HP Pavilion dm4 Entertainment PC

Maintenance and Service Guide

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MSG revision history

Revision	Publication date	Description
A	August 2010	• Updated commodities in the following location: Product description on page 1. • Updated bottom components illustration in the following location: Bottom components on page 13. • Updated the component replacement procedures for the hard drive in the following location: Hard drive on page 54. • Updated the component replacement procedures for the optical disk drive in the following location: Optical drive on page 56. • Added new supported hard drives to spare parts listings in the following locations: Computer major components on page 17, Mass storage devices on page 27, Sequential part number listing on page 29, Hard drive on page 54. • Added newly supported WLAN modules to spare parts listings in the following locations: Computer major components on page 17, Sequential part number listing on page 29, WLAN module on page 47. • Updated hard drive specifications in the following location: Hard drive specifications on page 94.

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**		
	620M, 2.66-GHz (SC turbo up to 3.33 GHz), 4-MB L3 cache	√	√
	Intel Core i5 processors		
	540M, 2.53-GHz (SC turbo up to 3.06 GHz), 3-MB L3 cache	√	√
	520M, 2.40-GHz (SC turbo up to 2.93 GHz), 3-MB L3 cache	√	√
	430M, 2.26-GHz (SC turbo to 2.53-GHz) 3-MB L3 cache	√	√
Chipset	Intel HM55 Express	√	√
Graphics	**Switchable discrete graphics** ATi Park Pro (ATI Mobility Radeon™ HD5450 with 512-MB of dedicated video memory [64-MB×16 DDR3, 4 pcs, 800-MHz])	√	
	Intel HD Graphics with shared video memory (memory size is dynamic change) Unified Memory Architecture (UMA)		√
Panel	**35.56-cm** (14.0-in) HD LED BrightView (1366 x 768 resolution)	√	√
	16:9 ultra wide aspect ratio	√	√
Memory	2 SODIMM slots	√	√
	Customer-accessible and upgradable	√	√
	Supports up to 8 GB of system memory	√	√
	DDR3, 1066-MHz, dual-channel memory (DDR3 1333 MHz downgraded to DDR3 1066 MHz)	√	√
	Supports the following configurations:	√	√
	• 8 GB (4 GB×2)		
	• 6 GB (2 GB×2 + 4 GB+1)		
	• 4 MB (2 GB×2 or 4 GBx1)		
	• 3 GB (1 GB×1 + 2 GB×1)		
	• 2 GB (2 GB×1)		

Category	Description	Discrete	UMA
	• 2 MB (1 GB×2)		
	• 1 GB (1 GB×1)		
Hard drives	Accelerometer protection support	√	√
	Supports the following **9.5-mm**, **6.35-cm** (2.5-in) SATA hard drives	√	√
	• 750 GB, 5400 rpm		
	• 640 GB, 7200 and 5400 rpm		
	• 500 GB, 7200 rpm		
	• 320 GB, 7200 rpm		
	• 250 GB, 7200 rpm		
	• 160 GB Solid-state drive		
	Supports the following solid-state drive:	√	√
	• 160-GB		
Optical drives	Supports the following **9.5-mm** (0.50-in) tray load, fixed, SATA drive:	√	√
	DVD±R/RW SuperMulti DL Drive		
Camera	HP TrueVision	√	√
	Low light, fixed (no tilt), activity LED	√	√
	640 × 480 by 24 frames per second	√	√
Microphone	One microphone, digital	√	√
	Noise suppression	√	√
Audio	Dolby Advanced Audio, HD audio	√	√
	Supports Microsoft Premium requirements	√	√
	Altec Lansing speakers	√	√
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	√	√
	Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter	√	√
	Intel® Centrino® Advanced–N + WiMAX 6250	√	√
	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter	√	√
	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter	√	√

Category	Description	Discrete	UMA
	Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	√	√
	Realink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter	√	√
	Integrated WWAN and GPS function:	√	
	Qualcomm module with two antennas	√	
	5 band antenna support: 2100/1800/1900/800/900 with additional GPS band	√	
External media card	5-in-1 Digital Media Slot; supports SD, MMC, MS, Mspro, xD	√	√
	Supports mini versions of SD, MMC, and MS Duo with adapter (adapter not included)	√	√
Ports	**VGA (Dsub 15-pin) supporting:** • 1600 x 1200 resolution at 75 Hz • VGA (Dsub 15-pin) supporting 1920 x 1200 resolution at 75 Hz	√	√
	Hot plug/unplug and auto detect for wide-aspect or standard-aspect video	√	√
	HDMI v1.3 supporting up to 1080p, 1920 x 1200 @ 60 Hz DVI mode	√	√
	USB 2.0 (3)	√	√
	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 Mylar click pad cover (taps and multitouch gestures enabled by default)	√	√
Power requirements	9-cell (93-Wh) 2.80-Ah Li-ion battery	√	√
	6-cell (62-Wh) 2.80-Ah Li-ion battery	√	√
	6-cell (55-Wh) 2.55-Ah Li-ion battery	√	√
	65-W AC adapter with Smart-Pin DC connector		√
	90-W AC adapter with Smart-Pin DC connector	√	
Security	Kensington Security Lock	√	√

Category	Description	Discrete	UMA
	Fingerprint reader with Digital Persona Software Support	√	√
Operating system	**Preinstalled:**	√	√
	Windows 7 Professional (64 bit)	√	√
	Windows 7 Home Premium (64 bit)	√	√
	Windows 7 Home Basic (32 and 64 bit)	√	√
	FreeDOS	√	√
	RedFlag	√	√
Serviceability	**End-user replaceable parts:**	√	√
	AC adapter	√	√
	Battery (system)	√	√
	Hard drive	√	√
	Memory module	√	√
	Optical drive	√	√
	Mini-card device	√	√
	SIM	√	√

2 External component identification

Identifying the hardware

Components included with the computer may vary by region and model. The illustrations in this chapter identify the standard features on most computer models.

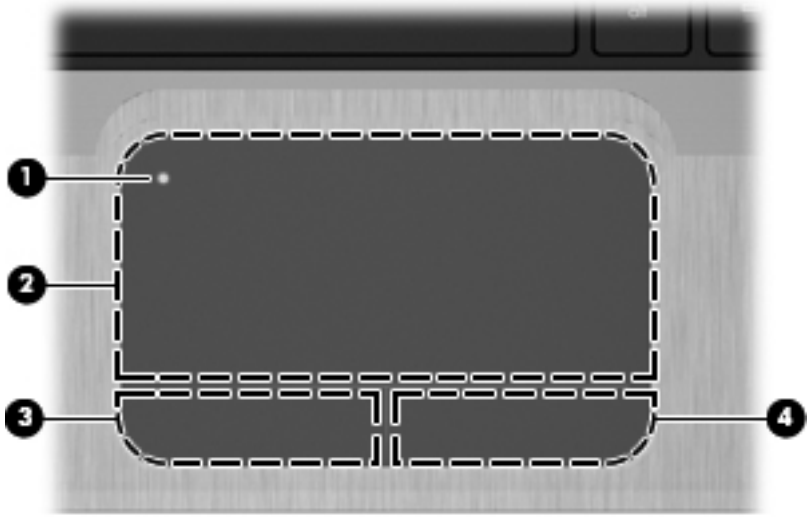
To see a list of hardware installed in the computer, follow these steps:

1. Select **Start > My Computer**.
2. In the left pane of the System Tasks window, select **View system information**.
3. Select **Hardware tab > Device Manager**.

You can also add hardware or modify computer configurations using Device Manager.

Top components

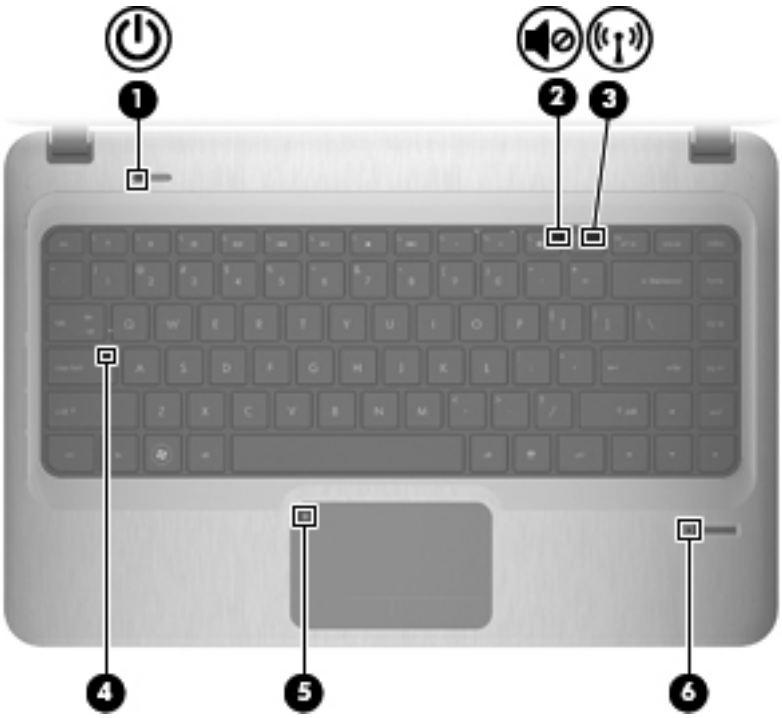
TouchPad



Component		Description
(1)	TouchPad on/off button	Turns the TouchPad on and off. Quickly double-tap the button 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.

*This table describes factory settings. To view or change pointing device preferences, select **Start > Devices and Printers**. Then, right-click the icon representing your device, and select **Mouse settings**.

Lights



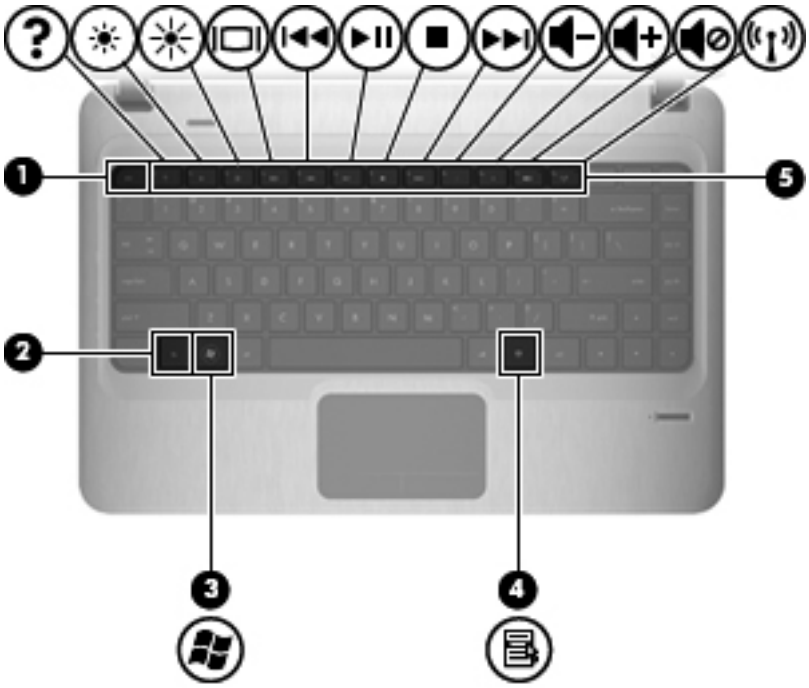
Component			Description
(1)		Power light	• White: Power is on. • Blinking White: The computer is in the Sleep state. **NOTE:** Another power light is located on the left side of the computer.
(2)		Mute light	Amber: Speaker sound is off.
(3)		Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. **NOTE:** Wireless devices are enabled at the factory. • Amber: All wireless devices are off.
(4)		Caps lock light	White: Caps lock is on.
(5)		TouchPad light	Amber: TouchPad is disabled.
(6)		Fingerprint reader light	• White: Fingerprint read is good. • Amber: Fingerprint read is bad.

Power button and fingerprint reader

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**.
(2)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon.

*This table describes factory settings. For information about changing factory settings, refer to the user guides located in Help and Support.

Keys

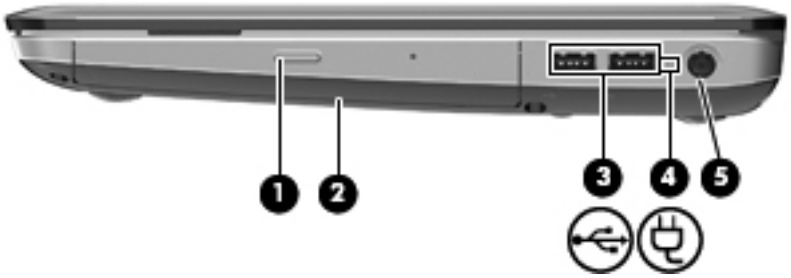


Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Displays system information when pressed in combination with the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Windows applications key	Displays a shortcut menu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

Front components

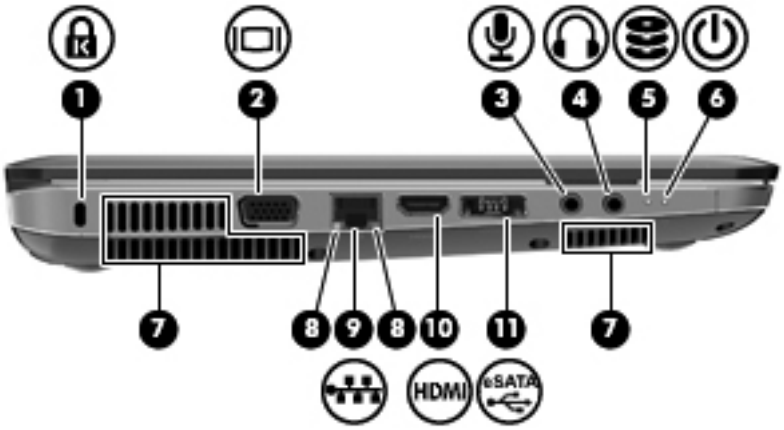
Component		Description
(1)	Digital Media Slot	Supports the following optional digital card formats: • Memory Stick (MS) • Memory Stick Pro (MSP) • MultiMediaCard (MMC) • Secure Digital (SD) Memory Card • Secure Digital High Capacity (SDHC) Memory Card (standard and large size) • xD-Picture Card (XD)
(2)	Speakers (2)	Produce sound.

Right-side components



Component		Description
(1)	Optical drive light	• On: The optical drive is being accessed. • Off: The optical drive is idle.
(2)	Optical drive	Reads/writes optical discs.
(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: The computer is connected to external power and the battery is charging. • Blinking: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light continues to blink.
(5)	Power connector	Connects an AC adapter.

Left-side components



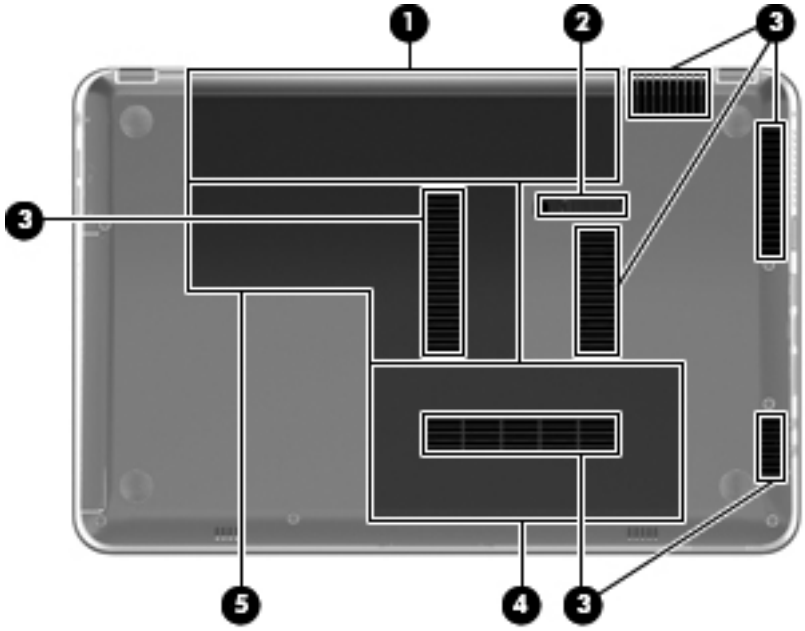
Component			Description
(1)		Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)		External monitor port	Connects an optional external display, such as a monitor or projector, to the computer.
(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.
(5)		Drive light	• White: The hard drive is being accessed. • Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the hard drive.
(6)		Power light	• On: Power is on. • Blinking: The computer is in the Sleep state. **NOTE:** Another power light is located next to the power button.
(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.
(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.

Component		Description
(10)	HDMI port	Connects an optional HDMI device.
(11)	Combo eSATA/USB port	Connects an optional USB device or high-performance eSATA components, such as an eSATA external hard drive.

Display components

Component		Description
(1)	Internal display switch	Turns off the display if the display is closed while the power is on.
(2)	Webcam light	White: The webcam is in use.
(3)	Webcam	Records video and captures still photographs.
(4)	Internal microphone	Record sound.

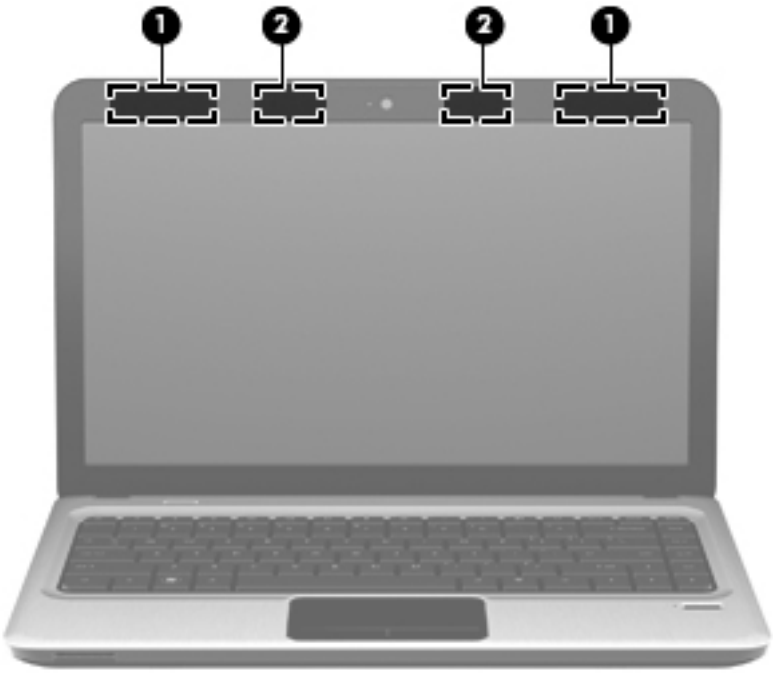
Bottom components



Component		Description
(1)	Battery bay	Holds the battery.
(2)	Battery release latch	Releases the battery from the battery bay.
(3)	Vents (6)	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/Wireless module compartment	Holds a wireless LAN module, a wireless WAN module, and memory modules. **NOTE:** 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.

Wireless antennas

On select computer models, at least two antennas send and receive signals from one or more wireless devices. These antennas are not visible from the outside of the computer.



Component		Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	WWAN antennas (2)*	Send and receive wireless signals to communicate with wireless wide-area networks (WWANs).

*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.

Additional hardware components

Component		Description
(1)	Power cord*	Connects an AC adapter to an AC outlet.
(2)	AC adapter	Converts AC power to DC power.
(3)	Battery*	Powers the computer when the computer is not plugged into external power.

*Batteries and power cords vary in appearance by region and country.

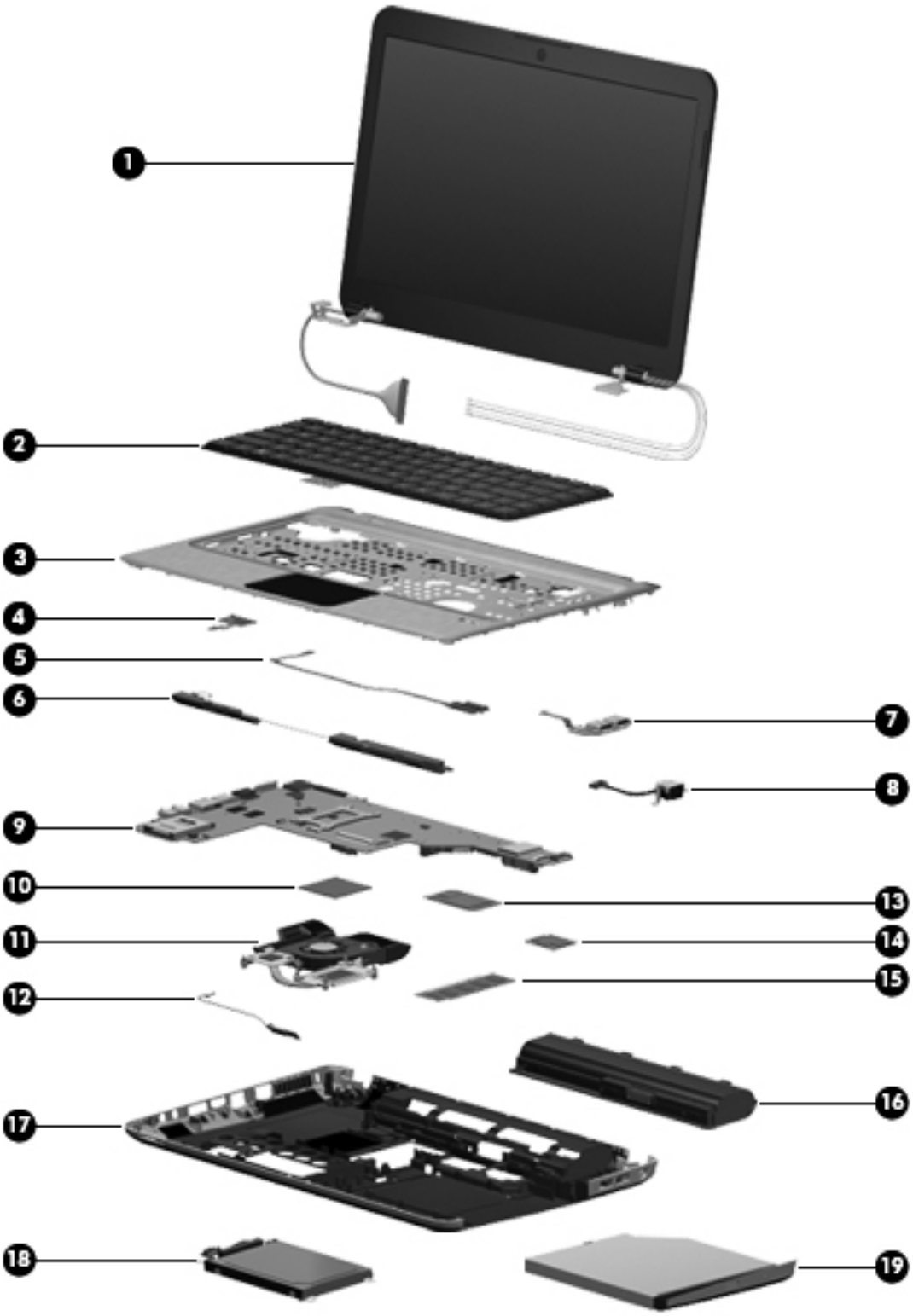
3 Illustrated parts catalog

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)**, WXGA, HD, BrightView display assembly** **NOTE:** See Display assembly components on page 25 for more display assembly internal component spare part information.	
	For use in models equipped with WWAN	613667-001
	For use in models not equipped with WWAN	608207-001
(2)	**Keyboards**	
	For use in Brazil	608222-201
	For use in English and French Canada	608222-121
	For use in Europe, the Middle East, and Asia	608022-B31
	For use in France	608022-051
	For use in Germany	608022-041
	For use in Japan	608022-291
	For use in Latin America	608222-161
	For use in the Netherlands	608022-DH1
	For use in Saudi Arabia	608022-171
	For use in South Korea	608222-AD1
	For use in Spain	608022-071
	For use in Switzerland	608022-BG1
	For use in Taiwan	608222-AB1
	For use in Thailand	608222-281
	For use in Turkey	608022-141
	For use in the United Kingdom	608022-031
	For use in the United States	608222-001
(3)	**Top cover** (includes Touchpad)	608224-001
(4)	**Power button board** (includes cable)	608226-001
(5)	**Fingerprint reader board**	608225-001
(6)	**Speaker assembly** (includes cable)	608232-001
(7)	**USB board** (includes cable)	608277-001
(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 graphics memory	616244-001
	For use in models equipped with 512 MB of discrete graphics memory	608203-001
	For use in models equipped with UMA graphics	608204-001

Item	Description	Spare part number
(10)	**Processor** (includes replacement thermal material)	
	Intel Core i7 processor, Dual Core	
	• 620M (2.26-GHz, 4-MB L3 cache)	587259-001
	Intel Core i5 processors, Dual Core	
	• 540M (2.53-GHz, 3-MB L3 cache)	594188-001
	• 520M (2.40-GHz, 3-MB L3 cache)	594187-001
	• 450M (2.40-GHz, 3-MB L3 cache)	613585-001
	• 430M (2.26-GHz, 3-MB L3 cache)	597624-001
(11)	**Fan/heatsink assembly** (includes replacement thermal material)	
	For use in models equipped with UMA graphics	608229-001
	For use in models equipped with discrete graphics	608231-001
(12)	**Bluetooth module** **NOTE:** The Bluetooth module cable is included in the Misc Cable Kit, spare part number 608227-001.	537921-001
(13)	**HP un2420 Broadband Module (WWAN)**	531993-001
(14)	**WLAN modules**	
	Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter For use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the US Virgin Islands	580101-001

Item	Description	Spare part number
	Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentian, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Belize, Benin, Bermuda, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Moldova, Romania, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	580101-002
	Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 For use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, the Cayman Islands, Chile, People's Republic of China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, Ukraine, United Arab Emirates, United Kingdom, Uruguay, the US Virgin Islands, the United States, Venezuela, and Vietnam	593530-001
	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter For use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States	582564-001

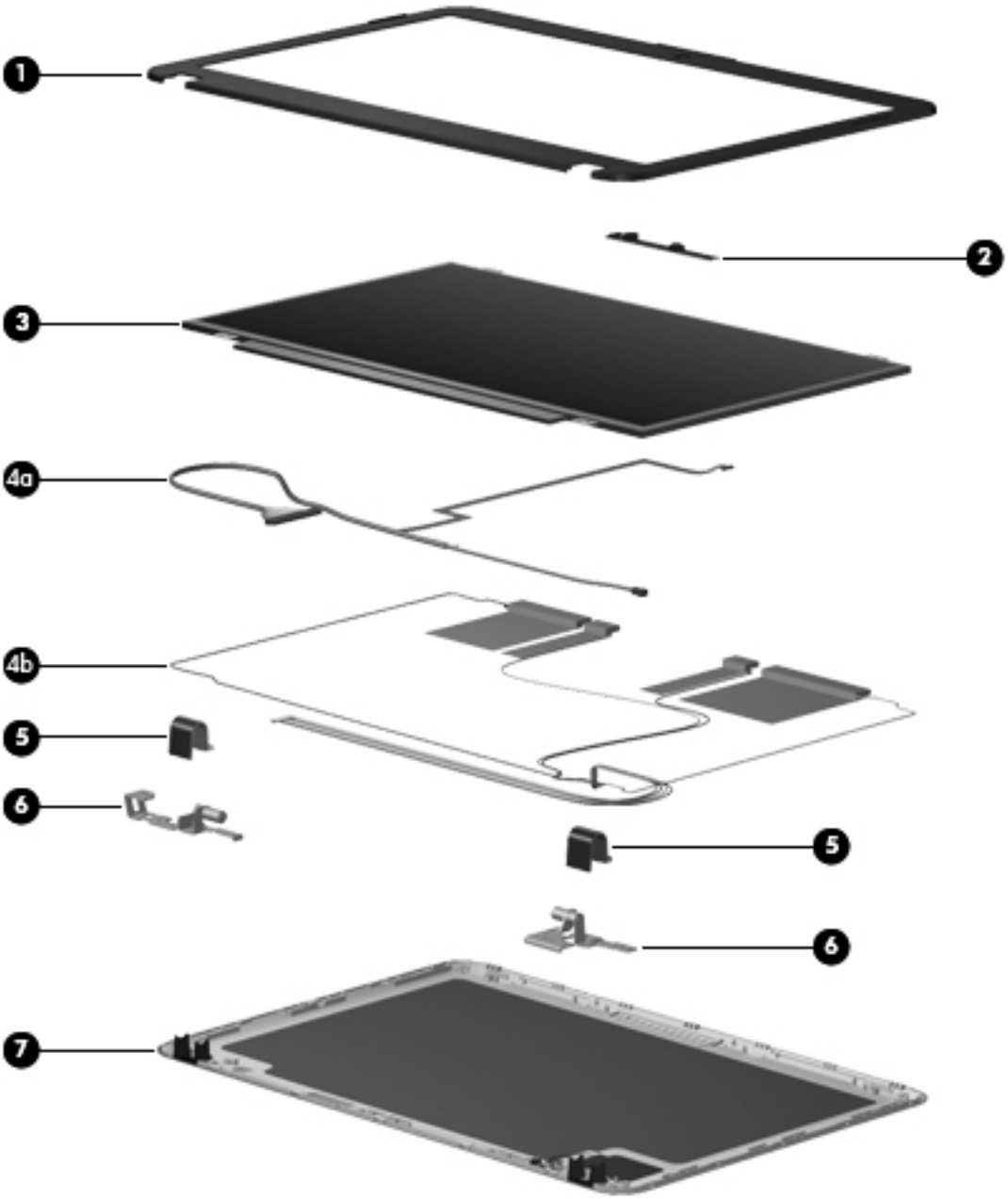
Item	Description	Spare part number
	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter For use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Guatemala, Guinea, Guinea-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, 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, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002
	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter 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, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593836-001

Item	Description	Spare part number
	Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter 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

Item	Description	Spare part number
	Realink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, 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, the 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, 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, the 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, the Philippines, Poland, Portugal, Puerto Rico, 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, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	602992-001
	Intel® Centrino® Advanced–N + WiMAX 6250 Intel® Centrino® Advanced–N + WiMAX 6250 for use in the United States	619997-001
(15)	**Memory modules** (PC3-10600, 1333-MHz)	
	4096-MB	599092-001
	2048-MB	598856-001
	1024-MB	598859-001
(16)	**Battery**	
	9-cell, 93-WH (2.80-Ah) Li-ion	593550-001
	6-cell, 62-WH (2.80-Ah) Li-ion	593562-001
	6-cell, 55-WH (2.55-Ah) Li-ion	593554-001
(17)	**Base enclosure** (includes modem cable and optical drive cable)	608223-001
(18)	**Hard drive** (includes hard drive bracket) **NOTE:** The hard drive cable is included in the Misc Cable Kit, spare part number 608227-001.	
	750-GB, 5400 RPM	622394-001
	640-GB, 5400 RPM	608219-001
	640-GB, 7200 RPM	621046-001

Item	Description	Spare part number
	500-GB, 7200 RPM	608218-001
	320-GB, 7200 RPM	608217-001
	250-GB, 7200 RPM	608216-001
	160-GB solid-state drive	608215-001
(19)	**DVD±RW SuperMulti DL Drive** (12.7 mm optical drive, fixed)	608221-001

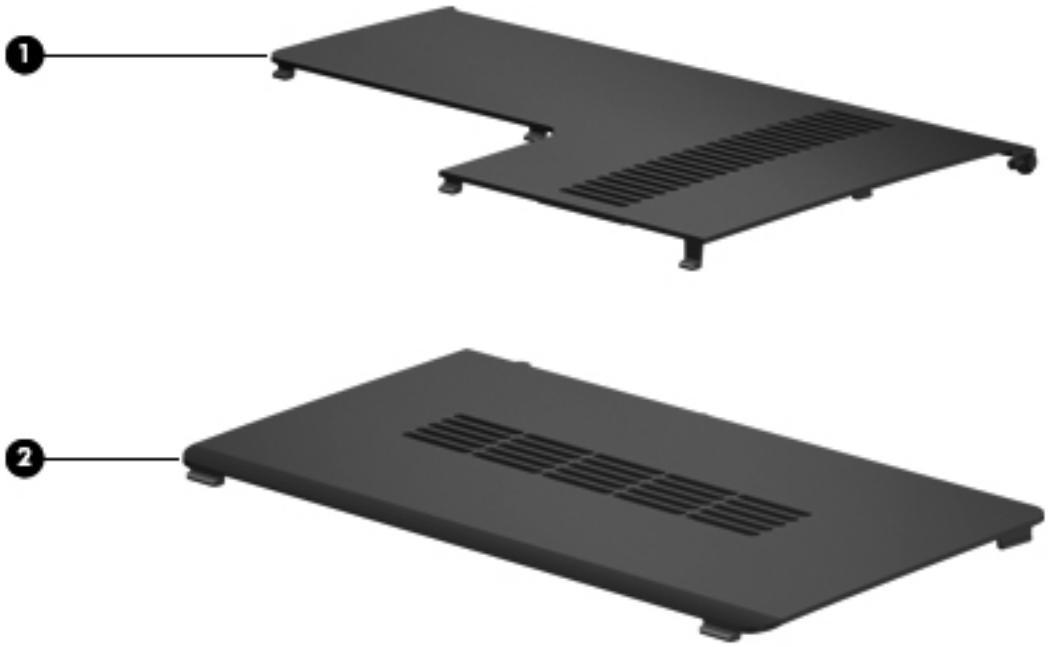
Display assembly components



Item	Description	Spare part number
(1)	**Display bezel**	608209-001
(2)	**Webcam module**	615744-001
(3)	**Display panel**, Brightview, high-definition, **35.56 cm** (14.0-in) (includes display panel cable)	
	For use in models without WWAN	608206-001
	For use in models with WWAN	613666-001

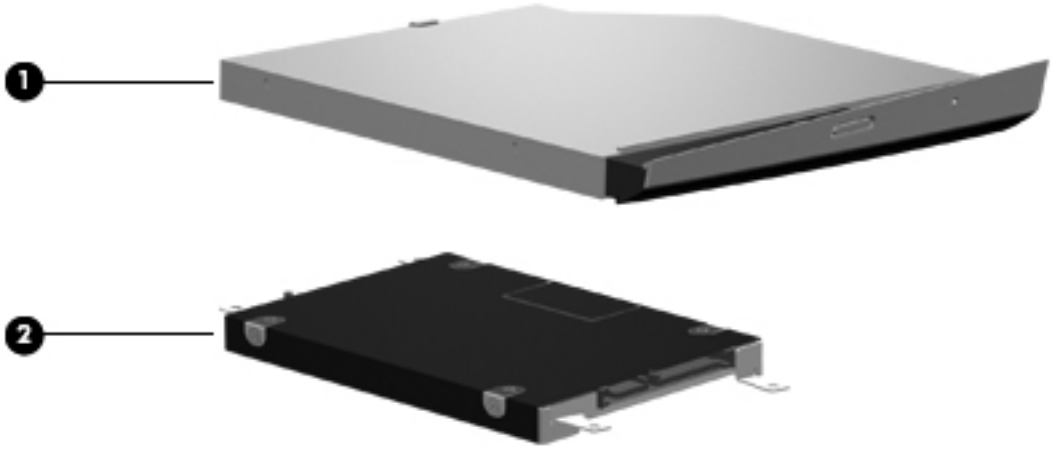
Item	Description	Spare part number
(3)	**Display hinge cover**	608210-001
(4a)	**Webcam cable**	
(4b)	**Antennas and cables**	
(5)	**Display hinge cover**	608210-001
(6)	**Display bracket**	608214-001
(7)	**Display back cover**	608208-001
	Display Screw Kit (not illustrated; includes screws and screw covers)	608212-001

Plastics Kit



Item	Description	Spare part number
	Plastics kit	608233-001
(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	608221-001
(2)	**Hard drive** (include hard drive bracket)	
	NOTE: The hard drive cable is included in the Misc Cable Kit, spare part number 608227-001.	
	750-GB, 5400 RPM	622394-001
	640-GB, 7200 RPM	621046-001
	640-GB, 5400 RPM	608219-001
	500-GB, 7200 RPM	608218-001
	320-GB, 7200 RPM	608217-001
	250-GB, 7200 RPM	608216-001
	160-GB solid-state drive	608215-001

Miscellaneous parts

Description	Spare part number
AC adapters	
90-W Smart AC adapter with power factor correction (PFC), RC/V 3W	613153-001
90-W AC adapter with power factor correction (PFC), RC/V EM 3W	613160-001
65-W Smart AC adapter, RC/V 3W	613152-001
65-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W	613161-001
Power cord, AC, 3 wire, black, 1.83-m	
For use in Argentina	490371-D01
For use in Australia	490371-011
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 India	490371-D61
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
RTC battery	449137-001

Description	Spare part number
Rubber feet	608228-001
Screw Kit • 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	608234-001

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
490371-011	Power cord, AC, 3-pin, black, 1.83-m, for use in Australia
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 Demmark
490371-111	Power cord, AC, 3-pin, black, 1.83-m, for use in Switzerland
490371-201	Power cord, AC, 3-pin, black, 1.83-m, for use in Thailand
490371-202	Power cord, AC, 3-pin, black, 1.83-m, for use in Brazil
490371-291	Power cord, AC, 3-pin, black, 1.83-m, for use in Japan
490371-AA1	Power cord, AC, 3-pin, black,1.83-m, for use in the People's Republic of China
490371-AB1	Power cord, AC, 3-pin, black,1.83-m, for use in Taiwan
490371-AD1	Power cord, AC, 3-pin, black,1.83-m, for use in South Korea
490371-D01	Power cord, AC, 3-pin, black,1.83-m, for use in Argentina
490371-D61	Power cord, AC, 3-pin, black,1.83-m, for use in India
531993-001	HP un2420 Broadband Module (WWAN)
537921-001	Bluetooth module without cable

Spare part number	Description
580101-001	Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter for use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the US Virgin Islands
580101-002	Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentian, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Belize, Benin, Bermuda, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Moldova, Romania, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
582564-001	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States
582564-002	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Guatemala, Guinea, Guinea-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, 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, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
587259-001	Intel Core i7 620M Dual Core processor (2.26-GHz, 4-MB L3 cache)

Spare part number	Description
593530-001	Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 for use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, the Cayman Islands, Chile, People's Republic of China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, Ukraine, United Arab Emirates, United Kingdom, Uruguay, the US Virgin Islands, the United States, Venezuela, and Vietnam
593550-001	9-cell, 93-WH (2.80-Ah) Li-ion battery
593562-001	6-cell 62-WH (2.80-Ah) Li-ion battery
593554-001	6-cell 55-WH (2.55Ah) Li-ion battery
593836-001	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter 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, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
594187-001	Intel Core i5 520M Dual Core processor (2.40-GHz, 3-MB L3 cache)
594188-001	Intel Core i5 540M Dual Core processor (2.53-GHz, 3-MB L3 cache)
597624-001	Intel Core i5 430M Dual Core processor (2.26-GHz, 3-MB L3 cache)
598856-001	Memory module, 2048-MB, PC3 10600, 1333-MHz
598859-001	Memory module, 1024-MB, PC3 10600, 1333-MHz
599092-001	Memory module, 4096-MB, PC3 10600, 1333-MHz

Spare part number	Description
600370-001	Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter 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
602992-001	Realink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, 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, the 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, 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, the 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, the Philippines, Poland, Portugal, Puerto Rico, 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, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
608203-001	System board (includes replacement thermal material) for use in models with 512 MB of discrete graphics memory
608204-001	System board (includes replacement thermal material) for use in models with UMA graphics subsystem
608207-001	**35.56 cm** (14.0-in) WXGA Brightview display assembly for use in models not equipped with WWAN
608206-001	**35.56 cm** (14.0-in) display panel, high definition, Brightview for use in models without WWAN

Spare part number	Description
608208-001	Display enclosure
608209-001	Display bezel
608210-001	Display hinge cover
608211-001	Display Cable Kit
608212-001	Display Screw Kit
608214-001	Display bracket (with hinges)
608216-001	250-GB, 7200 RPM hard drive
608217-001	320-GB, 7200 RPM hard drive
608218-001	500-GB, 7200 RPM hard drive
608219-001	640-GB, 5400 RPM hard drive
608221-001	DVD±RW SuperMulti DL Drive
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
608222-121	Keyboard for use in English and French Canada
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
608222-281	Keyboard for use in Thailand
608222-291	Keyboard for use in Japan
608222-AB1	Keyboard for use in Taiwan
608222-AD1	Keyboard for use in South Korea
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
608223-001	Base enclosure
608224-001	Top cover (includes Touchpad and bracket, button board, and cable)
608225-001	Fingerprint reader board
608226-001	Power button board (includes cable)

Spare part number	Description
608227-001	Misc Cable Kit (includes Bluetooth module cable and hard drive cable)
608228-001	Rubber feet
608229-001	Fan/heat sink for use in models with UMA graphics (includes replacement thermal material)
608231-001	Fan/heat sink assembly for use in models with discrete graphics (includes replacement thermal material)
608232-001	Speaker assembly (includes cable)
608233-001	Plastics Kit
608234-001	Screw Kit
608273-001	Power connector with cable
608277-001	USB board with cable
613152-001	90-W Smart AC adapter with power factor correction (PFC), RC/V 3W
613153-001	65-W Smart AC adapter, RC/V 3W
613160-001	90-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W
613161-001	65-W Smart AC adapter with power factor correction (PFC), RC/V EM 3W
613585-001	Intel Core i5 450M Dual Core processor (2.40-GHz, 3-MB L3 cache)
613666-001	**35.56 cm** (14.0-in) display panel, high definition, BrightView for use in models with WWAN
613667-001	**35.56 cm** (14.0-in) WXGA Brightview display assembly for use in models equipped with WWAN
615744-001	Webcam module
616244-001	System board (includes replacement thermal material) for use in models with 1 GB of discrete graphics memory
619997-001	Intel® Centrino® Advanced–N + WiMAX 6250 WLAN module for use in the United States
621046-001	640-GB, 7200 RPM hard drive
622394-001	750-GB, 5400 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

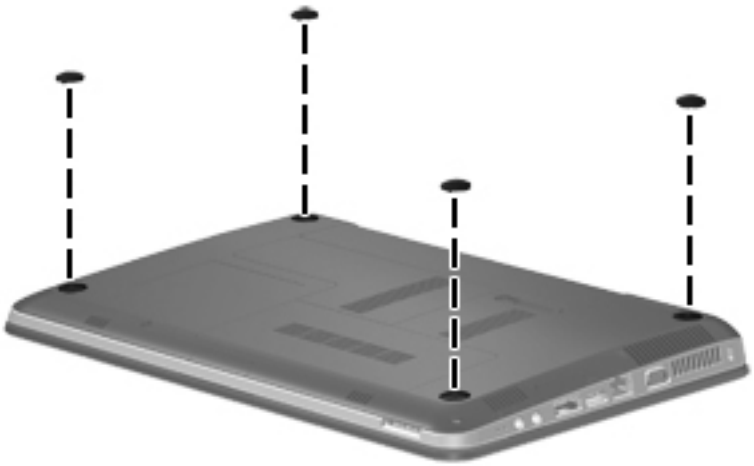
The serial number label, located in the battery bay of the computer, provides important information that you may need when contacting technical support.

- 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

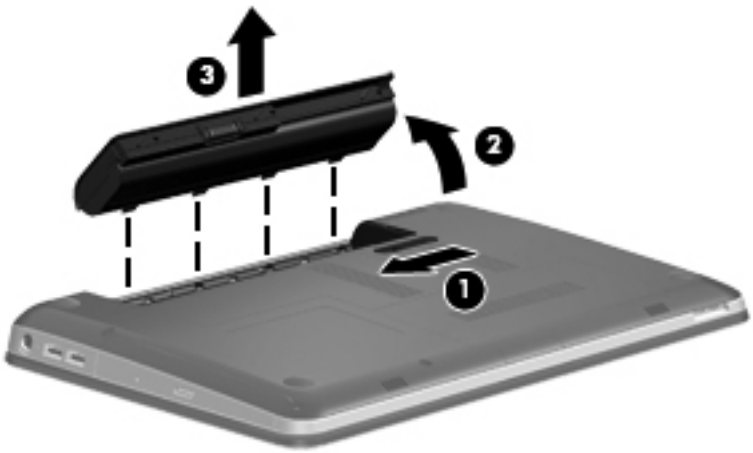
Description	Spare part number
9-cell, 93-WH (2.80-Ah) Li-ion	593550-001
6-cell, 55-WH (2.55Ah) Li-ion	593554-001
6-cell, 62-WH (2.80-Ah) Li-ion	593562-001

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 **(3)**.



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.

SIM

NOTE: This section applies only to computer models with WWAN capability.

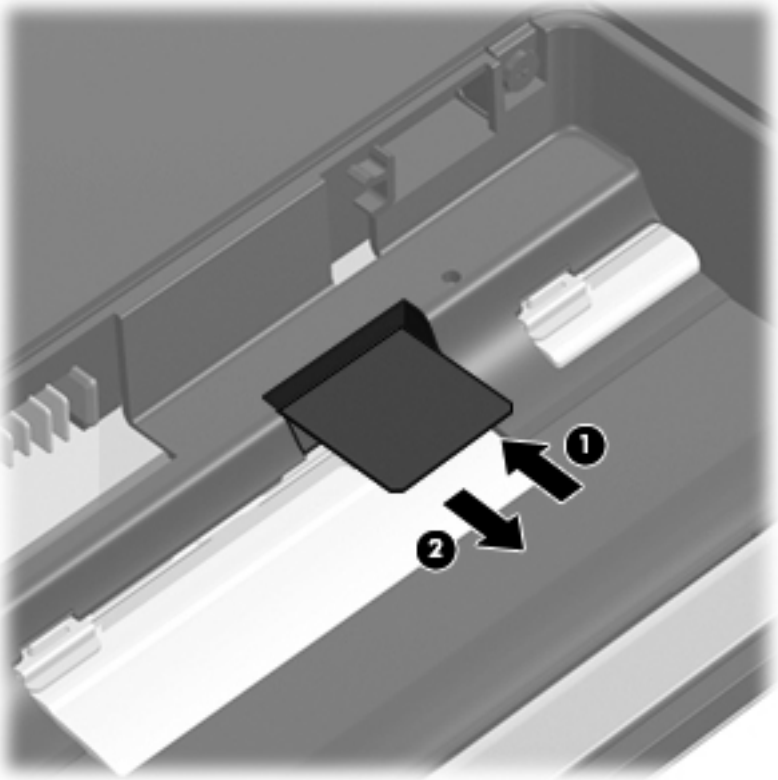
NOTE: If there is a SIM inserted in the SIM slot, it must be removed before disassembling the computer. Be sure that the SIM is reinserted in the SIM slot after reassembling the computer.

Before removing the SIM, 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 42).

Remove the SIM:

1. Press in on the SIM **(1)**. The module is partially ejected from the SIM slot.
2. Remove the SIM **(2)** from the SIM slot.



Reverse this procedure to install the SIM.

Memory module

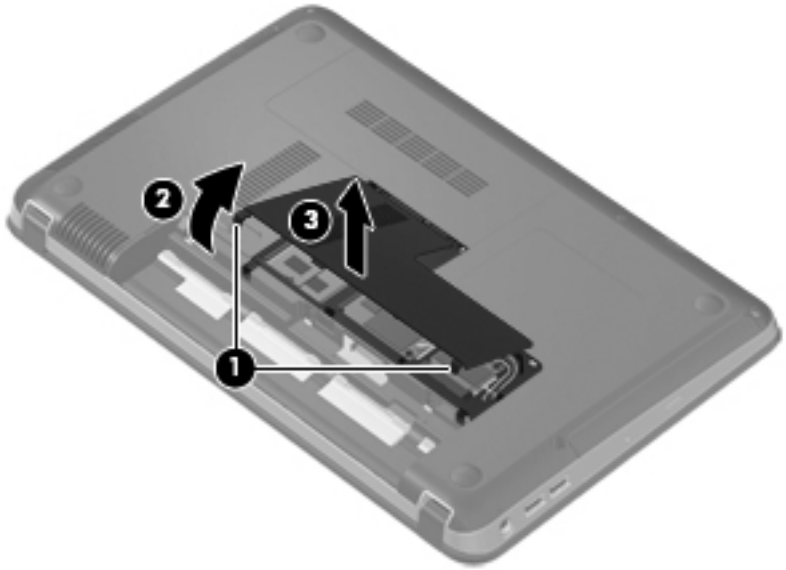
Description	Spare part number
4096-MB, PC3 10600, 1333-MHz	599092-001
2048-MB, PC3 10600, 1333-MHz	598856-001
1024-MB, PC3 10600, 1333-MHz	598859-001

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 42).

Remove the memory module:

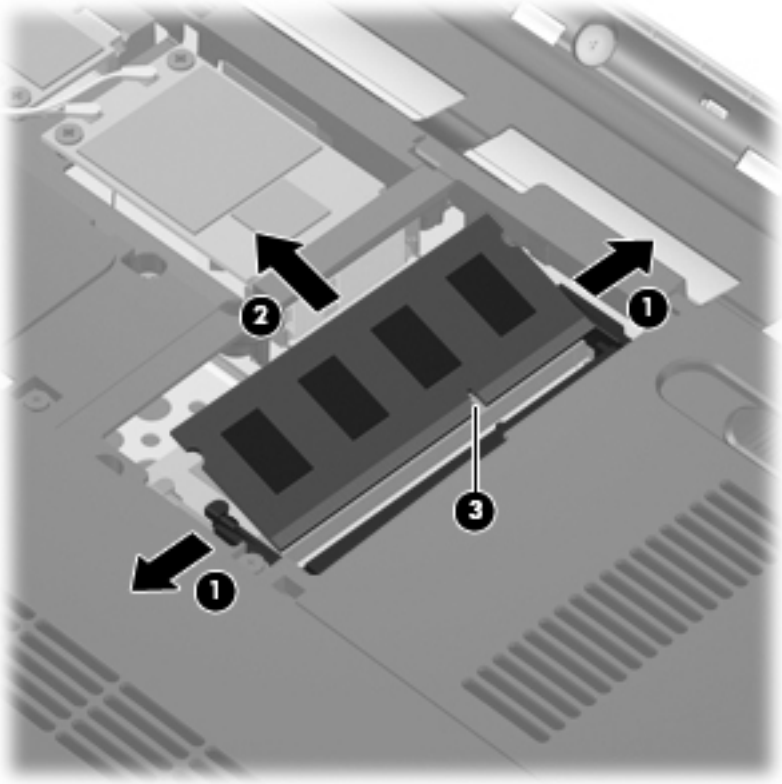
1. Turn the computer upside down with the front toward you.
2. Loosen the two Phillips PM2.5×5.0 captive screws **(1)** that secure the memory/wireless module compartment cover to the computer.
3. Lift the left side of the cover **(2)**, swing it forward, and remove it **(3)**. The memory/wireless compartment cover is included in the plastics kit, spare part number 608233-001.



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

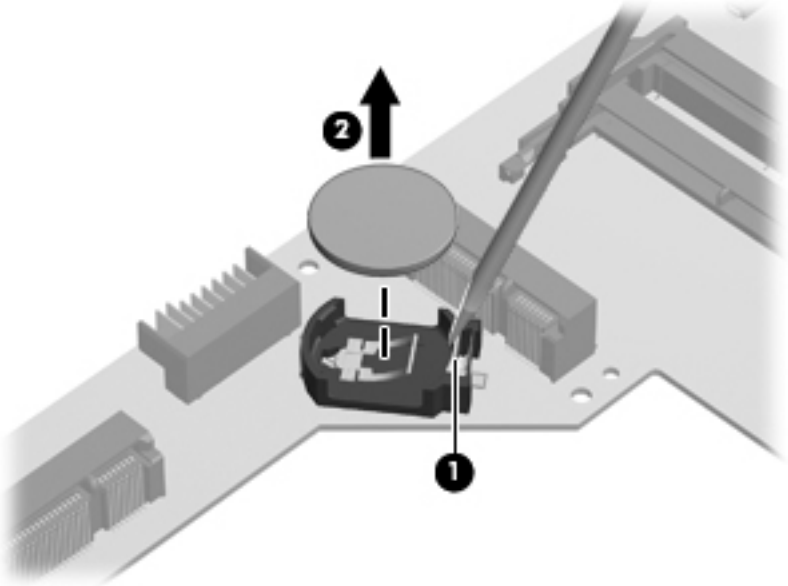
Description	Spare part number
RTC battery	449137-001

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 42).
5. Hard drive cover (see Hard drive on page 54).

Remove the RTC battery:

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



Reverse this procedure to install the RTC battery.

WLAN module

NOTE: The WLAN module and the WWAN module are not interchangeable.

Description	Spare part number
Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter For use in Canada, the Cayman Islands, Guam, Puerto Rico, the United States, and the US Virgin Islands	580101-001
Atheros AR9285 802.11 a/b/g/n 2x2 WiFi adapter For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentian, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Belize, Benin, Bermuda, Bhutan, Bosnia and Herzegovina, Botswana, Brazil, British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Denmark, Djibouti, Dominica, Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Republic of Moldova, Romania, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	580101-002
Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 For use in Andorra, Antigua and Barbuda, Argentina, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belgium, Bermuda, Bolivia, Bosnia and Herzegovina, Brazil, Brunei, Bulgaria, Canada, the Cayman Islands, Chile, People's Republic of China, Colombia, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, the Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Finland, France, French Guiana, Georgia, Germany, Ghana, Greece, Guadeloupe, Guam, Guatemala, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malawi, Malaysia, Malta, Martinique, Mauritius, Mexico, Monaco, Montenegro, Morocco, the Nether Antilles, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman, Pakistan, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Puerto Rico, Qatar, Romania, San Marino, Saudi Arabia, Senegal, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sri Lanka, Sweden, Switzerland, Taiwan, Tanzania, Thailand, Trinidad and Tobago, Turkey, Ukraine, United Arab Emirates, United Kingdom, Uruguay, the US Virgin Islands, the United States, Venezuela, and Vietnam	593530-001
Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter For use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States	582564-001

Description	Spare part number
Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter For use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Guatemala, Guinea, Guinea-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, 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, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, 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, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002
Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter 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, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the 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, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, 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, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593836-001

Description	Spare part number
Realink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, 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, the 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, 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, the 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, the Philippines, Poland, Portugal, Puerto Rico, 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, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the US Virgin Islands, the United States, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	602992-001
Broadcom 4313 802.11b/g/n 1x1 WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter 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
Intel® Centrino® Advanced–N + WiMAX 6250 WLAN module For use in the United States	619997-001

Before removing the WLAN module, follow these steps:

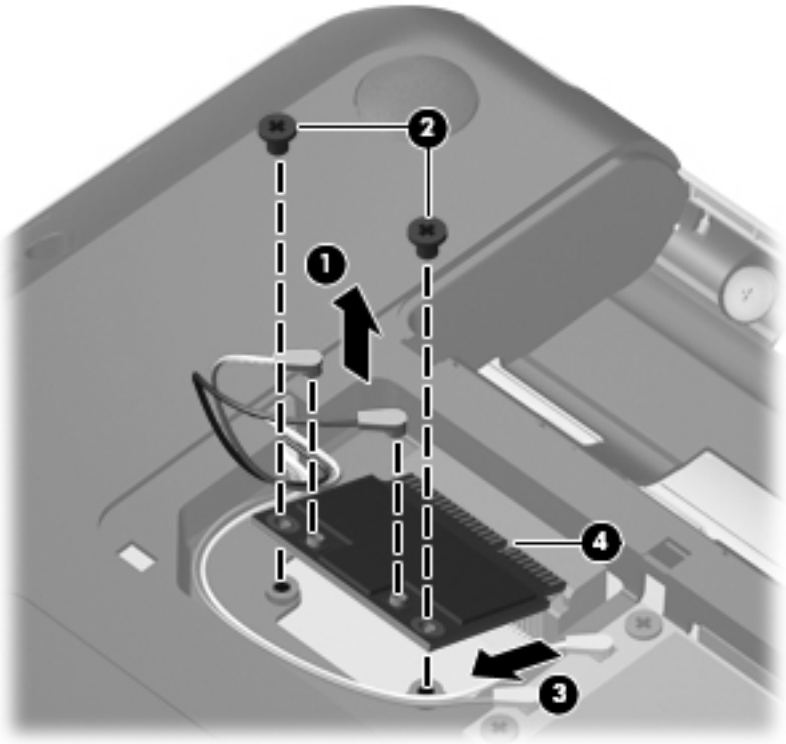
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 42).
5. Remove the memory/wireless module compartment cover (see Memory module on page 44).

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 PM2.0×4.0 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.

WWAN module

NOTE: The WWAN module and the WLAN module are not interchangeable.

Description	Spare part number
HP un2420 Broadband Module (WWAN)	531993-001

Before removing the WWAN module, follow these steps:

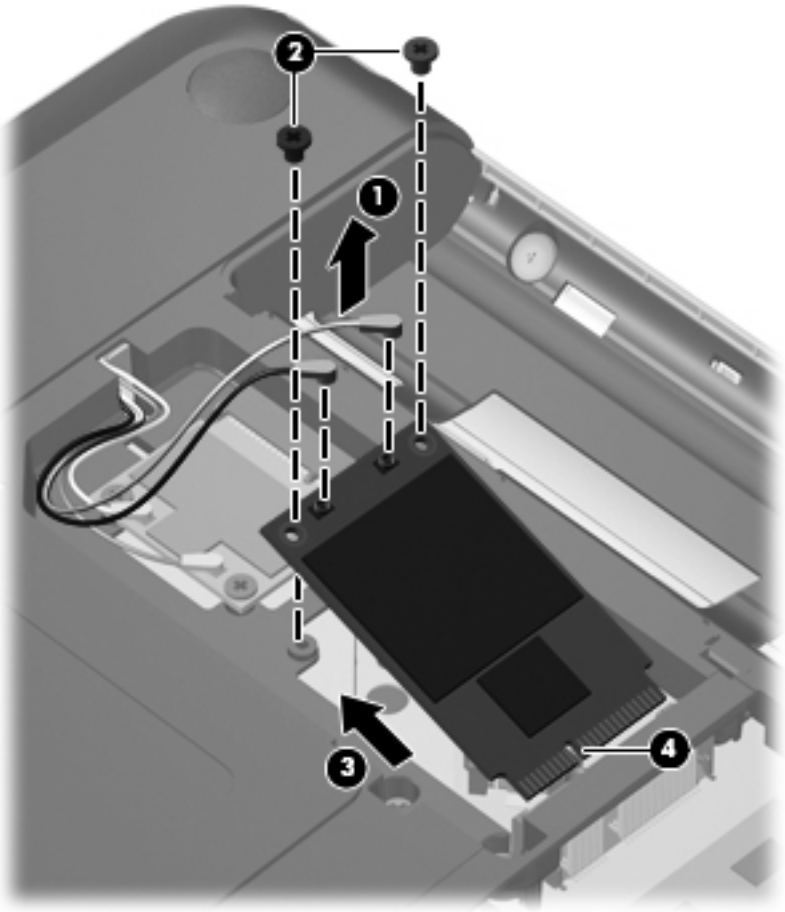
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 42).
5. Remove the memory/wireless module compartment cover (see Memory module on page 44).

Remove the WWAN module:

1. Turn the computer upright with the front toward you.
2. Disconnect the two WWAN antenna cables **(1)** from the WWAN module.
3. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

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



Reverse the above procedure to install the WWAN module.

Hard drive

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

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

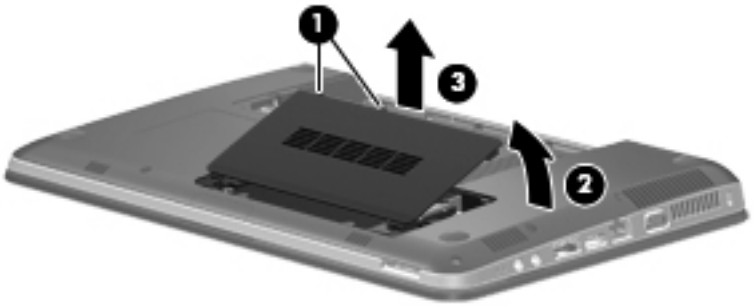
Description	Spare part number
750-GB, 5400 RPM	622394-001
640-GB, 7200 RPM	621046-001
640-GB, 5400 RPM	608219-001
500-GB, 7200 RPM	608218-001
320-GB, 7200 RPM	608217-001
250-GB, 7200 RPM	608216-001
160-GB solid-state drive	608215-001

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 42).
5. Remove the memory/wireless module compartment cover (see Memory module on page 44)

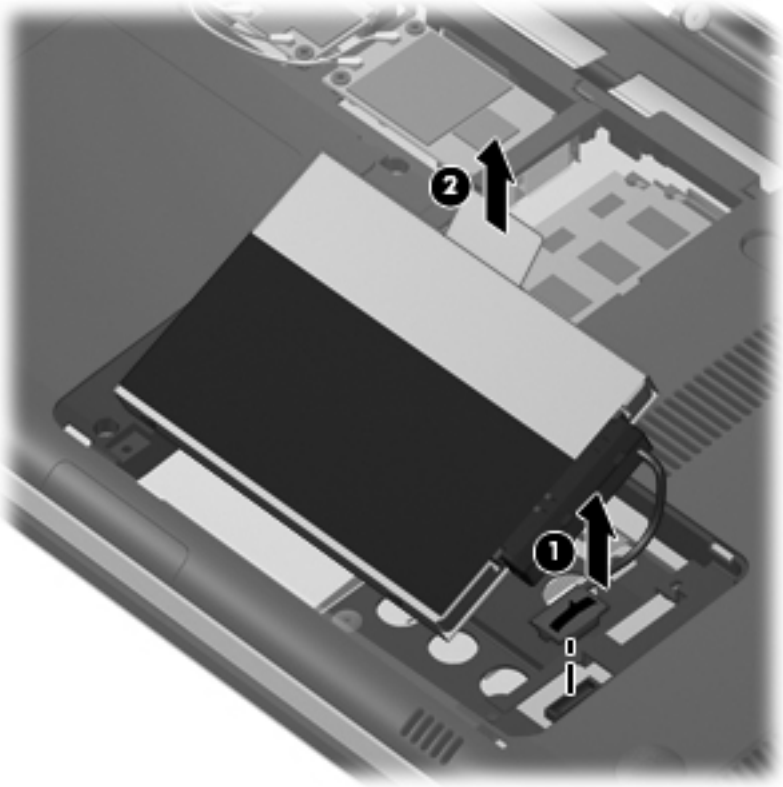
Remove the hard drive:

1. Position the computer with the front toward you.
2. Loosen the two captive Phillips PM2.5×5.0 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 608233-001.

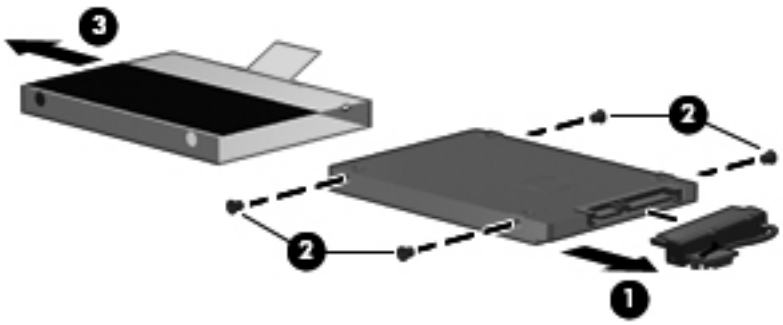


4. Disconnect the hard drive cable from the system board **(1)**.

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 PM3.0×3.0 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

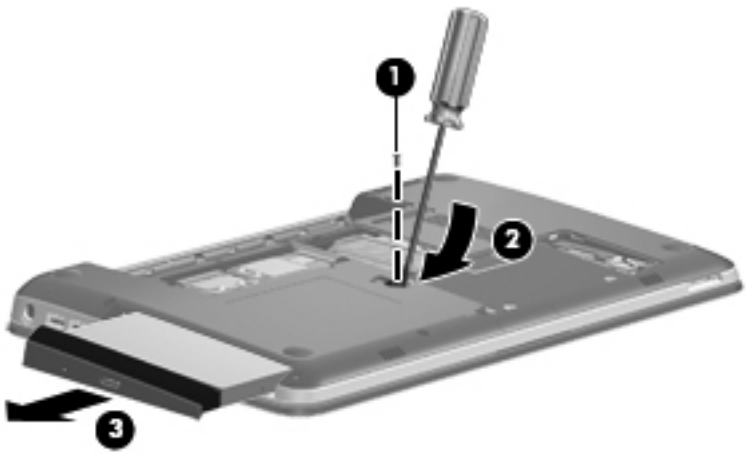
Description	Spare part number
DVD±RW SuperMulti DL Drive	608221-001

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 42).
5. Remove the memory/wireless module compartment cover (see Memory module on page 44).
6. Remove the hard drive cover (see Hard drive on page 54).

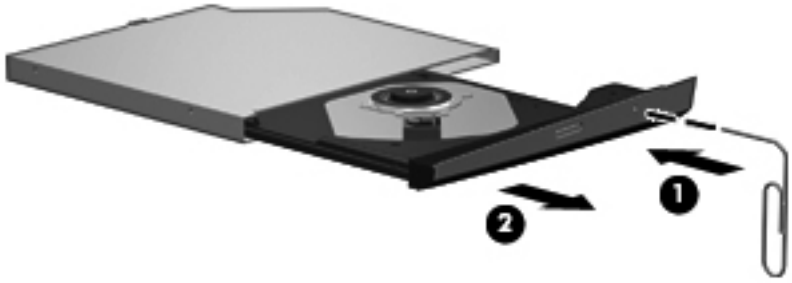
Remove the optical drive:

1. Position the computer upside down with the front toward you.
2. Remove the Phillips PM2.5x5.0 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)**.

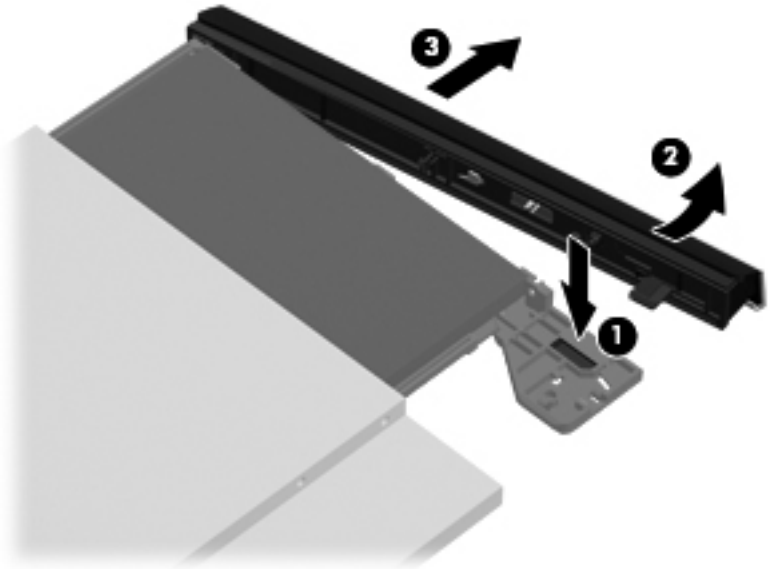


5. If it is necessary to remove the drive bezel, insert the end of a paper clip into the release access hole **(1)** in the optical drive bezel. Press in gently until the tray is released.

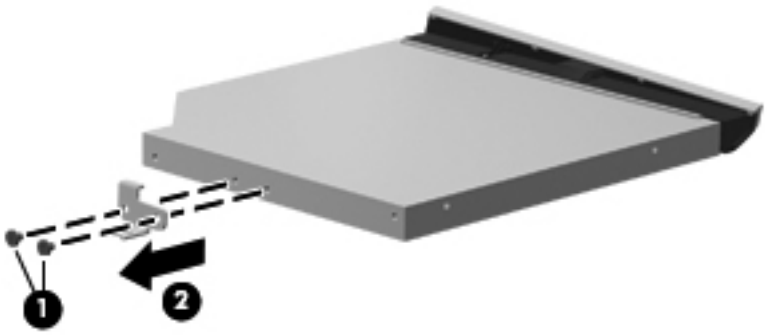
6. Firmly pull outward on the open tray **(2)** until the drive slides out.



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 PM2.0×3.0 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

Description	Spare part number
Keyboard for use in Brazil	608222-201
Keyboard for use in English and French Canada	608222-121
Keyboard for use in Europe, the Middle East, and Asia	608222-B31
Keyboard for use in France	608222-051
Keyboard for use in Germany	608222-041
Keyboard for use in Japan	608222-291
Keyboard for use in Latin America	608222-161
Keyboard for use in the Netherlands	608222-DH1
Keyboard for use in Saudi Arabia	608222-171
Keyboard for use in South Korea	608222-AD1
Keyboard for use in Spain	608222-071
Keyboard for use in Switzerland	608222-BG1
Keyboard for use in Taiwan	608222-AB1
Keyboard for use in Thailand	608222-281
Keyboard for use in Turkey	608222-141
Keyboard for use in the United Kingdom	608222-031
Keyboard for use in the United States	608222-001

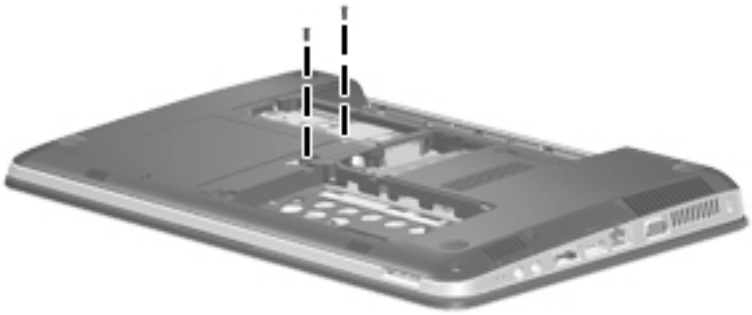
Before removing the keyboard, follow these steps:

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 42).
5. Remove the memory/wireless compartment cover (see Memory module on page 44).
6. Remove the hard drive cover (see Hard drive on page 54).

Remove the keyboard:

1. Turn the computer upside down with the front toward you.

2. Remove the two Phillips PM2.5×6.5 screws that secure the keyboard to the computer.



3. Turn the computer right-side up with the front toward you.
4. Open the computer 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 to which the keyboard cable is attached and disconnect the keyboard cable **(3)** from the system board.

8. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

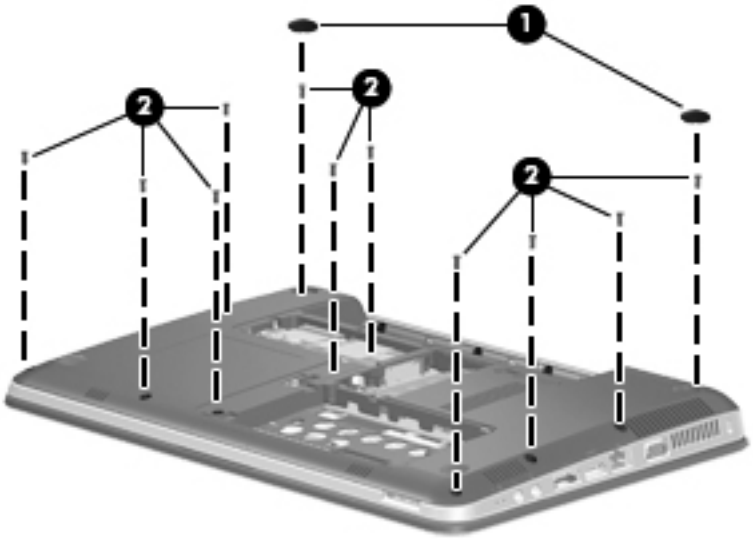
Description	Spare part number
Top cover (includes Touchpad and bracket, button board, and cable)	608224-001

Before removing the top cover, follow these steps:

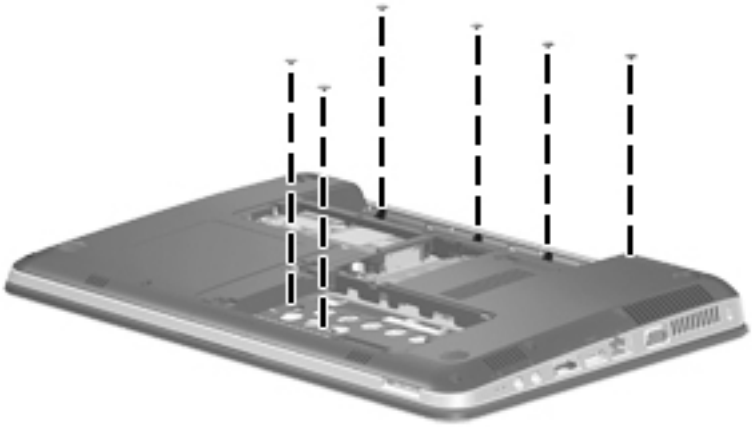
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the following components:
   a. Battery (see Battery on page 42)
   b. Hard drive (see Hard drive on page 54)
   c. Optical drive (see Optical drive on page 56)
   d. Keyboard (see Keyboard on page 58)

Remove the top cover:

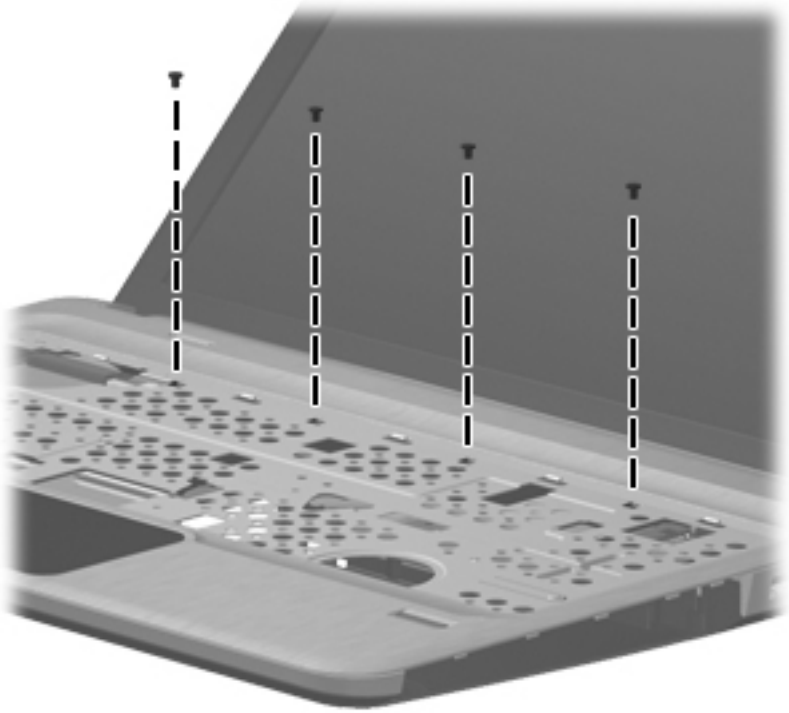
1. Turn the computer upside down with the front toward you.
2. Remove the two feet near the battery **(1)** and the 11 Phillips PM2.5×7.0 screws **(2)** that secure the top cover to the base enclosure. Two of the screws are under the feet.



3. Remove the six Phillips PM2.0x2.0 broadhead screws that secure the top cover to the base enclosure.

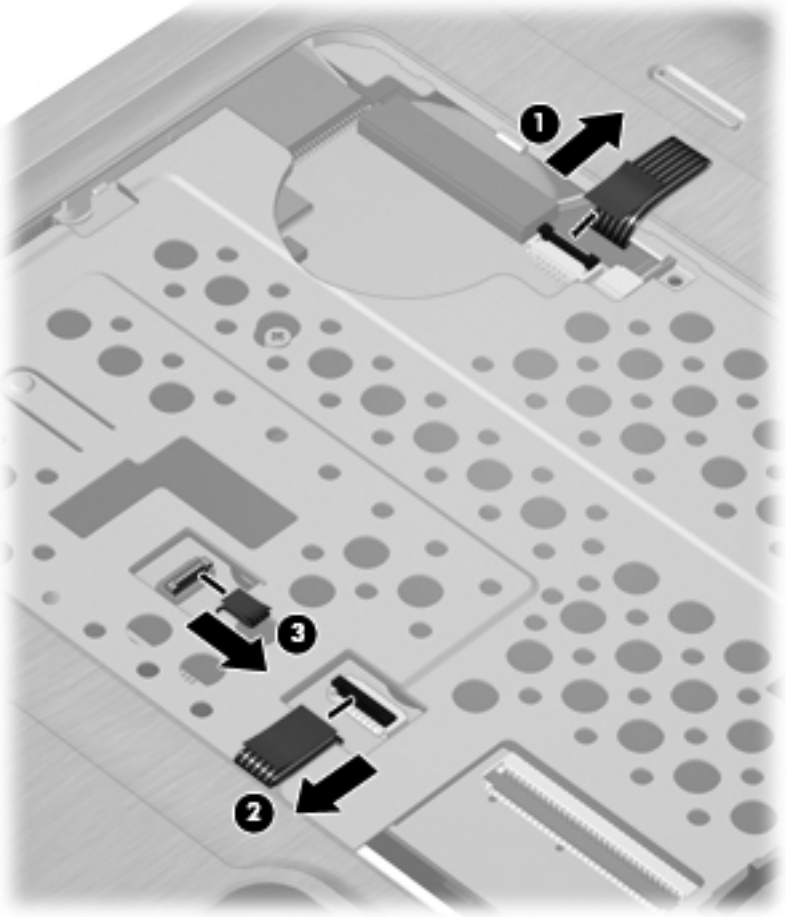


4. Turn the computer right-side up with the front toward you.
5. Open the computer as far as possible.
6. Remove the four Phillips PM2.0×4.0 screws that secure the top cover to the base enclosure, and then disengage the top cover from the base enclosure and lift the top cover up enough to gain access to the cables.



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

8. Release the ZIF connector to which the TouchPad button board cable is connected and disconnect the cable from the system board **(2)**.
9. Release the ZIF connector to which the fingerprint reader board cable is connected and disconnect the cable from the system board **(3)**.



10. Remove the top cover from the base enclosure.

Reverse this procedure to install the top cover.

Fingerprint reader board

Description	Spare part number
Fingerprint reader board	608225-001

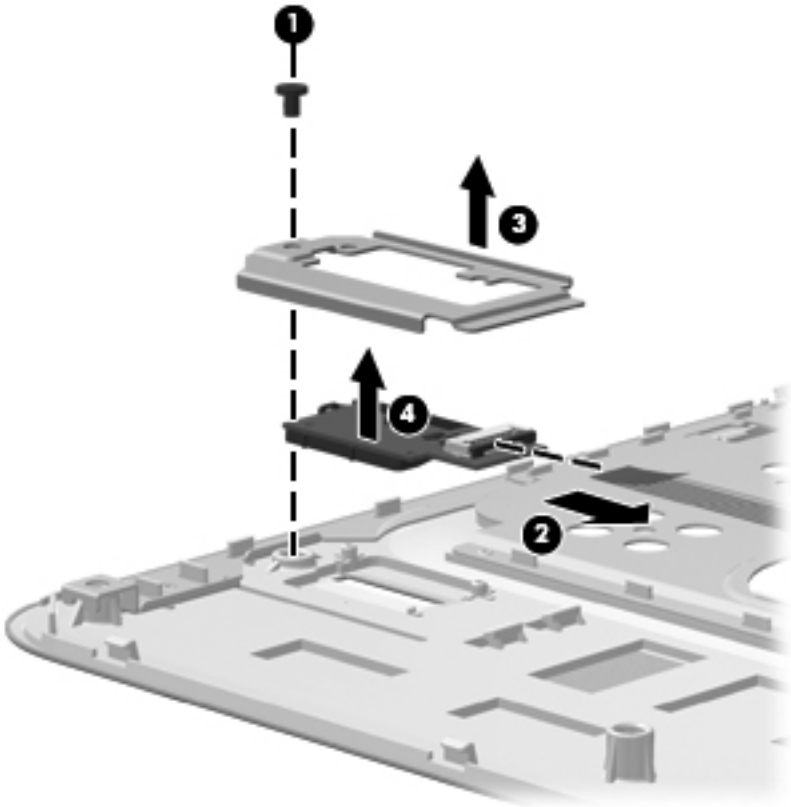
Before removing the fingerprint reader board, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. Optical drive (see Optical drive on page 56)
   c. Keyboard (see Keyboard on page 58)
   d. Top cover (see Top cover on page 60)

Remove the fingerprint reader board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the fingerprint reader board and bracket to the top cover.
3. Release the ZIF connector on the fingerprint reader board and disconnect the cable **(2)** from the connector.
4. Remove the fingerprint reader board bracket **(3)** from the top cover.

5. Remove the fingerprint reader board **(4)** 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)	608226-001

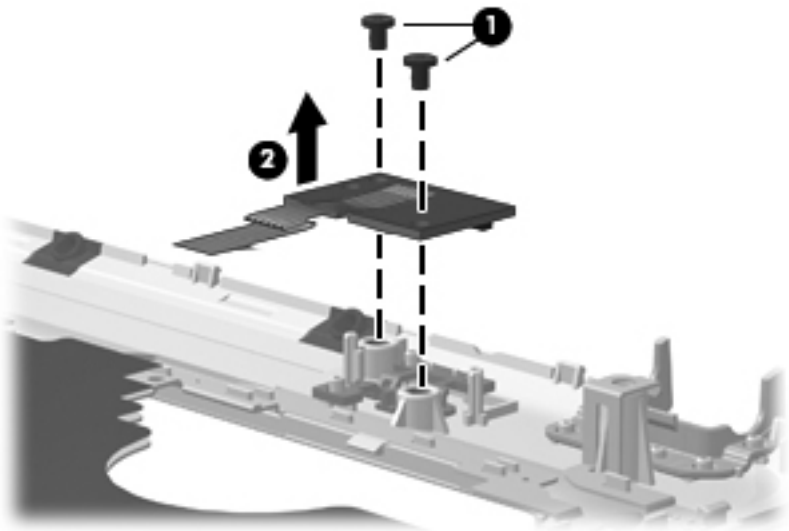
Before removing the power button board, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. Optical drive (see Optical drive on page 56)
   c. Keyboard (see Keyboard on page 58)
   d. Top cover (see Top cover on page 60)

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 PM2.0×3.0 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) WXGA Brightview display assembly for use in models equipped with WWAN	613667-001
35.56 cm (14.0-in) WXGA Brightview display assembly for use in models not equipped with WWAN	608207-001

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 42).
5. Disconnect the wireless antenna cables from the WLAN module (see WLAN module on page 47).
6. Remove the following components:
   a. WLAN module (see WLAN module on page 47)
   b. WWAN module (see WWAN module on page 52)
   c. Keyboard (see Keyboard on page 58)
   d. Optical drive (see Optical drive on page 56)
   e. Top cover (see Top cover on page 60)

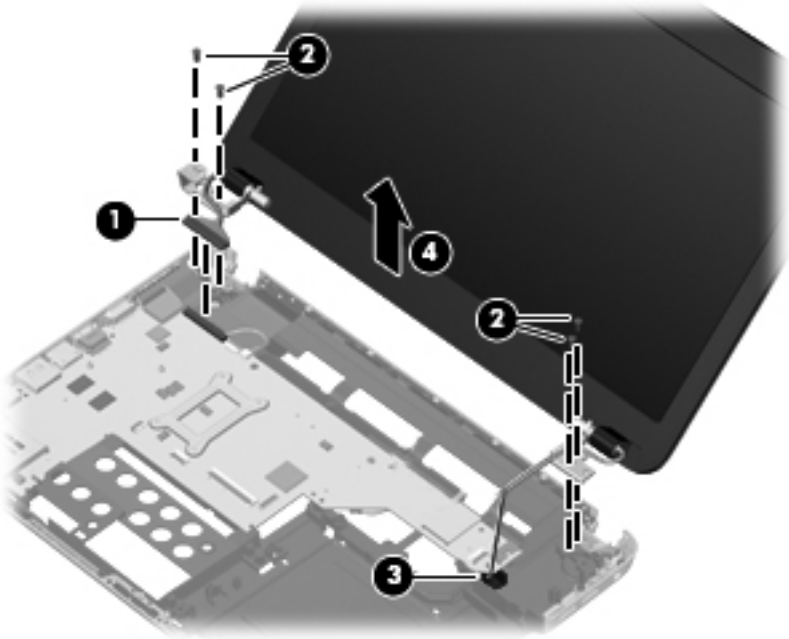
Remove the display assembly:

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 four black Phillips PM2.5×6.5 screws **(2)** that secure the display assembly to the computer.

△ **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.

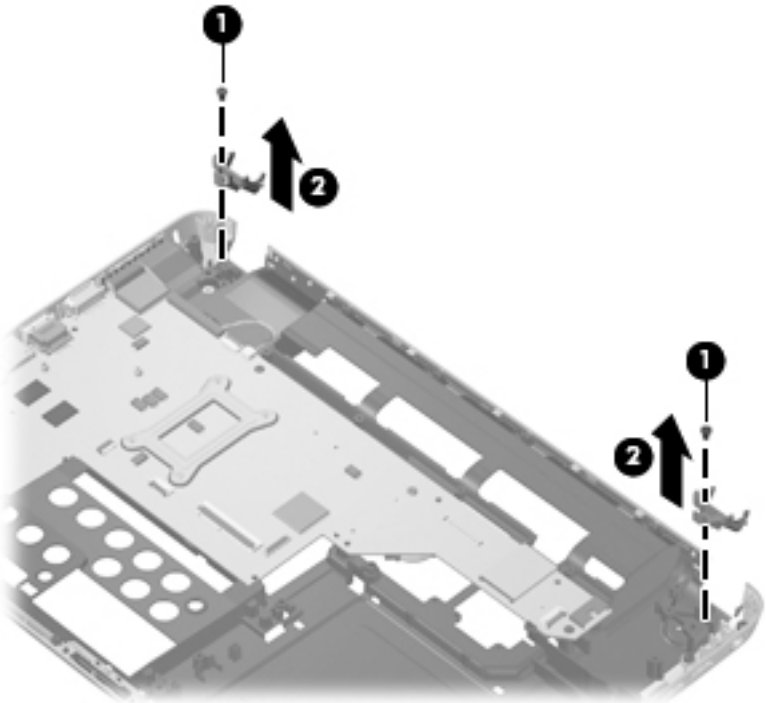
5. Remove the wireless antenna cables from the hole **(3)** built into the base enclosure.

6. Remove the display assembly **(4)**.



NOTE: In the left main display hinge, screws populate the right and left holes in the hinge (no screw in the middle hole). In the right main hinge, screws populate the left two holes in the hinge.

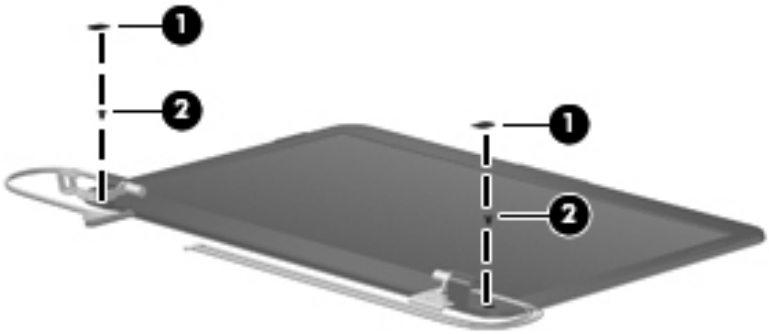
7. If it is necessary to remove the display brackets, remove the two Phillips PM2.0×3.0 screws **(1)** that secure the brackets to base enclosure, and the remove the brackets **(2)**.



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.

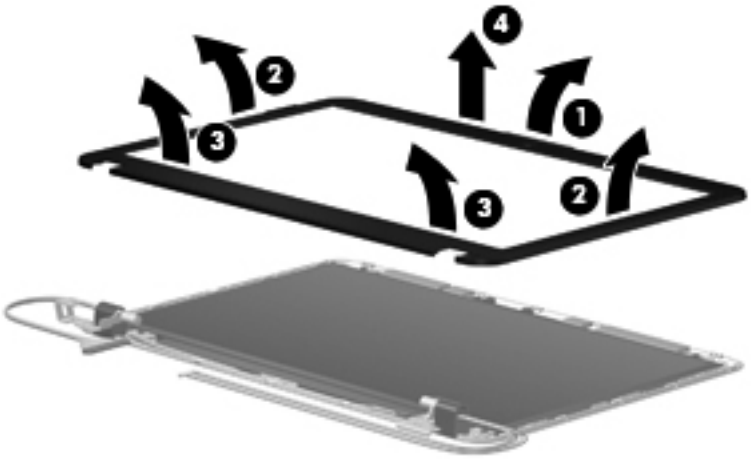
   (1) Two Mylar screw covers on the display bezel bottom edge

   (2) Two Phillips PM2.5×5.0 screws

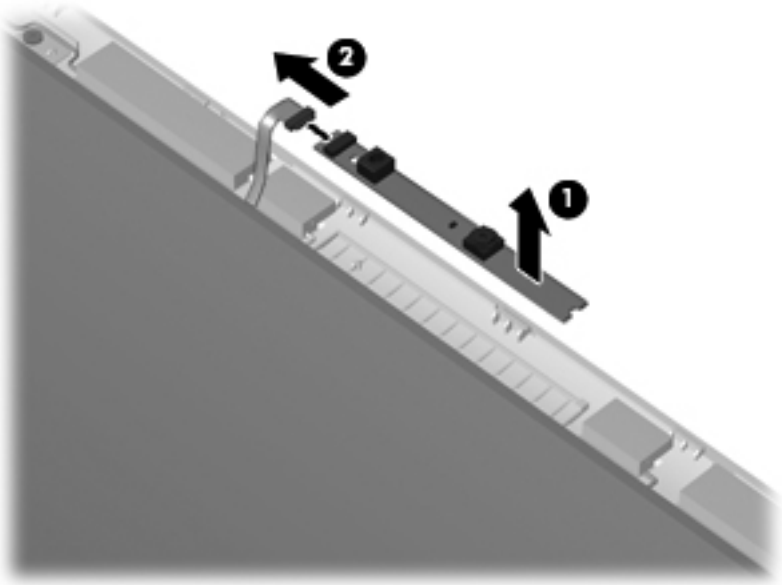


9. Flex the inside edge of the top **(1)**, the left and right sides **(2)**, and the bottom **(3)** of the display bezel until the bezel disengages from the display back cover.

10. Remove the display bezel **(4)**. The display bezel is available using spare part number 608209-001.

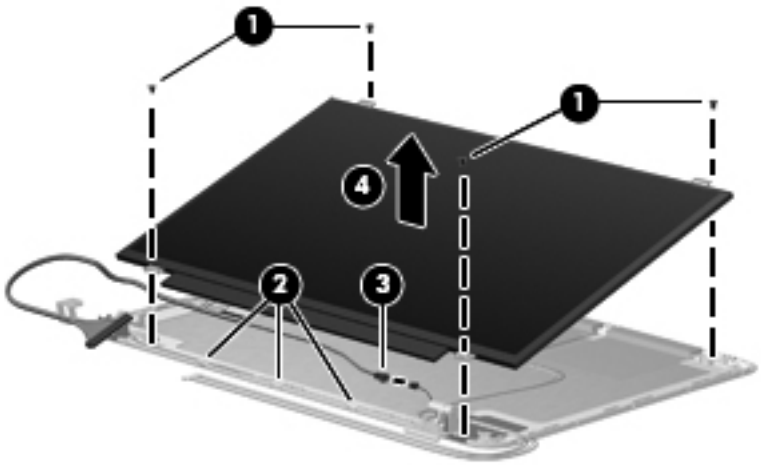


11. If it is necessary to replace the webcam module, lift the webcam from the double-sided tape on the display back cover **(1)**, disconnect the webcam cable **(2)** from the module, and remove the webcam. The webcam is available using spare part number 615744-001.



12. If it is necessary to replace the display panel, remove the four Phillips PM2.0×5.0 screws **(1)** that secure the display panel to the display enclosure.
13. Remove the cable from the routing path **(2)** along the bottom of the enclosure, disconnect the display panel cable from the HP logo light cable **(3)**, and then lift the panel from the enclosure **(4)**. The display panel is available using the spare part number 608206-001 for models without WWAN and 613666-001 for models with WWAN.

NOTE: The hinge cover screws are thicker than the other screws.

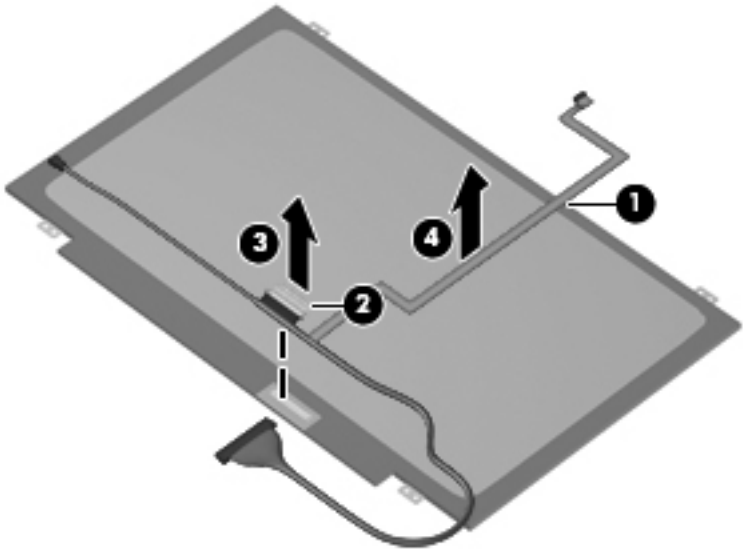


14. If it is necessary to replace the display cable, follow these steps:
    a. Turn the display panel upside down in front of you.
    b. Disengage the webcam cable from the glue securing it to the back of the display **(1)**.

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)**.



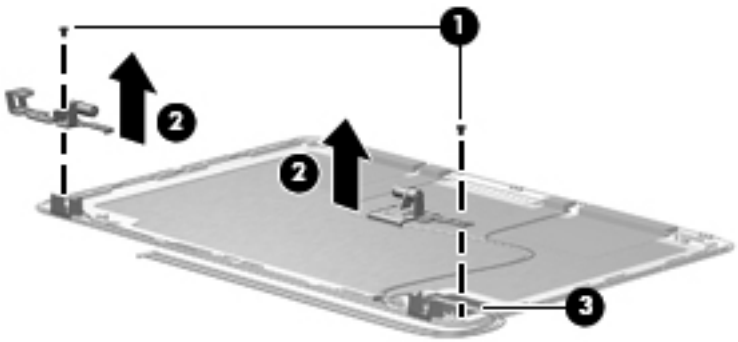
The display cable is available in the Display Cable Kit, spare part number 608211-001.

15. If it is necessary to replace the display bracket and hinges, remove the two Phillips PM2.5×5.0 screws **(1)** that secure the brackets to the display.

16. Remove the display hinges **(2)** from the display. The display bracket and hinge set is available using spare part number 608214-001.

NOTE: Note the WLAN antenna routing path through the right hinge **(3)**.

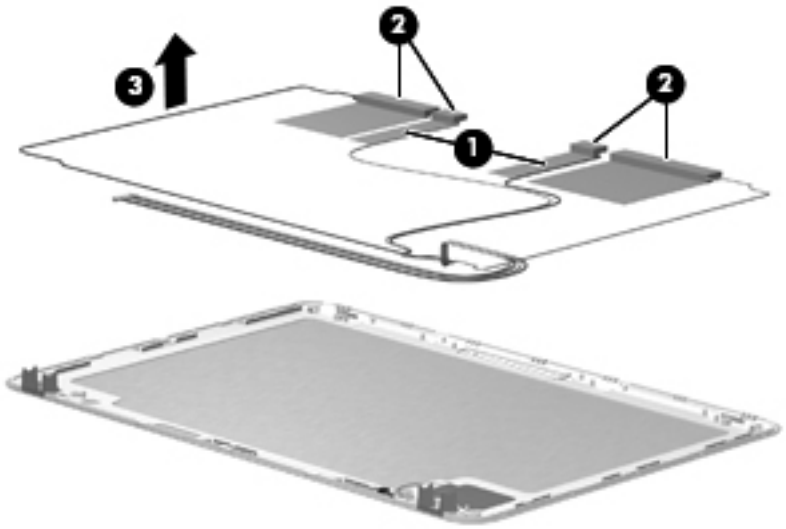
NOTE: The silver screws go on the outside of the hinges.



17. 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.

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

19. 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

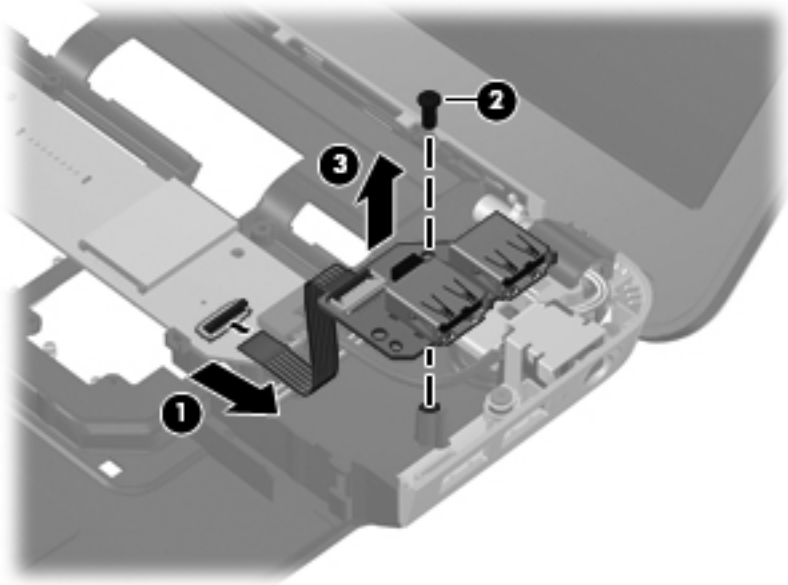
Description	Spare part number
USB board (includes cable)	608277-001

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. Optical drive (see Optical drive on page 56)
   c. Keyboard (see Keyboard on page 58)
   d. Top cover (see Top cover on page 60)

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 PM2.5×5.0 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

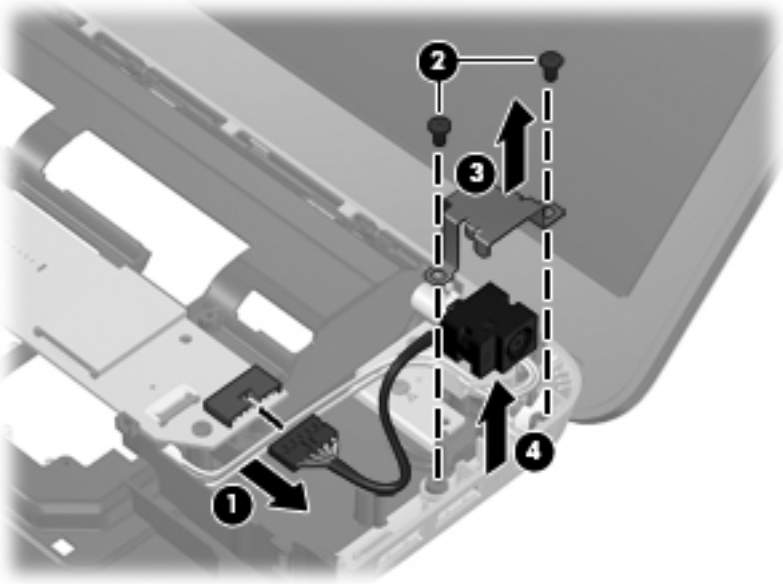
Before removing the power connector cable, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. Optical drive (see Optical drive on page 56)
   c. Keyboard (see Keyboard on page 58)
   d. Top cover (see Top cover on page 60)
   e. USB board (see USB board on page 72)

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 PM2.5×5.0 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 Misc Cable Kit, spare part number 608227-001.

Description	Spare part number
Bluetooth module	537921-001

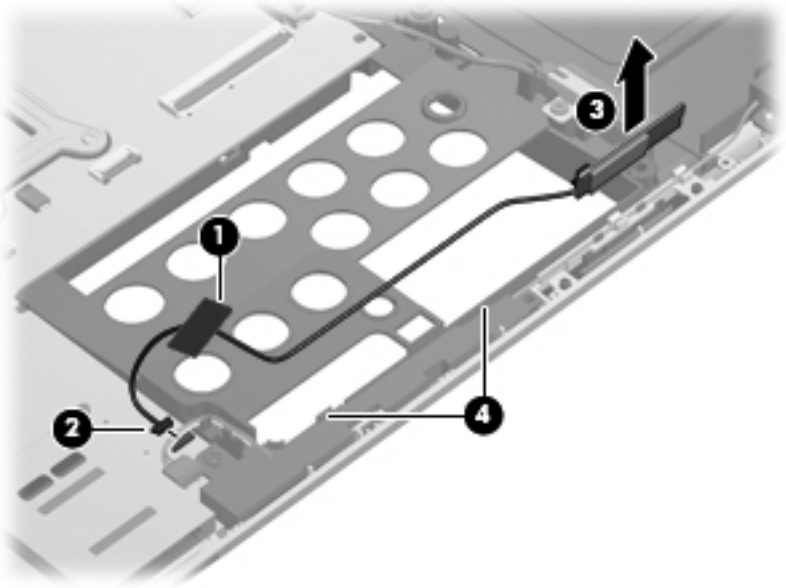
Before removing the Bluetooth module, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. Optical drive (see Optical drive on page 56)
   c. Keyboard (see Keyboard on page 58)
   d. Top cover (see Top cover on page 60)

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

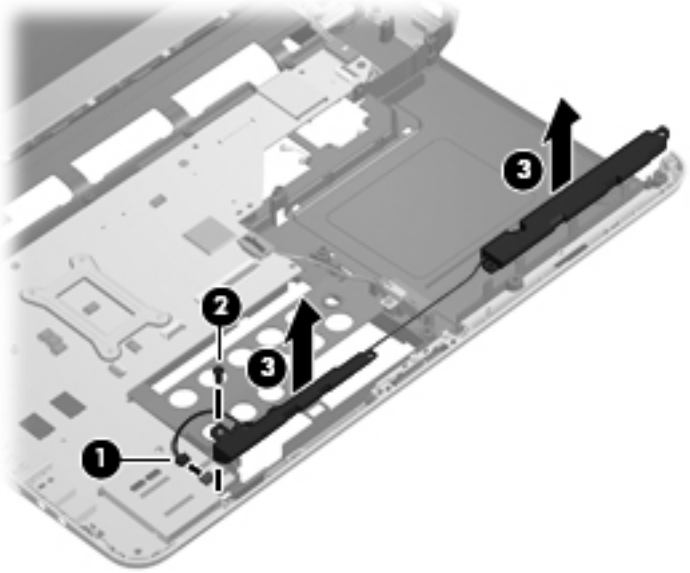
Before removing the speaker assembly, follow these steps:

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 42).
5. Remove the following components:
   a. Optical drive (see Optical drive on page 56)
   b. Keyboard (see Keyboard on page 58)
   c. Top cover (see Top cover on page 60)
   d. Bluetooth module (see Bluetooth module on page 75).

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 PM2.0×4.0 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.

Description	Spare part number
System board for use in models with 1 GB of discrete graphics memory	616244-001
System board for use in models with 512 MB of discrete graphics memory	608203-001
System board for use in models with UMA graphics	608204-001

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:

- SIM (see SIM on page 43)
- RTC battery (see RTC battery on page 46)
- Memory modules (see Memory module on page 44)
- WLAN module (see WLAN module on page 47)
- WWAN module (see WWAN module on page 52)
- Fan/heat sink assembly (see Fan/heat sink assembly on page 81)
- Processor (see Processor on page 86)

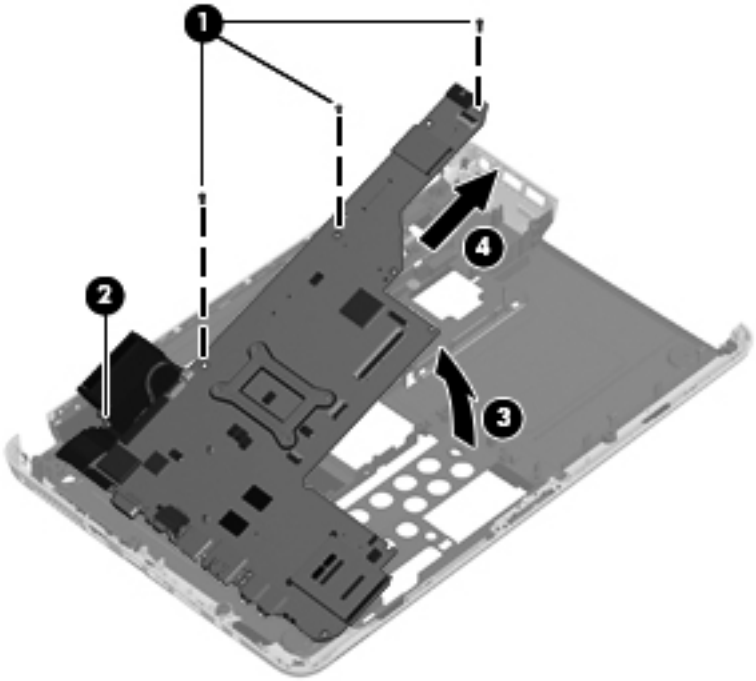
Before removing the system board, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. WLAN module (see WLAN module on page 47)
   c. WWAN module (see WWAN module on page 52)
   d. Optical drive (see Optical drive on page 56)
   e. Keyboard (see Keyboard on page 58)
   f. Top cover (see Top cover on page 60)
   g. Speaker assembly (see Speaker assembly on page 77)
   h. Display assembly (see Display assembly on page 66)

i. USB board (see USB board on page 72)

j. Power connector cable (see Power connector cable on page 73)

1. Turn the computer upright with the left side toward you.
2. Remove the three Phillips PM2.5×5.0 screws **(1)** that secure the system board to the computer.
3. Loosen the captive screw in the fan sink that secures the system board **(2)**.
4. Lift the right side of the system board **(3)**.
5. Release the system board by sliding it to the right at an angle **(4)** 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 models with UMA graphics	608229-001
Fan/heat sink assembly for use in models with discrete graphics	608231-001

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.

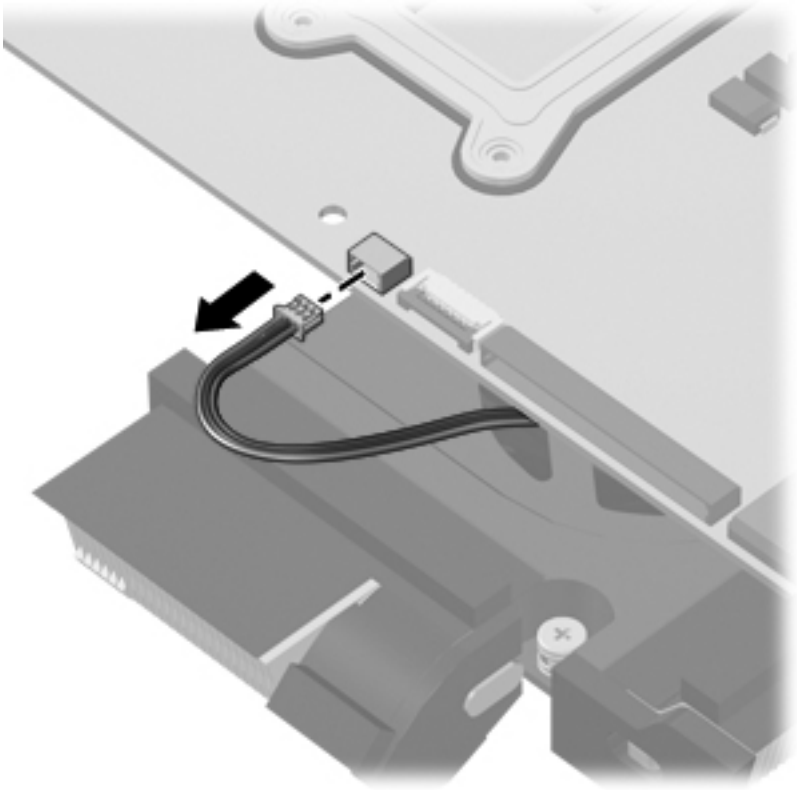
Before removing the fan/heat sink assembly, follow these steps:

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 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. WLAN module (see WLAN module on page 47)
   c. WWAN module (see WWAN module on page 52)
   d. Optical drive (see Optical drive on page 56)
   e. Keyboard (see Keyboard on page 58)
   f. Top cover (see Top cover on page 60)
   g. Speaker assembly (see Speaker assembly on page 77)
   h. Power connector cable (see Power connector cable on page 73)
   i. USB board (see USB board on page 72).
   j. Display assembly (see Display assembly on page 66)
   k. System board (see System board on page 79)

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.

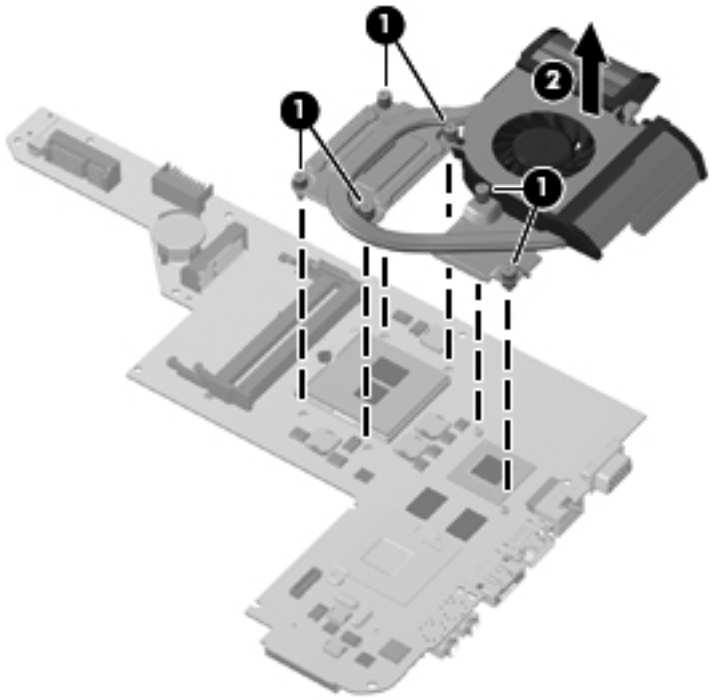
1. Turn the system board upside down.
2. Disconnect the fan cable from the system board.



3. Follow the sequence embossed on heat sink to loosen the six Phillips PM2.5×7.0 captive screws **(1)** that secure the fan/heat sink assembly to the system board.

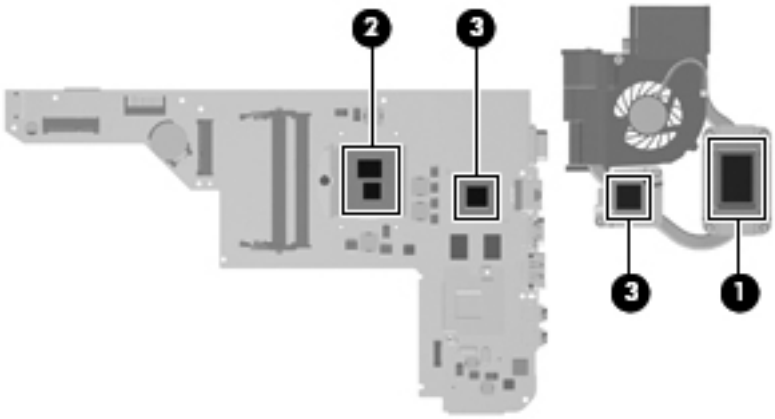
NOTE: Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it may be necessary to move the fan/heat sink assembly from side to side to detach the assembly.

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



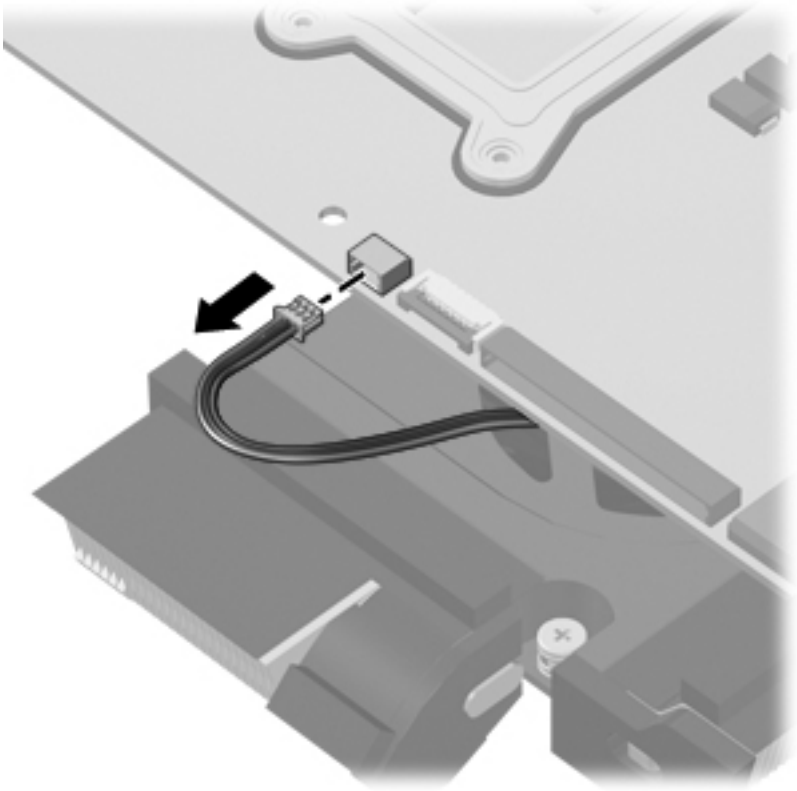
The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly **(1)**, **(3)** and the processor **(2)** and graphics processor **(3)** on the system board each time the fan/heat sink assembly is removed. Thermal pads and thermal paste must be installed on all surfaces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

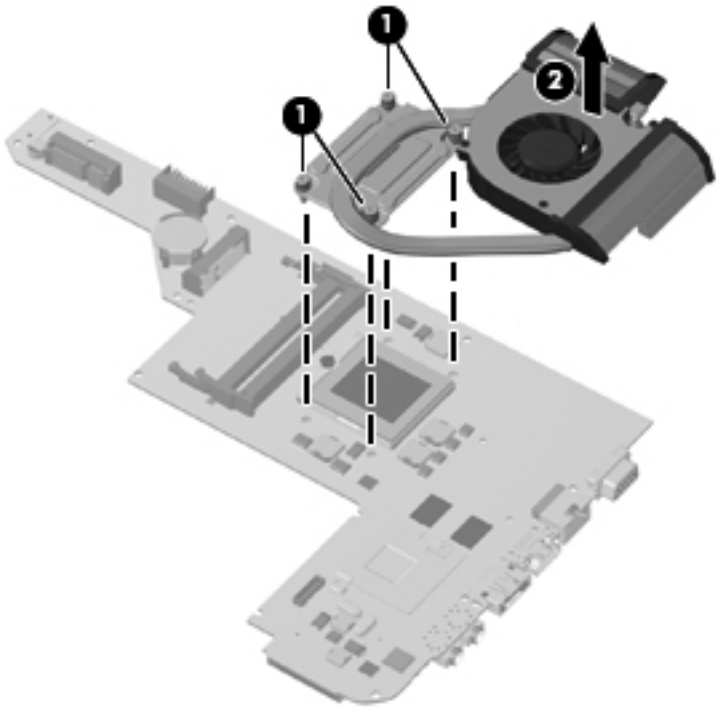
5. Disconnect the fan cable from the system board.



6. Follow the sequence embossed on heat sink to loosen the four Phillips PM2.5×7.0 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.

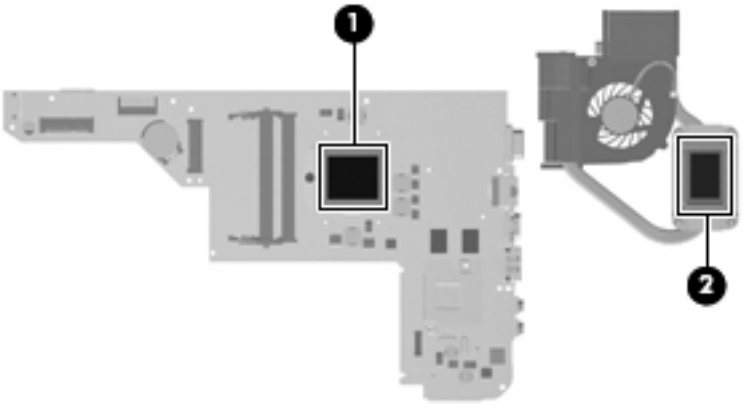
7. Remove the fan/heat sink assembly **(2)**.



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 620M Dual Core processor (2.26-GHz, 4-Mb L3 cache)	587259-001
Intel Core i5 540M Dual Core processor (2.53-GHz, 3-MB L3 cache)	594188-001
Intel Core i5 520M Dual Core processor (2.40-GHz, 3-MB L3 cache)	594187-001
Intel Core i5 450M Dual Core processor (2.40-GHz, 3-MB L3 cache)	613585-001
Intel Core i5 430M Dual Core processor (2.26-GHz, 3-MB L3 cache)	597624-001

Before removing the processor, follow these steps:

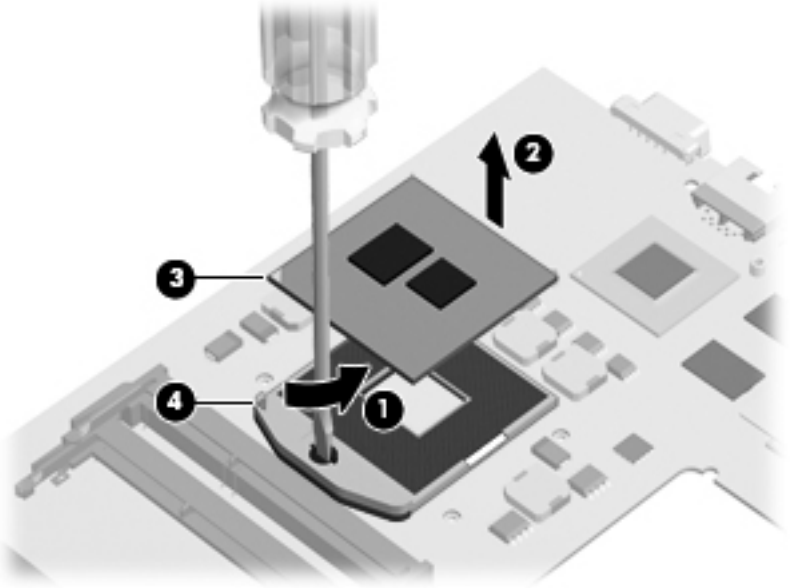
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 42).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 54)
   b. WLAN module (see WLAN module on page 47)
   c. WWAN module (see WWAN module on page 52)
   d. Optical drive (see Optical drive on page 56)
   e. Keyboard (see Keyboard on page 58)
   f. Top cover (see Top cover on page 60)
   g. Speaker assembly (see Speaker assembly on page 77)
   h. Power connector cable (see Power connector cable on page 73)
   i. USB board (see USB board on page 72)
   j. Display assembly (see Display assembly on page 66)
   k. System board (see System board on page 79)
   l. Fan/heat sink assembly (see Fan/heat sink assembly on page 81)

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.
Button Sound (select models only)	Enable/disable the capacitive button tapping sound.
Virtualization Technology (select models only)	Enable/disable the processor Virtualization Technology.
Processor C6 State (select models only)	Enable/disable the processor C6 sleep state.
LAN Power Saving (select models only)	Enable/disable LAN Power Saving. When enabled, saves power when the computer is in DC mode.
Card Reader/1394 Power Saving (select models only)	Enable/disable Card Reader/1394 Power Saving.

Select	To do this
Fan Always On	Enable/disable Fan Always On. When enabled, the computer fan will always be on.
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	
Depth	**22.8** cm (8.98 in)
Width	**34.8 cm** (13.70 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	
Operating (not writing to optical disc)	**0°C to 35°C** (32°F to 95°F)
Operating (writing to optical disc)	**5°C to 35°C** (41°F to 95°F)
Nonoperating	**-20°C to 60°C** (-4°F to 140°F)
Relative humidity	
Operating	10% to 90%
Nonoperating	5% to 95%
Maximum altitude (unpressurized)	
Operating	**-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***	**250-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	2.0 ms
Average	14.0 ms	14.0 ms	14.0 ms	12.0 ms	12.0 ms
Maximum	22.0 ms	22.0 ms	22.0 ms	22.0 ms	22.0 ms
Logical blocks	1,250,263,728	1,250,263,728	976,773,168	625,142,448	488,397,168

	750-GB*	640-GB*	500-GB*	320-GB*	250-GB*
Disc rotational speed	5400 rpm	5400 and 7200 rpm	7200 rpm	7200 rpm	7200 rpm
Operating temperature	**5°C to 55°C** (41°F to 131°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

Recovery after a system failure is as complete as your most current backup. HP recommends that you create recovery discs immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

Tools provided by the operating system and HP Recovery Manager software are designed to help you with the following tasks for safeguarding your information and restoring it in case of a system failure:

- Creating a set of recovery discs (Recovery Manager software feature). Recovery discs are used to start up (boot) your computer and restore the operating system and software programs to factory settings in case of system failure or instability.
- Backing up your information regularly to protect your important system files.
- Creating system restore points (operating system feature). System restore points allow you to reverse undesirable changes to your computer by restoring the computer to an earlier state.
- Recovering a program or driver (Recovery Manager software feature). This feature helps you reinstall a program or driver without performing a full system recovery.
- Performing a full system recovery (Recovery Manager software feature). With Recovery Manager, you can recover your full factory image if you experience system failure or instability. Recovery Manager works from a dedicated recovery partition (select models only) on the hard drive or from recovery discs you create.

NOTE: Computers with a solid-state drive (SSD) may not have a recovery partition. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software. To check for the presence of a recovery partition, select **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the partition is present, an HP Recovery drive is listed in the window.

Creating recovery discs

HP recommends that you create recovery discs to be sure that you can restore your system to its original factory state if you experience serious system failure or instability. Create these discs after setting up the computer for the first time.

Handle these discs carefully and keep them in a safe place. The software allows the creation of only one set of recovery discs.

NOTE: 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.

Note the following guidelines before creating recovery discs:

NOTE: The external hard drive must be connected to a USB port on the computer, not to a USB port on an external device such as a hub.

- You will need high-quality DVD-R, DVD+R, BD-R (writable Blu-ray), or CD-R discs. All these discs are purchased separately. DVDs and BDs have a much higher capacity than CDs. If you use CDs, up to 20 discs may be required, whereas only a few DVDs or BDs are required.

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

- The computer must be connected to AC power during this process.
- Only one set of recovery discs can be created per computer.
- 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. The next time you open Recovery Manager, you will be prompted to continue the disc creation process.

To create a set of recovery discs:

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

Backing up your information

As you add new software and data files, you should back up your system on a regular basis to maintain a reasonably current backup. Back up your system at the following times:

- At regularly scheduled times

  NOTE: Set reminders to back up your information periodically.

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

Note the following when backing up:

- Create system restore points using the Windows® System Restore feature, and periodically copy them to disc.
- Store personal files in the Documents library and back up this folder periodically.
- Back up templates stored in their associated programs.
- 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 reset your preferences.

  To copy the screen and paste it into a word-processing document, follow these steps:

  1. Display the screen.
  2. Copy the screen:

     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**.

4. Save the document.

- You can back up your information to an optional external hard drive, a network drive, or discs.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD-R, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

NOTE: DVDs store more information than CDs, so using them for backup reduces the number of recovery discs required.

- When backing up to discs, number each disc before inserting it into the optical drive of the computer.

Using Windows Backup and Restore

To create a backup using Windows Backup and Restore, follow these steps:

NOTE: Be sure that the computer is connected to AC power before you start the backup process.

NOTE: The backup process may take over an hour, depending on file size and the speed of the computer.

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up and create a backup.

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

Using system restore points

When you back up your system, you are creating a system restore point. 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 made to your system.

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 system files and settings.

When to create restore points

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing 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. Under **Protection Settings**, select the disk for which you want to create a restore point.
5. Click **Create**.
6. 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.

Performing a recovery

NOTE: You can recover only files that you have previously backed up. HP recommends that you use HP Recovery Manager to create a set of recovery discs (entire drive backup) as soon as you set up your computer.

Recovery Manager software allows you to repair or restore the system if you experience system failure or instability. Recovery Manager works from recovery discs or from a dedicated recovery partition (select models only) on the hard drive. However, if your computer includes a solid-state drive (SSD), you may not have a recovery partition. If that is the case, recovery discs have been included with your computer. Use these discs to recover your operating system and software.

NOTE: Windows has its own built-in repair features, such as System Restore. If you have not already tried these features, try them before using Recovery Manager.

NOTE: Recovery Manager recovers 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.

Recovering from the recovery discs

To restore the system from the recovery discs:

1. Back up all personal files.
2. Insert the first recovery disc into the optical drive and restart the computer.
3. Follow the on-screen instructions.

Recovering from the dedicated recovery partition (select models only)

NOTE: Computers with an SSD may not have a recovery partition. If the computer does not have a recovery partition, you will not be able to recover using this procedure. Recovery discs have been included for computers that do not have a partition. Use these discs to recover your operating system and software.

On some models, you can perform a recovery from the partition on the hard drive, accessed by pressing either the Start button or f11. This restores the computer to its factory condition.

To restore the system from the partition, follow these steps:

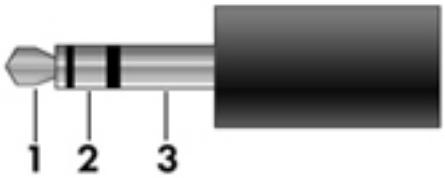
1. Access Recovery Manager in either of the following ways:
   - Select **Start > All Programs > Recovery Manager > Recovery Manager**.

     – 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 “Press <F11> for recovery” message is displayed on the screen.
2. Click **System Recovery** in the **Recovery Manager** window.
3. Follow the on-screen instructions.

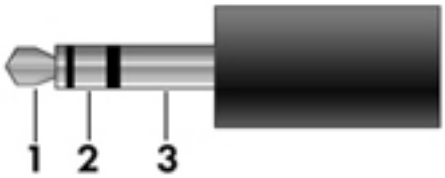
8 Connector pin assignments

Audio-out (headphone)



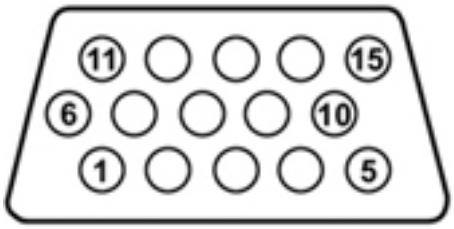
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

Audio-in (microphone)



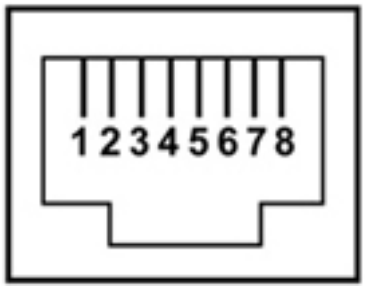
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

External monitor



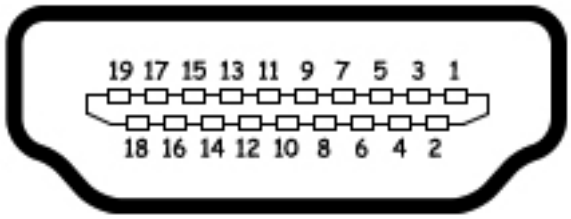
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

RJ-45 (network)



Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

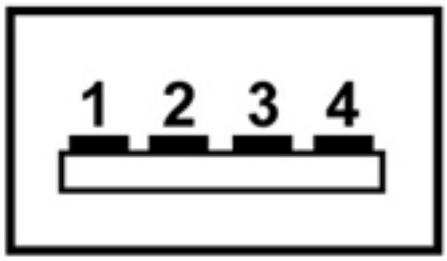
HDMI



Pin	Signal
1	TMDS data 2+
2	TMDS data 2 shield
3	TMDS data 2–
4	TMDS data 1+
5	TMDS data 1shield
6	TMDS data 1–
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0–

10	TMDS clock+
11	TMDS clock shield
12	TMDS clock–
13	CEC
14	No connect
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect
20	Shell

Universal Serial Bus



Pin	Signal
1	+5 VDC
2	Data -
3	Data +
4	Ground

9 Power cord set requirements

The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC or from 220 to 240 volts AC.

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

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

Requirements for all countries or regions

The requirements listed below are applicable to all countries or regions:

- The length of the power cord set must be at least 1.5 m (5.0 ft) and no more than 2.0 m (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by each country or region's power system.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries or regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	CCC	5

Country/region	Accredited agency	Applicable note number
South Korea	EK	4
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

10 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.

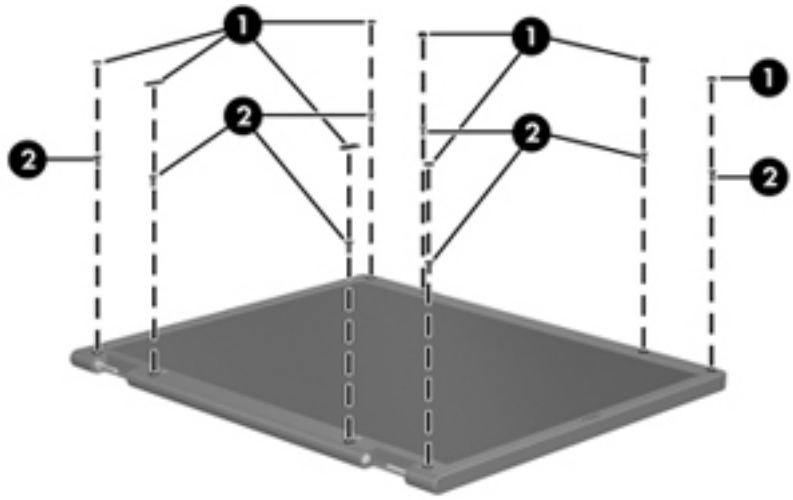
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, 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)**.

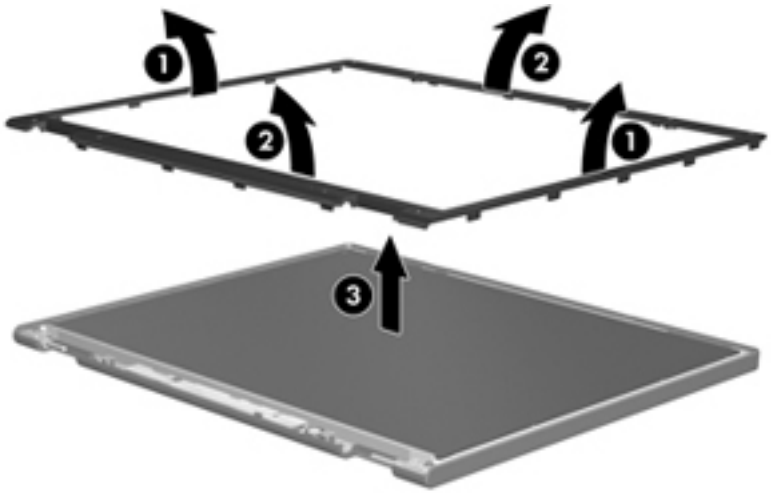
NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

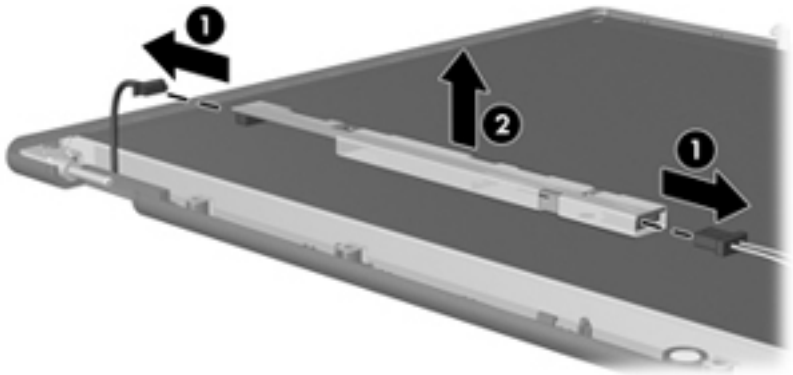
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



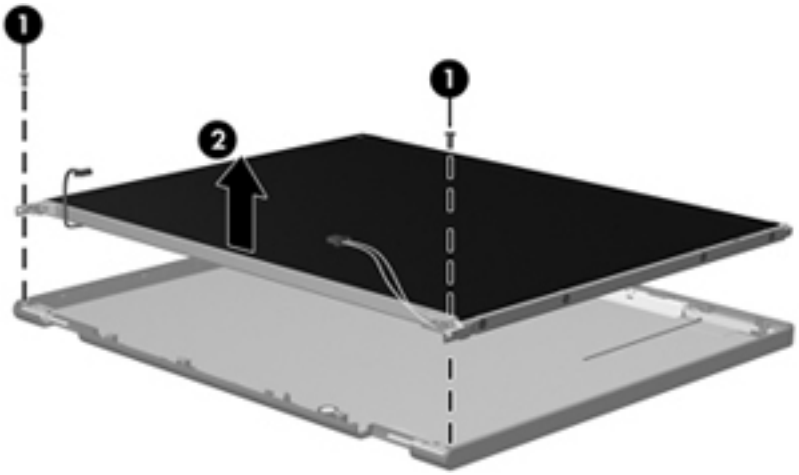
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



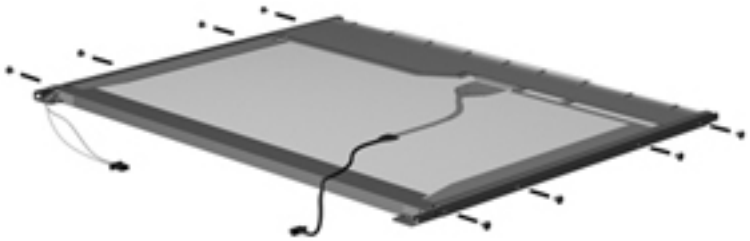
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



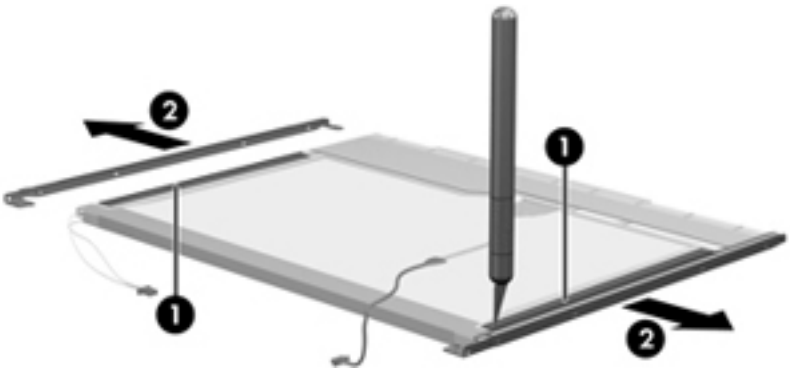
5. Remove all screws **(1)** that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly **(2)** from the display enclosure.



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

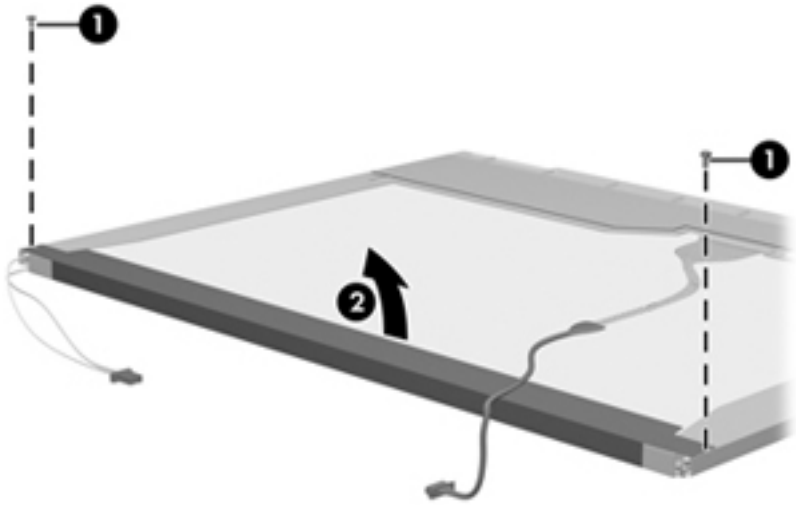


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.
10. Remove the display panel frame **(2)** from the display panel.

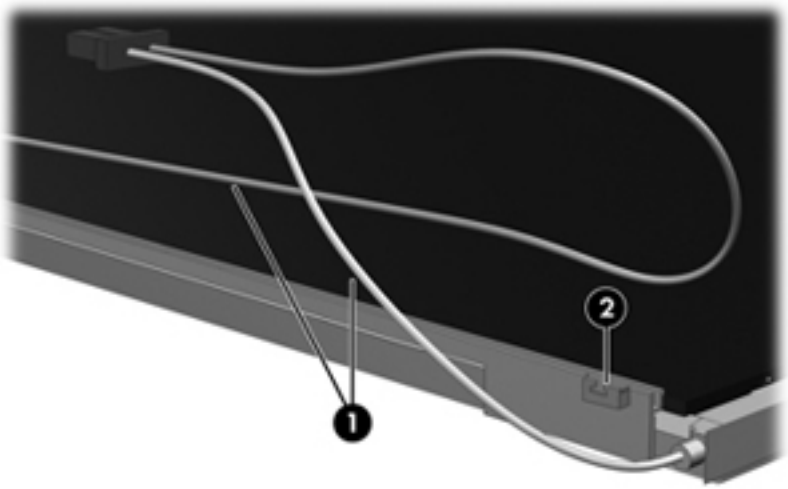


11. Remove the screws **(1)** that secure the backlight cover to the display panel.

12. Lift the top edge of the backlight cover **(2)** and swing it outward.



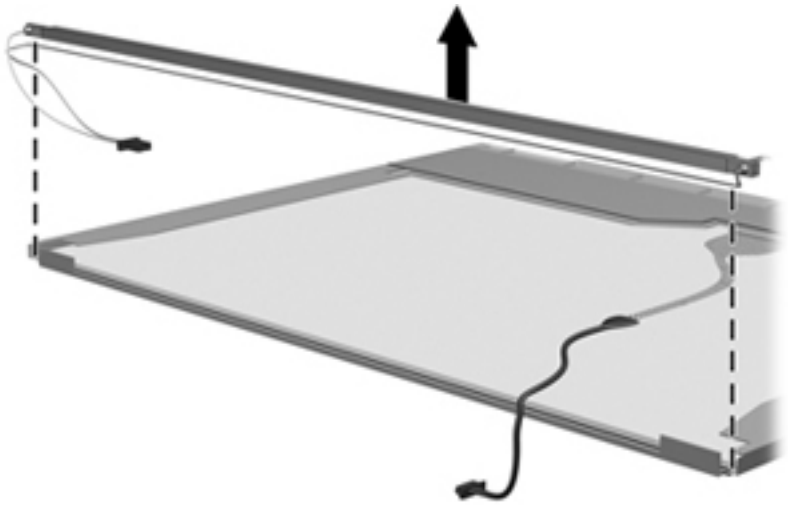
13. Remove the backlight cover.
14. Turn the display panel right-side up.
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



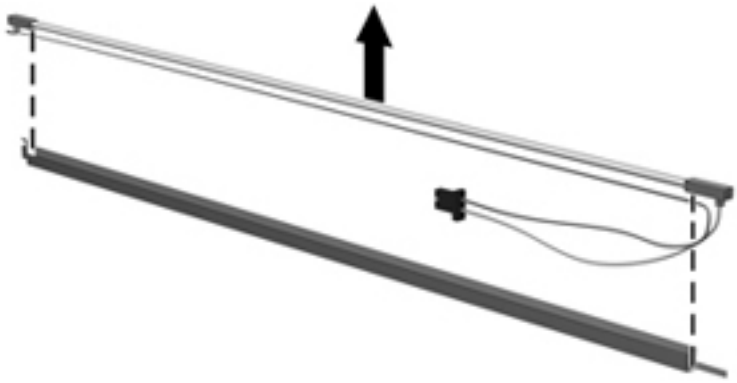
16. Turn the display panel upside-down.

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

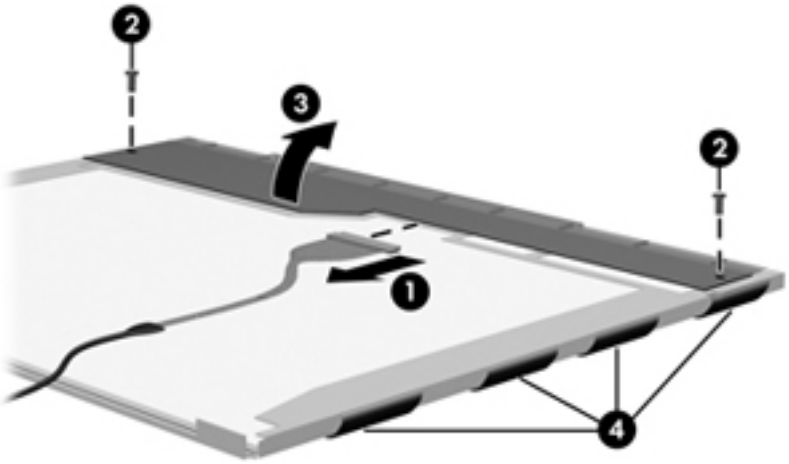
17. Remove the backlight frame from the display panel.



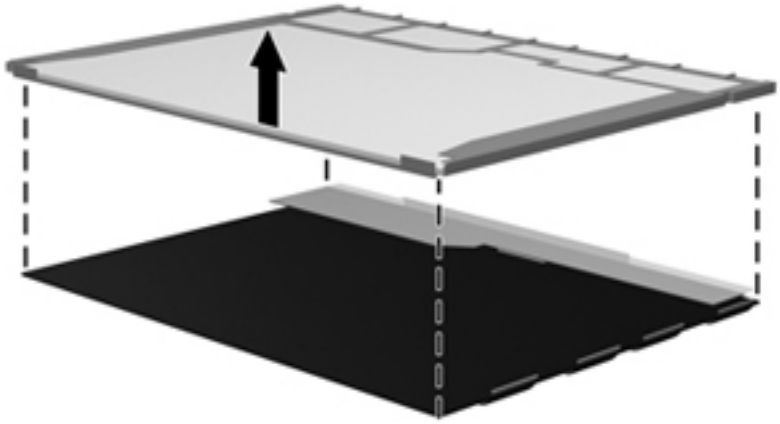
18. Remove the backlight from the backlight frame.



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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