

# HP Pavilion dv2 Entertainment PC Maintenance and Service Guide



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First Edition: March 2009

Document Part Number: 516247-001

## Safety warning notice

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- ⚠ **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	Computer models equipped with AMD processors and graphics subsystems with discrete memory	Computer models equipped with AMD processors and graphics subsystems with UMA memory
<b>Product Name</b>	HP Pavilion dv2 Entertainment PC	√	√
<b>Processor</b>	<b>Embedded AMD processor</b>		
	AMD Athlon™ 15W MV-40 1.60-GHz with 1-MB L2 cache (soldered on system board)	√	√
<b>Chipset</b>	Northbridge: AMD M690G chipset, ATI Radeon HD 3200 graphics	√	√
	Southbridge: AMD SB600	√	√
<b>Graphics</b>	ATI Mobility Radeon HD 3410 with 512 MB of discrete graphics subsystem memory (64 MB × 16 DDR2 × 4 PCs)	√	
	Unified memory architecture (UMA) integrated with shared video memory, ATI Radeon X1250 with 64 MB:		√
	<ul style="list-style-type: none"> <li>Up to 358 MB of graphics subsystem memory on computer models equipped with 2048 MB or more of main system memory</li> <li>Up to 251 MB of graphics subsystem memory on computer models equipped with 1024 MB</li> <li>Memory size is dynamic change</li> </ul>		
	Support for Blu-ray Disc playback with HD Decode, and DX10 Support	√	
<b>Panel</b>	<ul style="list-style-type: none"> <li>12.1-inch, WXGA+ (1280 × 800) BrightView, LED backlit</li> <li>Typical brightness 200 nits</li> </ul>	√	√
<b>Memory</b>	1 SODIMM slot	√	√
	Customer-accessible/upgradable	√	√
	Support for DDR2–533, uses 800-MHz/667-MHz parts downgraded to 533-MHz, DDR2	√	√
	Single channel support	√	√

Category	Description	Computer models equipped with AMD processors and graphics subsystems with discrete memory	Computer models equipped with AMD processors and graphics subsystems with UMA memory
	Supports up to 2 GB system memory <ul style="list-style-type: none"> <li>4096-MB total system memory (4096 MB × 1 )</li> <li>2048-MB total system memory (2048 MB × 1)</li> <li>1024-MB total system memory (1024 MB × 1)</li> </ul>	√	√
<b>Hard drives</b>	Supports Serial ATA (SATA) 9.5-mm, 6.35-cm (2.5-inch) hard drive	√	√
	Supports 1 hard drive	√	√
	Support for HP ProtectSmart Hard Drive Protection	√	√
	Single hard drive configurations: <ul style="list-style-type: none"> <li>500-GB, 5400-rpm</li> <li>320-GB, 5400-rpm</li> <li>250-GB, 5400-rpm</li> <li>160-GB, 5400-rpm</li> </ul>	√	√
<b>Optical drives</b>	Supports external optical drive only through USB port		
<b>Webcam</b>	Low-light VGA camera	√	√
	Fixed (no tilt)	√	√
	Activity LED	√	√
	640 × 480 by 24 frames per second	√	√
<b>Microphone</b>	Single analog microphone with appropriate software (supports beam forming, echo cancellation, and noise suppression)	√	√
<b>Audio</b>	HD Audio (IDT)	√	√
	Supports Microsoft® Premium requirements	√	√
	Pavilion-branded Altec Lansing speakers	√	√
<b>Modem</b>	No modem supported	√	√
<b>Ethernet</b>	Integrated Realtek 10/100 network interface card (NIC)	√	√
<b>Wireless</b>	<b>Integrated wireless local area network (WLAN) options by way of wireless module:</b>		
	2 wireless antennas built into display assembly		
	Broadcom 4322 802.11a/b/g/n WLAN module	√	√

Category	Description	Computer models equipped with AMD processors and graphics subsystems with discrete memory	Computer models equipped with AMD processors and graphics subsystems with UMA memory
	Broadcom BCM4312 802.11b/g WLAN module	√	√
	Broadcom 4322 802.11a/b/g/n + Bluetooth® WLAN module	√	√
	Broadcom BCM4312 802.11b/g + Bluetooth WLAN module	√	√
<b>Integrated wireless wide area network (WWAN) options by way of wireless module:</b>			
2 wireless antennas built into display assembly			
	HSPDA EV-DO WWAN module; supports all worldwide standards	√	√
<b>External media card</b>	Digital Media Slot	√	√
	Supports Memory Stick (MS), Memory Stick Pro (MSP), MultiMediaCard (MMC), Secure Digital (SD) Memory Card, Secure Digital High Capacity (SDHC) Memory Card, xD; supports mini versions of SD, MMC, MS Duo with adapter (adapter not included)	√	√
<b>Ports</b>	Audio-in (stereo microphone)	√	√
	Audio-out (stereo headphone)	√	√
	High-Definition Multimedia Interface (HDMI) v1.3b supporting 1080p with HDCP key	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√
	USB 2.0 (3)	√	√
	VGA (Dsub 15-pin) supporting 1920 x 1200 external resolution @ 60Hz, and 1600 x 1200 external resolution @ 75Hz, hot plug/unplug, and autodetect for correct output to wide-aspect vs. standard aspect video	√	√
	65-W (non-Smart ID Pin supported) AC adapter	√	√
<b>Docking</b>	No docking	√	√
<b>Keyboard/pointing devices</b>	12.1-inch full-size pocket keyboard with numeric keypad	√	√
	TouchPad supports 2-way scrolling	√	√
	Taps enabled as default	√	√
<b>Power requirements</b>	4-cell, 40.32-Wh, 2.8-Ah Li-ion battery	√	√
	6-cell, 55-Wh, 2.55-Ah Li-ion battery	√	√

<b>Category</b>	<b>Description</b>	<b>Computer models equipped with AMD processors and graphics subsystems with discrete memory</b>	<b>Computer models equipped with AMD processors and graphics subsystems with UMA memory</b>
	65-W AC adapter with localized cable plug support (2-wire plug with ground pin, supports 2-pin DC connector)	√	√
<b>Security</b>	Security cable slot	√	√
<b>Operating system</b>	<b>Preinstalled:</b>		
	FreeDOS		
	Windows Vista® Home Basic (32-bit)	√	√
	Windows Vista Home Premium (32-bit)	√	√
	Windows Vista Home Premium (64-bit)	√	√
<b>Serviceability</b>	AC adapter	√	√
	Battery (system)	√	√
	Hard drive (1)	√	√
	Memory module	√	√
	Mini-Card components	√	√

## 2 External component identification

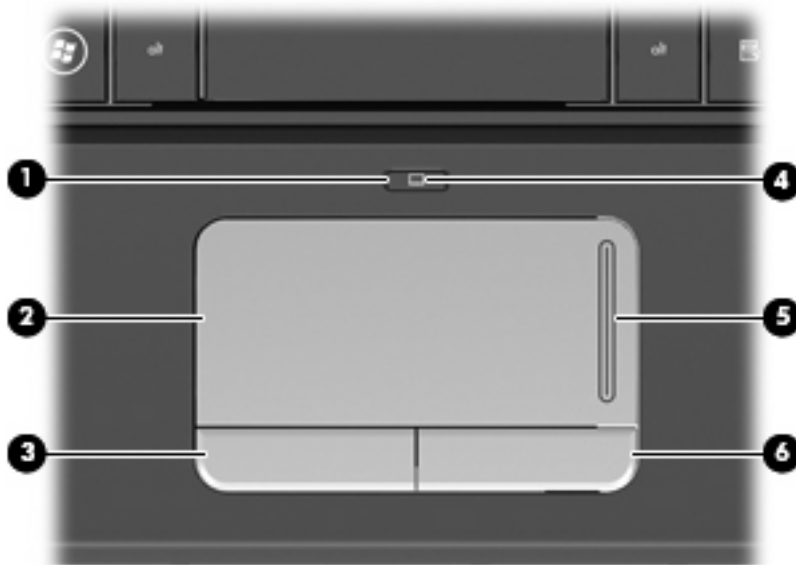
### Top components

#### Display components



Component	Description
(1) Wireless antenna locations (2) (select models only)	Send or receive signals from one or more wireless devices. These antennas are not visible from the outside of the computer.
(2) Internal microphone	Records sound.
(3) Webcam light	On: The webcam is in use.
(4) Webcam	Records video and captures still photographs.

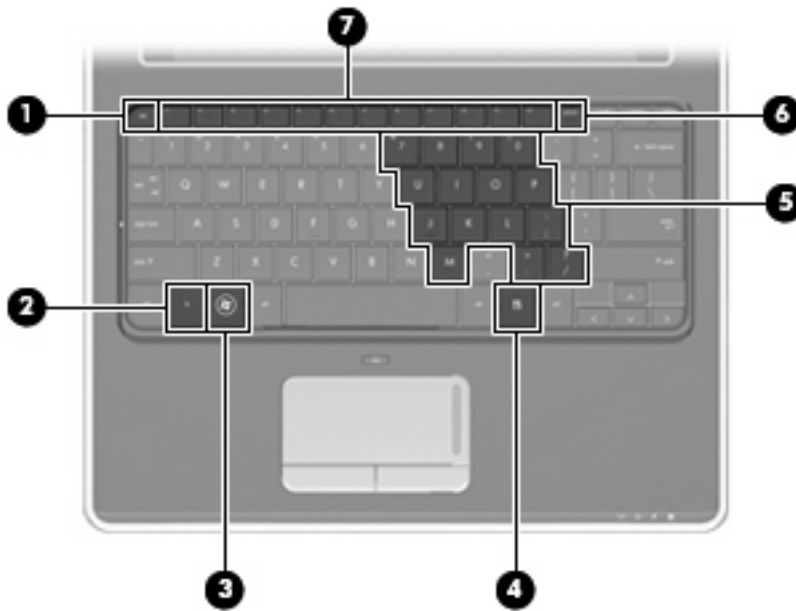
## TouchPad



Component	Description
(1) TouchPad on/off button	Enables/disables the TouchPad.
(2) TouchPad*	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) TouchPad light	<ul style="list-style-type: none"><li>• White: TouchPad is enabled.</li><li>• Amber: TouchPad is disabled.</li></ul>
(5) TouchPad scroll zone	Scrolls up or down.
(6) Right TouchPad button*	Functions like the right button on an external mouse.

\*This table describes factory settings. To view and change pointing device preferences, select **Start > Control Panel > Hardware and Sound > Mouse**.

## Keys



Component	Description
(1) <a href="#">esc</a> key	Displays system information when pressed in combination with the <a href="#">fn</a> key.
(2) <a href="#">fn</a> key	Executes frequently used system functions when pressed in combination with a function key or the <a href="#">esc</a> key.
(3) Windows logo key	Displays the Windows Start menu.
(4) Windows applications key	Displays a shortcut menu for items beneath the pointer.
(5) Embedded numeric keypad keys	Can be used like the keys on an external numeric keypad.
(6) num lk key	When pressed in combination with the <a href="#">fn</a> key, the num lk key enables and disables the embedded numeric keypad.
(7) Function keys	Execute frequently used system functions when pressed in combination with the <a href="#">fn</a> key.

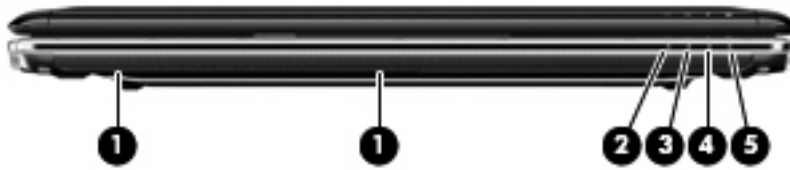
## Lights



Component	Description
(1) Caps lock light	On: Caps lock is on.
(2) TouchPad on/off light	<ul style="list-style-type: none"> <li>White: TouchPad is enabled.</li> <li>Amber: TouchPad is disabled.</li> </ul>
(3) Speakers (2)	Produce sound.
(4) Wireless light	<ul style="list-style-type: none"> <li>On: An integrated wireless device, such as a WLAN device and/or a Bluetooth® device, is on.</li> <li>Off: All wireless devices are off.</li> </ul>
(5) Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(6) Battery light	<ul style="list-style-type: none"> <li>On: A battery is charging.</li> <li>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 begins blinking rapidly.</li> <li>Off: If the computer is plugged into an external power source, the light is turned off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.</li> </ul>
(7) Drive light	Blinking: The hard drive or optical drive is being accessed.
(8) Num lock light	On: Num lock is on or the embedded numeric keypad is enabled.

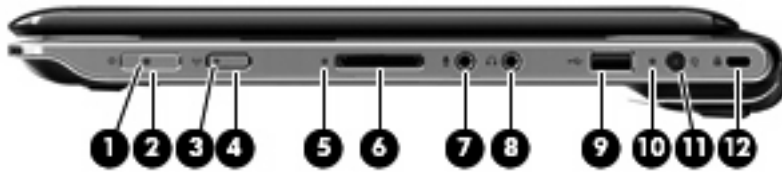


# Front components



Component	Description
(1) Speakers (2)	Produce sound.
(2) Wireless light	<ul style="list-style-type: none"> <li>On: An integrated wireless device, such as a WLAN device and/or a Bluetooth® device, is on.</li> <li>Off: All wireless devices are off.</li> </ul>
(3) Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(4) Battery light	<ul style="list-style-type: none"> <li>On: A battery is charging.</li> <li>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 begins blinking rapidly.</li> <li>Off: If the computer is plugged into an external power source, the light is turned off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.</li> </ul>
(5) Drive light	Blinking: The hard drive or optical drive is being accessed.

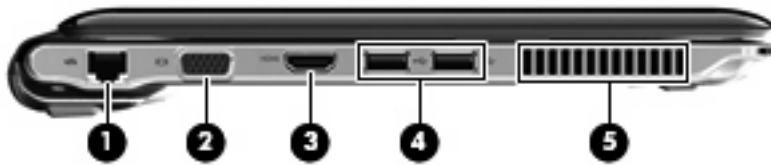
## Right-side components



Component	Description
(1) Power light	<ul style="list-style-type: none"> <li>On: The computer is on.</li> <li>Blinking: The computer is in the Sleep state.</li> <li>Off: The computer is off or in Hibernation.</li> </ul>
(2) Power switch	<ul style="list-style-type: none"> <li>When the computer is off, slide the switch to turn on the computer.</li> <li>When the computer is on, slide the switch briefly to initiate Sleep.</li> <li>When the computer is in the Sleep state, slide the switch briefly to exit Sleep.</li> <li>When the computer is in Hibernation, slide the switch briefly to exit Hibernation.</li> </ul> <p>If the computer has stopped responding and Windows® shutdown procedures are ineffective, slide and hold the power switch for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select <b>Start &gt; Control Panel &gt; System and Maintenance &gt; Power Options</b>.</p>
(3) Wireless light	<ul style="list-style-type: none"> <li>On: An integrated wireless device, such as a WLAN device and/or a Bluetooth® device, is on.</li> <li>Off: All wireless devices are off.</li> </ul>
(4) Wireless button	<p>Turns the wireless feature on or off but does not create a wireless connection.</p> <p><b>NOTE:</b> To establish a wireless connection, a wireless network must already be set up.</p>
(5) Digital Media Slot light	<p>On: The Digital Media Slot is in use.</p>
(6) Digital Media Slot	<p>Supports the following digital card formats:</p> <ul style="list-style-type: none"> <li>Memory Stick (MS)</li> <li>Memory Stick Pro (MSP)</li> <li>MultiMediaCard (MMC)</li> <li>Secure Digital (SD) Memory Card</li> <li>Secure Digital High Capacity (SDHC) Memory Card</li> <li>xD-Picture Card (XD)</li> <li>xD-Picture Card (XD) Type H</li> <li>xD-Picture Card (XD) Type M</li> </ul>

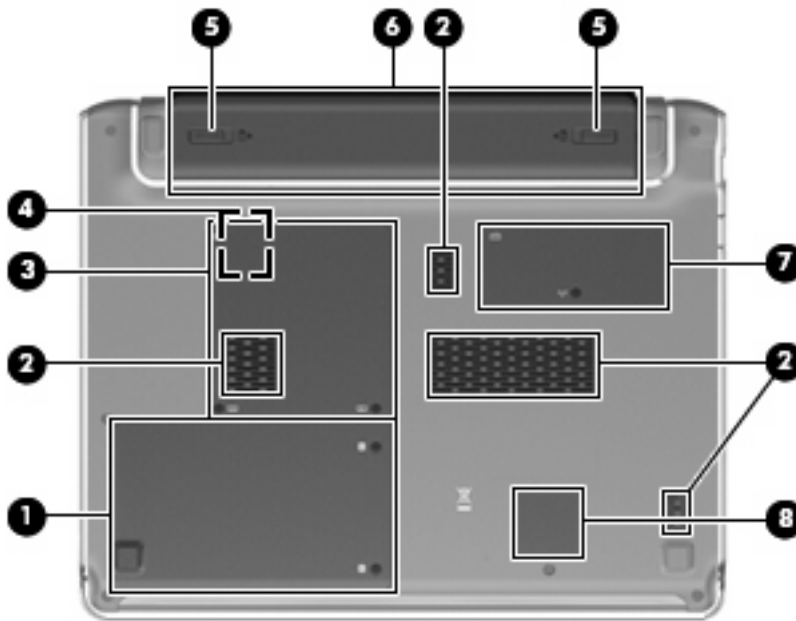
Component	Description
(7) Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(8) Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.
(9) USB port	Connects an optional USB device.
(10) AC adapter light	<ul style="list-style-type: none"> <li>• On: The computer is connected to external power.</li> <li>• Off: The computer is not connected to external power.</li> </ul>
(11) Power connector	Connects an AC adapter.
(12) Security cable slot	Attaches an optional security cable to the computer.
	<b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

## Left-side components



Component	Description
(1) RJ-45 (network) jack	Connects a network cable.
(2) External monitor port	Connects an external VGA monitor or projector.
(3) HDMI port (select models only)	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.
(4) USB ports (2)	Connect optional USB devices. <b>NOTE:</b> Select models only can be configured with an optional external USB optical disc drive. For more information, refer to the printed <i>Quick Setup</i> poster.
(5) Vent	Enables airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

## Bottom components



Component	Description
(1) Hard drive bay	Holds the hard drive.
(2) Vents (4)	Enable airflow to cool internal components.  <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3) Memory module compartment	Contains the memory module and WWAN module.
(4) SIM slot (select models only)	Contains a subscriber identity module (SIM). The SIM slot is located inside the battery bay.
(5) Battery release latches (2)	Release the battery from the battery bay.
(6) Battery bay	Holds the battery.
(7) Wireless module compartment	Holds a wireless LAN module.  <b>NOTE:</b> 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.
(8) Bluetooth compartment (select models only)	Contains a Bluetooth device.

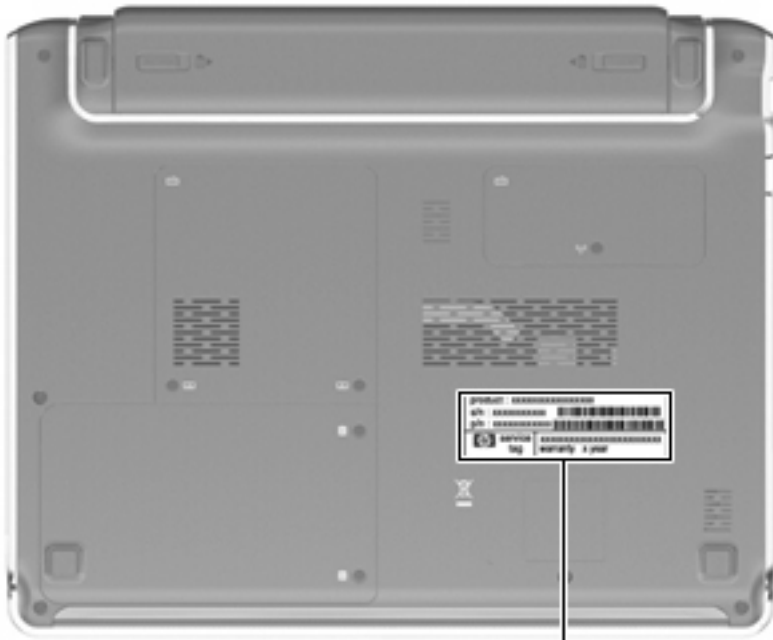
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## 3 Illustrated parts catalog

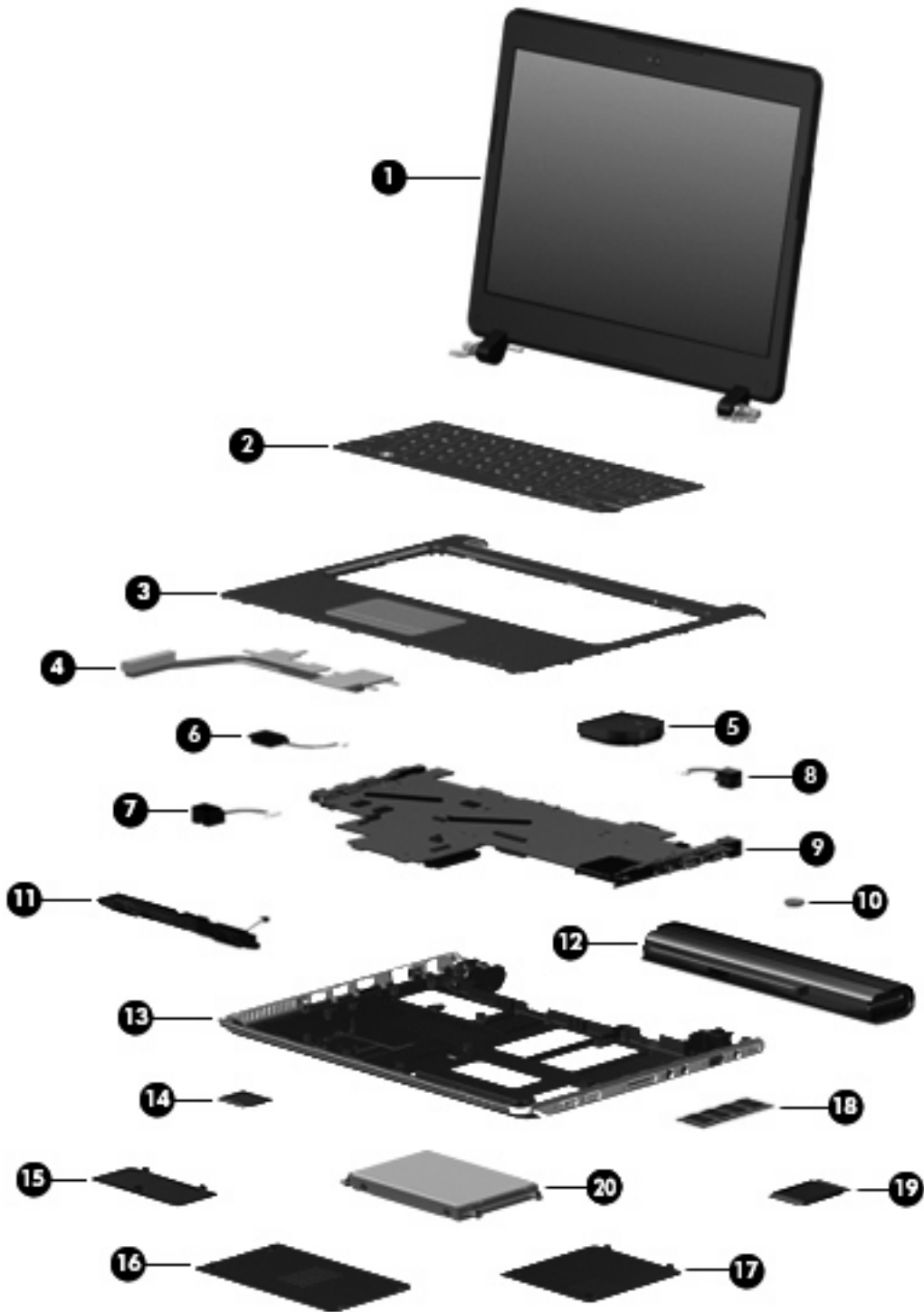
### Service tag

When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.

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



# Computer major components



Item	Description	Spare part number
(1)	<b>12.1-inch display Panel</b> (includes wireless antenna transceivers and cables) WXGA BrightView display panel with webcam and 1 microphone, Espresso Black	506769-001



Item	Description	Spare part number
	WXGA BrightView display panel with webcam and 1 microphone, Moonlight White	517587-001
	<b>Display Assembly internal components (not illustrated):</b>	
	12.1-inch, WXGA BrightView display panel (raw)	517742-001
	Display bezel	517733-001
	Display back cover, Espresso Black	517734-001
	Display back cover, Moonlight White	517735-001
	Webcam/microphone module	517736-001
	Webcam/microphone cable	517741-001
	Display brackets	517737-001
	Display hinges	517738-001
	Display hinge covers	517739-001
	Display cable	517740-001
	Display screw kit	517743-001
	Antennas	517760-001
<b>(2)</b>	<b>Keyboard</b> (includes keyboard cable)	
	<b>Espresso Black Keyboards</b>	
	Belgium	506782-A41
	Brazil	506782-201
	Denmark, Norway, and Sweden	506782-DH1
	France	506782-051
	French Canada	506782-121
	Germany	506782-041
	Greece	506782-151
	Italy	506782-061
	Japan	506782-291
	Latin America	506782-161
	The Netherlands	506782-B31
	Portugal	506782-131
	Russia	506782-251
	Saudi Arabia	506782-171
	South Korea	506782-AD1
	Spain	506782-071
	Switzerland	506782-111
	Taiwan	506782-AB1

<b>Item</b>	<b>Description</b>	<b>Spare part number</b>
	Thailand	506782-281
	Turkey	506782-141
	The United Kingdom	506782-031
	The United States	506782-001
	<b>Moonlight White Keyboards</b>	
	Belgium	517584-A41
	Brazil	517584-201
	Denmark, Norway, and Sweden	517584-DH1
	France	517584-051
	French Canada	517584-121
	Germany	517584-041
	Greece	517584-151
	Italy	517854-061
	Japan	517854-291
	Latin America	517584-161
	The Netherlands	517584-B31
	Portugal	517584-131
	Russia	517584-251
	Saudi Arabia	517584-171
	South Korea	517584-AD1
	Spain	517584-071
	Switzerland	517584-111
	Taiwan	517584-AB1
	Thailand	517584-281
	Turkey	517584-141
	The United Kingdom	517584-031
	The United States	517584-001
<b>(3)</b>	<b>Top cover</b> (includes TouchPad, TouchPad cable, and TouchPad buttons)	
	Top cover, Espresso Black	517745-001
	Top cover, Moonlight White	519533-001
<b>(4)</b>	<b>Thermal module</b>	
	Thermal module, UMA (heat sink)	517746-001
	Thermal module, discrete (heat sink)	517747-001
<b>(5)</b>	<b>Fan</b>	517749-001

Item	Description	Spare part number
	<b>Cable Kit</b> (not illustrated) (includes Bluetooth® cable, power cable, RJ-45 cable, and USB cable)	517757-001
	<b>NOTE:</b> See <a href="#">Cable Kit on page 23</a> for more Cable Kit spare part information.	
(6)	Bluetooth® connector cable (included in the Cable Kit, spare part number 517757-001. See <a href="#">Cable Kit on page 23</a> for more information.)	
(7)	RJ-45 connector cable (included in the Cable Kit, spare part number 517757-001. See <a href="#">Cable Kit on page 23</a> for more information.)	
(8)	USB connector cable (included in the Cable Kit, spare part number 517757-001. See <a href="#">Cable Kit on page 23</a> for more information.)	
(9)	<b>System board</b> (includes embedded AMD Athlon™ processor and replacement thermal material)	
	With UMA graphics subsystem memory (ATI Radeon X1250 with 64MB)	506762-001
	With discrete graphics subsystem memory (ATI Mobility Radeon HD 3410 with 512MB of dedicated video memory)	506763-001
(10)	<b>RTC Battery</b>	517759-001
(11)	<b>Speaker</b> (includes speaker cable)	517754-001
(12)	<b>Battery</b>	
	<ul style="list-style-type: none"> <li>Battery, 4-cell, 32-Wh, 2.8-Ah Li-on</li> </ul>	506780-001
	<ul style="list-style-type: none"> <li>Battery, 6-cell, 55-Wh, 2.55-Ah, Li-on</li> </ul>	506781-001
	<b>Battery cover</b> (not illustrated)	517744-001
(13)	<b>Base enclosure</b> (includes 4 rubber feet)	
	<ul style="list-style-type: none"> <li>For use with system boards with UMA graphics subsystem memory</li> </ul>	517752-001
	<ul style="list-style-type: none"> <li>For use with system boards with discrete graphics subsystem memory</li> </ul>	517753-001
(14)	<b>WLAN module:</b>	
	<b>Broadcom 4312 802.11b/g WLAN module:</b>	
	<ul style="list-style-type: none"> <li>For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States</li> </ul>	504593-001

Item	Description	Spare part number
	<ul style="list-style-type: none"> <li>For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</li> </ul>	504593-002
<b>Broadcom 4322 802.11a/b/g/n WLAN module:</b>		
	<ul style="list-style-type: none"> <li>For use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States</li> </ul>	504664-001
	<ul style="list-style-type: none"> <li>For use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</li> </ul>	504664-002

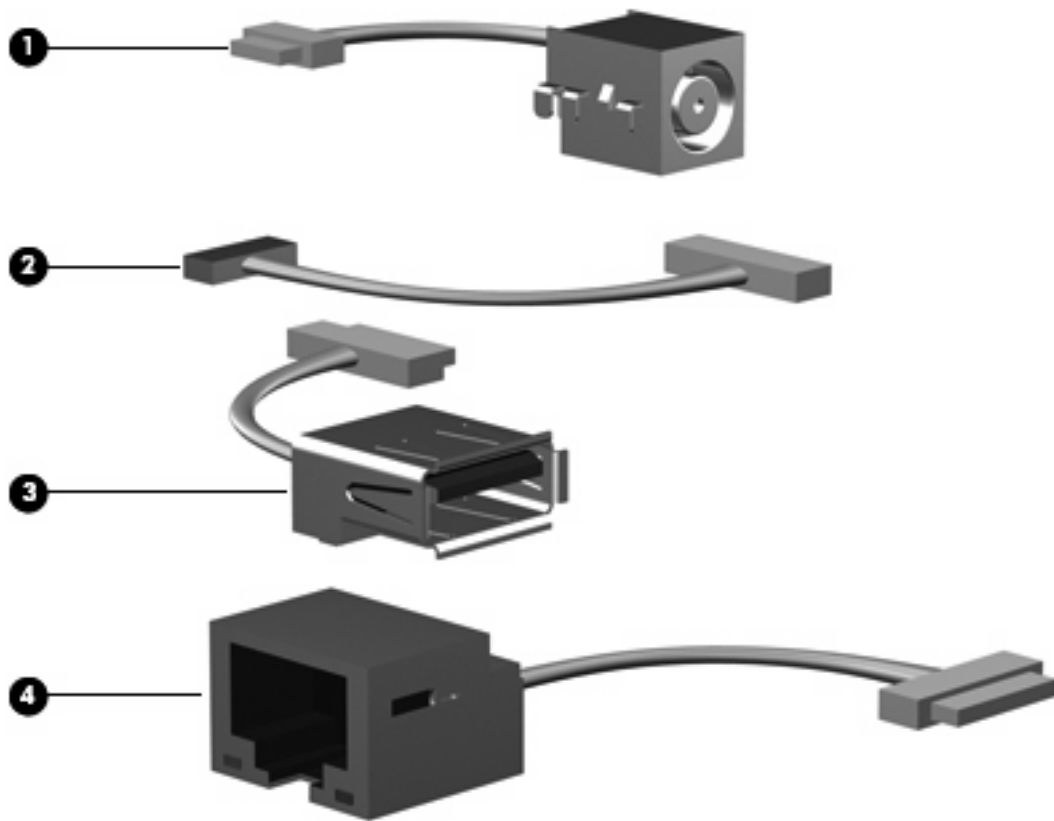
Item	Description	Spare part number
(15)	WLAN module compartment cover (included in access doors, spare part number 517748-001) See <a href="#">Access doors on page 22</a> for more spare part information.	
(16)	Hard drive bay cover (included in access doors, spare part number 517748-001) See <a href="#">Access doors on page 22</a> for more spare part information.	
(17)	Memory module compartment cover (included in access doors, spare part number 517748-001) See <a href="#">Access doors on page 22</a> for more spare part information.	
(18)	<b>Memory module</b> (800-MHz/667-MHz, PC2-5300, 1-DIMM)	
	4096-MB memory module for use only with computer models equipped with AMD processors	517588-001
	2048-MB memory module for use only with computer models equipped with AMD processors	506772-001
	1024-MB memory module for use only with computer models equipped with AMD processors	506771-001
(19)	<b>WWAN module</b>	483377-002
(20)	<b>Hard drive</b> (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)	
	500-GB, 5400-rpm	506776-001
	320-GB, 5400-rpm	506775-001
	250-GB, 5400-rpm	506774-001
	160-GB, 5400-rpm	506773-001
	<b>Hard Drive Hardware Kit</b> (not illustrated, includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)	506777-001
	<b>Access doors</b> (not illustrated, includes WLAN compartment cover, memory module compartment cover, and hard drive bay cover)	517748-001
	<b>NOTE:</b> See <a href="#">Access doors on page 22</a> for more spare part information.	
	<b>Rubber Kit</b> (not illustrated, contains 4 base enclosure rubber feet and 2 display bezel screw covers)	517761-001

## Access doors



Item	Description	Spare part number
	<b>Access doors</b>	517748-001
(1)	WLAN module compartment cover (includes 1 captive screw, secured by a C-clip)	
(2)	Hard drive bay cover (includes 2 captive screws, secured by C-clips)	
(3)	Memory module compartment cover (includes 1 captive screw, secured by a C-clip)	

## Cable Kit



Item	Description	Spare part number
	<b>Cable Kit</b>	517757-001
(1)	Power connector cable	
(2)	Bluetooth module cable	
(3)	USB cable	
(4)	RJ-45 cable (includes RJ-45 jack)	

## Mass storage devices



Item	Description	Spare part number
(1)	<b>Hard drives</b> (include left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)	
	500-GB, 5400-rpm	506776-001
	320-GB, 5400-rpm	506775-001
	250-GB, 5400-rpm	506774-001
	160-GB, 5400-rpm	506773-001
	<b>Hard Drive Hardware Kit</b> (not illustrated, includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)	506777-001
(2)	<b>External Optical drives</b> (include front bezel and bracket)	
	Blu-ray ROM with LightScribe DVD±R/RW SuperMulti DL Drive	506779-001
	DVD±RW SuperMulti Double-Layer Combo Drive with LightScribe	506778-001



# Miscellaneous parts

Description	Spare part number
<b>65-W AC adapter</b>	417220-001
<b>Wired headset with volume control</b>	371693-003
<b>Power cords</b>	
Argentina	490371-D01
Australia and New Zealand	490371-011
Belgium, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden	490371-021
Brazil	490371-201
Canada, French Canada, Latin America, Thailand, and the United States	490371-001
Denmark	490371-081
India	490371-D61
Israel	490371-BB1
Italy	490371-061
South Africa	490371-AR1
South Korea	490371-AD1
Switzerland	490371-111
Taiwan	490371-AB1
The United Kingdom and Singapore	490371-031
<b>Screw Kit</b>	517762-001
<ul style="list-style-type: none"> <li>• Phillips PM2.5x10.0 screw</li> <li>• Phillips PM2.5x9.0 screw</li> <li>• Phillips PM2.5x6.0 screw</li> <li>• Phillips PM2.5x6.0 captive screw</li> <li>• Phillips PM2.5x5.0 screw</li> <li>• Phillips PM2.5x4.0 screw</li> <li>• Phillips PM2.0x10.0 captive screw</li> <li>• Phillips PM2.0x3.0 screw</li> <li>• Phillips PM2.0x3.0 broadhead screw</li> <li>• Phillips PM2.0x5.0 screw</li> <li>• Phillips PM2.0x4.0 screw</li> </ul>	

## Sequential part number listing

Spare part number	Description
371693-003	Wired headset with volume control
417220-001	65-W AC adapter
483113-001	Bluetooth module for use only with computer models equipped with AMD processors (does not include a Bluetooth module cable)  <b>NOTE:</b> The Bluetooth module cable is included in the Cable Kit, spare part number 517757-001.
483377-002	WWAN module
490371-001	Power cord for use in Canada, French Canada, Latin America, Thailand, and the United States
490371-011	Power cord for use in Australia and New Zealand
490371-021	Power cord for use in Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden
490371-031	Power cord for use in the United Kingdom and Hong Kong
490371-061	Power cord for use in Italy
490371-081	Power cord for use in Denmark
490371-111	Power cord for use in Switzerland
490371-201	Power cord for use in Brazil
490371-AB1	Power cord for use in Taiwan
490371-AD1	Power cord for use in South Korea
490371-AR1	Power cord for use in South Africa
490371-BB1	Power cord for use in Israel
490371-D01	Power cord for use in Argentina
490371-D61	Power cord for use in India
504593-001	Broadcom 4312 802.11b/g WLAN module for use only with computer models equipped with AMD processors in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States

Spare part number	Description
504593-002	Broadcom 4312 802.11b/g WLAN module for use only with computer models equipped with AMD processors in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
504664-001	Broadcom 4322 802.11a/b/g/n WLAN module for use only with computer models equipped with AMD processors in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States
504664-002	Broadcom 4322 802.11a/b/g/n WLAN module for use only with computer models equipped with AMD processors in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
506762-001	System board with embedded AMD Athlon processor, MV-40, 1.6GHz, and UMA subsystem graphics memory
506763-001	System board with embedded AMD Athlon processor, MV-40, 1.6GHz, and discrete subsystem graphics memory
506769-001	12.1-inch WXGA BrightView display panel with webcam and 1 microphone
506771-001	1024-MB memory module (PC2-5300, 1 DIMM)
506772-001	2048-MB memory module (PC2-5300, 1 DIMM)

<b>Spare part number</b>	<b>Description</b>
506773-001	160-GB, 5400-rpm hard drive (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)
506774-001	250-GB, 5400-rpm hard drive (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)
506775-001	320-GB, 5400-rpm hard drive (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)
506776-001	500-GB, 5400-rpm hard drive (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)
506777-001	Hard drive Hardware Kit (Includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)
506778-001	External DVD±RW SuperMulti Double-Layer Combo Drive with LightScribe
506779-001	External Blu-ray ROM with LightScribe DVD±R/RW SuperMulti DL Drive
506780-001	4-cell Battery, 32-Wh, 2.80-Ah Li-on
506781-001	6-cell Battery, 55-Wh, 2.55-Ah Li-on
506782-001	Espresso Black keyboard for use in the United States
506782-031	Espresso Black keyboard for use in the United Kingdom
506782-041	Espresso Black keyboard for use in Germany
506782-051	Espresso Black keyboard for use in France
506782-061	Espresso Black keyboard for use in Italy
506782-071	Espresso Black keyboard for use in Spain
506782-111	Espresso Black keyboard for use in Switzerland
506782-121	Espresso Black keyboard for use in French Canada
506782-131	Espresso Black keyboard for use in Portugal
506782-141	Espresso Black keyboard for use in Turkey
506782-151	Espresso Black keyboard for use in Greece
506782-161	Espresso Black keyboard for use in Latin America
506782-171	Espresso Black keyboard for use in Saudi Arabia
506782-201	Espresso Black keyboard for use in Brazil
506782-251	Espresso Black keyboard for use in Russia
506782-281	Espresso Black keyboard for use in Thailand
506782-291	Espresso Black keyboard for use in Japan
506782-A41	Espresso Black keyboard for use in Belgium
506782-AB1	Espresso Black keyboard for use in Taiwan
506782-AD1	Espresso Black keyboard for use in South Korea
506782-B31	Espresso Black keyboard for use in The Netherlands
506782-DH1	Espresso Black keyboard for use in Denmark, Norway, and Sweden

<b>Spare part number</b>	<b>Description</b>
517584-001	Moonlight White keyboard for use in the United States
517584-031	Moonlight White keyboard for use in the United Kingdom
517584-041	Moonlight White keyboard for use in Germany
517584-051	Moonlight White keyboard for use in France
517584-061	Moonlight White keyboard for use in Italy
517584-071	Moonlight White keyboard for use in Spain
517584-111	Moonlight White keyboard for use in Switzerland
517584-121	Moonlight White keyboard for use in French Canada
517584-131	Moonlight White keyboard for use in Portugal
517584-141	Moonlight White keyboard for use in Turkey
517584-151	Moonlight White keyboard for use in Greece
517584-161	Moonlight White keyboard for use in Latin America
517584-171	Moonlight White keyboard for use in Saudi Arabia
517584-201	Moonlight White keyboard for use in Brazil
517584-251	Moonlight White keyboard for use in Russia
517584-281	Moonlight White keyboard for use in Thailand
517584-291	Moonlight White keyboard for use in Japan
517584-A41	Moonlight White keyboard for use in Belgium
517584-AB1	Moonlight White keyboard for use in Taiwan
517584-AD1	Moonlight White keyboard for use in South Korea
517584-B31	Moonlight White keyboard for use in The Netherlands
517584-DH1	Moonlight White keyboard for use in Denmark, Norway, and Sweden
517587-001	12.1-inch WXGA BrightView Display Panel with webcam and 1 microphone, Moonlight White
517588-001	4096-MB memory module (800-MHz/667-MHz, PC2-5300, 1-DIMM)
517733-001	Display bezel
517734-001	Display back cover, Espresso Black
517735-001	Display back cover, Moonlight White
517736-001	Webcam/microphone module
517737-001	Display brackets
517738-001	Display hinges
517739-001	Display hinge covers
517740-001	Display cable
517741-001	Webcam/microphone cable
517742-001	12.1-inch WXGA BrightView raw display panel

<b>Spare part number</b>	<b>Description</b>
517743-001	Display screw kit
517744-001	Battery cover
517745-001	Top cover, Espresso Black (includes TouchPad, TouchPad cable, and TouchPad buttons)
517746-001	Thermal module, UMA (includes heat sink and thermal material)
517747-001	Thermal module, discrete (includes heat sink and thermal material)
517748-001	Access doors (includes digital media slot bezel, WLAN module compartment cover, memory module compartment cover, hard drive bay cover)
517749-001	Fan
517752-01	Base enclosure for use with system boards with UMA graphics subsystem memory
517753-001	Base enclosure for use with system boards with discrete graphics subsystem memory
517754-001	Speaker
517756-001	Power switch board
517757-001	Cable Kit
517758-001	DC in cable
517759-001	RTC battery
517760-001	Antennas
517761-001	Rubber Kit (includes 4 base enclosure rubber feet and 2 display bezel screw covers)
517762-001	Screw Kit
519533-001	Top cover, Moonlight White (includes TouchPad, TouchPad buttons, and TouchPad cable)

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# 4 Removal and replacement procedures

## Preliminary replacement requirements

### Tools required


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

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

### Service considerations

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


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

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### Plastic parts

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

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## 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."

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# 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			
Event	Relative humidity		
	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  $\pm 10\%$  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

## Unknown user password

If the computer you are servicing has an unknown user password, follow these steps to clear the password.

---

 **NOTE:** These steps also clear CMOS.

---

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.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the RTC battery (see [RTC battery on page 66](#)).
6. Wait approximately 10 seconds.
7. Replace the RTC battery and reassemble the computer.
8. Connect AC power to the computer. Do not reinsert any batteries at this time.
9. Turn on the computer.

All passwords and all CMOS settings have been cleared.

# Component replacement procedures

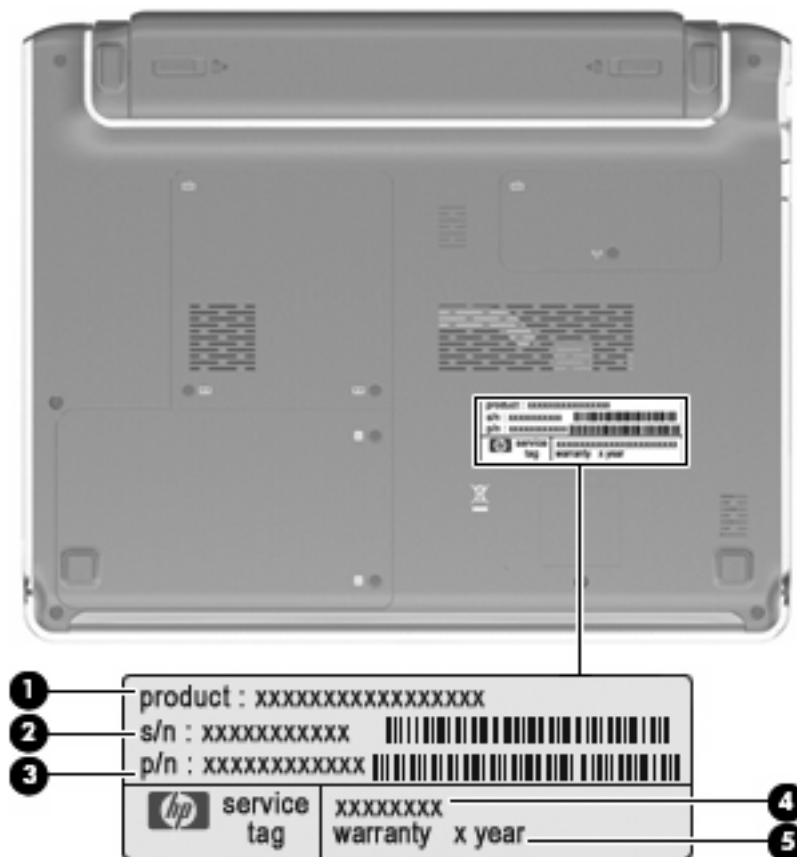
This chapter provides removal and replacement procedures.

There are as many as 91 screws, in 8 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.

## Service tag

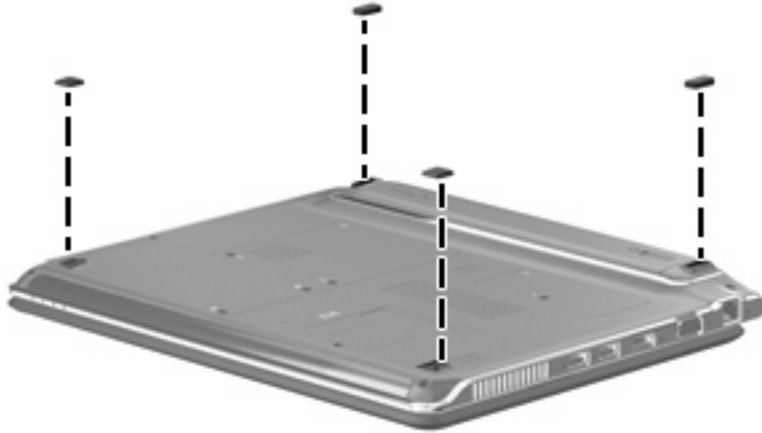
When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.

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



## Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Kit, spare part number 517761-001. Two rectangular rubber feet attach to the back edge of the base enclosure, and two square rubber feet attach to the front edge of the base enclosure in the locations illustrated below.



## Battery

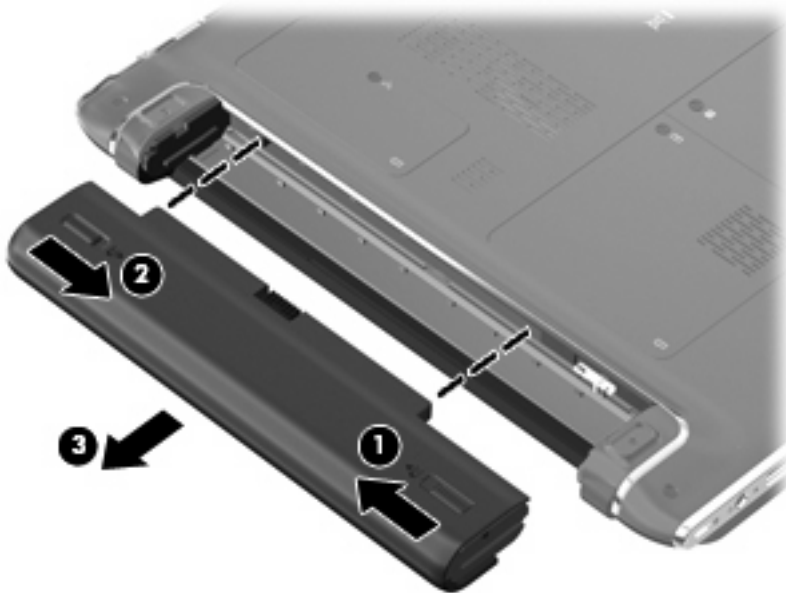
Description	Spare part number
6-cell, 55-Wh, 2.55-Ah Li-ion battery	506781-001
4-cell, 32-Wh, 2.80-Ah Li-ion battery	506780-001
Battery cover	517744-001

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. On the battery pack, slide the right battery release latch to the left **(1)**, then slide the left battery release latch to the right **(2)** and hold it.
3. Slide the battery pack **(3)** away from the computer.



To insert the battery, insert the rear edge of the battery into the battery bay and push in until it is seated. The battery release latches automatically lock the battery into place.

## Hard drive

 **NOTE:** The hard drive spare part kit includes left and right bracket rails, a connector cable, Mylar cover with tab, and 4 rubber isolators.

Description	Spare part number
500-GB, 5400-rpm	506776-001
320-GB, 5400-rpm	506775-001
250-GB, 5400-rpm	506774-001
160-GB, 5400-rpm	506773-001
Hard Drive Hardware Kit (includes left and right bracket rails, connector cable, Mylar cover with tab, and 4 rubber isolators)	506777-001

Before removing the hard drive, follow these steps:

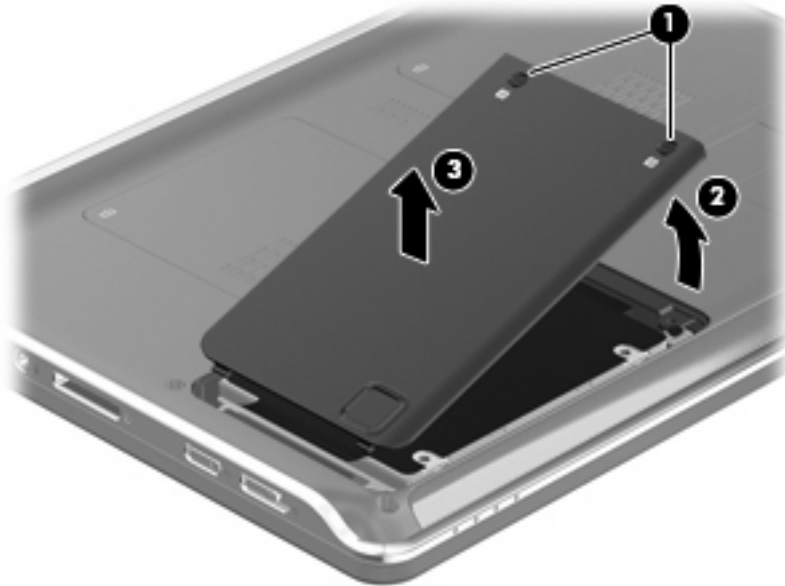
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).

Remove the hard drive:

1. Position the computer upside down with the front toward you.
2. Loosen the two Phillips PM2.5×6.0 captive screws **(1)** that secure the hard drive bay cover to the computer.



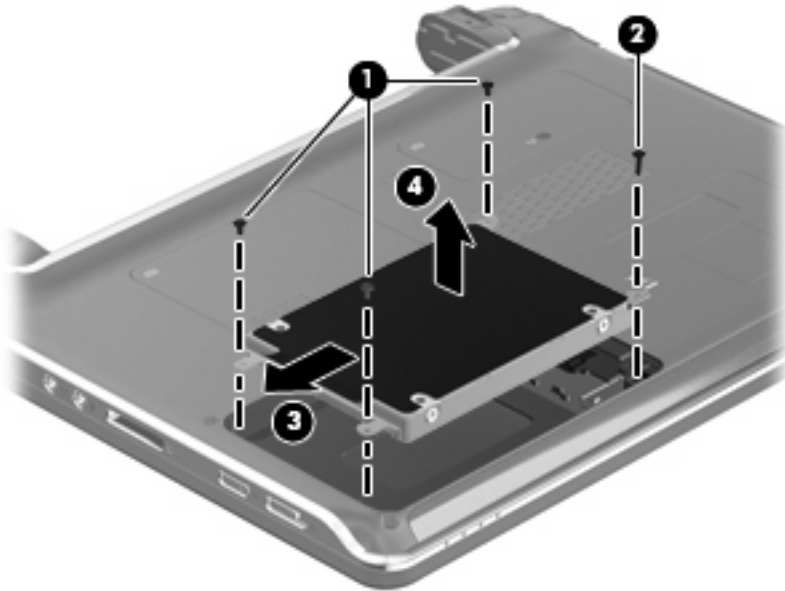
3. Lift the right side of the hard drive bay cover (2), swing it up and to the left, and remove the cover (3). The hard drive bay cover is included in the Access doors, spare part number 517748-001.



4. Remove the three Phillips PM2.5x4.0 screws (1), and the one Phillips PM2.5x7.0 screw (2) that secure the hard drive to the computer.

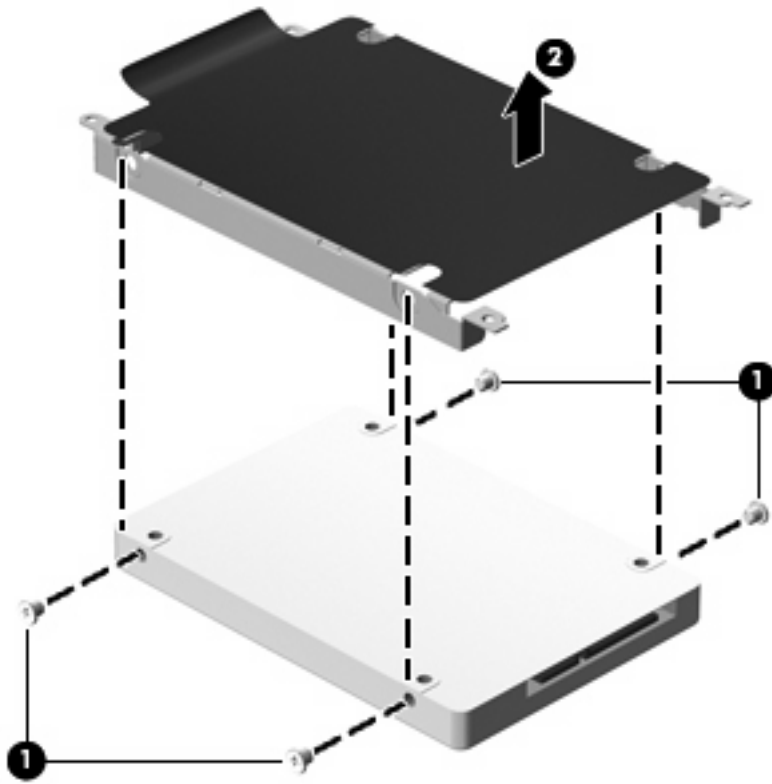
**⚠ WARNING!** Be sure to replace the 7.0-mm screw in the correct location as indicated below. If it is accidentally screwed into one of the 4.0-mm screw locations, it may damage the computer.

5. Use the Mylar tab to slide the hard drive to the left to disconnect it from the system board (3), and then lift the hard drive up on the right and remove it from the hard drive bay (4).



6. If it is necessary to replace the hard drive bracket or any of the hard drive bracket components, remove the two Phillips PM3.0x4.0 screws (1) from each side of the hard drive.

7. Lift the bracket (2) straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

## Memory module

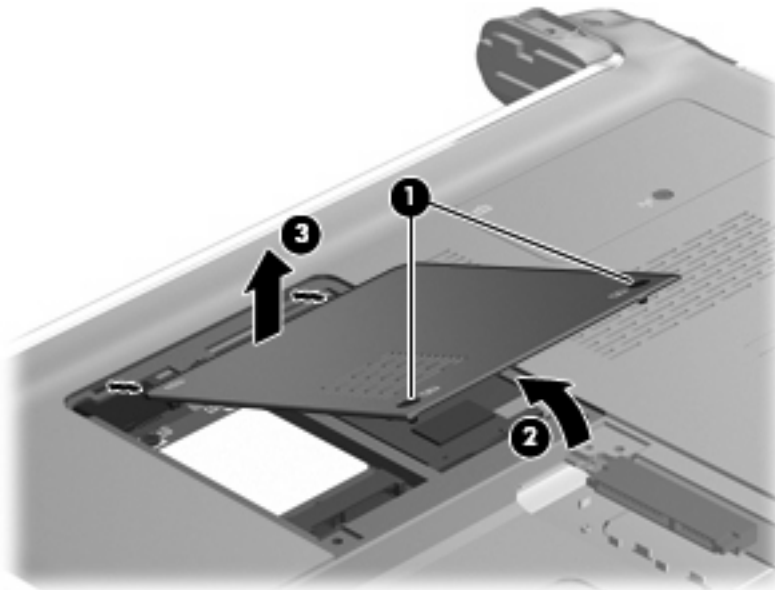
Description	Spare part number
4096-MB	517588-001
2048-MB	506772-001
1024-MB	506771-001

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 39](#)).


Remove the memory module:

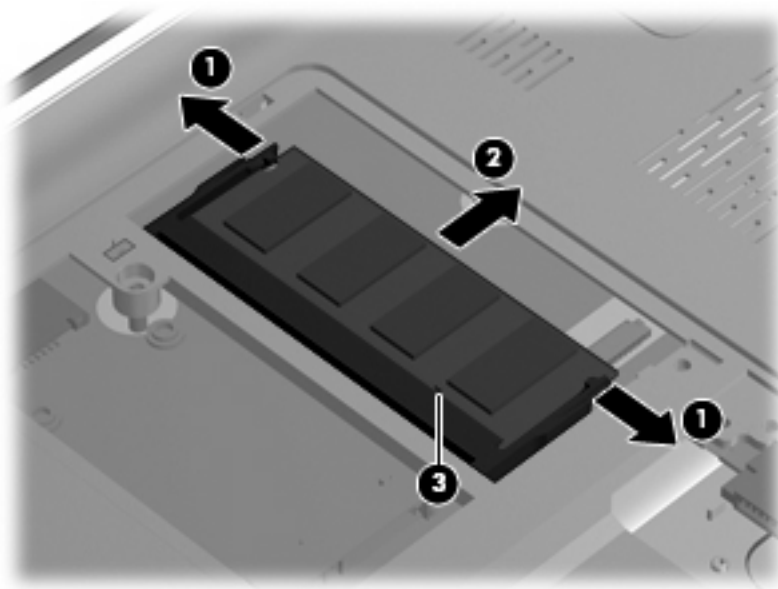
1. Position the computer upside down with the front toward you.
2. Loosen the two Phillips PM2.5×6.0 captive screws **(1)** that secure the memory module compartment cover to the computer.
3. Lift the front edge of the cover, swing it up and to the left **(2)**, and remove the cover **(3)**. The memory module compartment cover is included in the Access doors, spare part number 517748-001.



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 the memory module.

## WWAN module

Description	Spare part number
WWAN module	483377-002

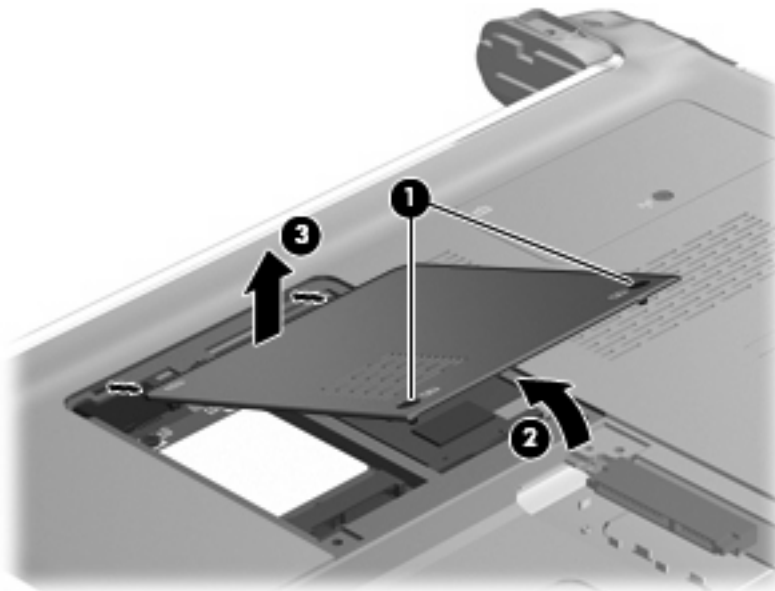
Before removing the WWAN module, follow these steps:

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 39](#)).


Remove the WWAN module:

△ **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.


1. Position the computer upside down with the front toward you.
2. Loosen the two Phillips PM2.5x6.0 captive screws (1) that secure the memory module compartment cover to the computer.
3. Lift the front edge of the cover, swing it up and to the left (2), and remove the cover (3). The memory module compartment cover is included in Access doors, spare part number 517748-001.

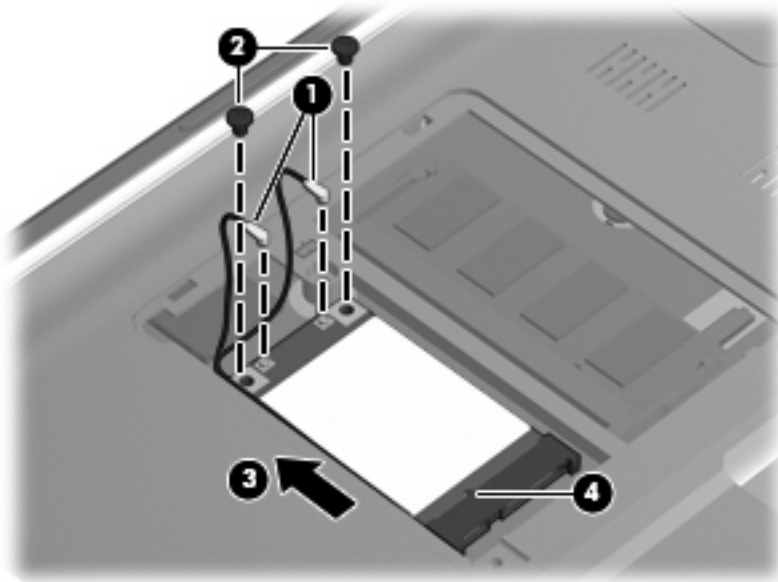


4. Disconnect the WWAN antenna cables (1) from the WWAN module.

 **NOTE:** The blue WWAN antenna cable connects to the “Aux” terminal. The red WWAN antenna cable connects to the “Main” terminal.

5. Remove the two Phillips PM2.5x4.0 screws **(2)** that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)
6. 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 this procedure to install the WWAN module.

## WLAN module

Description	Spare part number
Broadcom 4322 802.11a/b/g/n WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	504664-001
Broadcom 4322 802.11a/b/g/n WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	504664-002
Broadcom BCM4312 802.11b/g WLAN module for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	504593-001
Broadcom BCM4312 802.11b/g WLAN module for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the 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, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, the People's Republic of China, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the 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, Ireland, Israel, Italy, the Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the 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, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the 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 the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	504593-002

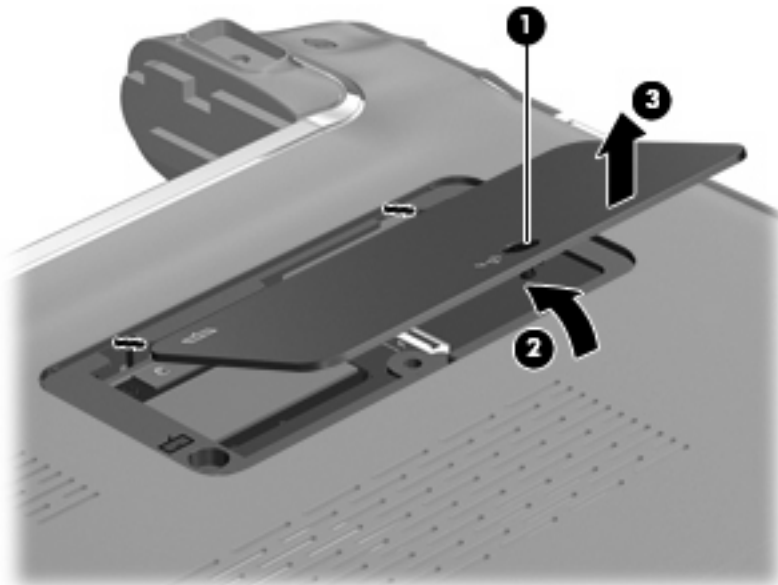
Before removing the WLAN module, follow these steps:

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 39](#)).

Remove the WLAN module:

**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.

1. Position the computer upside down with the front toward you.
2. Loosen the Phillips PM2.5x6.0 captive screw (1) that secures the WLAN module compartment cover to the computer.
3. Lift the edge of the cover, swing it up and to the left (2), and remove the cover (3). The WLAN module compartment cover is included in Access doors, spare part number 517748-001.




4. Disconnect the WLAN antenna cables (1) from the WLAN module.

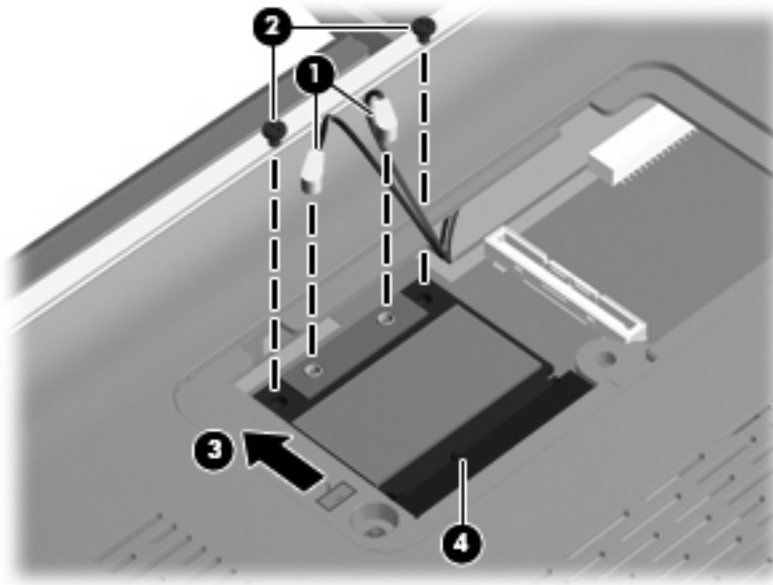
**NOTE:** The black WLAN antenna cable is connected to the WLAN module “Main” terminal. The white WLAN antenna cable is connected to the WLAN module “Aux” terminal.

5. Remove the two Phillips PM2.5x4.0 screws (2) that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)



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

 **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.

## Keyboard

### Keyboards—Espresso Black

For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	506782-A41	Portugal	506782-131
Brazil	506782-201	Russia	506782-251
Denmark, Norway, and Sweden	506782-DH1	Saudi Arabia	506782-171
France	506782-051	South Korea	506782-AD1
French Canada	506782-121	Spain	506782-071
Germany	506782-041	Switzerland	506782-111
Greece	5067820-151	Taiwan	506782-AB1
Italy	506782-061	Thailand	506782-281
Japan	506782-291	Turkey	506782-141
Latin America	506782-161	The United Kingdom	506782-031
The Netherlands	506782-B31	The United States	506782-001

### Keyboards—Moonlight White

For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	517584-A41	Portugal	517584-131
Brazil	517584-201	Russia	517584-251
Denmark, Norway, and Sweden	517584-DH1	Saudi Arabia	517584-171
France	517584-051	South Korea	517584-AD1
French Canada	517584-121	Spain	517584-071
Germany	517584-041	Switzerland	517584-111
Greece	517584-151	Taiwan	517584-AB1
Italy	517584-061	Thailand	517584-281
Japan	517584-291	Turkey	517584-141
Latin America	517584-161	The United Kingdom	517584-031
The Netherlands	517584-B31	The United States	517584-001

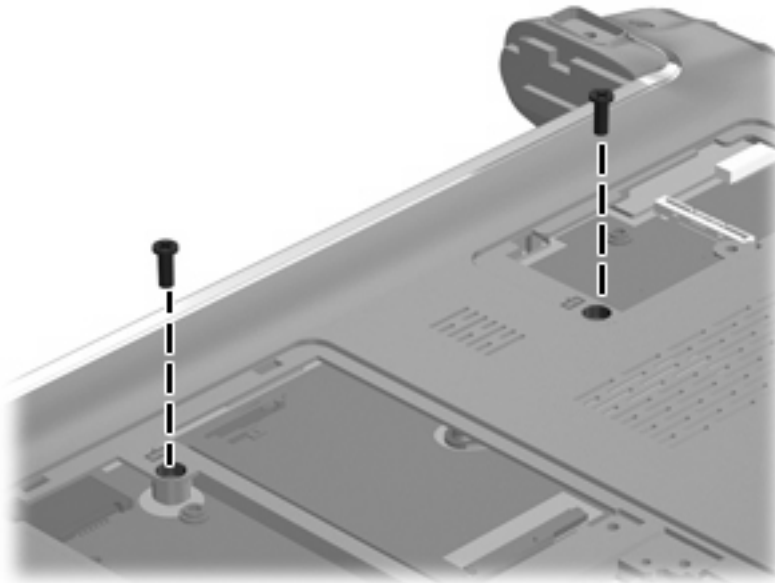
Before removing the keyboard, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))

Remove the keyboard:

1. Turn the computer upside down with the front toward you.
2. Remove one Phillips PM2.5×10.0 screw located in the memory module compartment, and one Phillips PM2.5×10.0 screw located in the WLAN compartment. The screw locations are identified by keyboard icons.

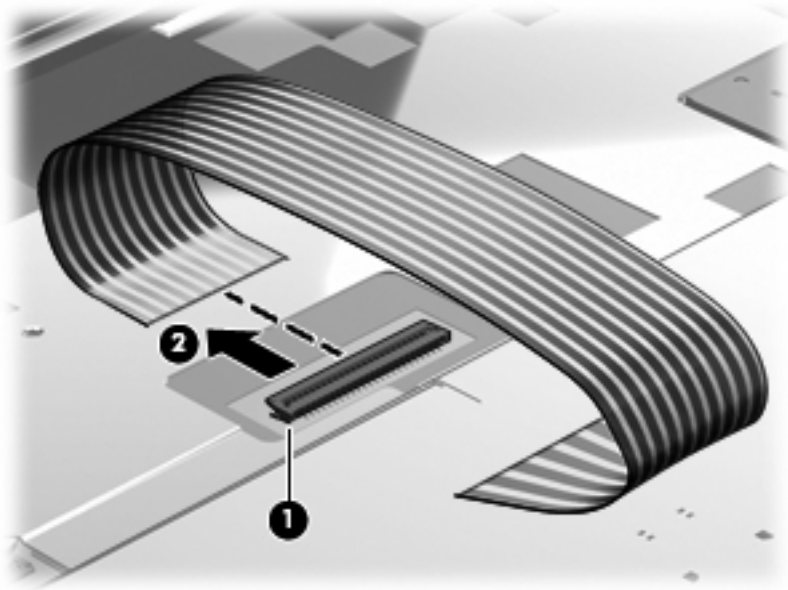


3. Turn the computer display-side up, with the front toward you.
4. Open the computer as far as possible.
5. Lift the rear edge of the keyboard **(1)** until it rests at an angle.

6. Slide the keyboard (2) back until the keyboard connector on the system board is accessible.



7. Release the zero insertion force (ZIF) connector (1) to which the keyboard cable is connected and disconnect the cable (2) from the system board.



8. Remove the keyboard.

Reverse this procedure to install the keyboard.

## Top cover

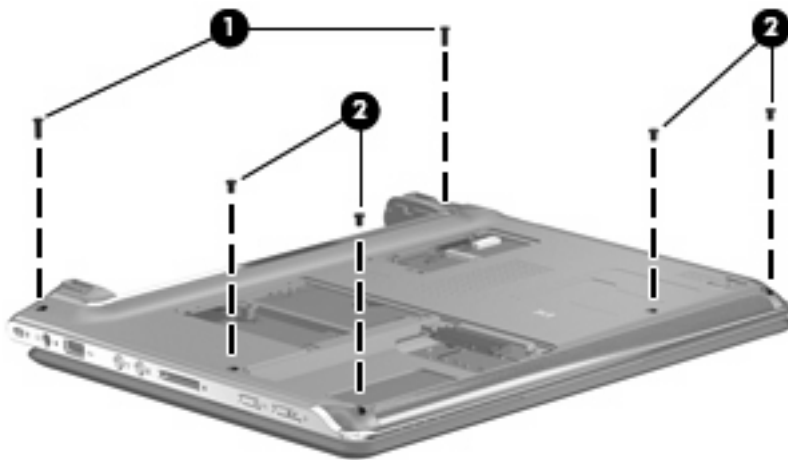
Description	Spare part number
Top cover with TouchPad, TouchPad cable, and TouchPad buttons, Espresso Black	517745-001
Top cover with TouchPad, TouchPad cable, and TouchPad buttons, Moonlight White	519533-001

Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))

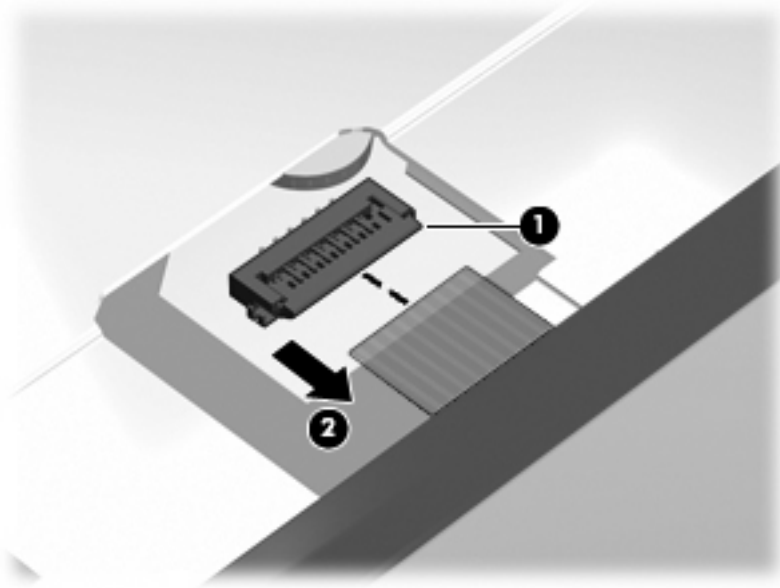
Remove the top cover:

1. Turn the computer upside down, with the front toward you.
2. Remove the two Phillips PM2.5x9.0 screws (1) and the four Phillips PM2.0x5.0 screws (2) that secure the top cover to the computer.

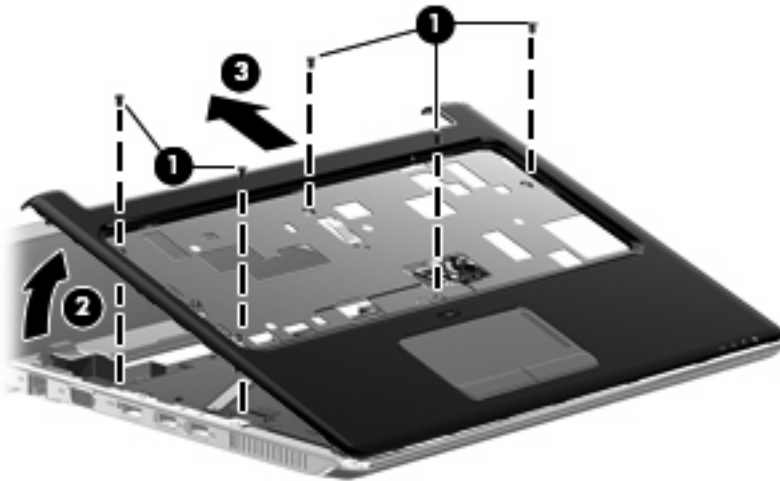


3. Turn the computer right-side up, with the front toward you.

4. Release the ZIF connector (1), and disconnect the TouchPad cable (2) from the system board.



5. Remove the five Phillips PM2.5x5.0 screws (1) that secure the top cover to the computer.
6. Lift the rear edge (2) of the top cover until it rests at an angle.
7. Remove the top cover (3) by lifting it up from the back and sliding it out.



Reverse this procedure to install the top cover.

## Fan

Description	Spare part number
Fan	517749-001

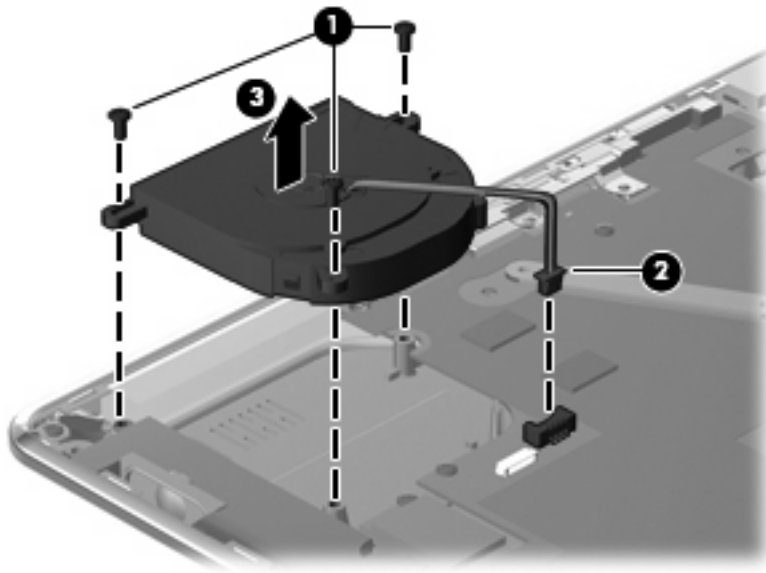
Before removing the fan, follow these steps:

1. Shut down the computer. If you are unsure whether 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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))


Remove the fan:

1. Remove the three Phillips PM2.0x5.0 screws **(1)** that secure the fan to the base enclosure.
2. Disconnect the fan cable **(2)** from the system board.

3. Lift the fan (3) up from the base enclosure.




Reverse this procedure to install the fan.

 **NOTE:** To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the left side of the computer.

The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill on the left side of the computer.



## Bluetooth module

 **NOTE:** The Bluetooth module spare part kits do not include a Bluetooth module cable. The Bluetooth module cable is available in the Cable Kit, spare part number 517757-001.

Description	Spare part number
Bluetooth module	483113-001

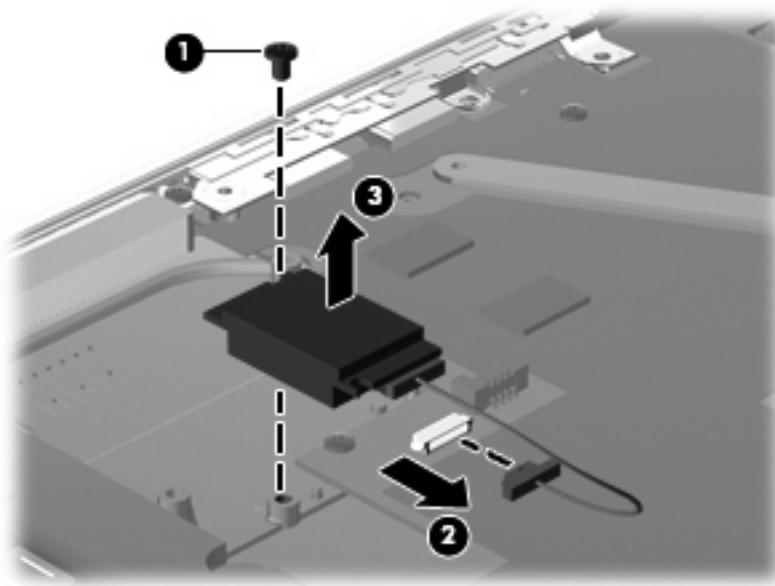
Before removing the Bluetooth module, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))

Remove the Bluetooth module:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the Bluetooth module to the base enclosure.
2. Disconnect the Bluetooth module cable **(2)** from the system board.

3. Remove the Bluetooth module (3) from the base enclosure.



Reverse this procedure to install the Bluetooth module.

## System board

 **NOTE:** All system board spare kits include replacement thermal material.

Description	Spare part number
With embedded processor, MV40, 1.6-GHz, RX781 Northbridge and ATI-M82-S discrete graphics subsystem memory	506763-001
With embedded processor, MV40, 1.6-GHz, RS780 Northbridge and ATI-M UMA graphics subsystem memory	506762-001

Before removing the system board, follow these steps:

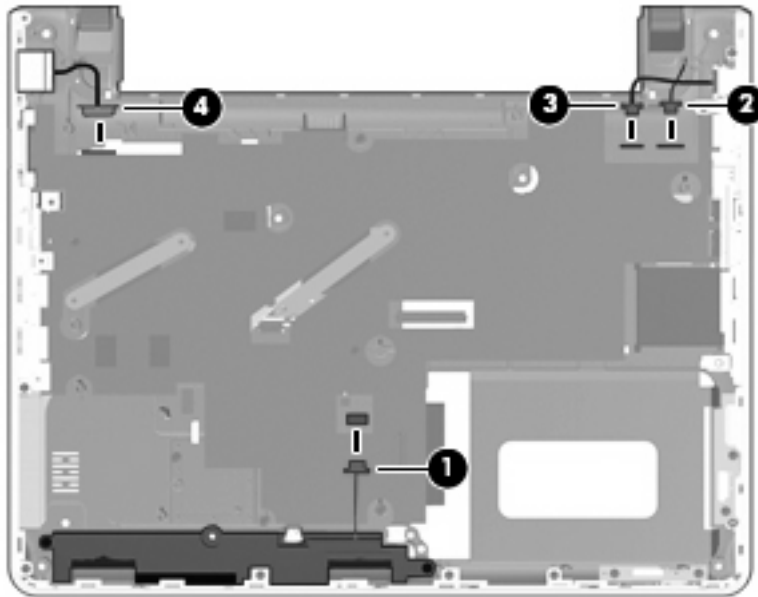
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. Bluetooth module (see [Bluetooth module on page 57](#))

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

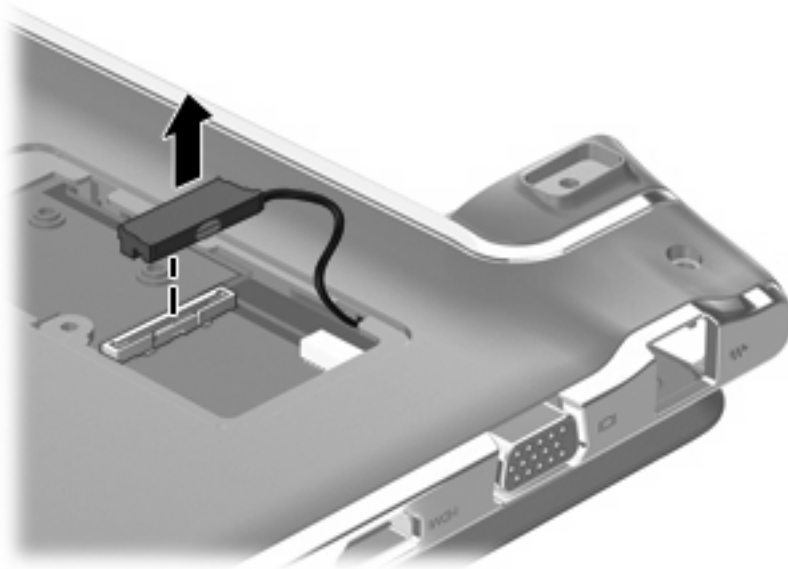
- RTC battery (see [RTC battery on page 66](#))
- Memory module (see [Memory module on page 43](#))
- WWAN module (see [WWAN module on page 45](#))
- WLAN module (see [Bluetooth module on page 57](#))
- Fan (see [Fan on page 55](#))
- Heat sink (see [System board on page 59](#))

Remove the system board:

1. Disconnect the following cables from the system board:
  - (1) Speaker cable
  - (2) Camera microphone cable
  - (3) Power connector cable
  - (4) RJ-45 cable

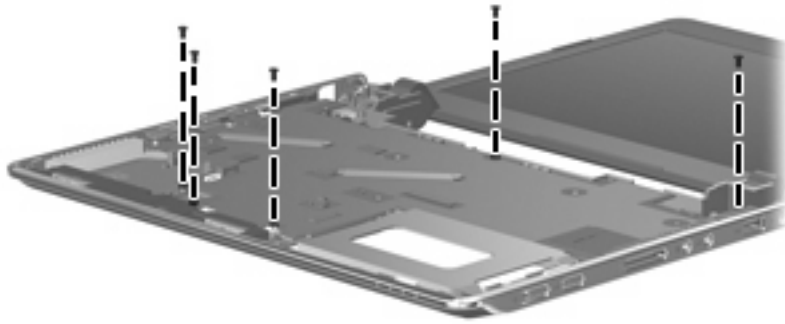


2. Turn the computer upside down and disconnect the display panel cable located in the WLAN compartment.

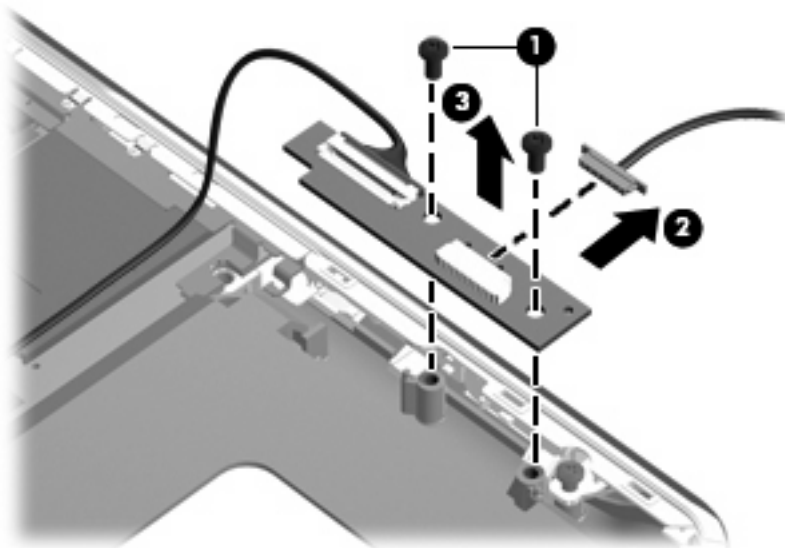


3. Turn the computer right-side up.

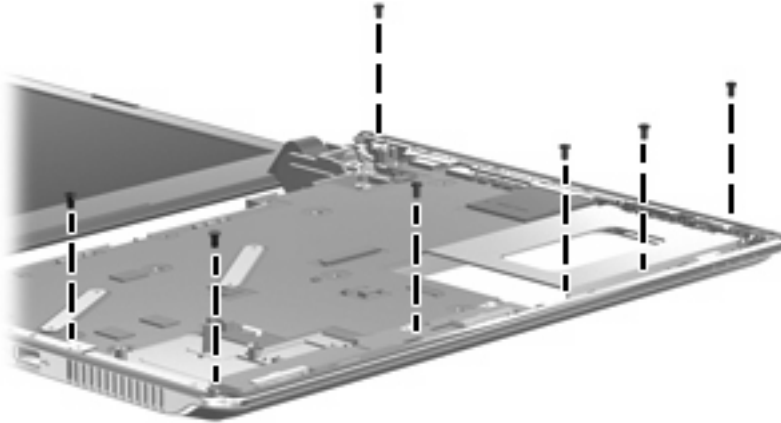
4. Remove the five Phillips PM2.0×5.0 screws that secure the system board to the base enclosure.



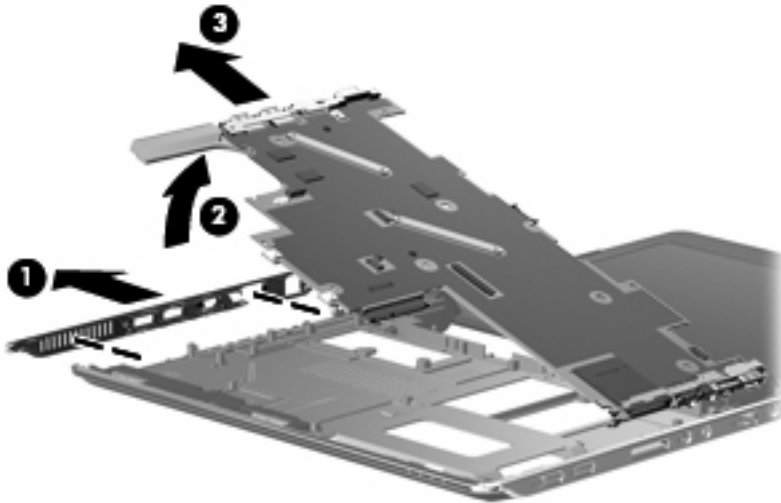
5. Remove the two PM2.0x3.0 screws (1) from the power switch board on the top, right side of the computer.
6. Disconnect the audio-infrared cable (2) from the power switch board.
7. Lift the power switch board (3) up from the base enclosure. The power switch board is available using spare part number 517756-001.



8. Remove seven PM2.0x5.0 screws from the silver metal trim surrounding the base enclosure as illustrated below.



9. Pull the left side of the metal trim away from the computer (1), lift the system board up on the left side at an angle (2), and remove it from the base enclosure (3).



Reverse this procedure to install the system board.

## Speaker assembly

Description	Spare part number
Speaker assembly	517754-001

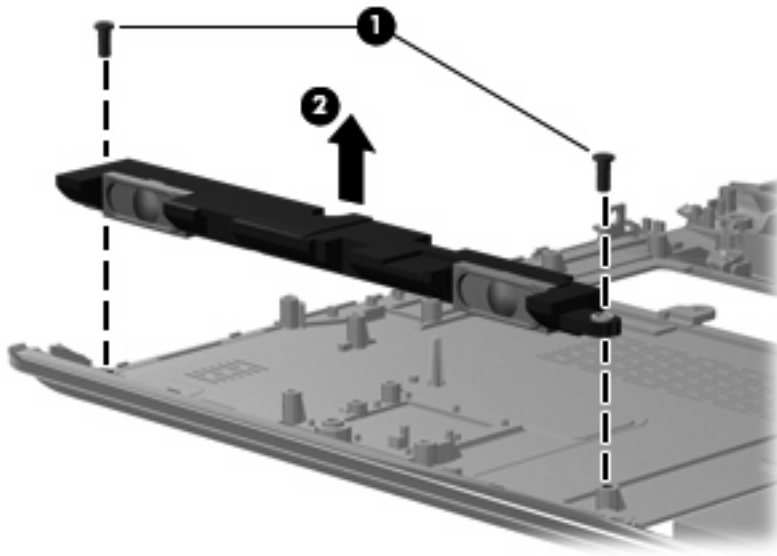
Before removing the speaker assembly, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. System board (see [System board on page 59](#))

Remove the speaker assembly:


1. Remove the two PM2.5x4.0 screws **(1)** that secure the speaker to the base enclosure.

2. Remove the speaker assembly (2).



Reverse this procedure to install the speaker assembly.

## LED board

 **NOTE:** The LED board is included with the base enclosure. For information on the base enclosure with a UMA heat sink, see spare part number 517752-001. For information on the base enclosure with a discrete heat sink, see spare part number 517753-001.

Before removing the LED board, follow these steps:

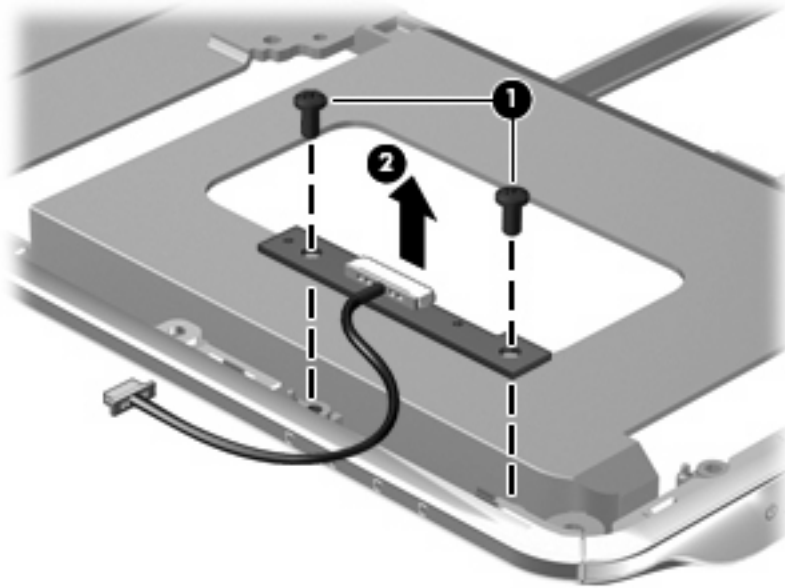
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))



- h. System board (see [System board on page 59](#))
- i. Speaker assembly (see [Speaker assembly on page 63](#))


Remove the LED board:

1. Remove the two PM2.0x5.0 screws (1) that secure the LED board to the base enclosure.
2. Lift the LED board up (2) and out of the base enclosure.



Reverse this procedure to install the LED board.

## RTC battery

 **NOTE:** Removing the AC adapter, battery pack, and RTC battery and leaving them uninstalled for 10 or more seconds causes all passwords and CMOS settings to be cleared.

Description	Spare part number
RTC battery	517759-001

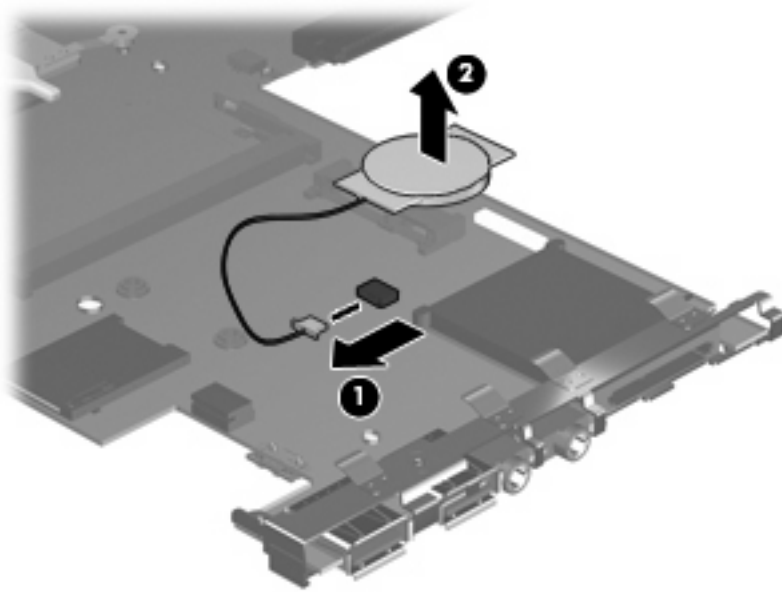
Before removing the RTC battery, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. System board (see [System board on page 59](#))

Remove the RTC battery:


1. Turn the system board upside down.
2. Disconnect the RTC battery cable **(1)** from the connector on the system board.

3. Remove the RTC battery (2) from the socket on the system board.



Reverse this procedure to install the RTC battery. Be sure that the RTC battery is installed with the “+” sign facing up.

## Display assembly

 **NOTE:** The display assembly includes a webcam, a microphone, and 2 wireless antenna transceivers and cables.

Description	Spare part number
12.1-inch WXGA+ BrightView display assembly, Espresso Black	506769-001
12.1-inch WXGA+ BrightView display assembly, Moonlight White	517587-001

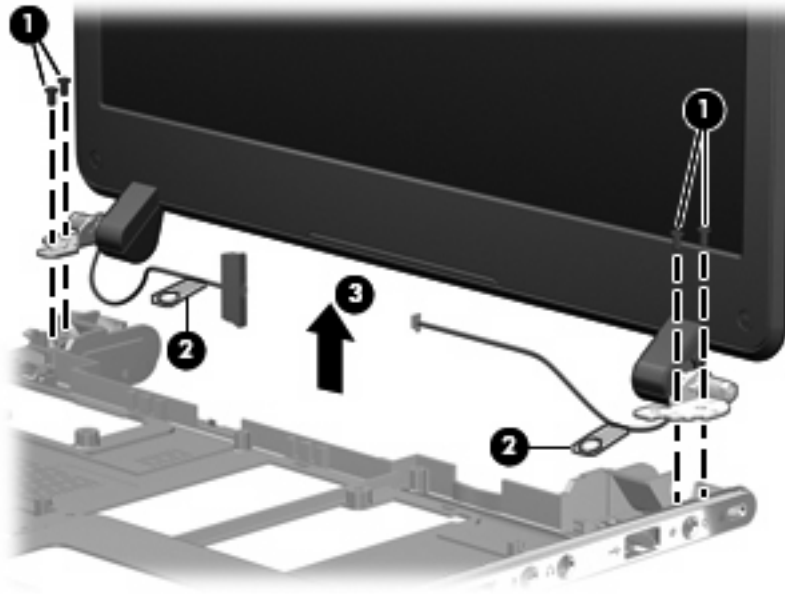
Before removing the display assembly, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#))
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. System board (see [System board on page 59](#))
  - i. Speaker assembly (see [Speaker assembly on page 63](#))

Remove the display assembly:

1. Open the computer display as far as possible.
  - △ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.
2. Remove the two Phillips PM2.0×5.0 screws **(1)** from each hinge that secures the display assembly to the computer. Each hinge also secures a grounding strap.
3. Disconnect the display panel cable ground loops **(2)**.

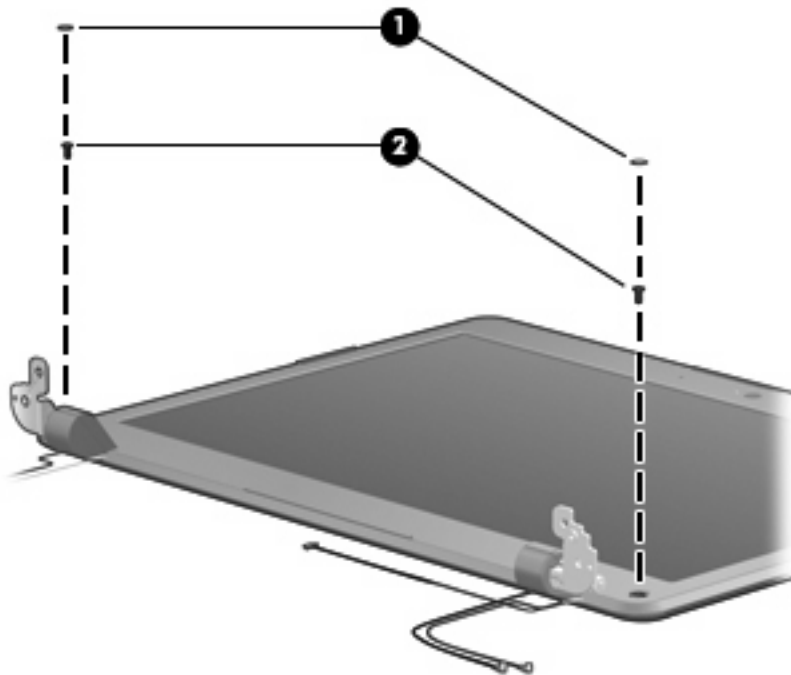
4. Remove the display assembly (3).



5. If it is necessary to replace the display bezel or any of the display assembly internal components, remove the following screw covers and screws:

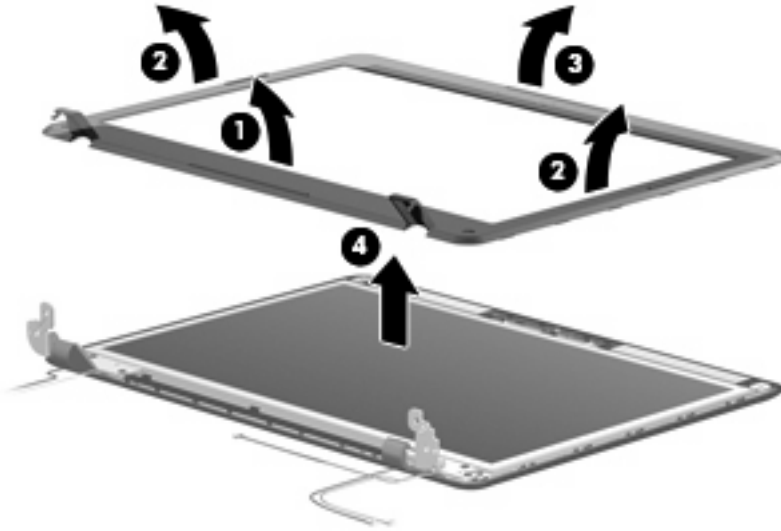
(1) Two rubber screw covers on the display bezel bottom edge. The display rubber screw covers are included in the Rubber Kit, spare part number 517761-001.

(2) Two Phillips PM2.0×5.0 screws.

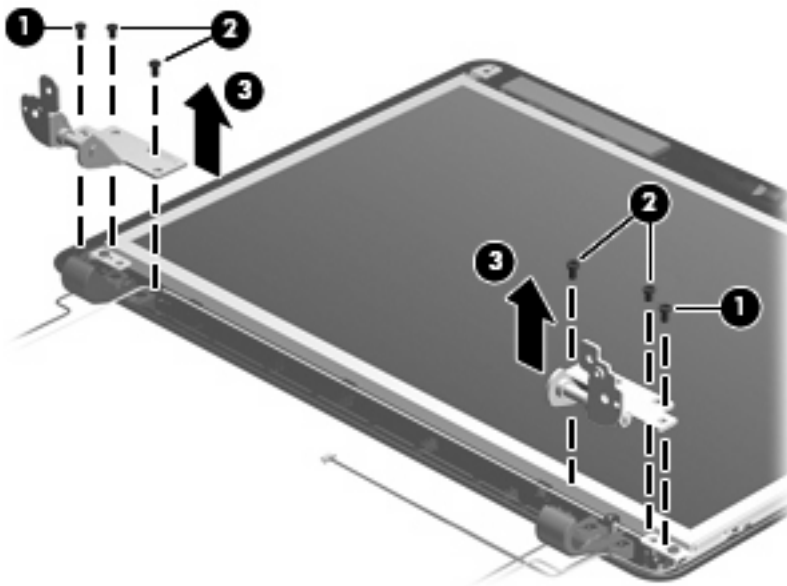


6. Flex the inside edges of the bottom edge (1), the left and right sides (2), and the top edge (3) of the display bezel until the bezel disengages from the display enclosure.

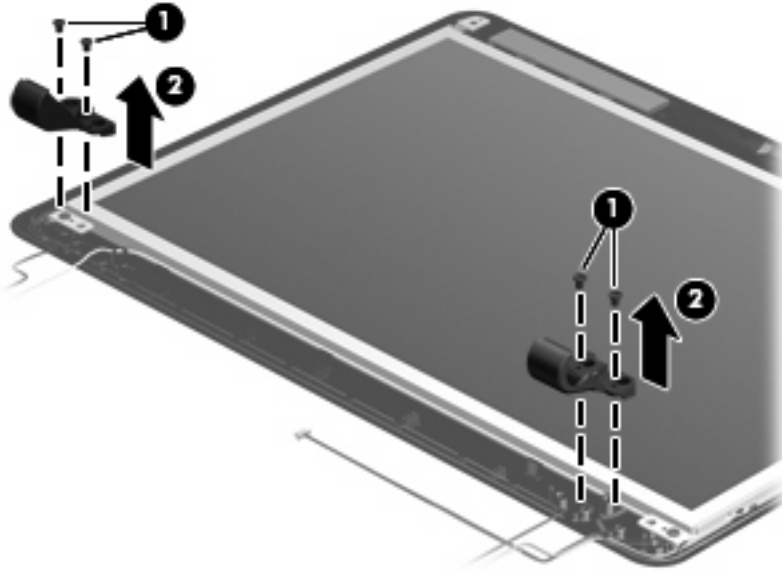
7. Remove the display bezel (4). The display bezel is available using spare part number 517733-001.



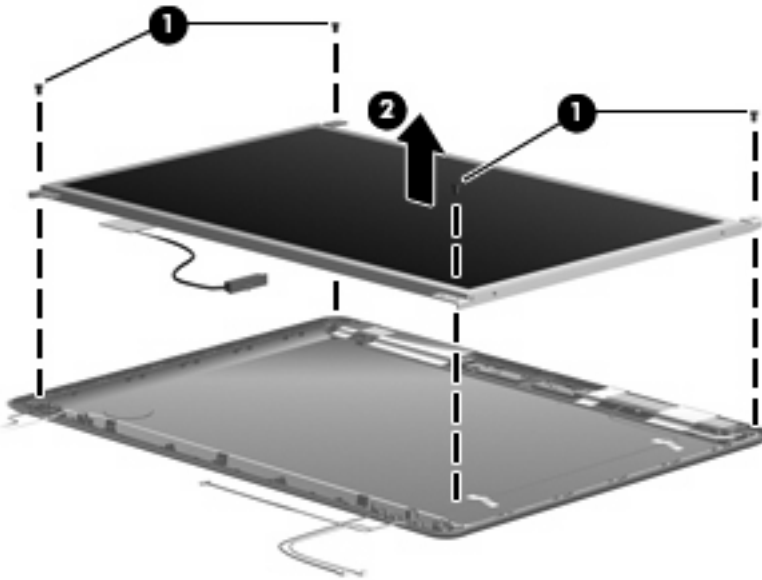
8. If it is necessary to replace the display hinges, remove the two Phillips PM2.0x5.0 screws (1) and the four Phillips PM 2.5x4.0 screws (2) that secure the hinges to the display panel.
9. Remove the display hinges (3). The display hinges are available in the Display Hinge Kit, spare part number 517738-001. The display hinge screws are available in the Display Screw Kit, spare part number 517743-001.



10. If it is necessary to replace the hinge covers, remove the four Phillips PM2.0x3.0 broadhead screws (1) that secure the covers to the hinges, then remove the hinge covers (2).




11. If it is necessary to replace the display panel, remove the four Phillips PM2.5x4.0 screws (1) that secure the display panel to the display enclosure.
12. Remove the display panel (2). The display panel is available using spare part number 517742-001 (WXGA BrightView display panel).



Reverse this procedure to reassemble and install the display assembly.

## Webcam/microphone module

 **NOTE:** If it has been determined that the webcam/microphone module is the component that must be replaced to complete the computer repair, the display assembly does not have to be removed. Follow the procedures in this section to replace the webcam/microphone module. For information on replacing the display assembly and other display assembly internal components, see [Display assembly on page 68](#).

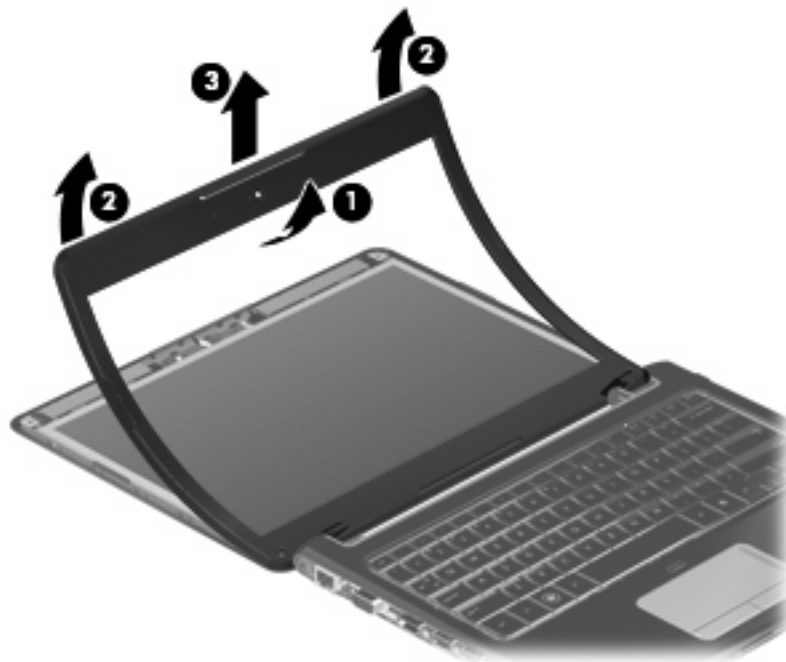
Description	Spare part number
Webcam/microphone module (includes double-sided tape)	517736-001

Before removing the webcam/microphone 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 39](#)).

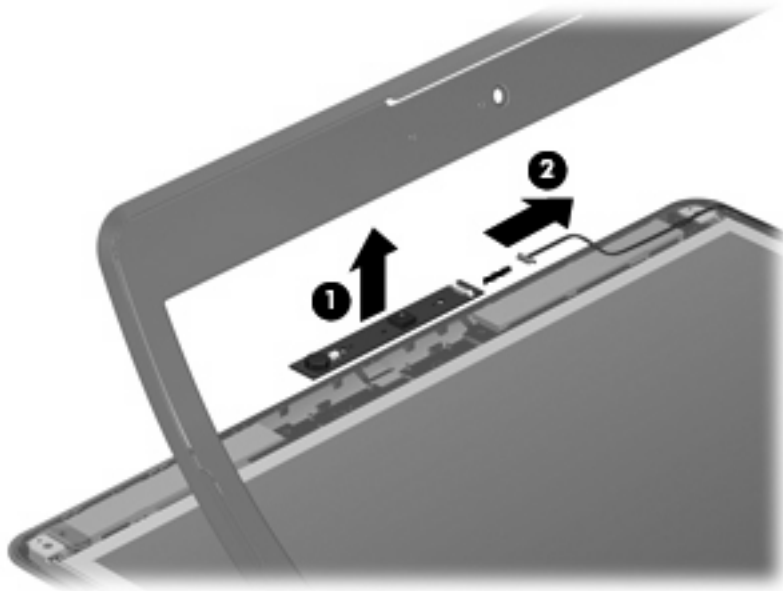
Remove the webcam/microphone module:

1. Turn the computer display-side up, with the front toward you.
2. Open the computer as far as possible.
3. Flex the inside edge of the top edge **(1)** and the left and right upper corners **(2)** of the display bezel until the bezel disengages from the display enclosure.
4. Release the display bezel top edge **(3)** from the display enclosure.






5. Release the webcam/microphone module (1) from the display enclosure as far as the webcam/microphone module cable allows.
6. Disconnect the webcam/microphone module cable (2) from the webcam/microphone module.



7. Remove the webcam/microphone module.

Reverse this procedure to install the webcam/microphone module.

## Power connector cable

 **NOTE:** The power connector cable is available in the Cable Kit, spare part number 501891-001.

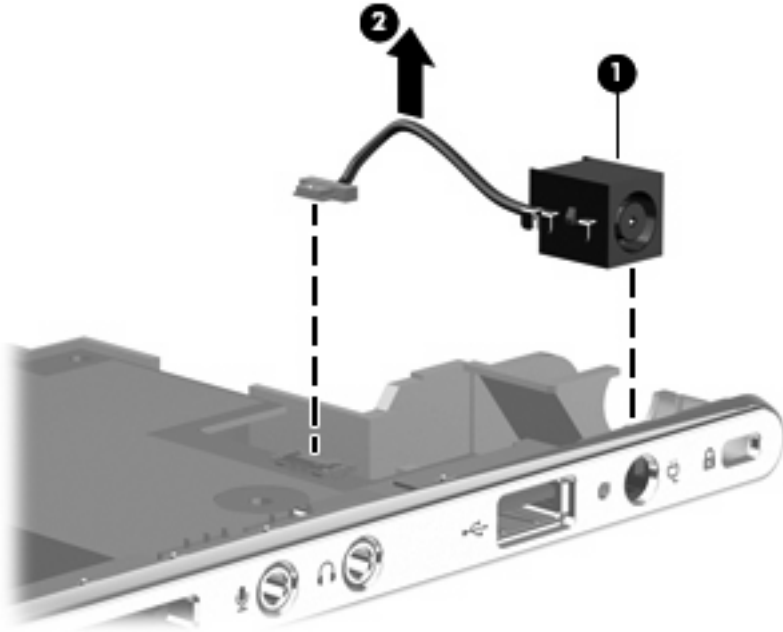
Before removing the power connector cable, follow these steps:

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 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#)).
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#)).
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. System board (see [System board on page 59](#))

Remove the power connector cable:


1. Remove the power connector (**1**) from the clip built into the base enclosure.

2. Remove the power connector cable (2) from the routing channel built into the base enclosure.




Reverse this procedure to install the power connector cable.

## Heat sink

 **NOTE:** The heat sink spare kit includes replacement thermal material.


Description	Spare part number
For use only with computer models equipped with discrete graphics subsystem memory	517747-001
For use only with computer models equipped with UMA graphics subsystem memory	517746-001

 **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.

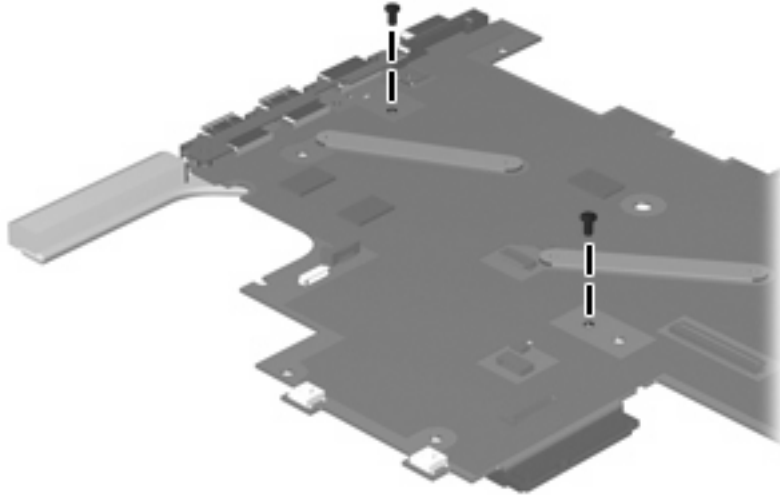
Before removing the heat sink, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 39](#)).
5. Remove the following components:
  - a. Hard drive (see [Hard drive on page 40](#)).
  - b. Memory module (see [Memory module on page 43](#))
  - c. WWAN module (see [WWAN module on page 45](#))
  - d. WLAN module (see [WLAN module on page 47](#))
  - e. Keyboard (see [Keyboard on page 50](#))
  - f. Top cover (see [Top cover on page 53](#))
  - g. Fan (see [Fan on page 55](#))
  - h. Bluetooth module (see [Bluetooth module on page 57](#))
  - i. Power switch board (see [System board on page 59](#))
  - j. System board (see [System board on page 59](#)).


Remove the heat sink:

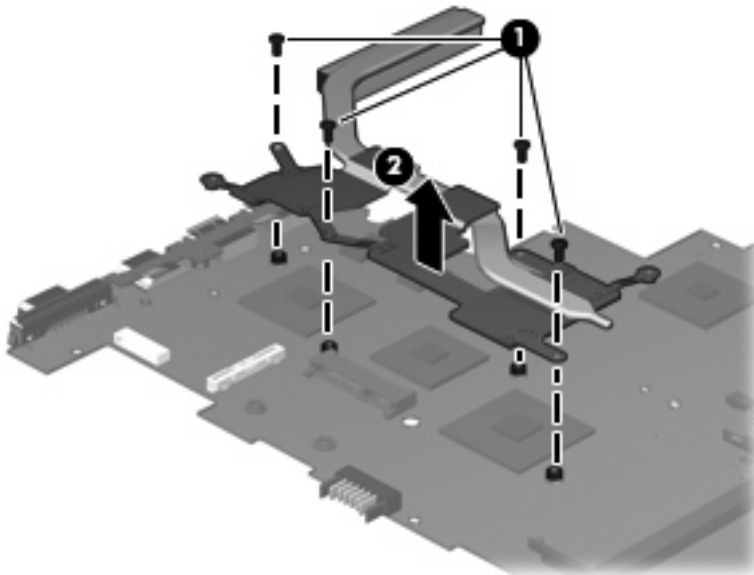
 **NOTE:** Steps 1 through 3 apply only to computer models equipped with discrete graphics subsystem memory.


1. Remove the two Phillips PM2.0×40 screws that secure the heat sink assembly to the top of the system board.



2. Turn the system board upside down and remove the four Phillips PM2.0×4.0 screws (1) that secure the heat sink assembly to the system board.
3. Remove the heat sink (2).


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

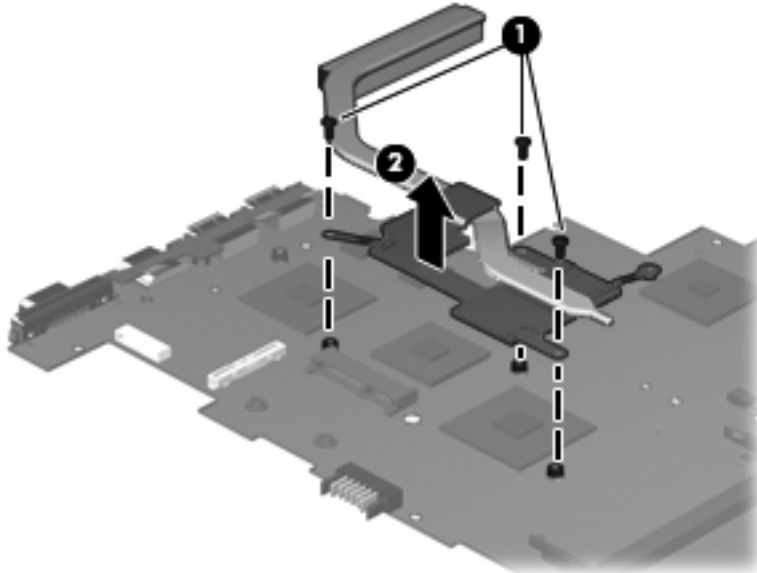



 **NOTE:** Steps 4 and 5 apply only to computer models equipped with UMA graphics subsystem memory.

4. Loosen the three Phillips PM2.0×4.0 screws (1) that secure the heat sink to the system board.

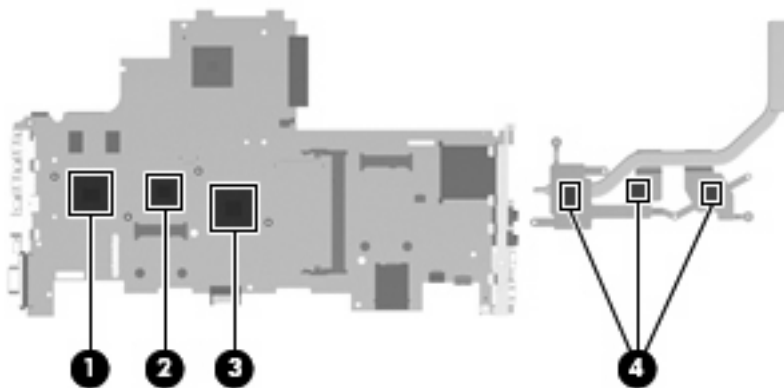
5. Remove the heat sink (2).


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



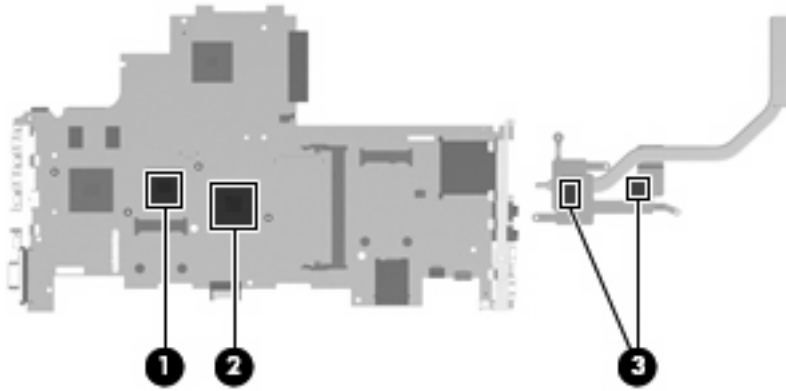
 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the system board (1), (2), and (3), and the heat sink components (4) each time the heat sink is removed. Thermal paste is used on the processor and the heat sink section that services it. Thermal pads are used on the Northbridge chip and the section of the heat sink that services it. Replacement thermal material is included with the discrete thermal module kit (spare part number 517747-001) and the discrete memory system board kit (spare part number 506763-001).

The following illustration shows the replacement thermal material locations for computer models equipped with discrete graphics subsystem memory.



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the system board (1) and (2), and the heat sink components (3) each time the heat sink is removed. Thermal paste is used on the processor and the heat sink section that services it. Thermal pads are used on the Northbridge chip and the section of the heat sink that services it. Replacement thermal material is included with the UMA thermal module kit, spare part number 517746-001) and the UMA memory system board (spare part number 506762-001), spare part kits.

The following illustration shows the replacement thermal material locations for computer models equipped with UMA graphics subsystem memory.




Reverse this procedure to install the heat sink assembly.

---

# 5 Setup Utility

## Starting the Setup Utility

The 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 (select models only) cannot be used to access the Setup Utility.

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

To start the Setup Utility:

- Open the 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 the 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 the Setup Utility

## Changing the language of the Setup Utility

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

1. Open the 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 the 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 the 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 the Setup Utility

Because the 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 the Setup Utility is open, press **f1**.

## Displaying system information

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

1. Open the 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 the 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 the Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

## Restoring default settings in the Setup Utility

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

1. Open the 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 the 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 the 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 the Setup Utility

You can exit the Setup Utility with or without saving changes.

- To exit the 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 the 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	<ul style="list-style-type: none"><li>• View and change the system time and date.</li><li>• View identification information about the computer.</li><li>• View specification information about the processor, memory size, system BIOS, and keyboard controller version (select models only).</li></ul>

### 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	Enabled/disable Fan Always On. When enabled, the computer fan will always be on.
Boot Options	<p>Set the following boot options:</p> <ul style="list-style-type: none"> <li>• <b>f9</b> and <b>f10</b> Delay (sec.)—Set the delay for the <b>f9</b> and <b>f10</b> functions of the Setup Utility in intervals of 5 seconds each (0, 5, 10, 15, 20).</li> <li>• CD-ROM boot—Enable/disable boot from CD-ROM.</li> <li>• Floppy boot—Enable/disable boot from diskette.</li> <li>• Internal Network Adapter boot—Enable/disable boot from Internal Network Adapter.</li> <li>• Boot Order—Set the boot order for: <ul style="list-style-type: none"> <li>◦ USB Floppy</li> <li>◦ Internal CD/DVD ROM drive</li> <li>◦ USB CD/DVD ROM drive</li> <li>◦ Hard drive</li> <li>◦ USB Diskette on Key</li> <li>◦ USB Hard drive</li> <li>◦ Network adapter</li> </ul> </li> </ul>

## Diagnostics menu

Select	To do this
Hard Disk Self Test	<p>Run a comprehensive self-test on the hard drive.</p> <p><b>NOTE:</b> On models with two hard drives, this menu option is called the <b>Primary Hard Disk Self Test</b>.</p>
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

	Metric	U.S.
<b>Dimensions</b>		
Width	29.2 cm	11.50 in
Depth	24.0 cm	9.45 in
Height (front to back)	2.37 to 3.23 cm	0.93 to 1.27 in
<b>Weight</b> (with hard drive, and 6-cell battery)	1.79 kg	3.94 lbs
Second hard drive adds:	0.13 kg	0.28 lbs
Camera adds:	0.009 kg	0.02 lbs
<b>Input power</b>		
Operating voltage	18.5 V dc @ 3.5 A - 65 W	
Operating current	3.5 A or 4.74 A	
<b>Temperature</b>		
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
<b>Relative humidity</b>		
Operating	10% to 90%	
Nonoperating	5% to 95%	
<b>Maximum altitude</b> (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
<b>NOTE:</b> Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.		

## 12.1-inch WXGA display specifications

	Metric	U.S.
<b>Dimensions</b>		
Height	26.1 cm	10.0 in
Width	16.3 cm	6.43 in
Diagonal	30.7 cm	12.1 in
<b>Number of colors</b>	Up to 16.8 million	
<b>Contrast ratio</b>	500:1	
<b>Brightness</b>	150 nits typical	
<b>Pitch resolution</b>		
Pitch	0.204 × 0.204 mm	
Format	1280 × 800	
Configuration	RGB vertical stripe	
<b>Backlight</b>	LED lit	
<b>Character display</b>	80 × 25	
<b>Total power consumption</b>	4.5 W	
<b>Viewing angle</b>	+/-45° horizontal, +/-35° vertical typical	

## Hard drive specifications

	500-GB*	320-GB*	250-GB*	160-GB*
<b>Dimensions</b>				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	101 g	101 g	101 g	101 g
<b>Interface type</b>	SATA	SATA	SATA	SATA
<b>Transfer rate</b>				
Synchronous (maximum)	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
<b>Seek times</b> (typical read, including setting)				
Single track	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms
<b>Logical blocks</b>	976,773,168	625,141,400	488,397,168	312,581,808
<b>Disc rotational speed</b>	5400-rpm	5400-rpm	5400-rpm	5400-rpm
<b>Operating temperature</b>	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.				
<b>NOTE:</b> Certain restrictions and exclusions apply. Contact technical support for details.				



# Blu-ray ROM DVD±R/RW SuperMulti DL Drive specifications

Applicable disc	Read:	Write:	
	CD-DA, CD+(E)G, CD-MIDI, CDTEXT, 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, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW	CD-R and CD-RW DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM	
<b>Access time</b>	<b>CD</b>	<b>DVD</b>	<b>HD</b>
Random	170 ms	170 ms	230 ms
<b>Cache buffer</b>	8 MB		
<b>Data transfer rate</b>			
24X CD-ROM	3,600 KB/sec		
8X DVD	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		
1X BD-ROM	4,500 KB/sec		
1X BD-R read	4,500 KB/sec		
1X BD-RE read	4,500 KB/sec		
<b>Transfer mode</b>	Multiword DMA Mode		

# DVD±RW and CD-RW Super Multi Double-Layer Combo Drive specifications

Applicable disc	Read:	Write:
	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	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Access time	CD	DVD
Random	< 175 ms	< 230 ms
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD	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 DMA specifications, AMD

Hardware DMA	System function
DMA4	Direct memory access controller

## System interrupt specifications, AMD discrete graphics

Hardware	IRQ System function
IRQ0	High precision event timer
IRQ1	Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard
IRQ5	RICOH OHCI Compliant IEEE 1394 Host Controller
IRQ7	Ricoh Memory Stick Controller Ricoh SD/MMC Host Controller Ricoh XD-Picture Card Controller SDA Standard Compliant SD Host Controller
IRQ8	High precision event timer
IRQ10	nVidia nForce PCI System Management
IRQ11	nVidia nForce System Management Controller
IRQ12	Synaptics PS/2 Port TouchPad
IRQ13	Numeric data processor
IRQ14	ATA Channel 0
IRQ15	ATA Channel 1
IRQ16	Broadcom WLAN adapter
IRQ17	Standard Enhanced PCI to USB Host Controller
IRQ18	Standard OpenHCD USB Host Controller
IRQ19	nVidia GeForce8400M GS
IRQ20	nVidia nForce Networking Controller
IRQ21	HDA Controller
IRQ23	Standard Dual Channel PCI IDE Controller

## System interrupt specifications, AMD UMA graphics

Hardware	IRQ System function
IRQ0	High precision event timer
IRQ1	Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard
IRQ5	RICOH OHCI Compliant IEEE 1394 Host Controller
IRQ7	Ricoh Memory Stick Controller Ricoh SD/MMC Host Controller Ricoh XD-Picture Card Controller SDA Standard Compliant SD Host Controller
IRQ8	High precision event timer
IRQ10	nVidia nForce PCI System Management
IRQ11	nVidia nForce System Management Controller
IRQ12	Synaptics PS/2 Port TouchPad
IRQ13	Numeric data processor
IRQ14	ATA Channel 0
IRQ15	ATA Channel 1
IRQ16	nVidia MCP67M
IRQ18	Standard OpenHCD USB Host Controller Standard OpenHCD USB Host Controller
IRQ19	Broadcom WLAN adapter
IRQ21	HDA Controller
IRQ22	Standard Enhanced PCI to USB Host Controller Standard Enhanced PCI to USB Host Controller
IRQ23	Standard Dual Channel PCI IDE Controller

# System I/O address specifications, AMD

I/O address (hex)	System function (shipping configuration)
0000 - 0008	DMA controller
000A - 000F	DMA controller
0020 - 0021	Programmable interrupt controller
0040 - 0043	System timer
0060 - 0060	Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard
0061 - 0061	System speaker
0062 - 0062	Microsoft ACPI-Compliant Embedded Controller
0064 - 0064	Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard
0066 - 0066	Microsoft ACPI-Compliant Embedded Controller
0070 - 0071	System CMOS/real time clock
0081 - 0083	DMA controller
0087 - 0087	DMA controller
0089 - 008B	DMA controller
008F - 008F (UMA only)	DMA controller
00A0 - 00A1	Programmable interrupt controller
00C0 - 00D1	DMA controller
00D4 - 00DF	DMA controller
00F0 - 00F1	Numeric data processor
0170 - 0177	ATA Channel 1
01F0 - 01F7	ATA Channel 0
0376 - 0376	ATA Channel 1
03B0 - 03BB	nVidia GeForce8400M GS (discrete) nVidia MCP67M (UMA)
03B0 - 03BB (discrete only)	PCI standard PCI-to-PCI bridge
03C0 - 03DF	nVidia GeForce8400M GS (discrete) nVidia MCP67M (UMA)
03C0 - 03DF (discrete only)	PCI standard PCI-to-PCI bridge
03F6 - 03F6	ATA Channel 0
3000 - 303F	nVidia nForce PCI System Management
3040 - 307F	nVidia nForce PCI System Management
3080 - 30BF	nVidia nForce PCI System Management
30C0 - 30CF	Standard Dual Channel PCI IDE Controller
30D0 - 30DF	Standard Dual Channel PCI IDE Controller

<b>I/O address (hex)</b>	<b>System function (shipping configuration)</b>
30E0 - 30E3 (UMA only)	Standard Dual Channel PCI IDE Controller
30E8 - 30EB	Standard Dual Channel PCI IDE Controller
30EC - 30EF	Standard Dual Channel PCI IDE Controller
30F0 - 30F7	Standard Dual Channel PCI IDE Controller
30F8 - 30FF (discrete only)	Standard Dual Channel PCI IDE Controller
4000 - 407F (discrete only)	nVidia GeForce8400M GS
4000 - 4FFF	PCI standard PCI-to-PCI bridge
5000 - 5FFF (discrete only)	PCI standard PCI-to-PCI bridge

## System memory map specifications, AMD discrete graphics

Size	Memory address	System function
128 KB	000A0000-000BFFFF	nVidia GeForce8400M GS
16 KB	B0000000-B0003FFF	HDA Controller
8 KB	B0004000-B0005FFF	Standard Dual Channel PCI IDE Controller
4 KB	B0006000-B0006FFF	Standard OpenHCD USB Host Controller
256 B	B0007000-B00070FF	Standard Enhanced PCI to USB Host Controller
4 KB	B0008000-B0008FFF	nVidia nForce Networking Controller
512 KB	B0080000-B00FFFFFF	nVidia nForce System Management Controller
2 KB	B0100000-B01007FF	RICOH OHCI Compliant IEEE 1394 Host Controller
256 B	B0100800-B01008FF	SDA Standard Compliant SD Host Controller
256 B	B0100C00-B0100CFF	Ricoh SD/MMC Host Controller
256 B	B0101000-B01010FF	Ricoh Memory Stick Controller
256 B	B0101400-B01014FF	Ricoh XD-Picture Card Controller
16 KB	B0200000-B0203FFF	Broadcom WLAN adapter
16 MB	B1000000-B1FFFFFF	nVidia GeForce8400M GS
32 MB	B2000000-B3FFFFFF	nVidia GeForce8400M GS
1 MB	B6000000-B60FFFFFF	Broadcom WLAN adapter
256 MB	C0000000-CFFFFFFF	nVidia GeForce8400M GS
1 KB	FED00000-FED003FF	High precision event timer

## System memory map specifications, AMD UMA graphics

Size	Memory address	System function
128 KB	000A0000-000BFFFF	nVidia MCP67M
16 KB	B0000000-B0003FFF	HDA Controller
8 KB	B0004000-B0005FFF	Standard Dual Channel PCI IDE Controller
4 KB	B0006000-B0006FFF	Standard OpenHCD USB Host Controller
256 B	B0007000-B00070FF	Standard Enhanced PCI to USB Host Controller
256 B	B0007400-B00074FF	Standard Enhanced PCI to USB Host Controller
16 B	B0007800-B000780F	nVidia nForce Networking Controller
256 B	B0007C00-B0007CFF	nVidia nForce Networking Controller
4 KB	B0008000-B0008FFF	Standard OpenHCD USB Host Controller
4 KB	B0009000-B0009FFF	nVidia nForce Networking Controller
512 KB	B0080000-B00FFFFFFF	nVidia nForce System Management Controller
16 MB	B1000000-B1FFFFFFF	nVidia MCP67M
16 MB	B2000000-B2FFFFFFF	nVidia MCP67M
2 KB	B3000000-B30007FF	RICOH OHCI Compliant IEEE 1394 Host Controller
256 B	B3000800-B30008FF	SDA Standard Compliant SD Host Controller
256 B	B3000C00-B3000CFF	Ricoh SD/MMC Host Controller
256 B	B3001000-B30010FF	Ricoh Memory Stick Controller
256 B	B3001400-B30014FF	Ricoh XD-Picture Card Controller
16 KB	B6000000-B6003FFF	Broadcom WLAN adapter
256 KB	C0000000-CFFFFFFF	nVidia MCP67M
1 KB	FED00000-FED003FF	High precision event timer

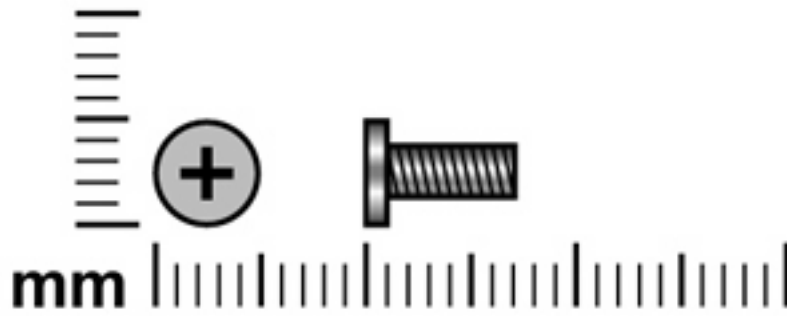


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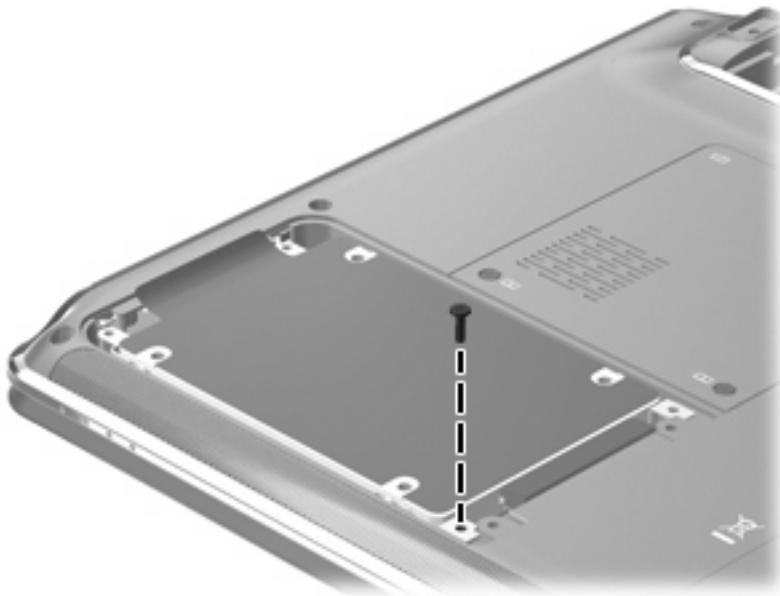
## 7 Screw listing

This section provides specification and reference information for the screws used in the computer. All screws listed in this section are available in the Screw Kit, spare part number 517762-001, and the Display Screw Kit, spare part number 517743-001.

## Phillips PM2.5×7.0 screw

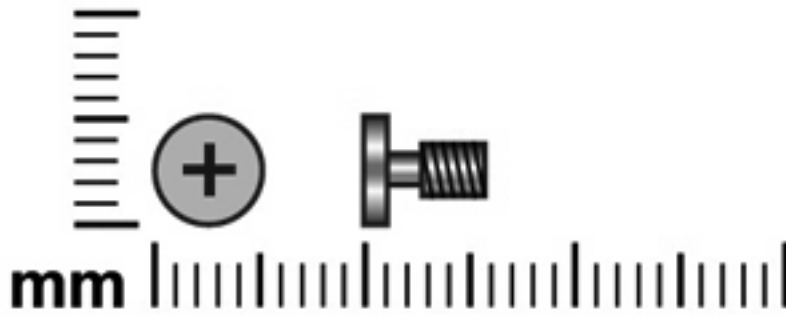


Color	Quantity	Length	Thread	Head diameter
Silver	1	7.0 mm	2.5 mm	5.0 mm

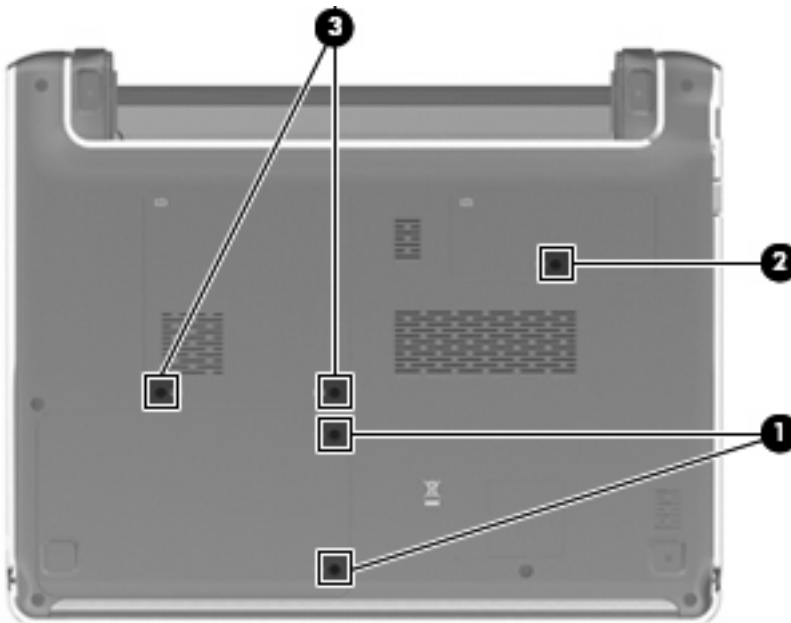


**Where used:** One screw that secures the hard drive to the computer

## Phillips PM2.5×6.0 captive screw



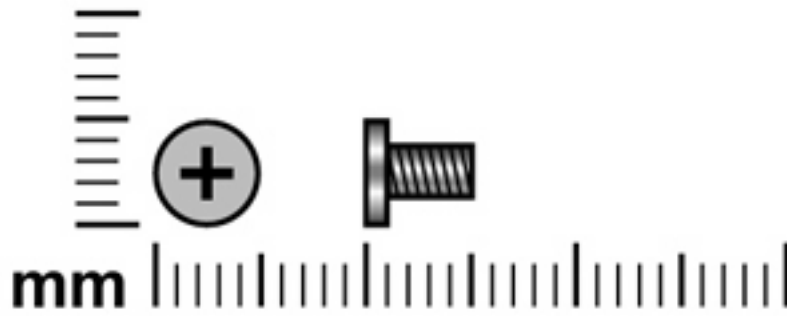
Color	Quantity	Length	Thread	Head diameter
Black	5	6.0 mm	2.5 mm	5.0 mm



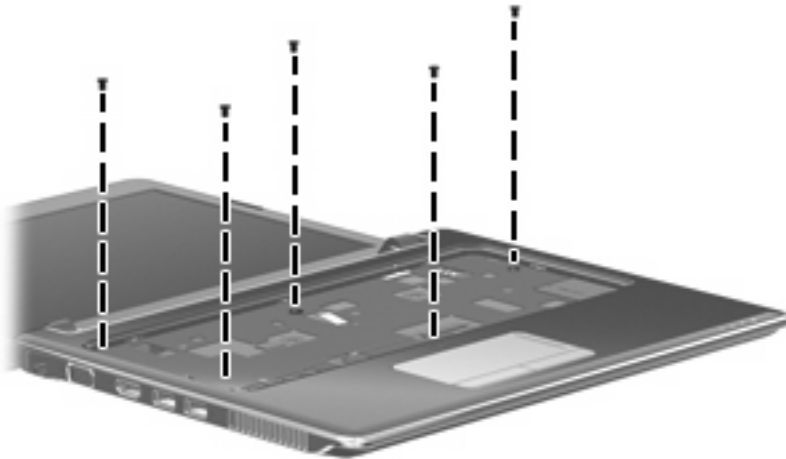
### Where used:

- (1) Two captive screws that secure the hard drive bay cover to the computer (screws are secured by C-clips)
- (2) One captive screw that secures the WLAN module compartment cover to the computer (screw is secured by a C-clip)
- (3) Two captive screws that secure the memory module compartment cover to the computer (screws are secured by C-clips)

## Phillips PM2.5x5.0 screw

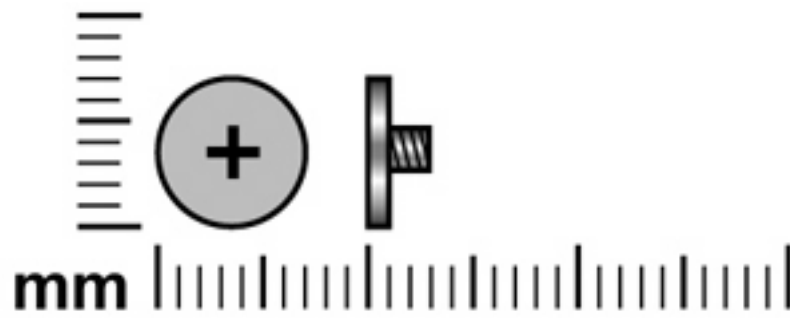


Color	Quantity	Length	Thread	Head diameter
Silver	5	5.0 mm	2.5 mm	5.0 mm

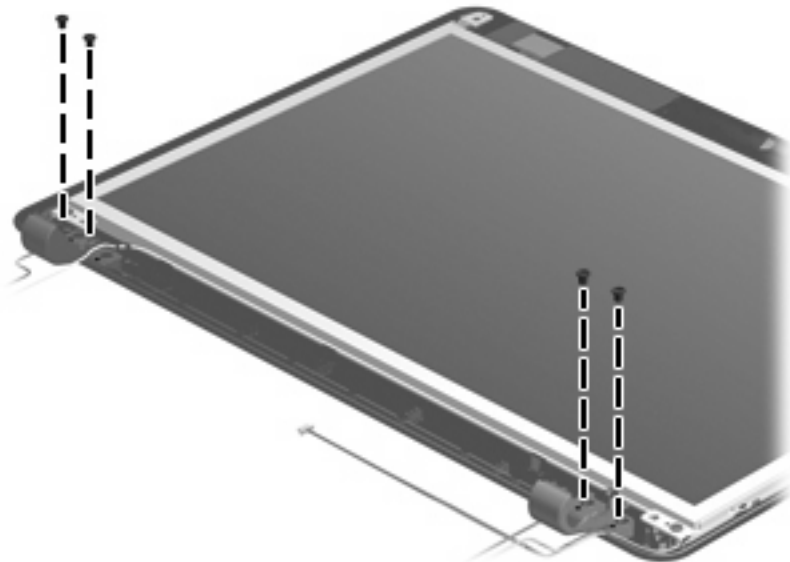


**Where used:** 5 screws that secure the top cover to the computer

## Phillips PM2.0x3.0 broadhead screw

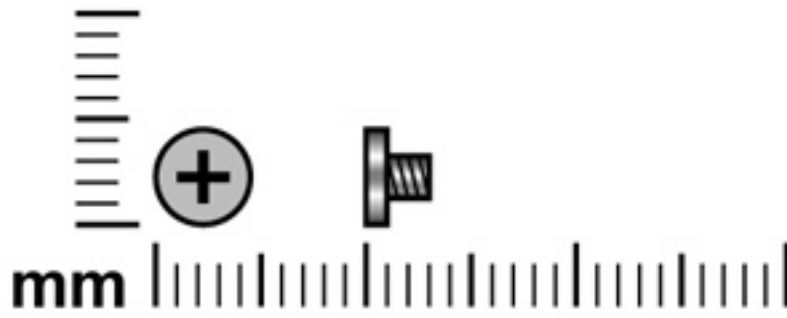


Color	Quantity	Length	Thread	Head diameter
Black	4	3.0 mm	2.0 mm	7.0 mm

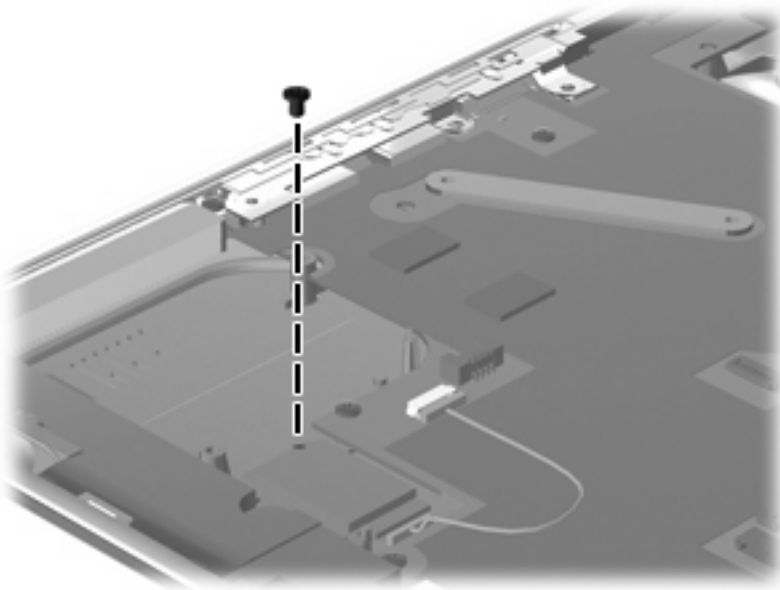


**Where used:** 4 broadhead screws that secure the hinge covers to the display panel

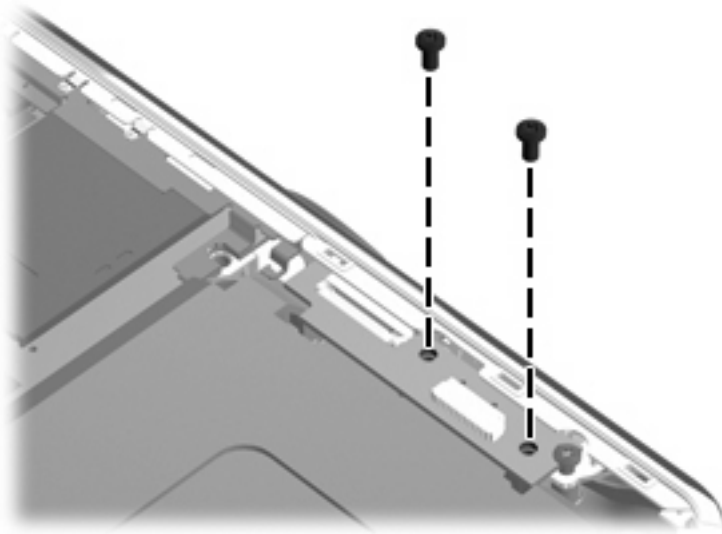
## Phillips PM2.0x3.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	3	3.0 mm	2.0 mm	4.5 mm

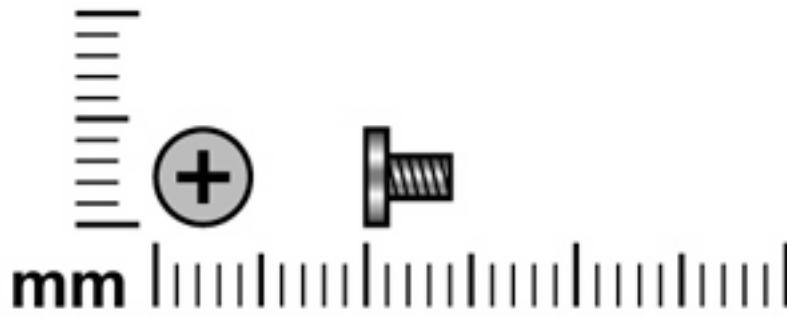


**Where used:** One screw that secures the Bluetooth module to the system board

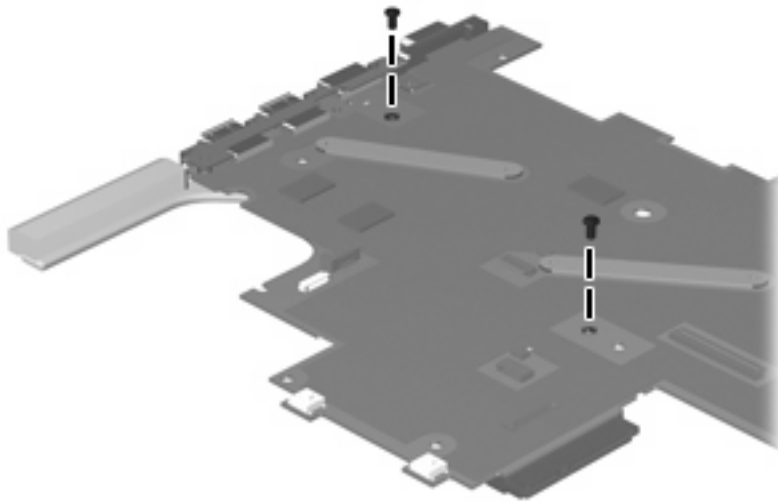


**Where used:** 2 screws that secure the power switch board to the base enclosure

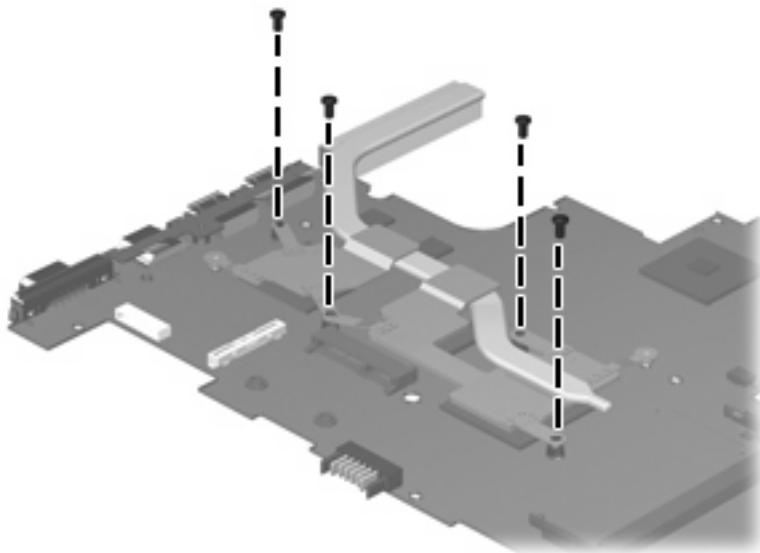
## Phillips PM2.0×4.0 screw



Color	Quantity	Length	Thread	Head diameter
Silver	9	4.0 mm	2.0 mm	4.5 mm

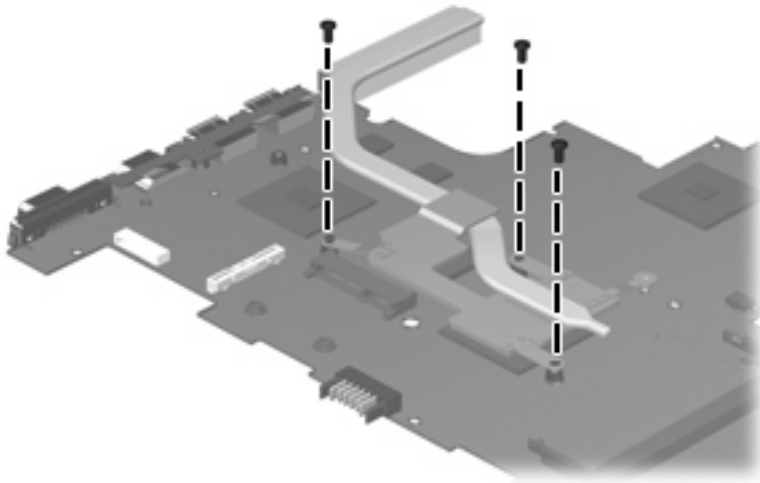


**Where used:** 2 screws that secure the discrete heat sink to the top of the system board



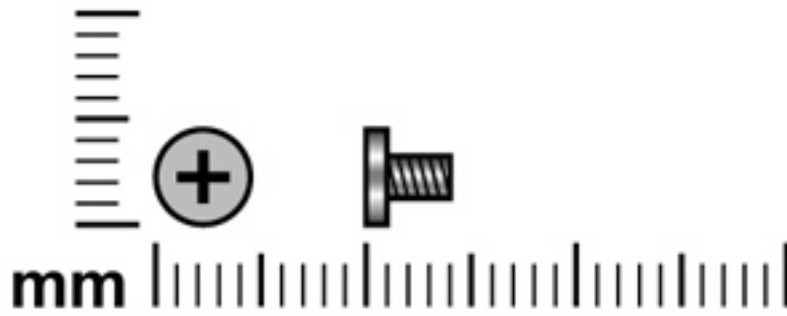
**Where used:** 4 screws that secure the discrete heat sink to the bottom of the system board



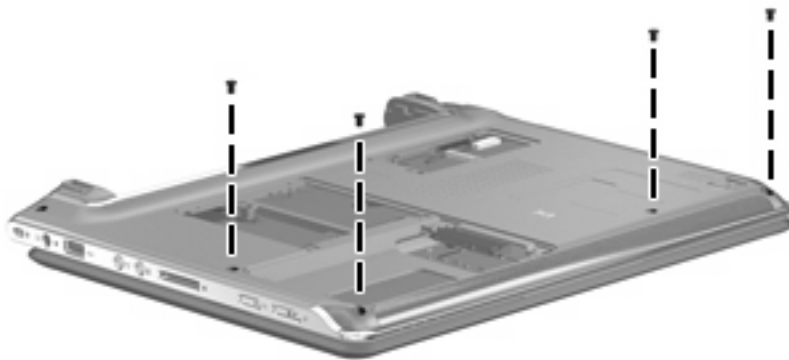


**Where used:** 3 screws that secure the UMA heat sink to the bottom of the system board

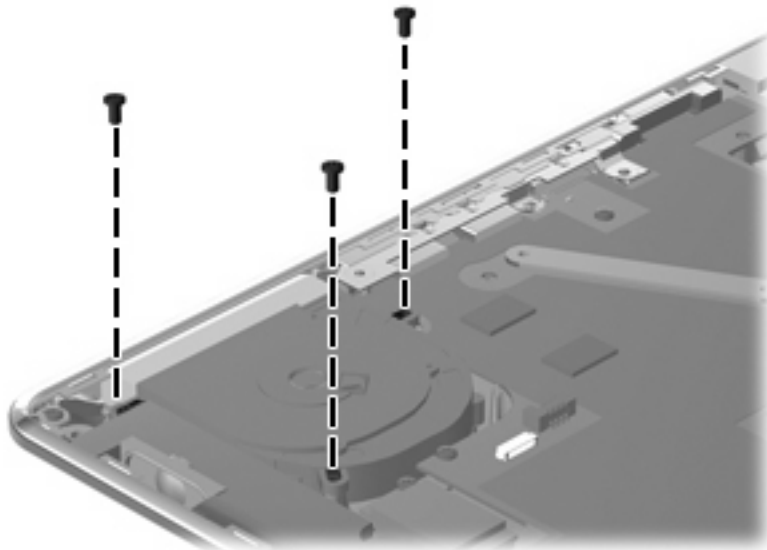
## Phillips PM2.0×5.0 screw



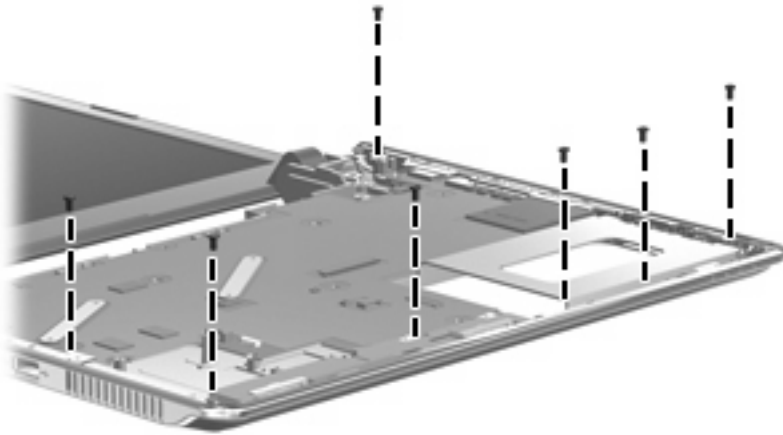
Color	Quantity	Length	Thread	Head diameter
Black	16	5.0 mm	2.0 mm	5.0 mm



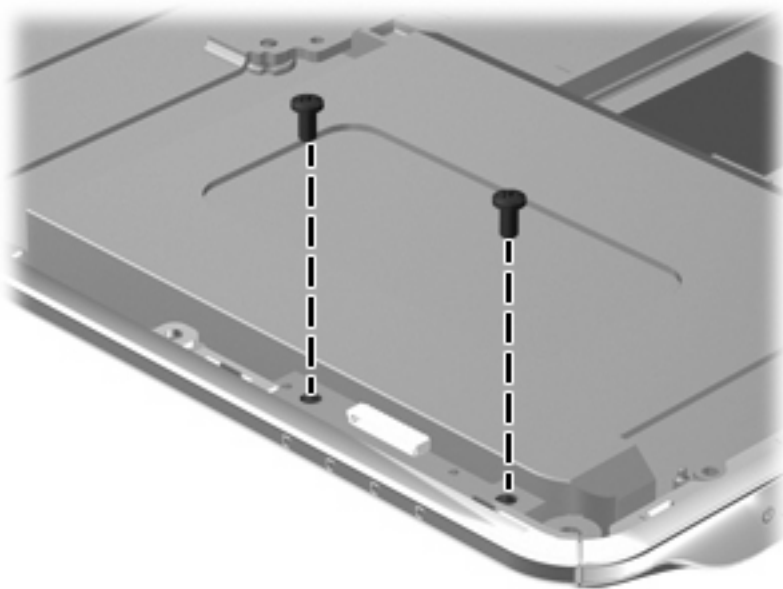
**Where used:** 4 screws that secure the top cover to the computer



**Where used:** 3 screws that secure the fan to the system board

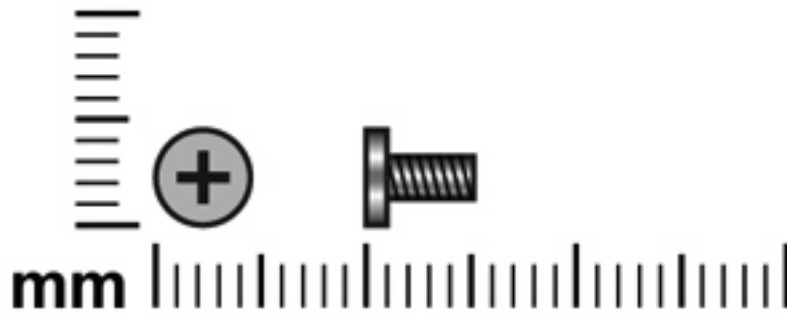


**Where used:** 7 screws that secure the silver metal trim to the base component

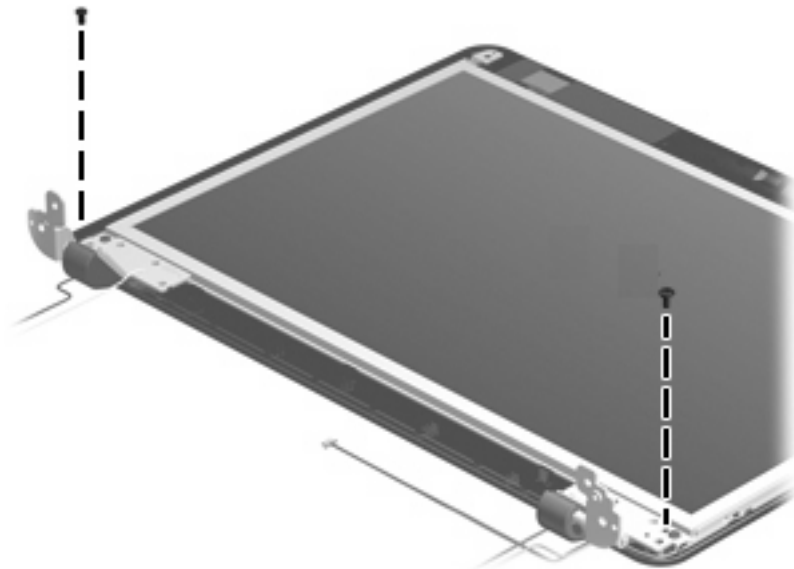


**Where used:** 2 screws that secure the LED board to the base component

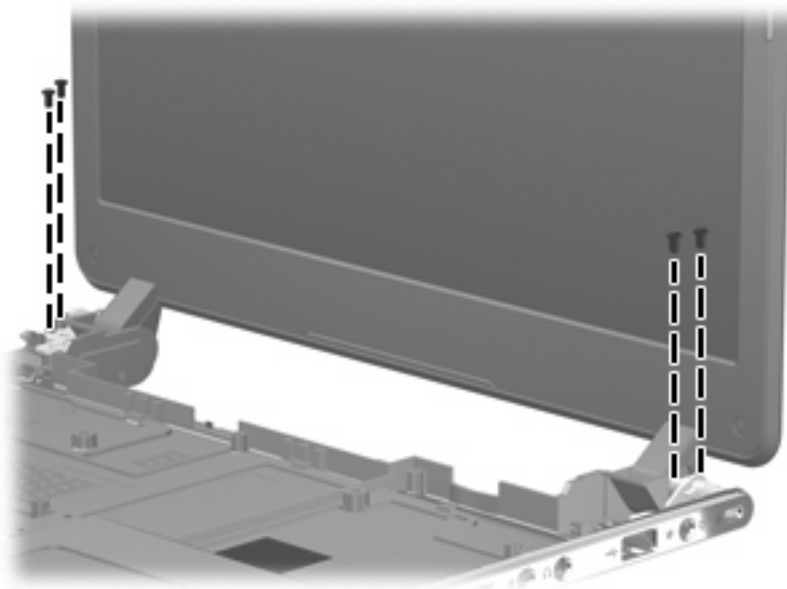
## Phillips PM2.0x5.0 screw



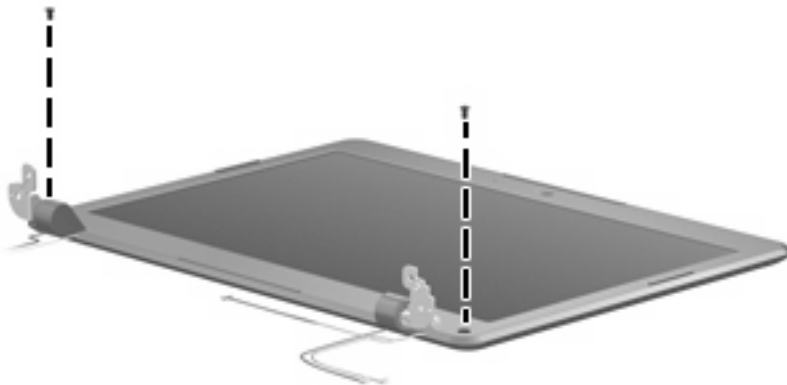
Color	Quantity	Length	Thread	Head diameter
Silver	13	5.0 mm	2.0 mm	5.0 mm



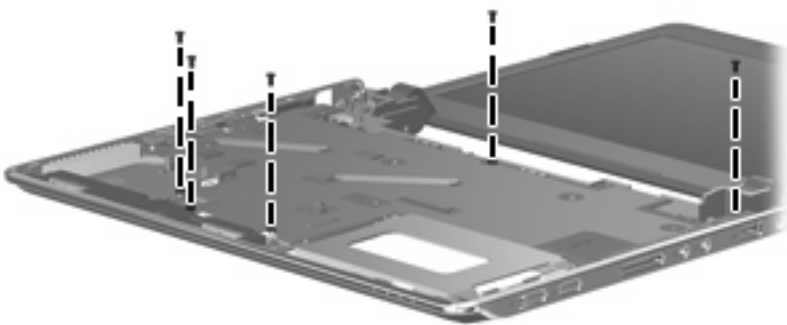
**Where used:** 2 screws that secure the hinges to the display panel



**Where used:** 4 screws that secure the display assembly to the computer

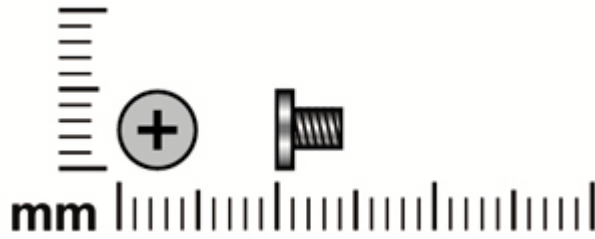


**Where used:** 2 screws that secure the display bezel to the display assembly

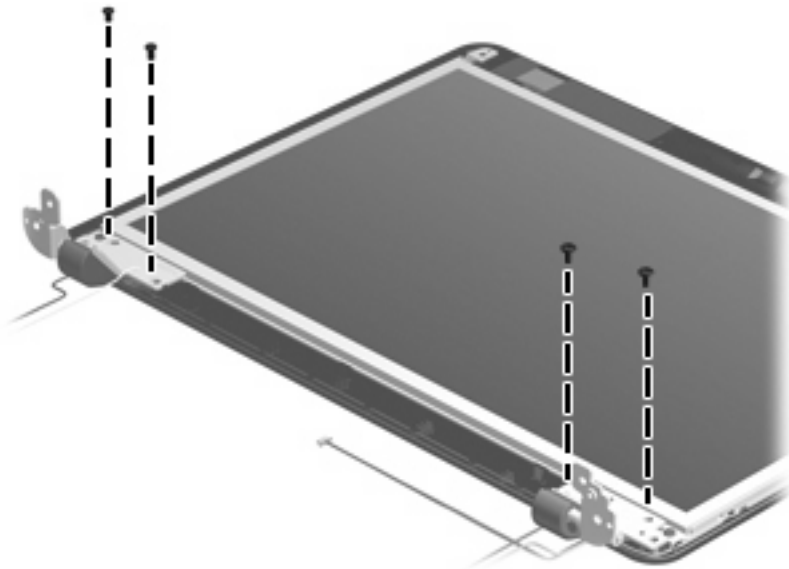


**Where used:** 5 screws that secure the system board to the base component

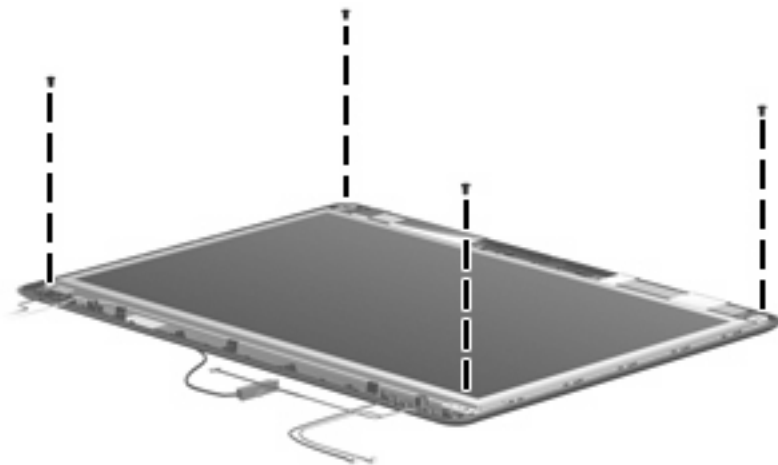
## Phillips PM2.5×4.0 screw



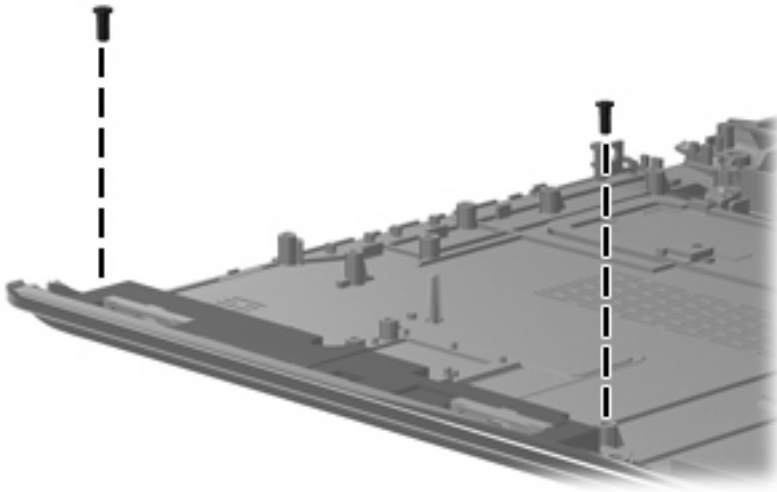
Color	Quantity	Length	Thread	Head diameter
Black	10	4.0 mm	2.5 mm	5.0 mm



**Where used:** 4 screws that secure the display hinge covers to the display panel

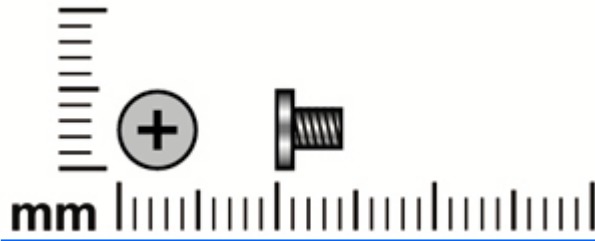


**Where used:** 4 screws that secure the display panel to the display assembly

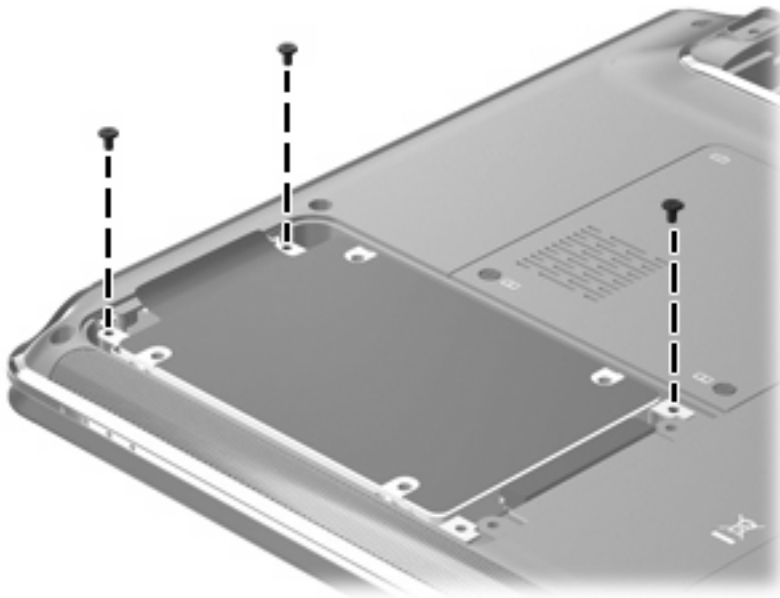


**Where used:** 2 screws that secure the speaker module to the base component

## Phillips PM2.5x4.0 screw

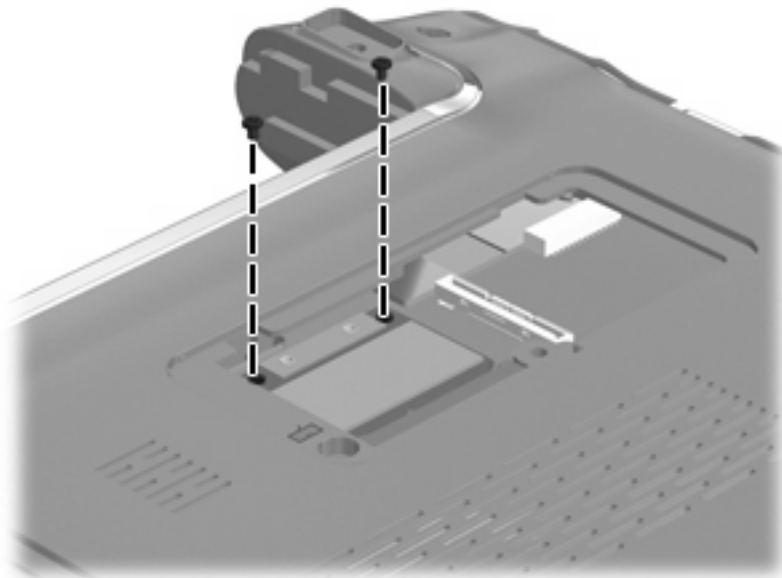


Color	Quantity	Length	Thread	Head diameter
Silver	5	4.0 mm	2.5 mm	5.0 mm



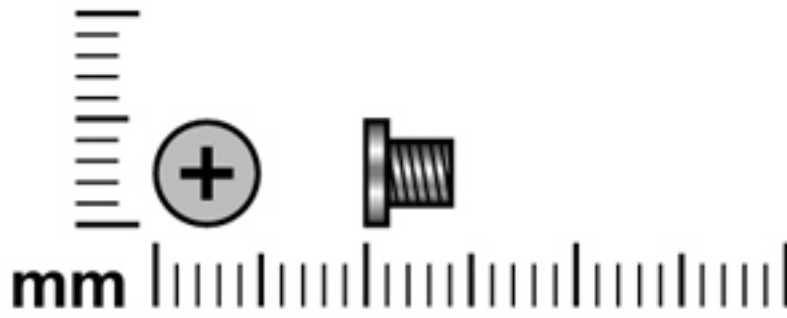
**Where used:** 3 screws that secure the hard drive to the bottom of the computer



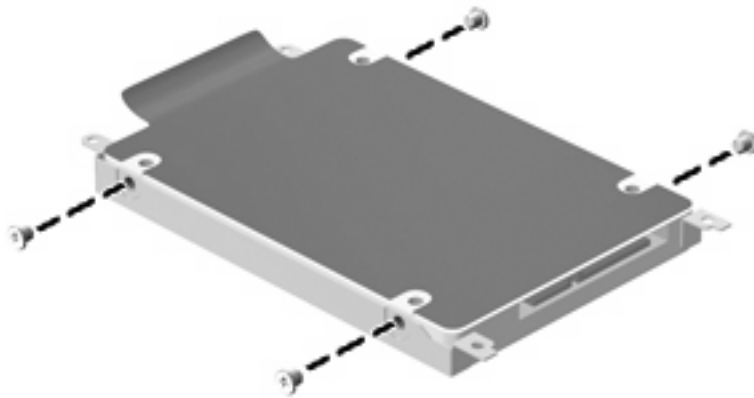


**Where used:** 2 screws that secure the WLAN module to the bottom of the computer

## Phillips PM3.0×4.0 screw

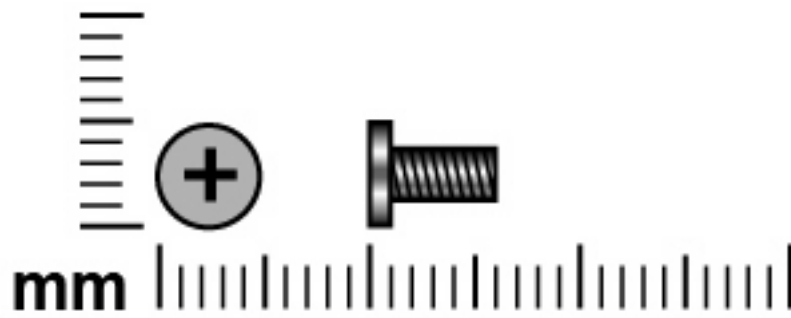


Color	Quantity	Length	Thread	Head diameter
Silver	4	4.0 mm	3.0 mm	5.0 mm

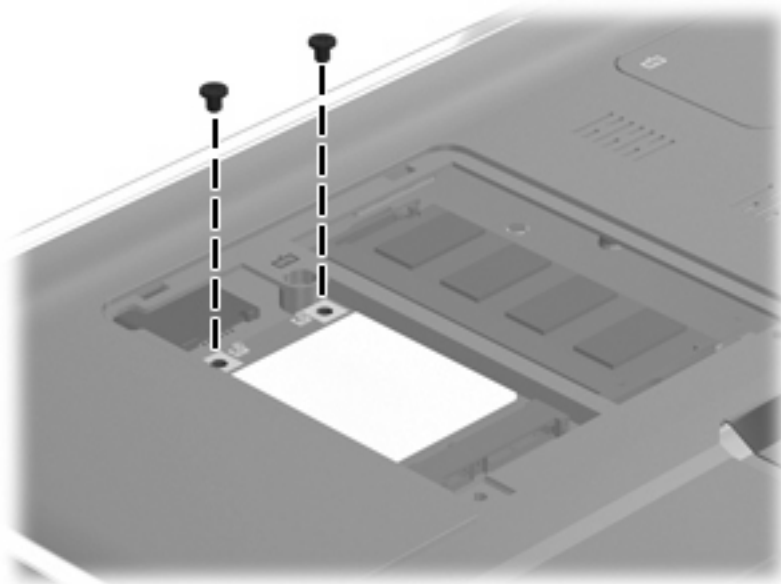


**Where used:** 4 screws that secure the hard drive bracket to the hard drive

## Phillips PM2.5×6.0 screw

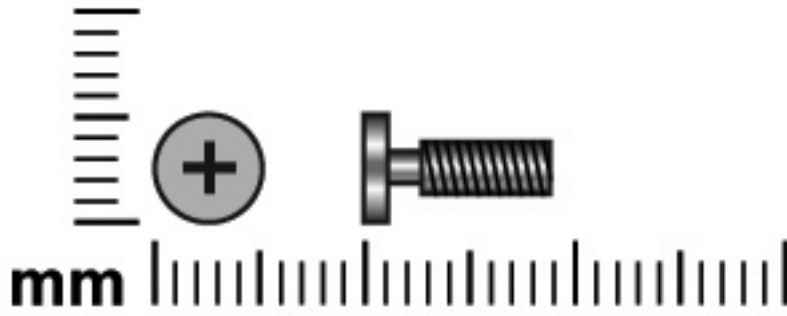


Color	Quantity	Length	Thread	Head diameter
Black	2	6.0 mm	2.5 mm	5.0 mm

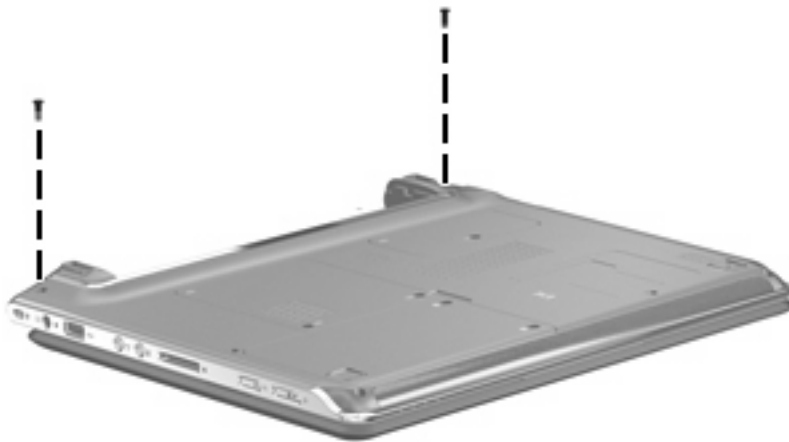


**Where used:** 2 screws that secure the WWAN module to the bottom of the computer

## Phillips PM2.5×9.0 screw

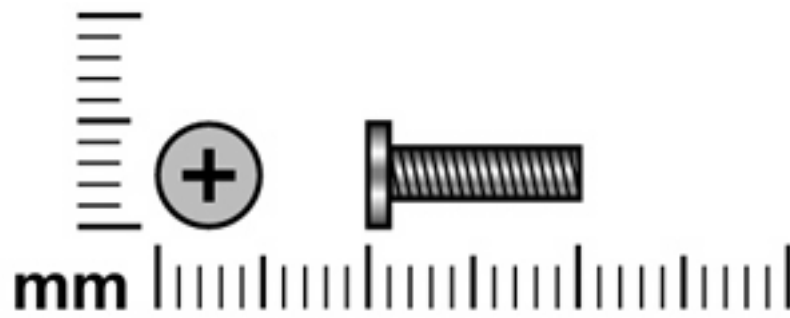


Color	Quantity	Length	Thread	Head diameter
Black	2	9.0 mm	2.5 mm	5.0 mm

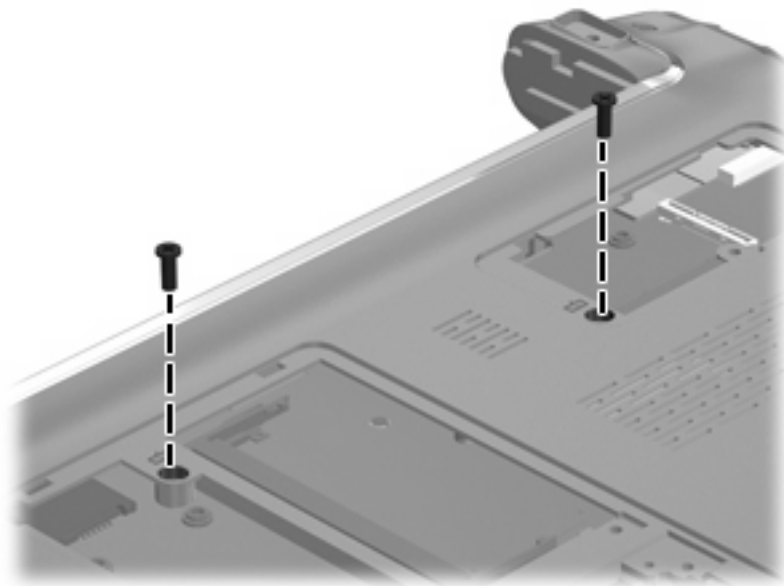


**Where used:** 2 screws that secure the top cover to the computer

## Phillips PM2.5x10.0 screw



Color	Quantity	Length	Thread	Head diameter
Black	2	10.0 mm	2.5 mm	5.0 mm



**Where used:** 2 screws that secure the keyboard to the computer

---


# 8 Backup and Recovery

## Recovering system information

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:** If your computer includes a solid-state drive (SSD), you 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 > Computer**. If the partition is present, an HP Recovery drive is listed in the Hard Disk Drives section of 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:** If your computer does not include an internal optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can purchase recovery discs for your computer from the HP Web site.

---

Note the following guidelines before creating recovery discs:

- You will need high-quality DVD-R, double-layer DVD-R, DVD+R, double-layer 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±RW, 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 Manager**.

Recovery Manager opens.

2. Click **Advanced Options**.

---

 **NOTE:** If you are operating the computer on battery power, you will be prompted to connect to AC power before you can go to the next step.


---

3. Click **Recovery disc creation**, and then click **Next**.
4. Follow the on-screen instructions.

# Backing up your information

## When to back up

- On a regularly scheduled basis

 **NOTE:** Set reminders to back up your information periodically.

---

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

## Backup suggestions


- Create a set of recovery discs using Recovery Manager.
- Create system restore points using the Windows® System Restore feature, and periodically copy them to disc.
- Store personal files in the Documents folder 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:

- a. Display the screen.
- b. Copy the screen:  
To copy only the active window, press **alt+fn+prt sc**.  
To copy the entire screen, press **fn+prt sc**.
- c. Open a word-processing document, and then select **Edit > Paste**.

## 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 Maintenance > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Under **Automatic restore points**, select the disk for which you want to create a restore point.
5. Click **Create**.

The System Protection window opens.

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 Maintenance > System**.
2. In the left pane, click **System protection**.
3. Click the **System Protection** tab.
4. Click the **System Restore** button, and then click **Next**.


The System Restore window opens.

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 an 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 that you create 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 and driver roll-back capabilities. 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:** If your computer includes an SSD, you may 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 from either the Start button or **f11**. This restores the computer to its factory condition.

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

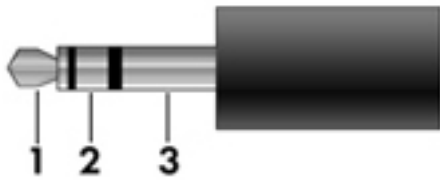
1. Access Recovery Manager in either of the following ways:
  - Select **Start > All Programs > Recovery Manager > Recovery Manager**.
  - or –
  - Restart the computer and press **f11** while the “Press <F11> for recovery” message is displayed on the screen. Then select **Recovery Manager**.

Recovery Manager opens.

2. Click **Advanced Options**.
3. Click **System recovery**, and then click **Next**.
4. Follow the on-screen instructions.

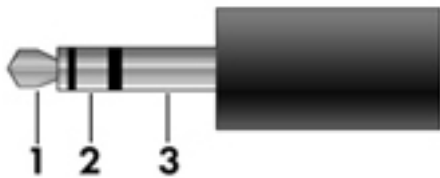
# 9 Connector pin assignments

## Audio-in (microphone)



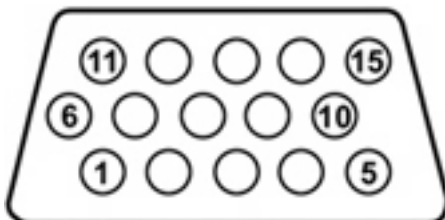
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

## Audio-out (headphone)



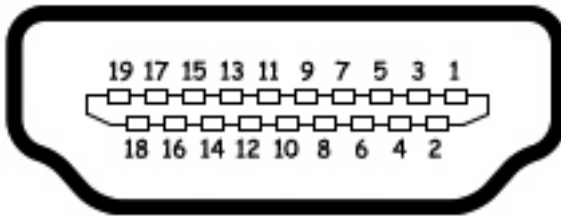
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

## External monitor



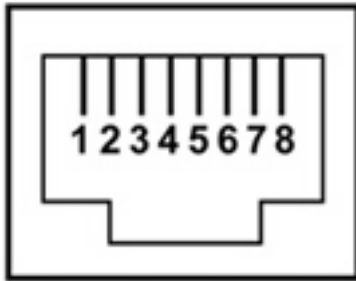
<b>Pin</b>	<b>Signal</b>
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

# HDMI



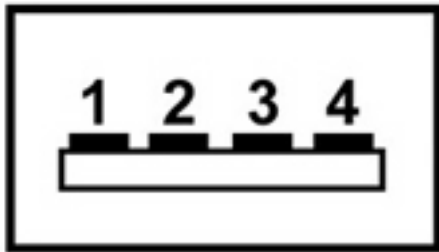
Pin	Signal
1	TMDS data 2+
2	TMDS data 2 shield
3	TMDS data 2-
4	TMDS data 1+
5	TMDS data 1 shield
6	TMDS data 1-
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0-
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock-
13	CEC
14	Not connected
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect
20	Shell

## RJ-45 (network)



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

## Universal Serial Bus



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

---

# 10 Power cord set requirements

The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 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 or 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
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-mm<sup>2</sup> 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-mm<sup>2</sup> 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-mm<sup>2</sup> 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-mm<sup>2</sup> 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.



---

# 11 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. Caution must be exercised 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. Careful handling must be exercised when removing these components.
- 📄 **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>.

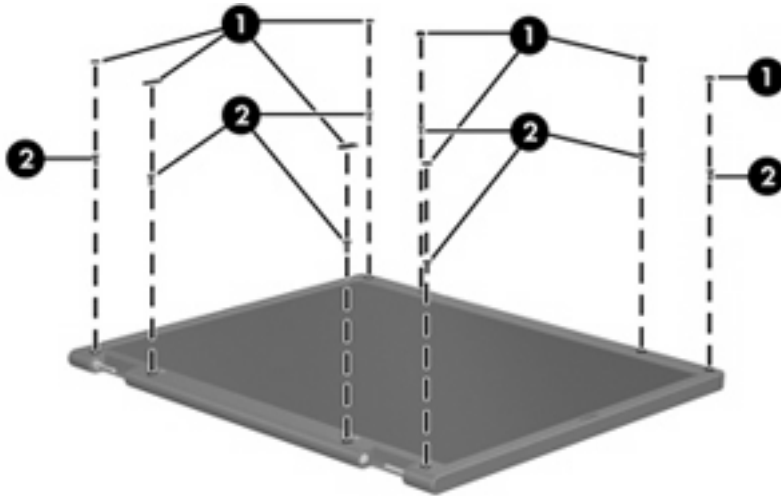
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



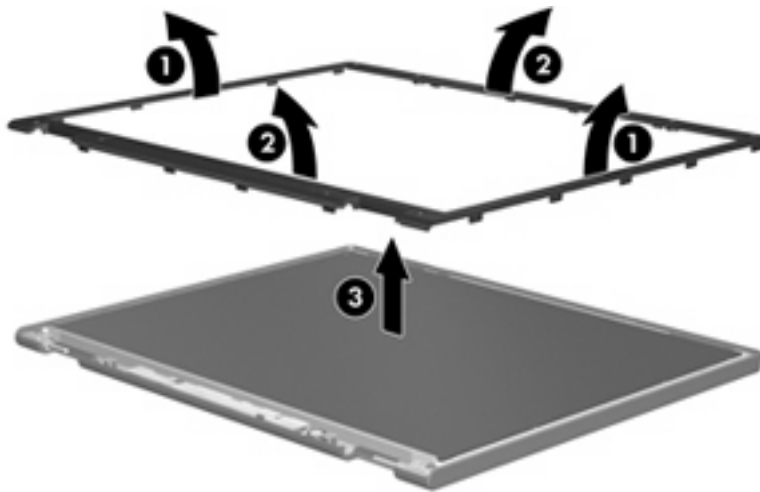
- 📄 **NOTE:** The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

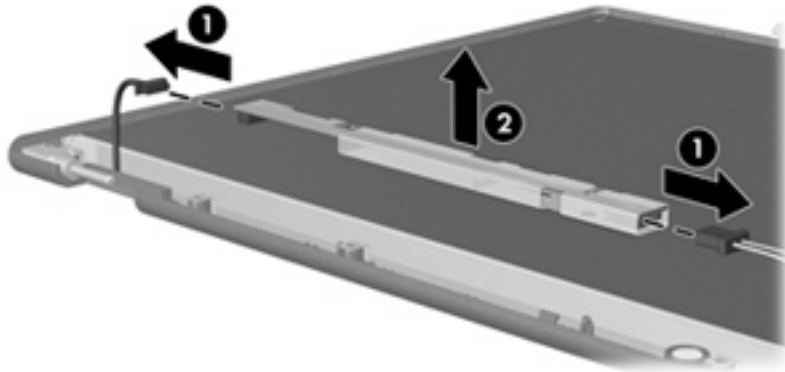
1. Remove all screw covers (1) and screws (2) that secure the display bezel to the display assembly.



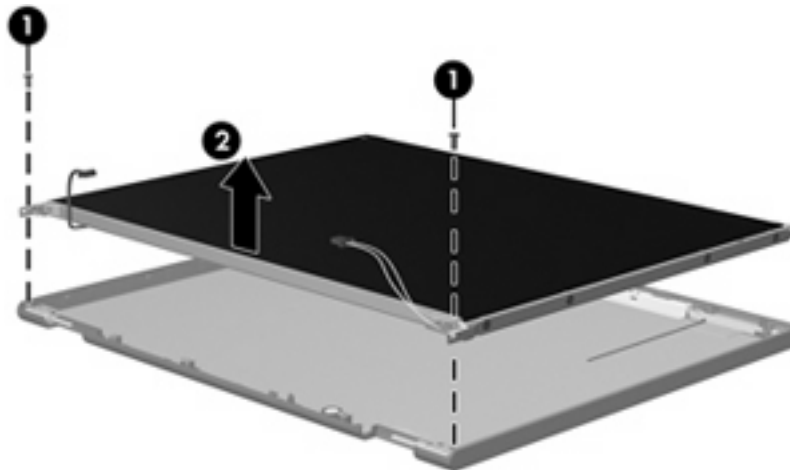
2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel (3).



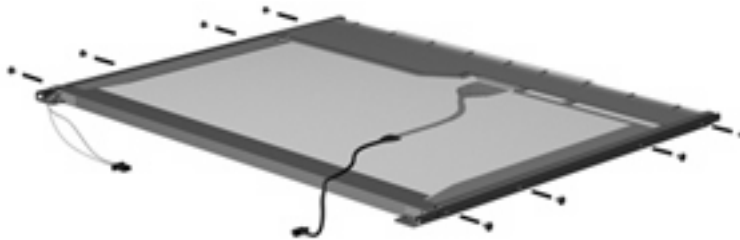
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter (2).



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.

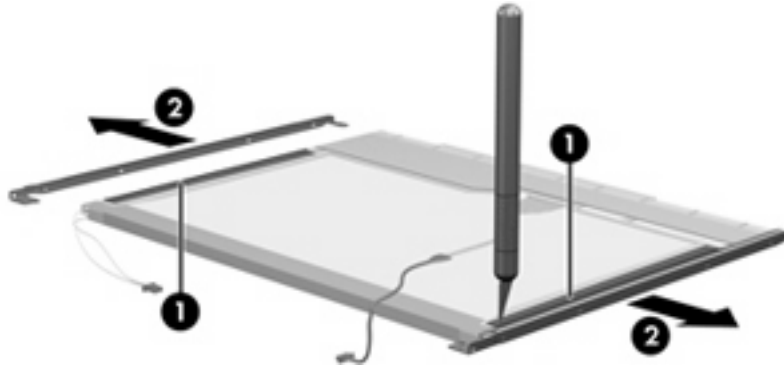


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

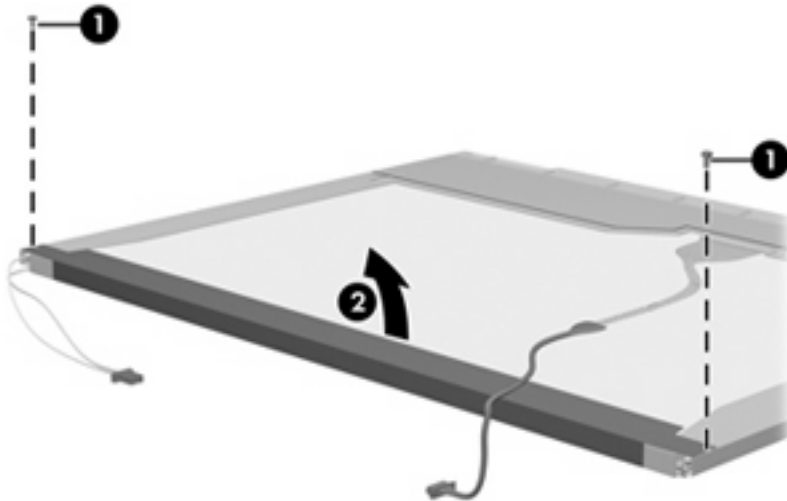


9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

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

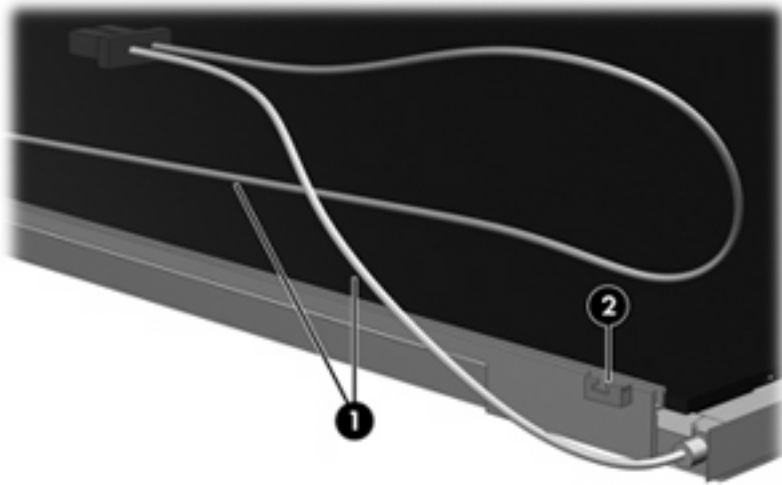


11. Remove the screws (1) that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover (2) and swing it outward.



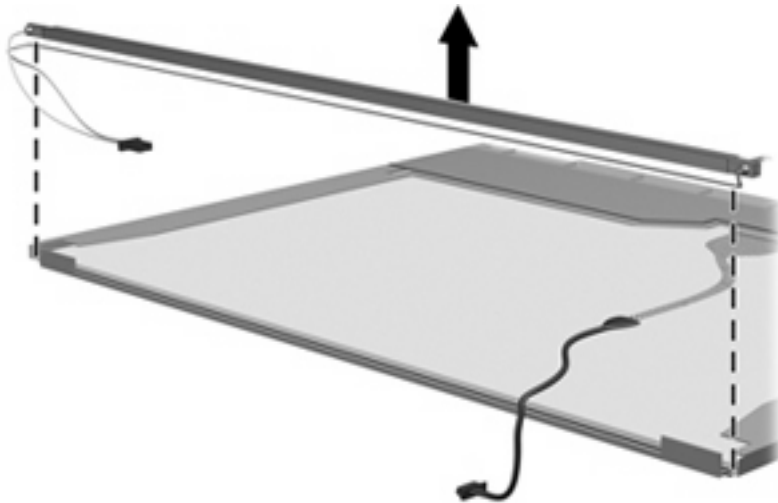
13. Remove the backlight cover.
14. Turn the display panel right-side up.

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

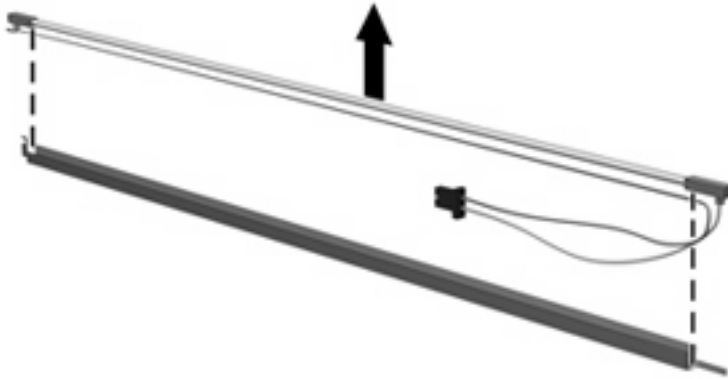


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.

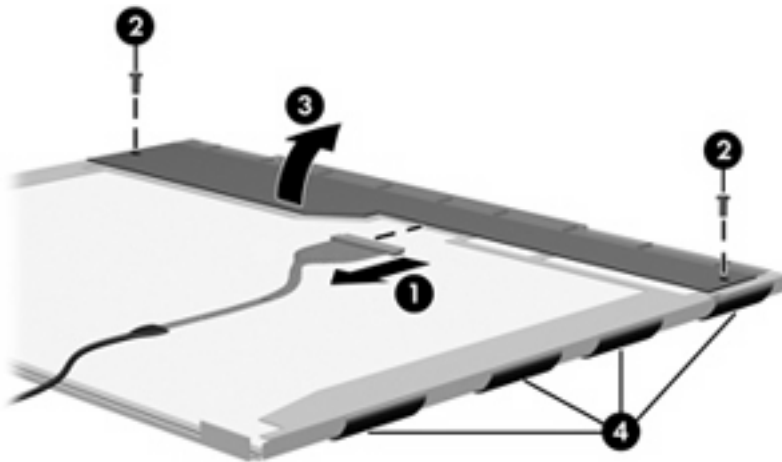
**⚠ WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.



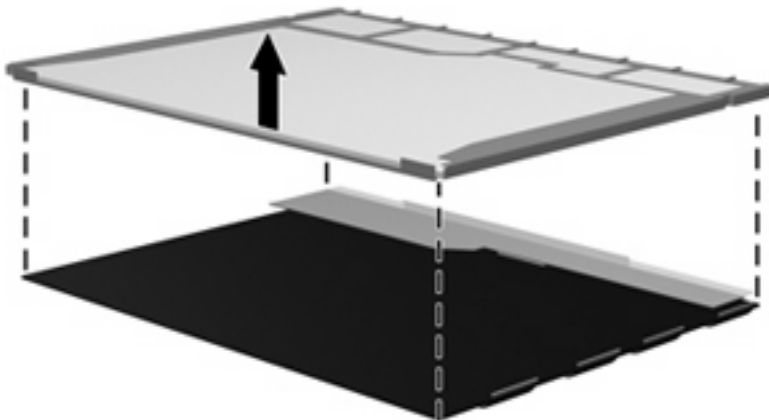
18. Remove the backlight from the backlight frame.



19. Disconnect the display 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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