recovering a program or driver

Restore

In the event of hard drive failure, to restore your system to its factory image you will need a set of recovery discs or a recovery flash drive that you can create using HP Recovery Manager. HP recommends that you use this software to create either a set of recovery discs or a recovery flash drive immediately after software setup.

If for some other reason you need to restore your system, this can be achieved using the HP Recovery partition (select models only), without the need for recovery discs or a recovery flash drive. To check for the presence of a recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

CAUTION: HP Recovery Manager (partition or discs/flash drive) restores only software that was preinstalled at the factory. Software not provided with this computer must be reinstalled manually.

NOTE: Recovery discs have been included if your computer does not have a recovery partition.

Creating restore media

HP recommends that you create either a set of recovery discs or a recovery flash drive to be sure that you can restore your computer to its original factory state if the hard drive fails, or if for any reason you cannot restore using the recovery partition tools. Create these discs or the flash drive after setting up the computer for the first time.

NOTE: HP Recovery Manager allows the creation of only one set of recovery discs or one recovery flash drive. Handle these discs or the flash drive carefully and keep them in a safe place.

NOTE: 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 purchase recovery discs for your computer from the HP Web site. 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.

Guidelines:

- Purchase high-quality DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs.

  NOTE: Read-write discs, such as CD-RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the HP Recovery Manager software.

- The computer must be connected to AC power during this process.
- Only one set of recovery discs or one recovery flash drive can be created per computer.

  NOTE: If you are creating recovery discs, number each disc before inserting it into the optical drive.

- If necessary, you can exit the program before you have finished creating the recovery discs or recovery flash drive. The next time you open HP Recovery Manager, you will be prompted to continue the backup creation process.

To create a set of recovery discs or a recovery flash drive:

1. Select **Start > All Programs > HP > HP Recovery Manager > HP Recovery Media Creation**.
2. Follow the on-screen instructions.

Performing a system restore

HP Recovery Manager software allows you to repair or restore the computer to its original factory state. HP Recovery Manager works from recovery discs or a recovery flash drive, or from a dedicated recovery partition (select models only) on the hard drive.

NOTE: A system restore needs to be performed if the computer hard drive has failed or if all attempts to correct any functional computer issues fail. A system restore should be used as a final attempt to correct computer issues.

Note the following when performing a system restore:

- You can restore only the system that you have previously backed up. HP recommends that you use Recovery Manager to create either a set of recovery discs or a recovery flash drive as soon as you set up the computer.
- Windows has its own built-in repair features, such as System Restore. If you have not already tried these features, try them before using HP Recovery Manager.
- HP Recovery Manager restores only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

Restoring using the dedicated recovery partition (select models only)

When using the dedicated recovery partition, there is an option to back up pictures, music and other audio, videos and movies, recorded TV shows, documents, spreadsheets and presentations, e-mails, and Internet favorites and settings during this process.

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

1. Access HP Recovery Manager in either of the following ways:
   - Select **Start > All Programs > HP > HP Recovery Manager > HP Recovery Manager**.

     – 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.

Restoring using the restore 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, the computer boot order needs to be changed.

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.

Backing up and recovering your information

It is very important to back up your files and keep any new software in a safe place. As you add new software and data files, continue to create backups on a regular basis.

How completely you are able to recover your system depends on how recent your backup is.

NOTE: A recovery from your most recent backup needs to be performed if the computer has a virus attack or if any major system components fail. In order to correct computer issues, a recovery should first be attempted before a system restore is attempted.

You can back up your information to an optional external hard drive, a network drive, or discs. Back up your system at the following times:

- At regularly scheduled times

TIP: Set reminders to back up your information periodically.

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Guidelines:

- Create system restore points using the Windows® System Restore feature, and periodically copy them to an optical disc or an external hard drive. For more information on using system restore points, refer to Using Windows system restore points on page 95.
- Store personal files in the Documents library and back up this folder 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, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

Using Windows Backup and Restore

Guidelines:

- Be sure that the computer is connected to AC power before you start the backup process.
- Allow enough time to complete the backup process. Depending on file sizes, it may take over an hour.

To create a backup:

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. Refer to Help and Support for more information.

Using Windows system restore points

A system restore point allows you to save and name a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes.

NOTE: Recovering to an earlier restore point does not affect data files saved or e-mails created since the last restore point.

You also can create additional restore points to provide increased protection for your files and settings.

When to create restore points

- Before you add or modify software or hardware
- Periodically, whenever the computer is functioning optimally

NOTE: If you revert to a restore point and then change your mind, you can reverse the restoration.

Create 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. Follow the on-screen instructions.

Restore to a previous date and time

To revert to a restore point (created at a previous date and time), when the computer was functioning optimally, follow these steps:

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**.
5. Follow the on-screen instructions.

8 Recycling

Battery

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 computer battery disposal.

Display

WARNING! The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

CAUTION: The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. When you remove these components, handle them carefully.

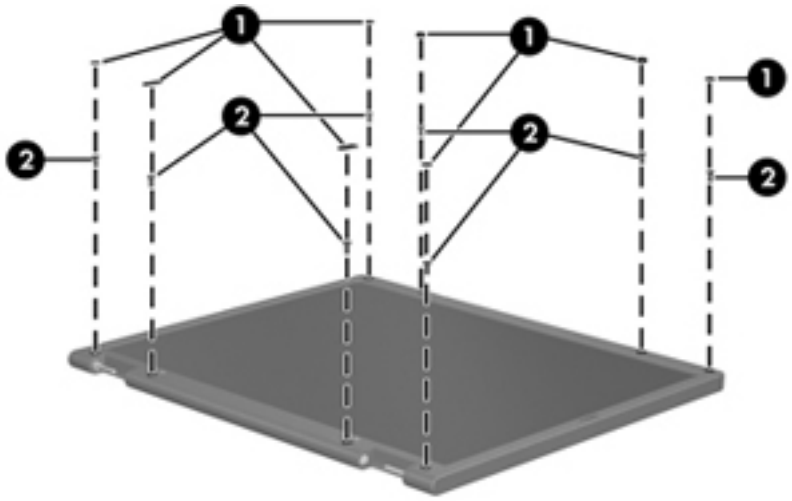
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at http://www.eiae.org.

This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.

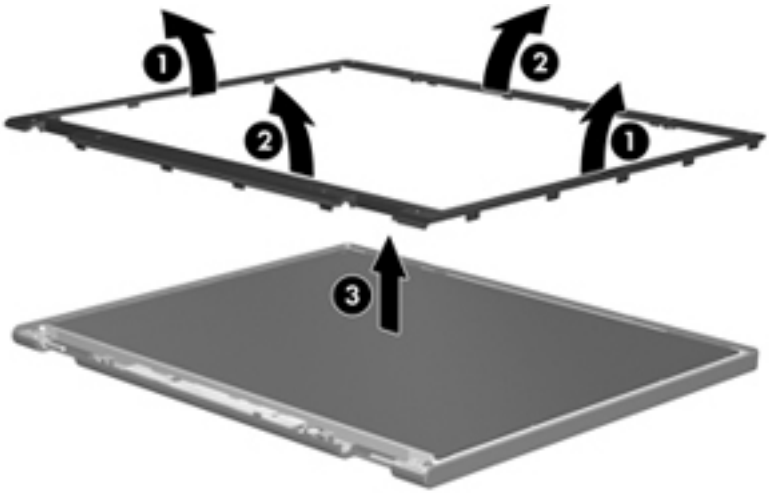
NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

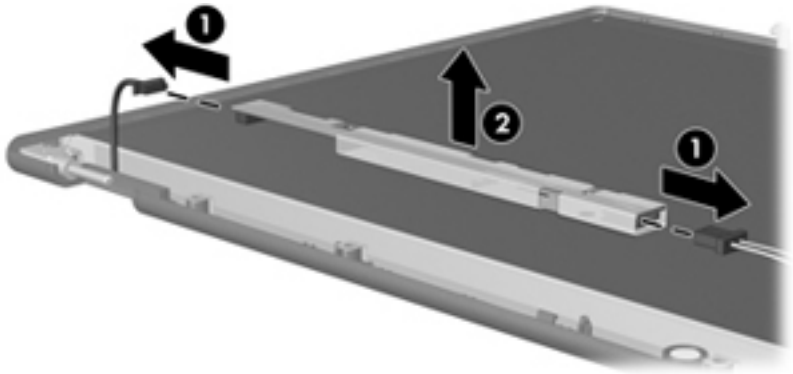
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



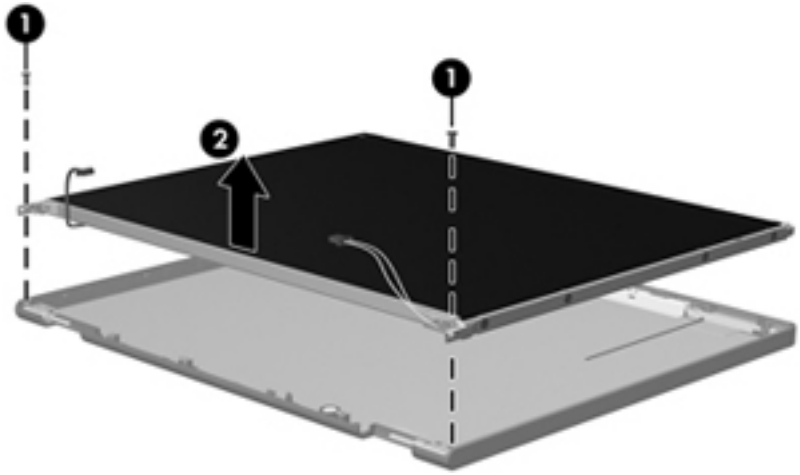
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



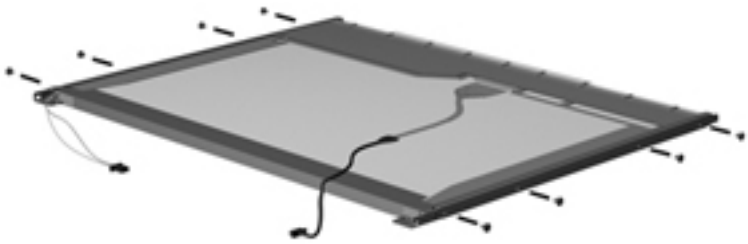
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **(2)** from the display enclosure.

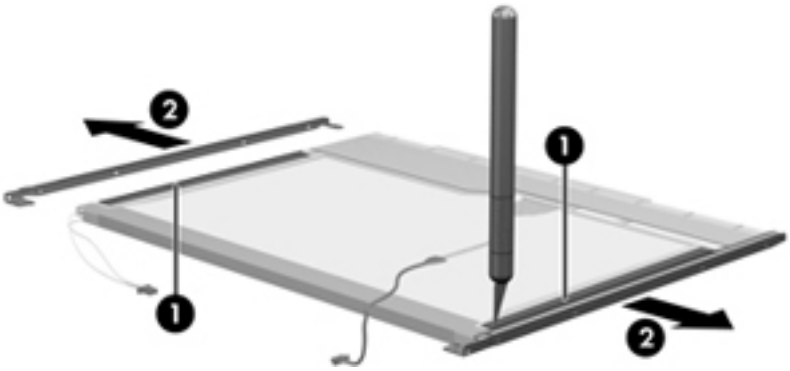


7. Turn the display panel assembly upside-down.
8. Remove all screws that secure the display panel frame to the display panel.

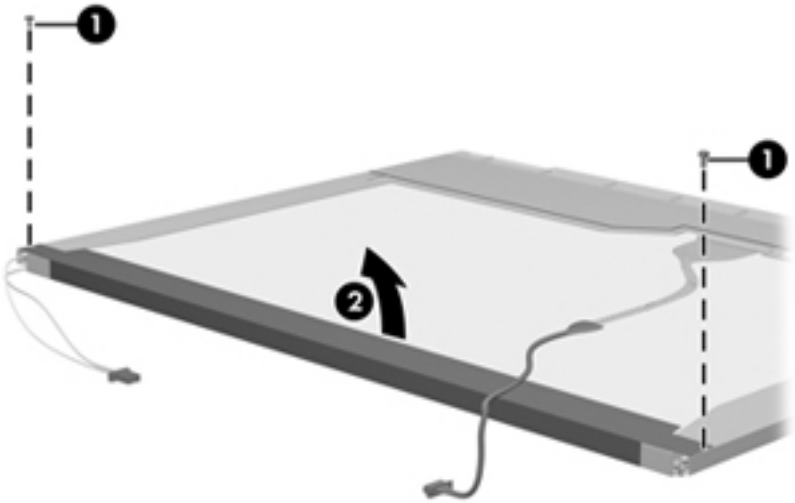


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

10. Remove the display panel frame **(2)** from the display panel.

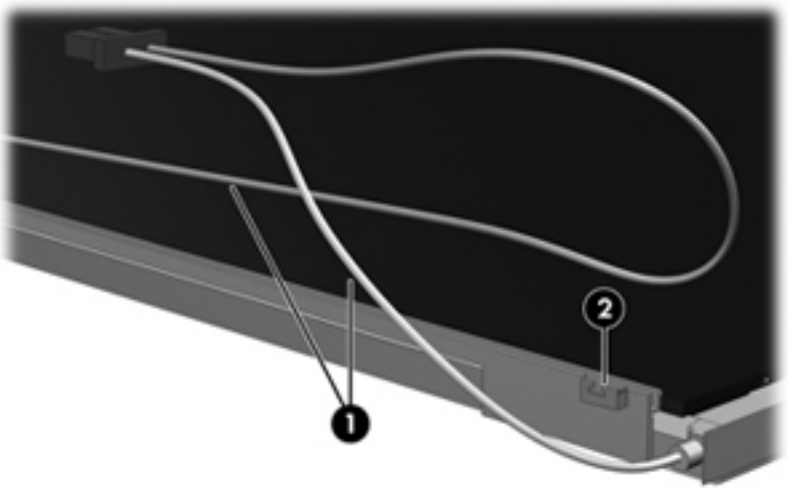


11. Remove the screws **(1)** that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



13. Remove the backlight cover.
14. Turn the display panel right-side up.

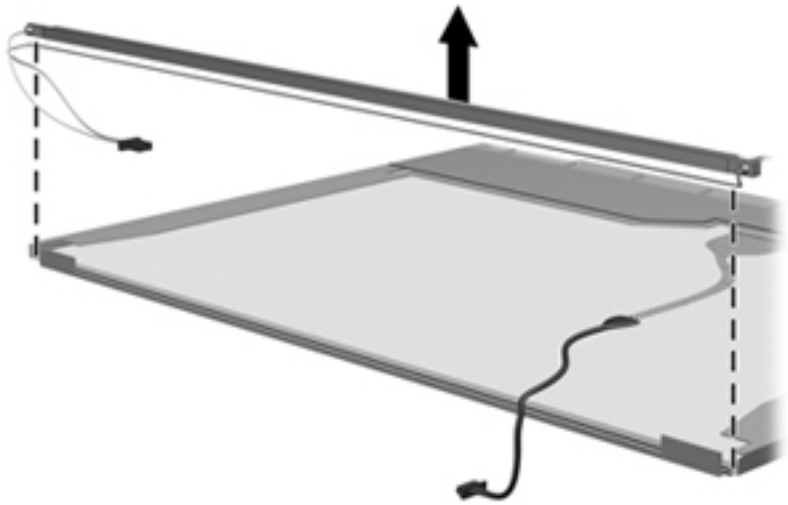
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



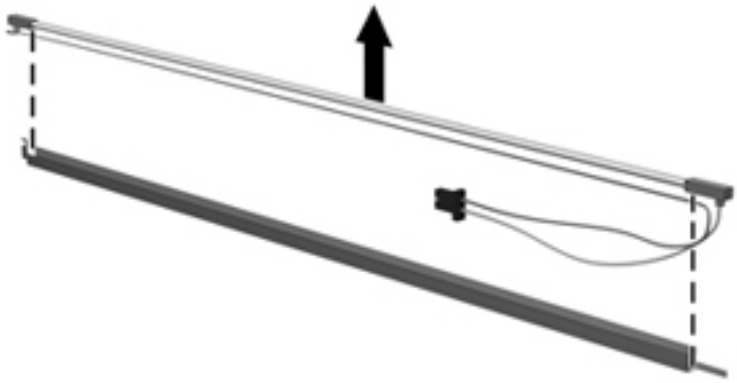
16. Turn the display panel upside-down.

⚠ **WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

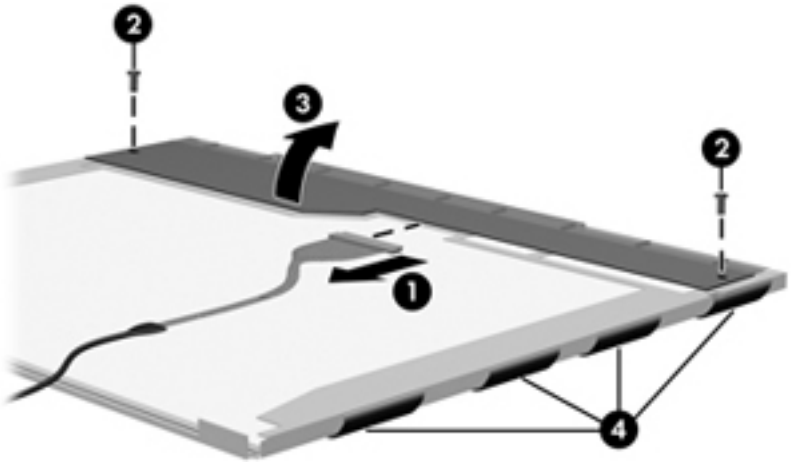
17. Remove the backlight frame from the display panel.



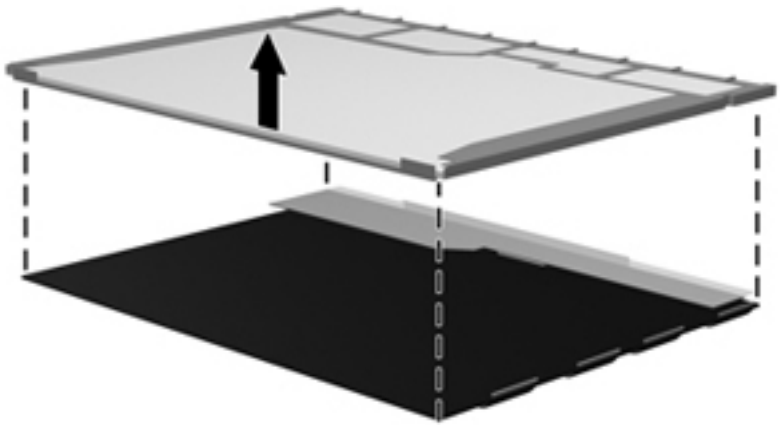
18. Remove the backlight from the backlight frame.



19. Disconnect the display panel cable **(1)** from the LCD panel.
20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.
21. Release the LCD panel **(3)** from the display rear panel.
22. Release the tape **(4)** that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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