



HP ProBook 4430s Notebook PC  
HP ProBook 4431s Notebook PC  
HP ProBook 4330s Notebook PC  
HP ProBook 4331s Notebook PC

Maintenance and Service Guide

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## 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	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
<b>Product Name</b>	HP ProBook 4430s Notebook PC	√			
	HP ProBook 4431s Notebook PC		√		
	HP ProBook 4330s Notebook PC			√	
	HP ProBook 4331s Notebook PC				√
<b>Processors</b>	<b>Intel® Core™ i7 processor, Dual Core</b>				
	2620M, 2.70-GHz (Turbo up to 3.40) processor 4-MB L3 cache, 4 threads	√	√	√	√
	<b>Intel® Core i5 processors, Dual Core</b>				
	2540M, 2.60-GHz (Turbo up to 3.30) processor 3-MB L3 cache, 4 threads	√	√	√	√
	2520M, 2.50-GHz (Turbo up to 3.20) processor 3-MB L3 cache, 4 threads	√	√	√	√
	2430M, 2.40-GHz (Turbo up to 3.0) processor 3-MB L3 cache, 4 threads	√	√	√	√
	2410M, 2.30-GHz (Turbo up to 2.90) processor 3-MB L3 cache, 4 threads	√	√	√	√
	<b>Intel Core i3 processors, Dual Core</b>				
	2350M, 2.30-GHz processor 3-MB L3 cache	√	√	√	√
	2330M, 2.20-GHz processor 3-MB L3 cache	√	√	√	√
	2310M, 2.10-GHz processor 3-MB L3 cache	√	√	√	√
	<b>Intel Pentium Dual-Core processors</b>				
	B940, 2.1-GHz processor 2-MB L3 cache, 2 threads	√	√	√	√
	B910, 2.0-GHz processor 2-MB L3 cache, 2 threads	√	√	√	√
	<b>Intel Celeron processor, Dual Core</b>				
	B840, 1.90-GHz processor 2-MB L3 cache, 2 threads	√	√	√	√

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
	B810, 1.60-GHz processor 2-MB L3 cache, 2 threads	√	√	√	√
<b>Chipset</b>	Mobile Intel HM65 chipset	√	√	√	√
<b>Graphics</b>	Intel HD Graphics 3000 (UMA)	√		√	
	AMD Radeon™ HD 6490M, 512-MB or 1-GB (discrete)		√		√
<b>Panel</b>	All display assemblies include 2 wireless local area network (WLAN) antennas			√	√
	33.8-cm (13.3-inch) HD, 1366x768	√	√		
	33.8-cm (13.3-inch) HD, 1366x768, includes camera	√	√		
	33.8-cm (13.3-inch) HD, 1366x768, includes camera and WWAN	√			
		√			
	33.8-cm (13.3-inch) HD, BrightView, 1366x768	√	√		
	33.8-cm (13.3-inch) HD, BrightView, 1366x768, includes camera	√	√		
	33.8-cm (13.3-inch) HD, BrightView, 1366x768, includes camera and WWAN	√			
	35.6-cm (14.0-inch) HD, 1366x768			√	√
	35.6-cm (14.0-inch) HD, 1366x768, with camera			√	√
	35.6-cm (14.0-inch) HD, BrightView, 1366x768			√	√
	35.6-cm (14.0-inch) HD, BrightView, 1366x768, with camera			√	√
	Support privacy filter	√	√	√	√
<b>Memory</b>	Two customer-accessible/upgradeable memory module slots supporting up to 8 GB of RAM	√	√	√	√
	Supports dual-channel memory	√	√	√	√
	PC3-10600, 1333-MHz, DDR3	√	√	√	√

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
	Supports the following configurations: 1333-MHz PC3-10600 DDR3:	√	√	√	√
	<ul style="list-style-type: none"> <li>• 8192 (4096 × 2)</li> <li>• 4096 (2048 × 2)</li> <li>• 4096 (4096 × 1)</li> <li>• 3072 (2048 + 1024)</li> <li>• 2048 (2048 × 1)</li> <li>• 2048 (1024 × 2)</li> <li>• 1024 (1024 × 1)</li> </ul>				
	Brazil DDR3 PC3-10600 1333 Mhz:			√	
	<ul style="list-style-type: none"> <li>• 4096 (2048 × 2)</li> <li>• 4096 (4096 × 1)</li> <li>• 3072 (2048 + 1024)</li> <li>• 2048 (2048 × 1)</li> </ul>				
<b>Hard drives</b>	Supports 9.5-mm or 7-mm, 6.35-cm (2.50-in) SATA hard drives with HP DriveGuard	√	√	√	√
	Customer-accessible	√	√	√	√
	Supports the following drives:	√	√	√	√
	<ul style="list-style-type: none"> <li>• 750-GB, 7200-rpm</li> <li>• 500-GB, 7200-rpm</li> <li>• 320-GB, 7200-rpm</li> <li>• 250-GB, 7200-rpm</li> <li>• 640-GB, 5400-rpm</li> <li>• 500-GB, 5400-rpm</li> <li>• 320-GB, 5400-rpm</li> <li>• 250-GB, 5400-rpm</li> </ul>				
<b>Fixed optical drives</b>	Supports the following 12.7-mm SATA optical drives:	√	√	√	√
	<ul style="list-style-type: none"> <li>• DVD-ROM</li> <li>• DVD+/-RW SuperMulti DL</li> <li>• Blu-ray ROM DVD+/-RW SuperMulti DL</li> <li>• Blu-ray R/RE DVD +/-RW SuperMulti DL Drive</li> </ul>				
	Supports no optical drive option	√	√	√	√

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
<b>Audio/Visual</b>	Integrated dual-array microphone (webcam models only)	√	√	√	√
	Integrated mono (non-webcam models)	√	√	√	√
	Stereo speakers (2)	√	√	√	√
	Integrated webcam (720p HD)	√	√	√	√
	Supports no camera option	√	√	√	√
	Headphone and microphone jacks	√	√	√	√
<b>Modem</b>	56K V.92 MDC data/fax modem	√	√	√	√
	Brazil RCTO (MDC1.5)			√	
	Modem cable not included	√	√	√	√
	Supports "No Modem" option	√	√	√	√
<b>Ethernet</b>	Realtek RTL8151EH-CG 10/100/1000	√	√	√	√
	S3/S4/S5 wake on LAN	√	√	√	√
	Ethernet cable not included	√	√	√	√
<b>Wireless</b>	<b>Integrated WLAN options by way of wireless module:</b>				
	Two WLAN antennas built into display assembly	√	√	√	√
	Supports "no WLAN" option	√	√	√	√
	Supports the following WLAN formats:	√	√	√	√
	<ul style="list-style-type: none"> <li>• Ralink 802.11 b/g/n 1×1</li> <li>• Realtek 802.11 b/g/n 1×1</li> <li>• Atheros 802.11 b/g/n +BT Combo</li> <li>• Ralink 802.11 a/b/g/n +BT Combo</li> <li>• Realtek 802.11 b/g/n +BT Combo</li> <li>• Intel 802.11 a/b/g/n 2×2 +BT Combo</li> </ul>				
	<b>Integrated WWAN options by way of wireless module:</b>				
	Two WWAN antennas built into display assembly (world-wide 5 band, configured with panels on all units)	√			
	Subscriber identity module (SIM) security (customer-accessible in battery bay)	√			
	Supports "no WWAN" option	√			
	Supports the following WWAN modules:	√			
	<ul style="list-style-type: none"> <li>• Qualcomm Gobi 3000 HSPA/CDMA with GPS</li> <li>• Ericsson 5521 HSPA+</li> <li>• Ericsson F3307-900</li> </ul>				

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
<b>Integrated personal area network (PAN) options by way of Bluetooth® module:</b>					
	Bluetooth 3.0 only supported by combo card	√	√	√	√
<b>External media card</b>	One ExpressCard 34mm slot	√	√	√	√
	6-in-1 Digital Media Reader Slot	√	√	√	√
<b>Ports</b>	Audio-in (stereo microphone)	√	√	√	√
	Audio-out (stereo headphone)	√	√	√	√
	RJ-11 (modem)	√	√	√	√
	RJ-45 (Ethernet, includes link and activity lights)	√	√	√	√
	USB 3.0 (1)	√	√	√	√
	USB 2.0 (3)	√	√	√	√
	VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)	√	√	√	√
	HDMI	√	√	√	√
	Multi-pin AC port	√	√	√	√
<b>Keyboard/pointing devices</b>	Full-sized keyboard	√	√	√	√
	Touchpad includes: supports 2-way scroll with legend, taps enabled by default, 2-finger scrolling and zoom enabled by default	√	√	√	√
<b>Power requirements</b>	Smart AC adapter with localized cable plug support (3-wire plug with ground pin):	√	√	√	√
	90-W		√		√
	65-W	√		√	
	9-cell, 93-Wh Li-ion battery	√	√	√	√
	6-cell, 55-Wh Li-ion battery	√	√	√	√
	6-cell, 47-Wh Li-ion battery	√	√	√	√
<b>Security</b>	Integrated fingerprint reader	√	√	√	√
	Intel AT support	√	√	√	√
	Support Kensington security lock	√	√	√	√
	Support no fingerprint reader option	√	√	√	√
<b>Operating system</b>	<b>Preinstalled:</b>				
	Windows 7 Professional 32 with Microsoft® Basics	√	√	√	√
	Windows 7 Professional 64 with Microsoft Basics	√	√	√	√
	Windows 7 Home Premium 64 with Microsoft Basics	√	√	√	√

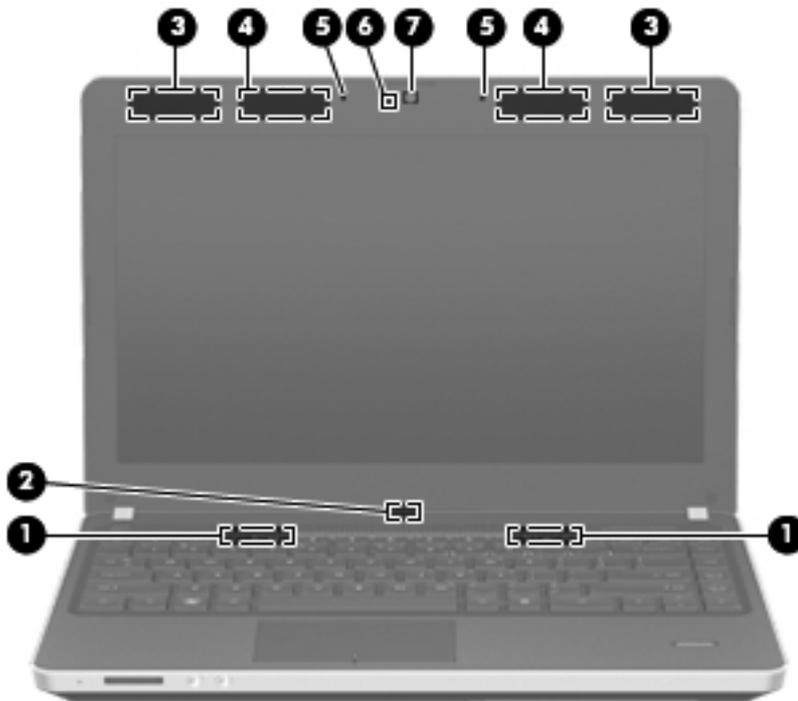
Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
	Windows 7 Home Premium 32 with Microsoft Basics	√	√	√	√
	Windows 7 Home Basic 32 with Microsoft Basics		√		√
	Windows Vista Home Basic 32 with Microsoft Basics	√		√	
	Novell™: SuSE Linux™ – SLED 11	√	√	√	√
	FreeDOS	√	√	√	√
	<b>Preinstalled with Microsoft Office:</b>				
	Windows 7 Professional 32 with Microsoft Office 2010 Starter MSNA	√	√		
	Windows 7 Professional 32 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Starter	√	√	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Personal	√	√	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Home & Business	√	√	√	√
	Windows 7 Professional 32 with Microsoft Office 2010 Professional	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter MSNA	√	√		
	Windows 7 Professional 64 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Starter	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Personal	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Home & Business	√	√	√	√
	Windows 7 Professional 64 with Microsoft Office 2010 Professional	√	√	√	√
	Windows 7 Home Premium 32 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Home Premium 32 with Microsoft Office 2010 Starter	√	√	√	√
	Windows 7 Home Premium 32 with Microsoft Office 2010 Personal	√	√	√	√
	Windows 7 Home Premium 32 with Microsoft Office 2010 Home & Business	√	√	√	√
	Windows 7 Home Premium 32 with Microsoft Office 2010 Professional	√	√	√	√

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter EDGI	√	√	√	√
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter	√	√	√	√
	Windows 7 Premium 64 with Microsoft Office 2010 Professional	√	√	√	√
	Windows 7 Starter with Microsoft Office 2010 Starter	√	√	√	√
	Windows 7 Home Basic 32 with Microsoft Office 2010 Starter EDGI	√		√	
	Windows 7 Home Basic 32 with Microsoft Office 2010 Starter	√		√	
	Windows Vista Basic 32 with Microsoft Office 2010 Starter	√		√	
	Windows Vista Basic 32 with Microsoft Office 2010 Personal	√		√	
	Windows Vista Basic 32 with Microsoft Office 2010 Home & Business	√		√	
	Windows Vista Basic 32 with Microsoft Office 2010 Professional	√		√	
	Windows 7 Starter with Office 2010 Preload	√		√	
	Windows 7 Starter with Office 2007 Ready - EDGI	√		√	
	<b>Restore Media:</b>				
	Windows 7 Professional 64	√	√	√	√
	Windows 7 Professional 32	√	√	√	√
	Windows 7 Home Basic 32	√	√	√	√
	Windows 7 Home Premium 64	√	√	√	√
	Windows 7 Home Premium 32	√	√	√	√
	Windows 7 Starter	√	√	√	√
	DRDVD Windows 7	√	√	√	√
	Windows Vista – through Service only	√	√	√	√
	<b>Web-only support:</b>				
	Windows XP Professional	√	√	√	√
	<b>Certified:</b>				
	Microsoft WHQL	√	√	√	√
<b>Serviceability</b>	<b>End-user replaceable parts:</b>				
	AC adapter	√	√	√	√
	Battery (system)	√	√	√	√

Category	Description	4430s (UMA)	4430s/ 4431s (disc)	4330s (UMA)	4330s/ 4331s (disc)
	Hard drive	√	√	√	√
	Memory module	√	√	√	√
	Optical drive	√	√	√	√
	WLAN module	√	√	√	√
	WWAN module, SIM	√			
	Keyboard	√	√	√	√

## 2 External component identification

### Display



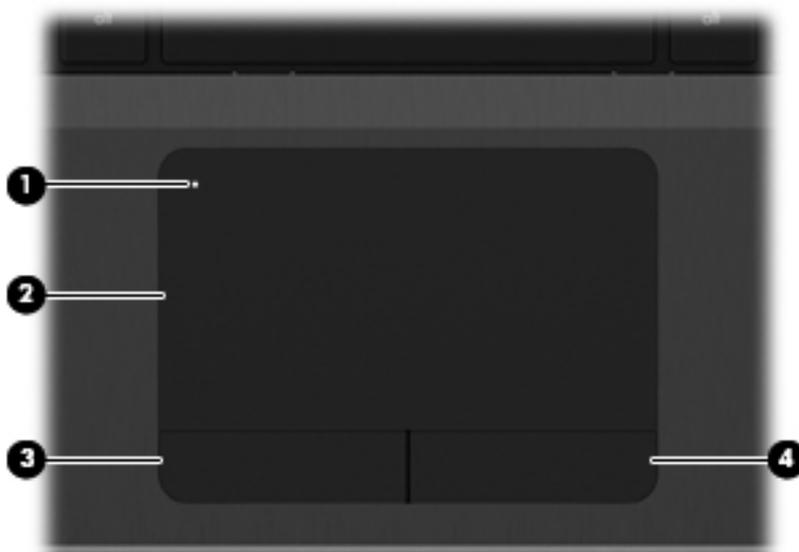
Component	Description
(1) Speakers (2)	Produce sound.
(2) Internal display switch	Turns off the display or initiates Sleep if the display is closed while the power is on. <b>NOTE:</b> The display switch is not visible from the outside of the computer.
(3) WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).
(4) WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(5) Internal microphone(s) (1 or 2 depending on model)	Record sound.
(6) Webcam light (select models only)	On: The webcam is in use.

Component	Description
(7) Webcam (select models only)	Records video and captures still photographs.  To use the webcam, select <b>Start &gt; All Programs &gt; ArcSoft TotalMedia Suite &gt; WebCam Companion</b> .

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

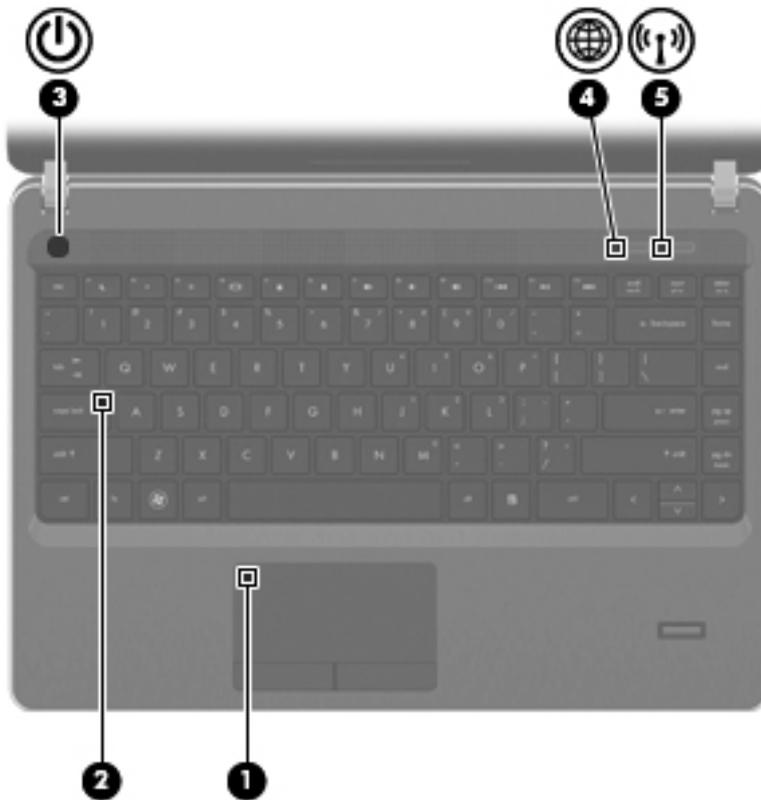
## Top

### TouchPad



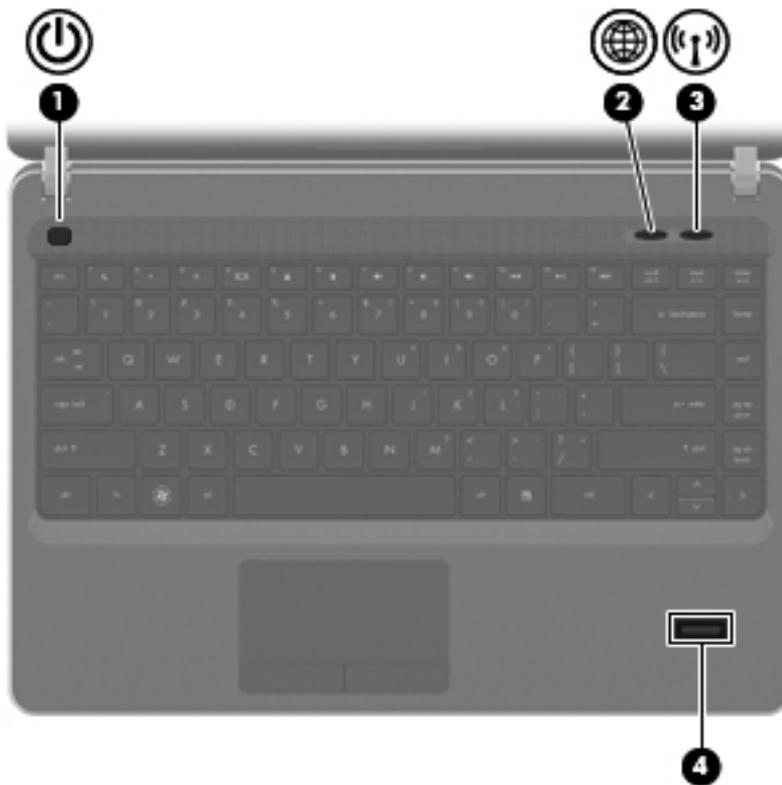
Component	Description
(1) TouchPad on/off button	Turns the TouchPad on and off.
(2) TouchPad	Moves the pointer and selects or activates items on the screen.
(3) Left TouchPad button	Functions like the left button on an external mouse.
(4) Right TouchPad button	Functions like the right button on an external mouse.

## Lights



Component	Description
(1) TouchPad light	<ul style="list-style-type: none"> <li>• Amber: The TouchPad is off.</li> <li>• Off: The TouchPad is on.</li> </ul>
(2) Caps lock light	<ul style="list-style-type: none"> <li>• White: Caps lock is on.</li> <li>• Off: Caps lock is 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)  QuickWeb light	<ul style="list-style-type: none"> <li>• On: The computer is on or the default Web browser is in use.</li> <li>• Blinking: When the QuickWeb button is pressed, the light blinks 5 times, and then the default Web browser opens.</li> </ul> <p><b>NOTE:</b> To use HP QuickWeb when the computer is off, HP QuickWeb must be enabled in Computer Setup</p>
(5)  Wireless light	<ul style="list-style-type: none"> <li>• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</li> <li>• Amber: All wireless devices are off.</li> </ul>

## Buttons and fingerprint reader (select models only)



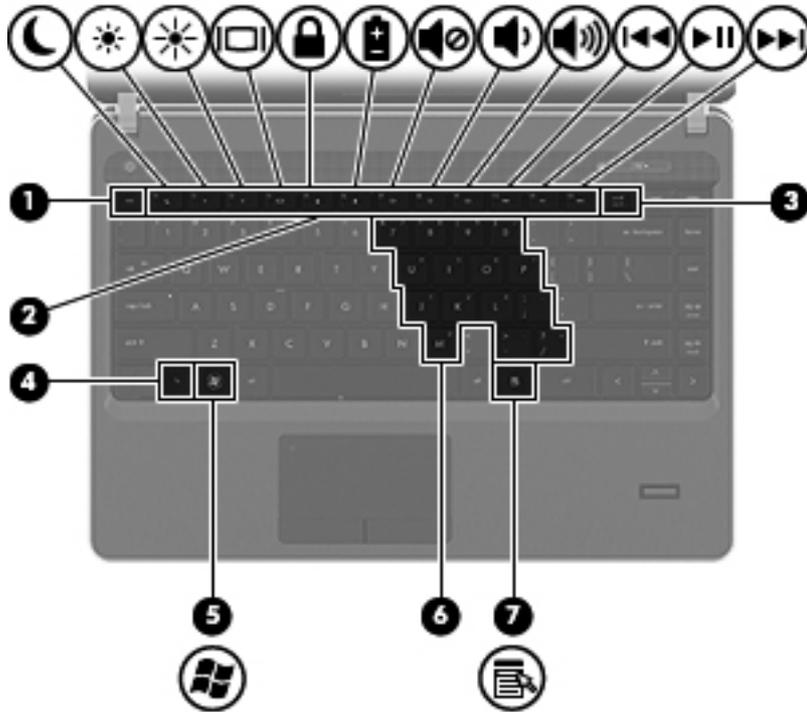
Component	Description
(1)  Power button	<ul style="list-style-type: none"> <li>• When the computer is off, press the button to turn on the computer.</li> <li>• When the computer is on, press the button briefly to initiate Sleep.</li> <li>• When the computer is in the Sleep state, press the button briefly to exit Sleep.</li> <li>• When the computer is in Hibernation, press the button briefly to exit Hibernation.</li> </ul> <p>If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings:</p> <ul style="list-style-type: none"> <li>• <b>Windows 7</b>—Select <b>Start &gt; Control Panel &gt; System and Security &gt; Power Options</b>.</li> <li>• <b>Windows Vista</b>—Select <b>Start &gt; Control Panel &gt; System and Maintenance &gt; Power Options</b></li> <li>• Or refer to the <i>HP Notebook Reference Guide</i>.</li> </ul>

Component	Description
(2)  QuickWeb button	<ul style="list-style-type: none"> <li>• When the computer is off or in Hibernation, press the button to open HP QuickWeb.</li> <li>• When the computer is in Microsoft Windows, press the button to open the default Web browser.</li> <li>• When the computer is in HP QuickWeb, press the button to open the default Web browser.</li> </ul> <p><b>NOTE:</b> For more information, refer to “HP QuickWeb” in this guide and to the HP QuickWeb software Help. If your computer does not have HP QuickWeb software, the button does not perform any action or function.</p>
(3)  Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.
(4)  Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

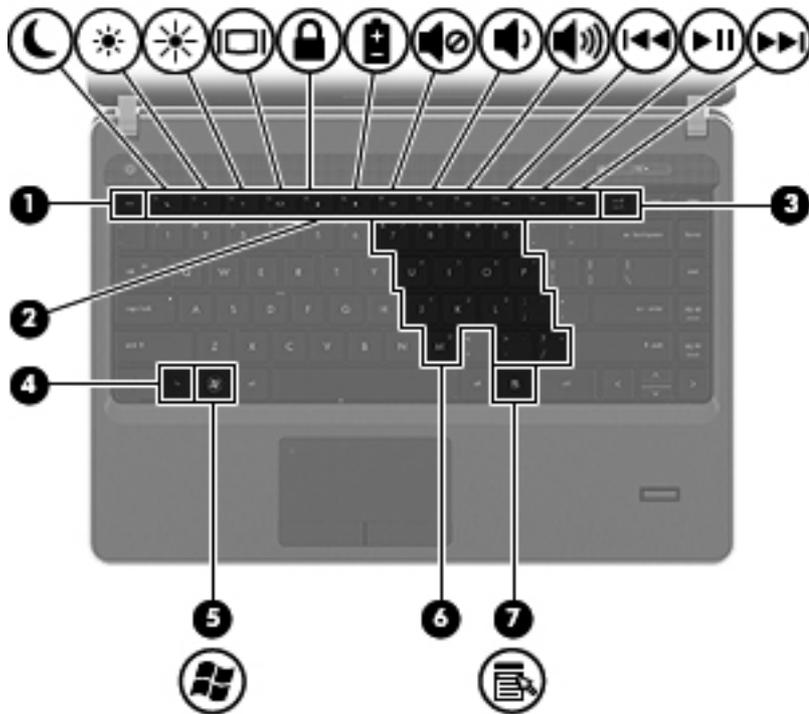
## Keys



**NOTE:** Refer to the illustration that most closely matches your computer.



Component	Description
(1) <b>esc</b> key	Displays system information when pressed in combination with the <b>fn</b> key.
(2) Function keys	Execute frequently used system functions when pressed in combination with the <b>fn</b> key.
(3) <b>num lk</b> key	Enables/disables the embedded numeric keypad when pressed in combination with the <b>fn</b> key.
(4) <b>fn</b> key	Executes frequently used system functions when pressed in combination with a function key, the <b>num lk</b> key, or the <b>esc</b> key.
(5)  Start key	Displays the Start menu.
(6) Embedded numeric keypad keys	Can be used like the keys on an external numeric keypad when pressed in combination with the <b>fn</b> and <b>num lk</b> keys.
(7)  Menu key	Displays the active program's shortcut menu (same as the right-click menu).



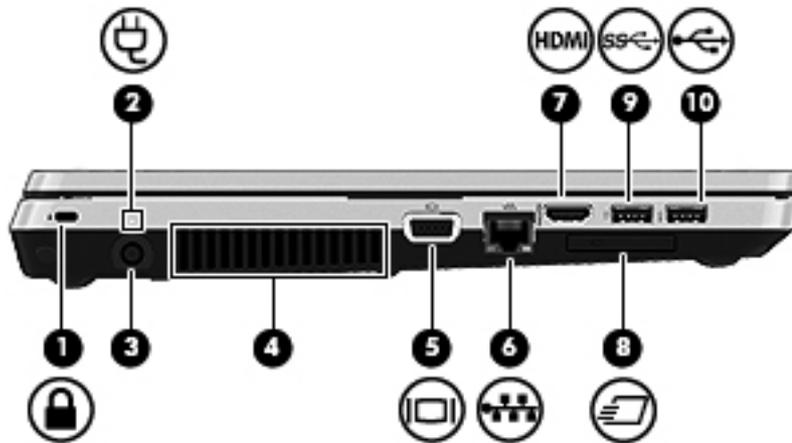
Component	Description
(1) <a href="#">esc</a> key	Displays system information when pressed in combination with the <a href="#">fn</a> key.
(2) Function keys	Execute frequently used system functions when pressed in combination with the <a href="#">fn</a> key.
(3) <a href="#">num lk</a> key	Enables/disables the embedded numeric keypad when pressed in combination with the <a href="#">fn</a> key.
(4) Integrated numeric keypad	When the keypad has been enabled, the keys can be used like an external numeric keypad.
(5) <a href="#">fn</a> key	Executes frequently used system functions when pressed in combination with a function key, the <a href="#">num lk</a> key, or the <a href="#">esc</a> key.
(6)  Start key	Displays the Start menu.
(7)  Menu key	Displays the active program's shortcut menu (same as the right-click menu)..

# Front



Component	Description
(1)  Drive light	<ul style="list-style-type: none"><li>• White: The hard drive or optical drive is being accessed.</li><li>• Amber: HP 3D DriveGuard has temporarily parked the hard drive.</li></ul>
(2)  Media Card Reader	Supports the following digital card formats: <ul style="list-style-type: none"><li>• Memory Stick Pro</li><li>• Memory Stick Duo Pro</li><li>• MultiMediaCard</li><li>• MultiMediaCard Micro</li><li>• Secure Digital (SD) Card</li><li>• Secure Digital (SD) Card Micro</li></ul>
(3)  Audio-out (headphone) jack	Connects optional headphones, earbuds, a headset, or television audio.  <b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i>  <b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.
(4)  Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

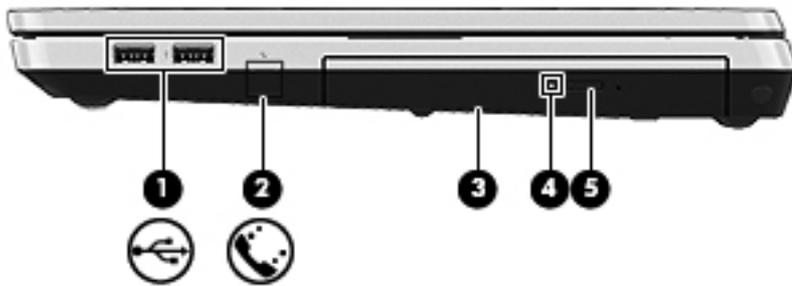
# Left



Component	Description
(1) 	<p>Security cable slot</p> <p>Attaches an optional security cable to the computer.</p> <p><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.</p>
(2) 	<p>AC adapter light</p> <ul style="list-style-type: none"> <li>White: The computer is connected to external power and the battery is 90 to 99% charged.</li> <li>Amber: The computer is connected to external power and the battery is 0 to 90% charged.</li> <li>Blinking amber: 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: The battery is fully charged.</li> </ul> <p><b>NOTE:</b> If the computer is plugged into an external power source, the light turns 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.</p>
(3)	<p>Power connector</p> <p>Connects an AC adapter.</p>
(4)	<p>Vent</p> <p>Enables airflow to cool internal components.</p> <p><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.</p>
(5) 	<p>External monitor port</p> <p>Connects an external VGA monitor or projector.</p>
(6) 	<p>RJ-45 (network) jack</p> <p>Connects a network cable.</p>
(7) 	<p>HDMI port</p> <p>Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.</p>

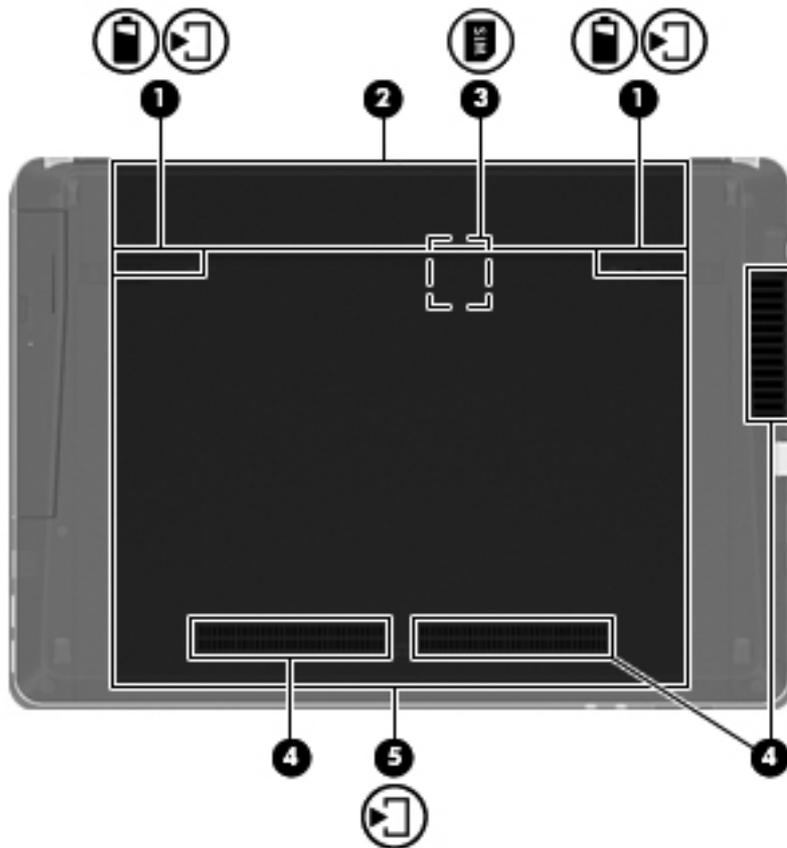
Component		Description
(8)	ExpressCard slot	Reads and writes to ExpressCards.
(9)	 USB port	Connects an optional USB device.
(10)	 USB port	Connects an optional USB device.

## Right



Component		Description
(1)	 USB ports (2)	Connect optional USB devices.
(2)	RJ-11 (modem) jack (select models only)	Connects a modem cable.
(3)	Optical drive	Reads and writes (select models only) to an optical disc.
(4)	Optical drive light	Lights when optical drive is active.
(5)	Optical drive eject button	Ejects the optical drive.

## Bottom



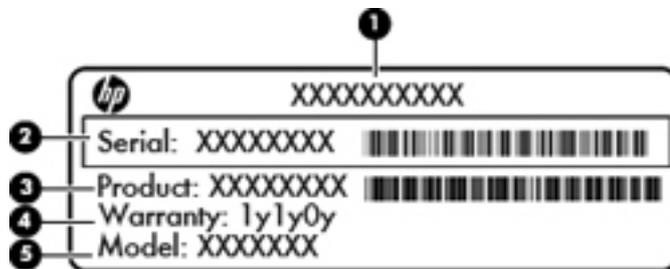
Component	Description
(1) 	Battery and access cover release latches Release the battery from the battery bay, and the access cover from the computer.
(2)	Battery bay Holds the battery.
(3)	SIM slot Contains a wireless subscriber identity module (SIM) (select models only). The SIM slot is located inside the battery bay.
(4)	Vents (2) 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.
(5) 	Access door Contains the hard drive, the wireless LAN module slot, and the memory module slot.  <b>CAUTION:</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.

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## 3 Illustrated parts catalog

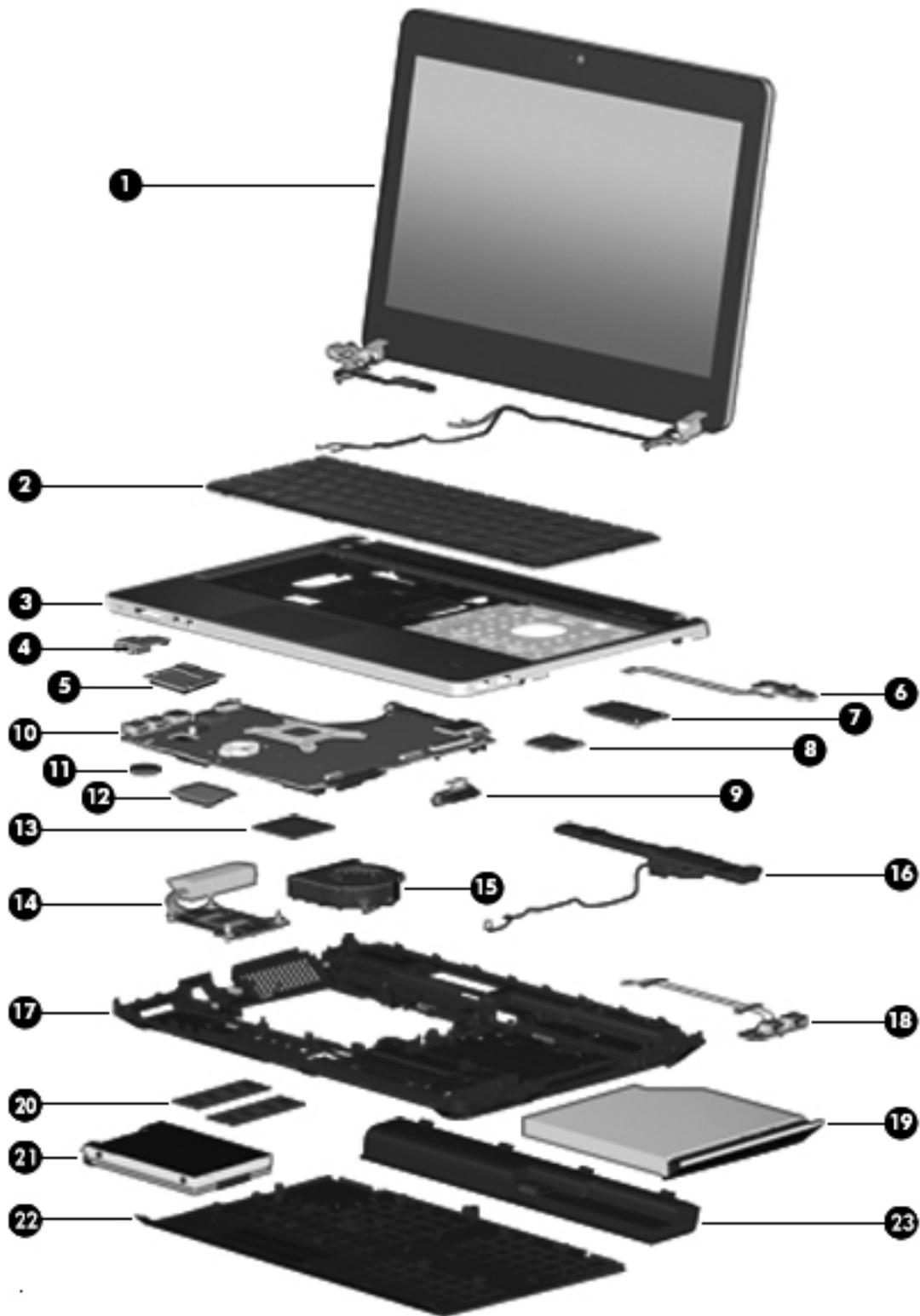
### Service tag

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



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

# Computer major components



Item	Description	Spare part number
<b>(1)</b>	<b>Display panel</b>	
	For use in HP ProBook 4330s/4331s models:	
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, anti-glare, without webcam</li> </ul>	646995-001
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, anti-glare, with webcam</li> </ul>	646996-001
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, BrightView, without webcam</li> </ul>	646997-001
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, BrightView, with webcam</li> </ul>	646998-001
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, anti-glare, with webcam and WWAN</li> </ul>	646999-001
	<ul style="list-style-type: none"> <li>33.8-cm (13.3-inch) HD, BrightView, with webcam and WWAN</li> </ul>	647000-001
	For use in HP ProBook 4430s/4431s models:	
	<ul style="list-style-type: none"> <li>35.6-cm (14.0-inch), anti-glare, without webcam</li> </ul>	646991-001
	<ul style="list-style-type: none"> <li>35.6-cm (14.0-inch), anti-glare, with webcam</li> </ul>	646992-001
	<ul style="list-style-type: none"> <li>35.6-cm (14.0-inch), BrightView, without webcam</li> </ul>	646993-001
	<ul style="list-style-type: none"> <li>35.6-cm (14.0-inch), BrightView, with webcam</li> </ul>	646994-001
<b>(2)</b>	<b>Keyboard</b> (includes cable)	646365-xxx
	<b>NOTE:</b> For a detailed list of available keyboards, see <a href="#">Sequential part number listing on page 34</a> .	
<b>(3)</b>	<b>Top cover</b>	
	For use in model 4330s/4331s:	
	<ul style="list-style-type: none"> <li>With a fingerprint reader and USB 3.0</li> </ul>	646331-001
	<ul style="list-style-type: none"> <li>Without a fingerprint reader and with USB 3.0</li> </ul>	646333-001
	<ul style="list-style-type: none"> <li>With a fingerprint reader and USB 2.0</li> </ul>	658336-001
	<ul style="list-style-type: none"> <li>Without a fingerprint reader and with USB 2.0</li> </ul>	658337-001
	<ul style="list-style-type: none"> <li>With no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader</li> </ul>	667660-001
	<ul style="list-style-type: none"> <li>With no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader</li> </ul>	667661-001
	For use in model 4430s/4431s:	
	<ul style="list-style-type: none"> <li>With a fingerprint reader and USB 3.0</li> </ul>	646335-001
	<ul style="list-style-type: none"> <li>Without a fingerprint reader and with USB 3.0</li> </ul>	646337-001
	<ul style="list-style-type: none"> <li>With a fingerprint reader and USB 2.0</li> </ul>	658338-001
	<ul style="list-style-type: none"> <li>Without a fingerprint reader and with USB 2.0</li> </ul>	658339-001
	<ul style="list-style-type: none"> <li>With no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader</li> </ul>	667662-001
	<ul style="list-style-type: none"> <li>With no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader</li> </ul>	667663-001
<b>(4)</b>	<b>Audio board</b>	647605-001
<b>(5)</b>	<b>Card reader board</b>	646361-001

Item	Description	Spare part number
(6)	<b>Quick Launch board</b>	646362-001
(7)	<b>WWAN modules</b>	
	HP Ic2010 HSPA Mobile Broadband Module	612600-001
	HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001
	HP hs2340 HSPA+ Mobile Broadband Module	632155-001
(8)	<b>WLAN module</b>	
	Atheros AR9002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593127-001

Item	Description	Spare part number
	Realtek 8188BC8 802.11a/b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	602993-001
	Ralink 5390GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	630703-001

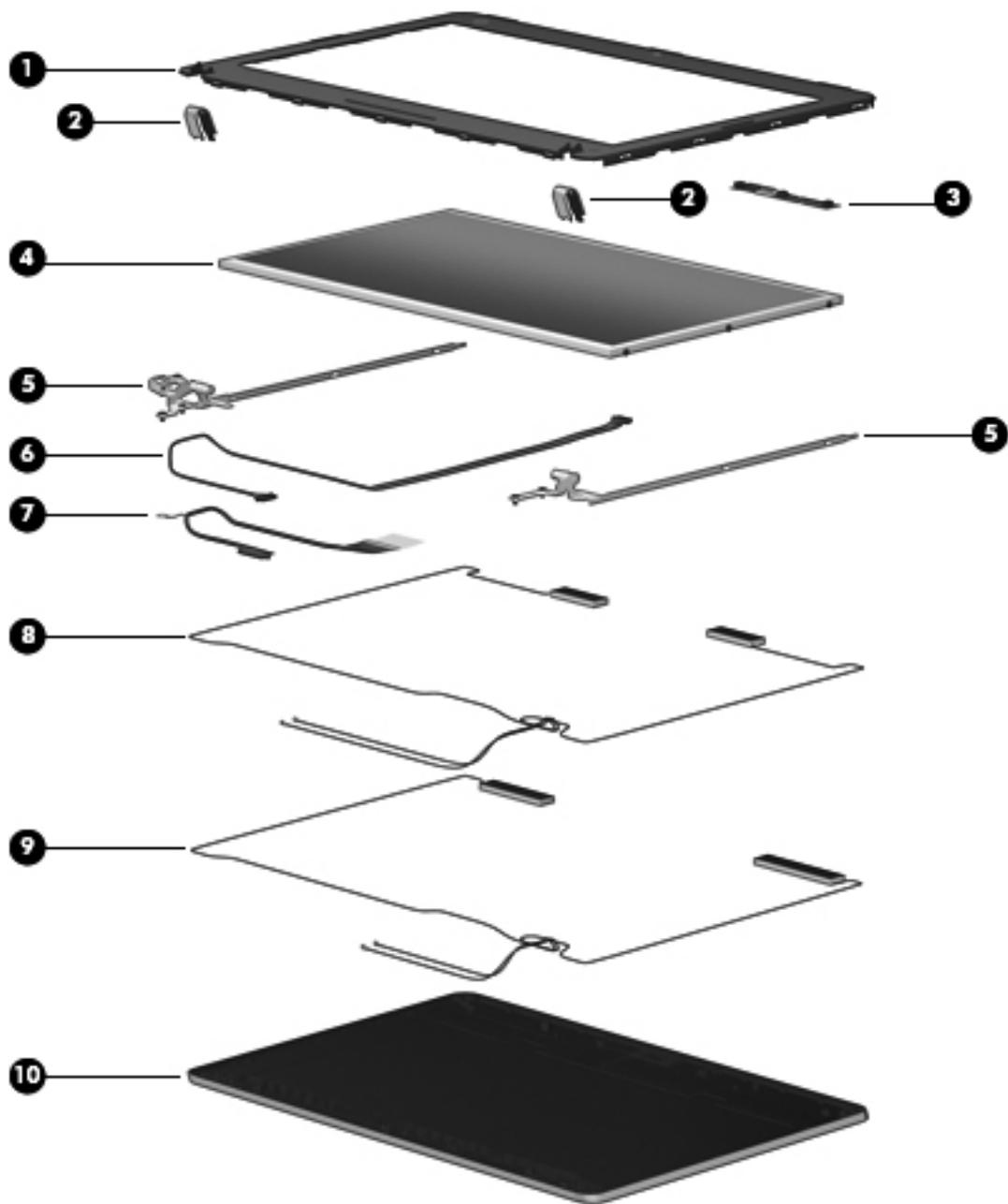
Item	Description	Spare part number
	Ralink 8190BC8 802.11b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	630813-001
	Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	640926-001

Item	Description	Spare part number
	Intel Centrino® Advanced-N 6230 for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	636672-001
<b>(9)</b>	<b>Optical drive connector</b>	646359-001
<b>(10)</b>	<b>System board</b> (includes replacement thermal material)	
	For use in UMA models with USB 3.0 and with WWAN	646325-001
	For use in UMA models with USB 3.0 and without WWAN	646326-001
	For use in discrete models with USB 3.0 and 512-MB graphics memory	646327-001
	For use in discrete models with USB 3.0 and 1-GB graphics memory	646328-001
	For use in discrete models with USB 2.0 and 512-MB graphics memory	658334-001
	For use in discrete models with USB 2.0 and 1-GB graphics memory	658335-001
<b>(11)</b>	<b>RTC battery</b>	449137-001
<b>(12)</b>	<b>Modem module</b>	628824-001
	<b>NOTE:</b> The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646369-001. See <a href="#">Cable Kit on page 32</a> for more Cable Kit spare part number information.	
<b>(13)</b>	<b>Processor</b>	
	<b>Intel Core i7 processors, Dual Core</b>	
	2620M, 2.7-GHz (turbo up to 3.4-GHz) processor, 4-MB L3 cache	631252-001
	<b>Intel Core i5 processors, Dual Core</b>	
	2540M, 2.6-GHz (turbo up to 3.3-GHz) processor, 3-MB L3 cache (includes phase change material (PCM))	631255-001
	2520M, 2.5-GHz (turbo up to 3.2-GHz) processor, 3-MB L3 cache (includes phase change material (PCM))	631253-001

Item	Description	Spare part number
	2430M, 2.4-GHz (turbo up to 3.0-GHz) processor, 3-MB L3 cache	653341-001
	2410M, 2.3-GHz (turbo up to 2.9-GHz) processor, 3-MB L3 cache	638039-001
	<b>Intel Core i3 processors, Dual Core</b>	
	2350M, 2.3-GHz processor, 3-MB L3 cache (includes thermal grease)	653340-001
	2330M, 2.2-GHz processor, 3-MB L3 cache (includes thermal grease)	653339-001
	2310M, 2.1-GHz processor, 3-MB L3 cache (includes thermal grease)	638037-001
	<b>Intel Pentium processors, Dual-Core</b>	
	B950, 2.1-GHz processor, 2-MB L3 cache	653338-001
	B940, 2.0-GHz processor, 2-MB L3 cache	653337-001
	<b>Intel Celeron processor, Dual Core</b>	
	B840, 1.9-GHz processor, 2-MB L3 cache	664663-001
	B810, 1.6-GHz processor, 2-MB L3 cache	646760-001
<b>(14)</b>	<b>Heat sink</b> (includes replacement thermal material)	
	For use in models with discrete graphics	646356-001
	For use in models with UMA graphics	646357-001
<b>(15)</b>	<b>Fan</b>	646358-001
<b>(16)</b>	<b>Speaker assembly</b>	646364-001
<b>(17)</b>	<b>Base enclosure</b>	
	For use with 4330s/4331s models	646339-001
	For use with 4430s/4431s models	646340-001
<b>(18)</b>	<b>USB 2.0 board</b>	646360-001
<b>(19)</b>	<b>Optical drive</b> (includes bracket, bezel, and screws)	
	Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive	647947-001
	Blu-ray ROM DVD±RW SuperMulti DL Drive	647948-001
	DVD±RW and CD-RW SuperMulti DL Combo Drive	647946-001
	DVD-ROM Drive	647945-001
<b>(20)</b>	<b>Memory modules</b> (PC3-10600, 1333-MHz, DDR3)	
	4-GB	621569-001
	2-GB	621565-001
	1-GB	639736-001
<b>(21)</b>	<b>Hard drive</b>	
	750-GB, 7200-rpm	633252-001
	640-GB, 5400-rpm	603785-001
	500-GB, 7200-rpm	634925-001

<b>Item</b>	<b>Description</b>	<b>Spare part number</b>
	500-GB, 5400-rpm	634932-001
	320-GB, 7200-rpm	641672-001
	320-GB, 5400-rpm	622643-001
	250-GB, 7200-rpm	635225-001
	250-GB, 5400-rpm	622641-001
<b>(22)</b>	<b>Bottom door</b>	646341-001
<b>(23)</b>	<b>Battery, Li-ion</b>	
	9-cell (93 WHr, 2.8 Ah)	633809-001
	6-cell (55 WHr, 2.8 Ah)	650938-001
	6-cell (47 WHr, 2.2 Ah)	633805-001

## Display components



Item	Description	Spare part number
(1)	<b>Display bezel</b>	
	For use with HP ProBook 4330/4331s models with a webcam	646343-001
	For use with HP ProBook 4330/4331s models without a webcam	646342-001
	For use with HP ProBook 4430/4431s models with a webcam	646345-001
	For use with HP ProBook 4430/4431s models without a webcam	646344-001
(2)	<b>Display hinge covers</b>	646355-001

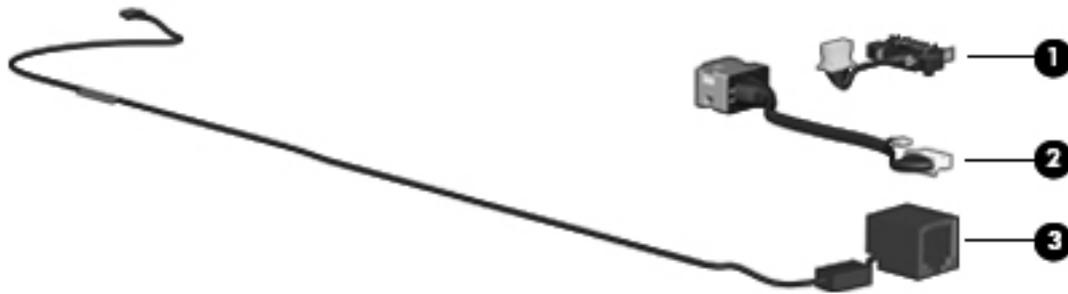
<b>Item</b>	<b>Description</b>	<b>Spare part number</b>
<b>(3)</b>	<b>Webcam module</b>	642795-001
	<b>Microphone module</b> (not illustrated)	642797-001
<b>(4)</b>	<b>Display panel</b>	
	33.8-cm (13.3-inch), anti-glare	646374-001
	33.8-cm (13.3-inch), BrightView	646990-001
	35.6-cm (14.0-inch), anti-glare	646375-001
	35.6-cm (14.0-inch), BrightView	646989-001
<b>(5)</b>	<b>Display hinges</b> (includes left and right hinges)	646354-001
<b>(6)</b>	<b>Webcam cable</b>	646275-001
<b>(7)</b>	<b>Display Cable Kit</b>	605766-001
<b>(8)</b>	<b>WLAN antennas</b>	646352-001
<b>(9)</b>	<b>WWAN antennas</b>	646353-001
<b>(10)</b>	<b>Display enclosure</b>	
	For use in HP ProBook 4330s/4331s models	646346-001
	For use in HP ProBook 4430s/4431s models	646348-001
	<b>Kensington lock bracket</b> (not illustrated)	
	For use in 4330s/4331s models	646367-001
	For use in 4430s/4431s models	646368-001

## Plastics Kit



Item	Description	Spare part number
	<b>Plastics Kit</b>	646373-001
(1)	RJ-11 holder	
(2)	Secure Digital card protective insert	
(3)	ExpressCard slot protective insert	
(4)	Optical drive protective insert	

## Cable Kit



Item	Description	Spare part number
	<b>Cable Kit:</b>	646369-001
(1)	Battery connector cable	
(2)	Power connector cable	
(3)	RJ-11 connector cable	

## Mass storage devices

Description	Spare part number
<b>Optical drives</b>	
Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive	647947-001
Blu-ray ROM DVD±RW SuperMulti DL Drive	647948-001
DVD±RW and CD-RW SuperMulti DL Combo Drive	647946-001
DVD-ROM Drive	647945-001
<b>Hard drives</b>	
750-GB, 7200-rpm	633252-001
640-GB, 5400-rpm	603785-001
500-GB, 7200-rpm	634925-001
500-GB, 5400-rpm	634932-001
320-GB, 5400-rpm	622643-001
320-GB, 7200-rpm	641672-001
250-GB, 7200-rpm	635225-001
250-GB, 5400-rpm	622641-001
<b>Hard Drive Hardware Kit</b> (includes hard drive bracket, insulator, and screws)	647944-001

## Miscellaneous parts

Description	Spare part number
<b>AC adapters</b>	
65-W AC adapter	609939-001
65-W AC adapter for use in India	609948-001
90-W AC adapter	609940-001
90-W AC adapter for use in India	609947-001
<b>Power cords:</b>	
For use in Argentina	490371-D01
For use in Brazil	490371-202
For use in Denmark	490371-081
For use in Europe, the Middle East, and Africa	490371-021
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in South Africa	490371-AR1
For use in Switzerland	490371-111
For use in Thailand	490371-201
For use in the United Kingdom	490371-031
For use in the United States	490371-001
<b>Rubber Kit (includes SIM bumper and feet)</b>	
For use with model 4330s/4331s	646371-001
For use with model 4430s/4431s	646372-001
<b>Screw Kit</b>	646370-001
<b>Mouse, optical, 2-button</b>	390632-001
<b>HP optical travel mouse</b>	434594-001
<b>HP basic carrying case</b>	455084-001
<b>Professional slim, top load case</b>	592923-001
<b>Notebook combination lock</b>	591699-001
<b>Nylon case</b>	612757-001
<b>HP keyed cable lock</b>	626729-001

## Sequential part number listing

Spare part number	Description
390632-001	Mouse, optical, 2-button
434594-001	HP USB optical travel mouse
449137-001	RTC battery
455084-001	HP basic carrying case
490371-001	Power cord for use in North America
490371-021	Power cord for use in Europe, the Middle East, and Africa
490371-031	Power cord for use in the United Kingdom
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 Thailand
490371-202	Power cord for use in Brazil
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
591699-001	Combination lock
592923-001	Professional, slim top load case
593127-001	Atheros AR9002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe

Spare part number	Description
602993-001	Realtek 8188BC8 802.11a/b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
603785-001	640-GB, 5400-rpm hard drive
605766-001	Display Cable Kit
609939-001	65-W AC adapter
609940-001	90-W AC adapter
609947-001	90-W AC adapter for use in India
609948-001	65-W AC adapter for use in India
612600-001	HP Ic2010 HSPA Mobile Broadband Module
612757-001	Nylon case
621565-001	2-GB memory module (PC3-10600, 1333-MHz, DDR3)
621569-001	4-GB memory module (PC3-10600, 1333-MHz, DDR3)
622641-001	250-GB, 5400-rpm hard drive
622643-001	320-GB, 5400-rpm hard drive
626729-001	HP keyed cable lock
628824-001	Modem module
	<b>NOTE:</b> The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646369-001. See <a href="#">Cable Kit on page 32</a> for more Cable Kit spare part number information.

Spare part number	Description
630703-001	Ralink 5390GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
630813-001	Ralink 8190BC8 802.11b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
631252-001	Intel Core i7 processor, 2620M, 2.7-GHz (turbo up to 3.4-GHz), 4-MB L3 cache (includes thermal material)
631253-001	Intel Core i5 processor, 2520M, 2.5-GHz (turbo up to 3.2-GHz), 3-MB L3 cache (includes thermal material)
631255-001	Intel Core i7 processor, 2540M, 2.6-GHz (turbo up to 3.3-GHz), 3-MB L3 cache (includes thermal material)
632155-001	HP hs2340 HSPA+ Mobile Broadband Module (WWAN)
633252-001	750-GB, 7200-rpm hard drive
633805-001	6-cell, 47 WHr, 2.2 Ah Li-ion battery
633809-001	9-cell, 93 WHr, 2.8 Ah Li-ion battery
634400-001	HP un2430 EV-DO/HSPA Mobile Broadband Module

Spare part number	Description
634925-001	500-GB, 7200-rpm hard drive
634932-001	500-GB, 5400-rpm hard drive
635225-001	250-GB, 7200-rpm hard drive
636672-001	Intel Centrino Advanced-N 6230 for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
638037-001	Intel Core i3 processor, 2310M, 2.1-GHz, 3-MB L3 cache (includes thermal material)
638039-001	Intel Core i5 processor, 2410M, 2.3-GHz (turbo up to 2.9-GHz), 3-MB L3 cache (includes thermal material)
639736-001	1-GB memory module (PC3-10600, 1333-MHz, DDR3)
640926-001	Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
641672-001	320-GB, 7200-rpm hard drive
642795-001	Webcam module

<b>Spare part number</b>	<b>Description</b>
642797-001	Microphone module
646275-001	Webcam cable
646325-001	System board for use in UMA models with USB 3.0 and with WWAN
646326-001	System board for use in UMA models with USB 3.0 and without WWAN
646327-001	System board for use in models with USB 3.0 and 512 MB of discrete graphics
646328-001	System board for use in models with USB 3.0 and 1 GB of discrete graphics
646331-001	Top cover for use in 4330s/4331s models with a fingerprint reader and USB 3.0
646333-001	Top cover for use in 4330s/4331s models without a fingerprint reader and with USB 3.0
646335-001	Top cover for use in 4430s/4431s models with a fingerprint reader and USB 3.0
646337-001	Top cover for use in 4430s/4431s models without a fingerprint reader and with USB 3.0
646339-001	Base enclosure for use with 4330s/4331s models
646340-001	Base enclosure for use with 4430s/4431s models
646341-001	Bottom door
646342-001	Display bezel for use with HP ProBook 4330s/4331s models without a webcam
646343-001	Display bezel for use with HP ProBook 4330s/4331s models with a webcam
646344-001	Display bezel for use with HP ProBook 4430s/4431s models without a webcam
646345-001	Display bezel for use with HP ProBook 4430s/4431s models with a webcam
646346-001	Display enclosure for use in HP ProBook 4330s/4331s models
646348-001	Display enclosure for use in HP ProBook 4430s/4431s models
646352-001	WLAN antennas
646353-001	WWAN antennas
646354-001	Display hinges (includes left and right hinges)
646355-001	Display hinge covers
646356-001	Heat sink for use in computers with discrete graphics
646357-001	Heat sink for use in computers with UMA graphics
646358-001	Fan
646359-001	Optical drive connector
646360-001	USB 2.0 board
646361-001	Card reader board
646362-001	Quick Launch board
646364-001	Speaker assembly
646365-001	Keyboard for use in models in the United States
646365-031	Keyboard for use in models in the United Kingdom
646365-041	Keyboard for use in models in Germany

<b>Spare part number</b>	<b>Description</b>
646365-051	Keyboard for use in models in France
646365-061	Keyboard for use in models in Italy
646365-071	Keyboard for use in models in Spain
646365-121	Keyboard for use in models in French Canada
646365-131	Keyboard for use in models in Portugal
646365-141	Keyboard for use in models in Turkey
646365-161	Keyboard for use in models in Latin America
646365-171	Keyboard for use in models in Saudi Arabia
646365-201	Keyboard for use in models in Brazil
646365-211	Keyboard for use in models Hungary
646365-251	Keyboard for use in models in Russia
646365-261	Keyboard for use in models in Bulgaria
646365-281	Keyboard for use in models in Thailand
646365-291	Keyboard for use in models in Japan
646365-A41	Keyboard for use in models in Belgium
646365-A81	Keyboard for use in models in the Czech Republic
646365-AB1	Keyboard for use in models in Taiwan
646365-AD1	Keyboard for use in models in South Korea
646365-B31	Keyboard for use in models in the Netherlands and Europe
646365-BA1	Keyboard for use in models in Slovakia
646365-BB1	Keyboard for use in models in Israel
646365-BG1	Keyboard for use in models in Switzerland
646365-DD1	Keyboard for use in models in Iceland
646365-DH1	Keyboard for use in models in the Netherlands
646365-DJ1	Keyboard for use in models in Greece
646365-DW1	Keyboard for use in models in the French Arabic region
646367-001	Kensington lock bracket for use in 4330s/4331s models
646368-001	Kensington lock bracket for use in 4430s/4431s models
646369-001	Cable Kit (see <a href="#">Cable Kit on page 32</a> for more Cable Kit spare part information)
646370-001	Screw Kit
646371-001	Rubber Kit for use with model 4330s/4331s (includes SIM bumper and feet)
646372-001	Rubber Kit for use with model 4430s/4431s (includes SIM bumper and feet)
646374-001	Display panel, 33.8-cm (13.3-inch), anti-glare
646375-001	Display panel, 35.6-cm (14.0-inch), BrightView

<b>Spare part number</b>	<b>Description</b>
646760-001	Intel Celeron processor, B810, 1.6-GHz, 2-MB L3 cache (include thermal material)
646989-001	Display panel, 35.6-cm (14.0-inch), BrightView
646990-001	Display panel, 33.8-cm (13.3-inch), BrightView
646991-001	35.6-cm (14.0-inch) display assembly, anti-glare, without webcam
646992-001	35.6-cm (14.0-inch) display assembly, anti-glare, with webcam
646993-001	35.6-cm (14.0-inch) display assembly, BrightView, without webcam
646994-001	35.6-cm (14.0-inch) display assembly, BrightView, with webcam
646995-001	33.8-cm (13.3-inch) display assembly, HD, anti-glare, without webcam
646996-001	33.8-cm (13.3-inch) display assembly, HD, anti-glare, with webcam
646997-001	33.8-cm (13.3-inch) display assembly, HD, BrightView, without webcam
646998-001	33.8-cm (13.3-inch) display assembly, HD, BrightView, with webcam
646999-001	33.8-cm (13.3-inch) display assembly, HD, anti-glare, with webcam and WWAN
647000-001	33.8-cm (13.3-inch) display assembly, HD, BrightView, with webcam and WWAN
647605-001	Audio board
647944-001	Hard Drive Hardware Kit (includes hard drive bracket, insulator, and screws)
647945-001	DVD-ROM drive (includes bracket, bezel, and screws)
647946-001	DVD±RW and CD-RW SuperMulti DL combo drive (includes bracket, bezel, and screws)
647947-001	Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive (includes bracket, bezel, and screws)
647948-001	Blu-ray ROM DVD±RW SuperMulti DL Drive (includes bracket, bezel, and screws)
650938-001	6-cell, 55 WHr, 2.8 Ah Li-ion battery
653337-001	Intel Pentium Dual-Core processor, B940, 2.0-GHz, 2-MB L3 cache (includes thermal material)
653338-001	Intel Pentium Dual-Core processor, B950, 2.1-GHz, 2-MB L3 cache (includes thermal material)
653339-001	Intel Core i3 processor, 2330M, 2.2-GHz, 3-MB L3 cache (includes thermal material)
653340-001	Intel Core i3 processor, 2350M, 2.3-GHz, 3-MB L3 cache (includes thermal material)
653341-001	Intel Core i5 processor, 2430M, 2.4-GHz (turbo up to 3.0-GHz), 3-MB L3 cache (includes thermal material)
658334-001	System board for use in discrete models with USB 2.0 and 512-MB graphics memory
658335-001	System board for use in discrete models with USB 2.0 and 1-GB graphics memory
658336-001	Top cover for use in 4330s/4331s models with a fingerprint reader and USB 2.0
658337-001	Top cover for use in 4330s/4331s models without a fingerprint reader and with USB 2.0
658338-001	Top cover for use in 4430s/4431s models with a fingerprint reader and USB 2.0
658339-001	Top cover for use in 4430s/4431s models without a fingerprint reader and with USB 2.0
664663-001	Intel Celeron processor, B840, 1.9-GHz, 2-MB L3 cache (includes thermal material)
667660-001	Top cover with no USB logo for use in 4330s/4331s models, in USB 2.0 or USB 3.0 computers, with a fingerprint reader

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<b>Spare part number</b>	<b>Description</b>
667661-001	Top cover with no USB logo for use in 4330s/4331s models, in USB 2.0 or USB 3.0 computers, without a fingerprint reader
667662-001	Top cover with no USB logo for use in 4430s/4431s models, in USB 2.0 or USB 3.0 computers, with a fingerprint reader
667663-001	Top cover with no USB logo for use in 4430s/4431s models, in USB 2.0 or USB 3.0 computers, without a fingerprint reader

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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:

- Flat-bladed screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 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.

---

## Cables and connectors

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**⚠ 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

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**⚠ 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, and 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

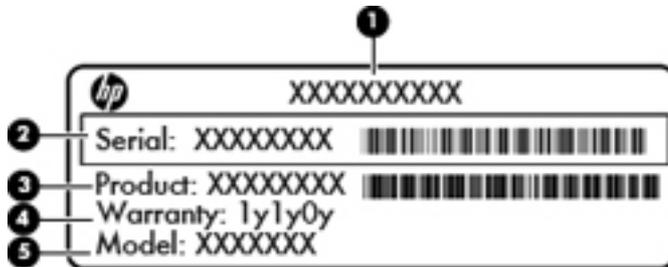
# Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 95 screws and screw locks, in 15 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

## Service tag

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



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

## Battery

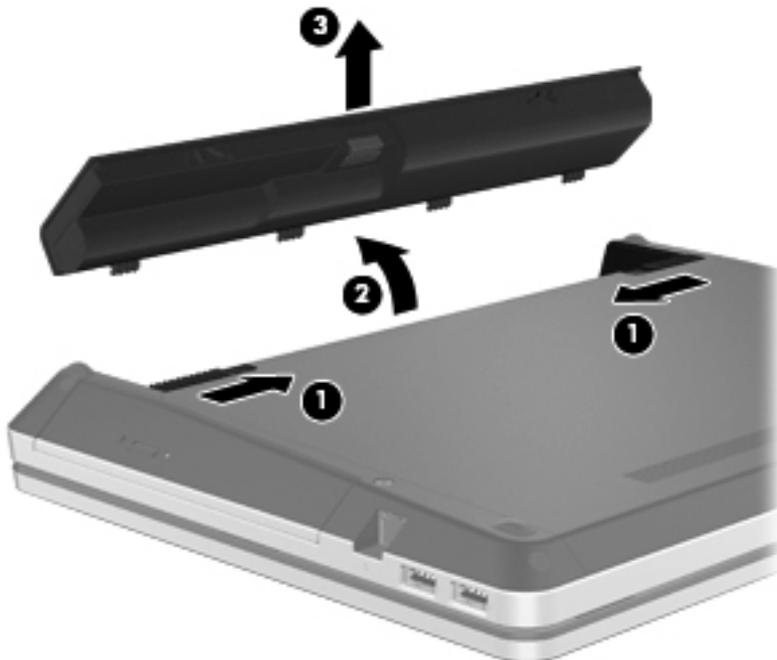
Description	Spare part number
9-cell, 93 WHr, 2.8 Ah Li-ion battery	633809-001
6-cell, 55 WHr, 2.8 Ah Li-ion battery	650938-001
6-cell, 47 WHr, 2.2 Ah Li-ion battery	633805-001

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. Position the computer upside-down on a flat surface, with the battery bay toward you.
2. Slide the battery release latch **(1)** to release the battery.
3. Pivot the battery **(2)** upward to remove it from the computer **(3)**.



Install the battery by inserting it into the battery bay until you hear a click.

## SIM

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

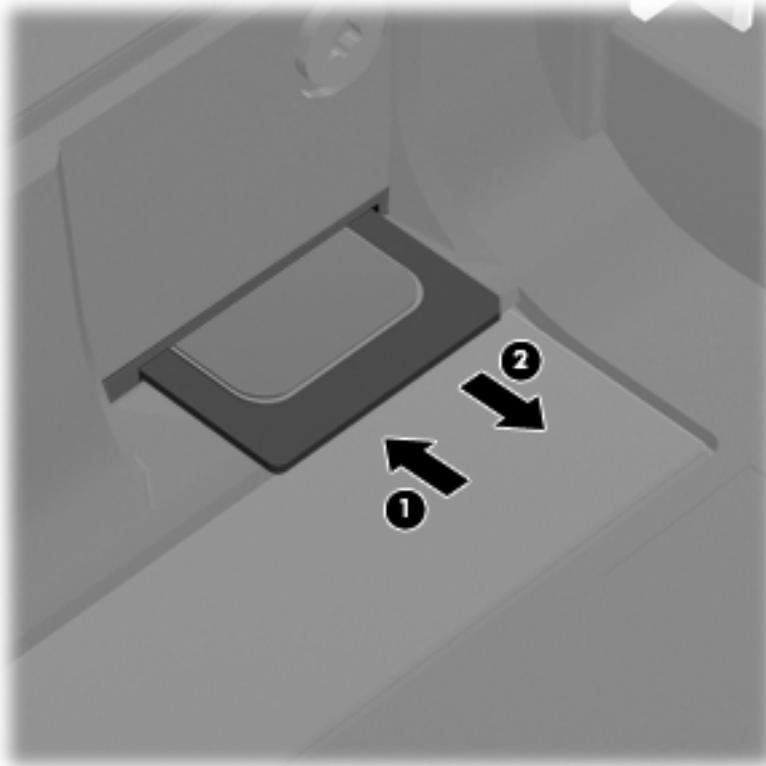
 **NOTE:** If there is a SIM inserted in the SIM slot, it must be removed before disassembling the computer. Be sure that the SIM is reinserted in the SIM slot after reassembling the computer.

Before removing the SIM, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).

Remove the SIM:

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



Reverse this procedure to install the SIM.

## Bottom door

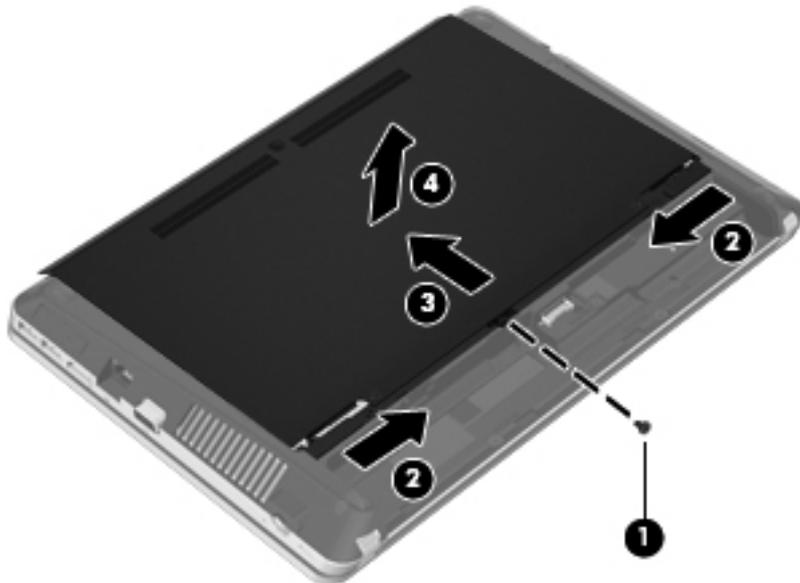
Description	Spare part number
Bottom door	646341-001

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.
4. Remove the battery (see [Battery on page 48](#)).

Remove the bottom door:

1. Position the computer upside-down on a flat surface, with the battery bay toward you.
2. Remove the locking screw (if installed) **(1)** and slide the release latch **(2)**.
3. Slide the door toward the front of the computer **(3)**, and then lift the door off the computer **(4)**.



Reverse the removal procedures to install the bottom door.

## Optical drive



**NOTE:** All optical drive spare part kits include an optical drive bezel.

Description	Spare part number
Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive	647947-001
Blu-ray ROM DVD±RW SuperMulti DL Drive	647948-001
DVD±RW and CD-RW SuperMulti DL Combo Drive	647946-001
DVD-ROM Drive	647945-001

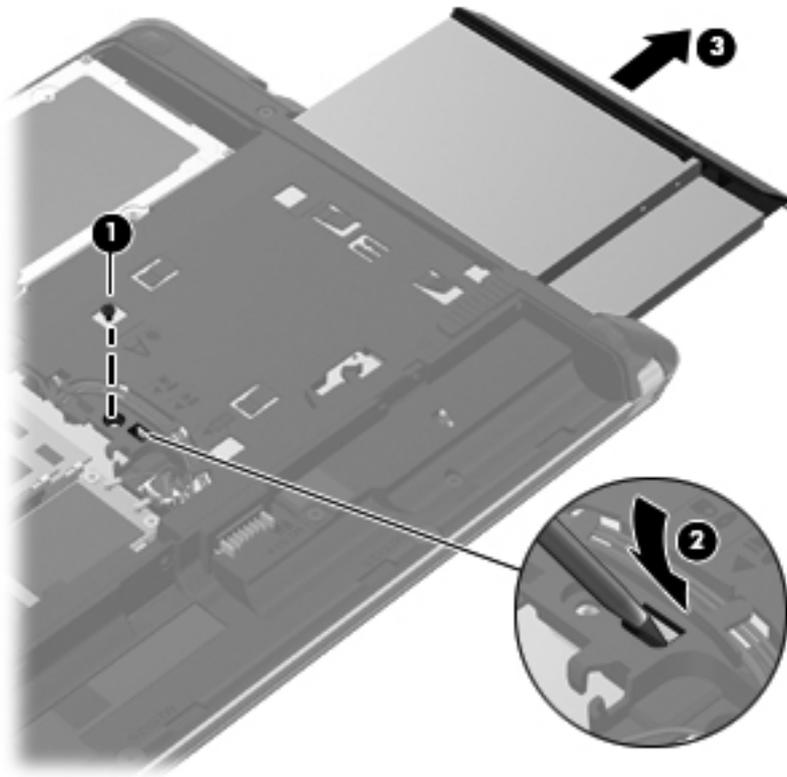
Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

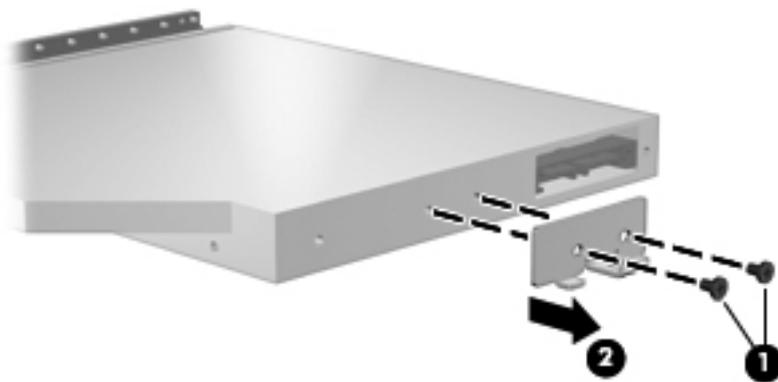
Remove the optical drive:

1. Position the computer upside-down with the right side toward you.
2. Remove the Phillips PM2.5×4.0 screw **(1)** that secures the optical drive to the computer.
3. Push the optical drive tab **(2)** to release the optical drive from the computer.

4. Remove the optical drive **(3)** from the computer.



5. If it is necessary to replace the optical drive bracket, position the optical drive with the rear toward you.
6. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the optical drive bracket to the optical drive.
7. Remove the optical drive bracket **(2)**.



Reverse this procedure to install an optical drive.

## Hard drive



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

Description	Spare part number
750-GB, 7200-rpm hard drive	633252-001
640-GB, 5400-rpm hard drive	603785-001
500-GB, 7200-rpm hard drive	634925-001
500-GB, 5400-rpm hard drive	634932-001
320-GB, 7200-rpm hard drive	641672-001
320-GB, 5400-rpm hard drive	622643-001
250-GB, 7200-rpm hard drive	635225-001
250-GB, 5400-rpm hard drive	622641-001
Hard Drive Hardware Kit (includes hard drive bracket, insulator, and screws)	647944-001

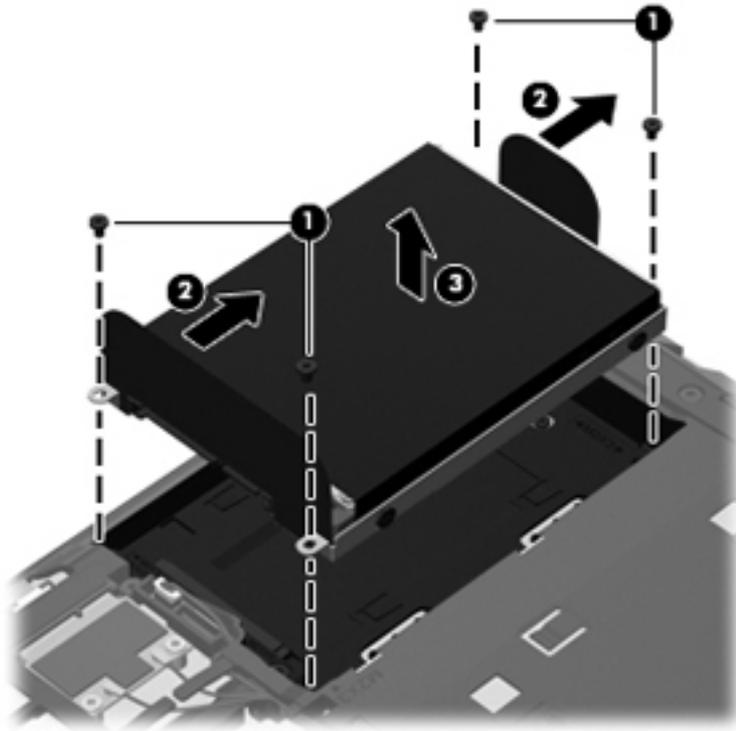
Before disassembling the computer, follow these steps:

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.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

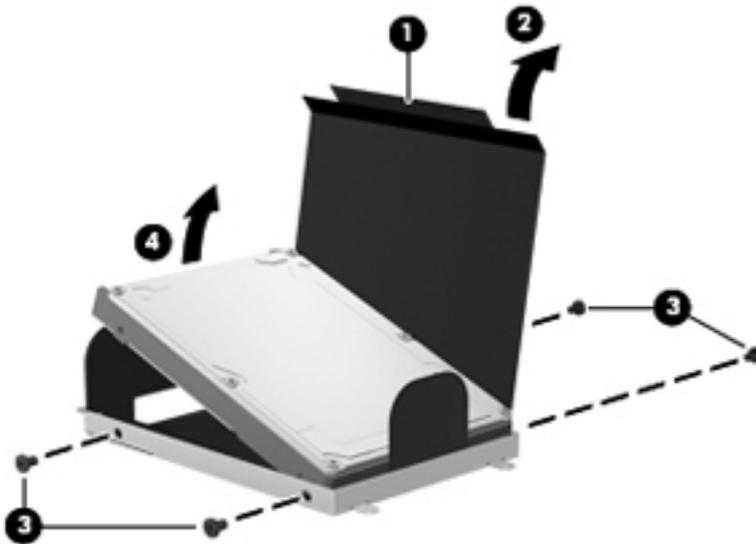
Remove the hard drive:

1. Position the computer upside-down, with the battery bay toward you.
2. Remove the four Phillips PM2.0×3.0 screws **(1)** that secure the hard drive to the computer.
3. Grasp the Mylar tab on the hard drive and slide the hard drive to the right **(2)** to disconnect it from the system board connector.

4. Remove the hard drive (3) from the hard drive bay.



5. If it is necessary to replace the hard drive bracket, remove the tape (1) that secures the Mylar cover down onto the bracket, and then lift to open the Mylar cover (2).
6. Remove the two Phillips PM3.0×3.0 hard drive bracket screws (3) from each side of the hard drive (4 total screws).
7. Rotate the hard drive upward and remove it from the bracket (4).



Reverse this procedure to reassemble and install the hard drive.

## Memory modules

 **NOTE:** Primary and expansion memory is installed in a stacked configuration in the bottom of the computer.

Description	Spare part number
1-GB (PC3-10600, 1333-MHz, DDR3)	639736-001
2-GB (PC3-10600, 1333-MHz, DDR3)	621565-001
4-GB (PC3-10600, 1333-MHz, DDR3)	621569-001

### Update BIOS before adding memory modules

Before adding new memory, make sure you update the computer to the latest BIOS.

 **CAUTION:** Failure to update the computer to the latest BIOS prior to installing new memory may result in various system problems.

To update BIOS:

1. Navigate to [www.hp.com](http://www.hp.com).
2. Click **Support & Drivers** > click **Drivers & Software**.
3. In the **Enter a product name/number** box, type the computer model information, and then click **Search**.
4. Click the link for the computer model.
5. Select the operating system, and then click **Next**.
6. Under **Step 2: Select a Download**, click the **BIOS** link.
7. Click the link for the most recent BIOS.
8. Click the **Download** button, and then follow the on-screen instructions.

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 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

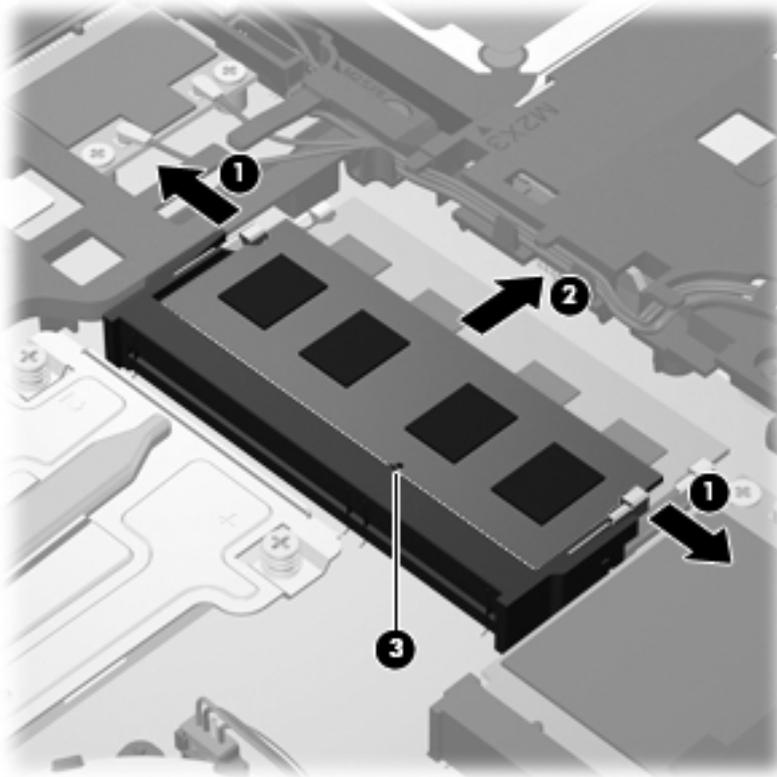
Remove the memory module:

1. Position the computer upside-down with the battery bay toward you.
2. 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.)

3. Remove the memory module (2) by pulling the module 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.

 **NOTE:** The computer uses two memory sockets. The top socket houses the expansion memory module and is shown in the following image. The bottom socket houses the primary memory module. The removal procedure is the same for both memory sockets.



Reverse this procedure to install a memory module.

## WWAN module

 **CAUTION:** The WWAN module and the WLAN module are not interchangeable.

Description	Spare part number
HP Ic2010 HSPA Mobile Broadband Module	612600-001
HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001
HP hs2340 HSPA+ Mobile Broadband Module	632155-001

Before removing the WWAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the SIM (see [SIM on page 49](#)).
6. Remove the bottom door (see [Bottom door on page 50](#)).

Remove the WWAN module:

1. Position the computer upside-down with the battery bay toward you.
2. Disconnect the WWAN antenna cables (1) from the terminals on the WWAN module.

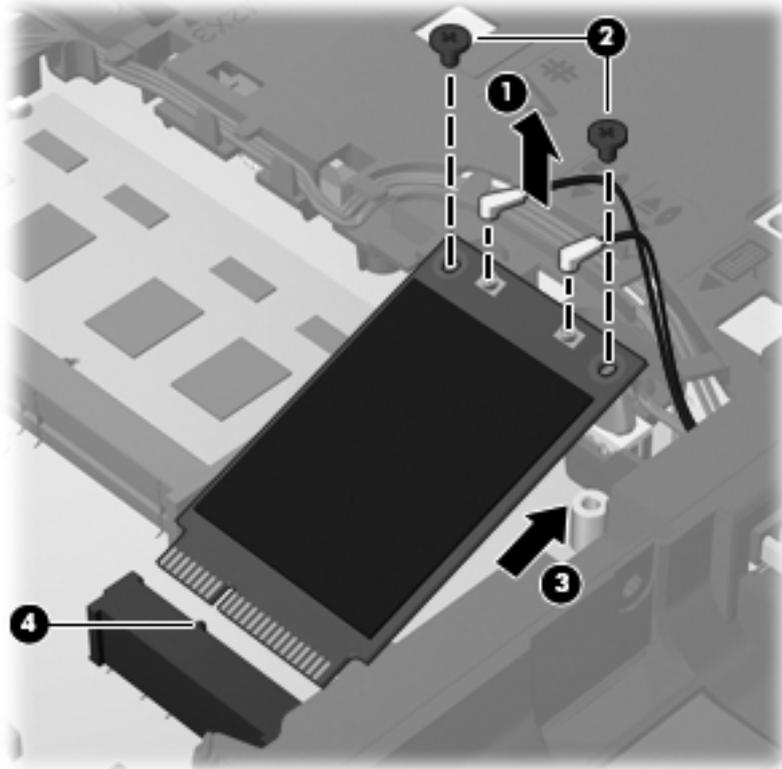
 **NOTE:** The red WWAN antenna cable is connected to the WWAN module “Main” terminal. The blue WWAN antenna cable is connected to the WWAN module “Aux” terminal.

3. Remove the two Phillips PM2.0×3.0 screws (2) that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

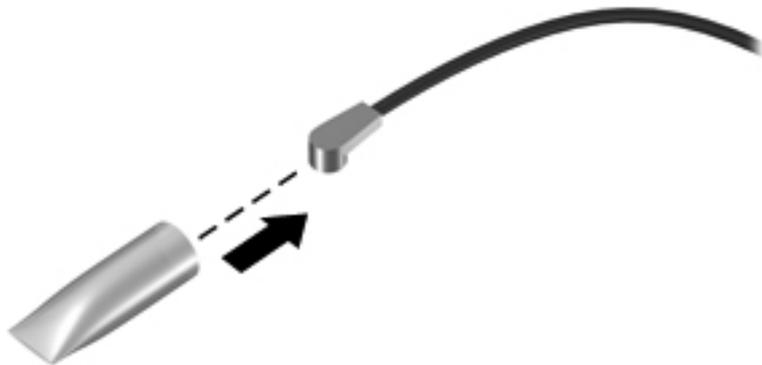
4. Remove the WWAN module (3) by pulling the module away from the slot at an angle.

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

**Figure 4-1** Removing the WWAN module



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



Reverse this procedure to install the WWAN module.

## WLAN/Bluetooth combo card

The computer uses a card that provides both WLAN and Bluetooth functionality.

 **CAUTION:** The WLAN module and the WWAN module are not interchangeable.

Description	Spare part number
Atheros AR9002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593127-001
Realtek 8188BC8 802.11a/b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	602993-001

Description	Spare part number
<p>Ralink 5390GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</p>	630703-001
<p>Ralink 8190BC8 802.11b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</p>	630813-001

Description	Spare part number
Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	640926-001
Intel Centrino® Advanced-N 6230 for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Baltics, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	636672-001

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

Remove the WLAN module:

1. Position the computer upside-down with the battery bay toward you.
2. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.



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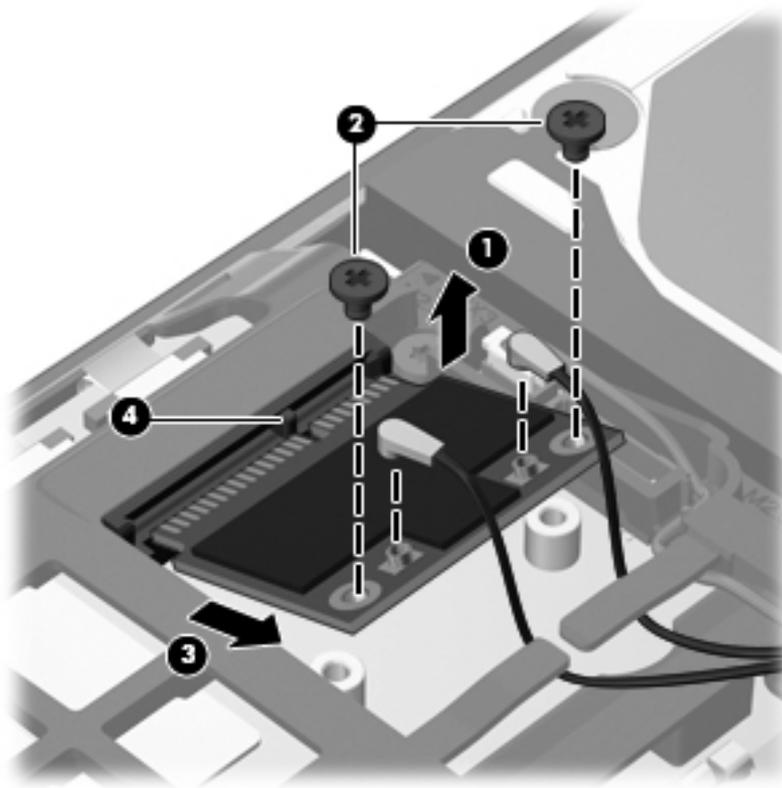
**NOTE:** The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2”. If the computer is equipped with an 802.11a/b/g/n WLAN module, the yellow WLAN antenna cable connects to the middle terminal on the WLAN module.

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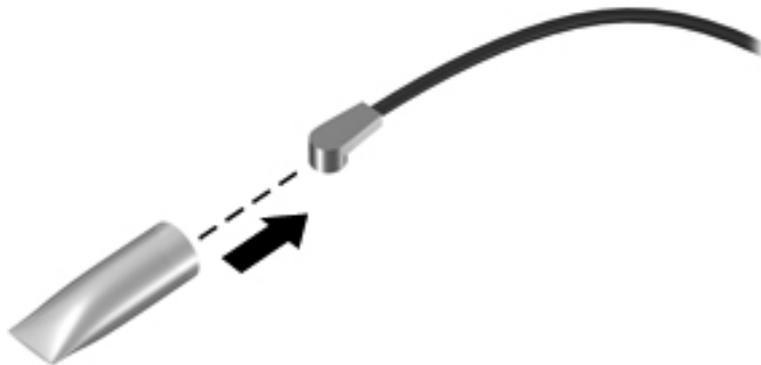
3. Remove the two Phillips PM2.0×3.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

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



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



Reverse this procedure to install the WLAN module.

## Keyboard

 **NOTE:** For a detailed list of available keyboards, see [Sequential part number listing on page 34](#).

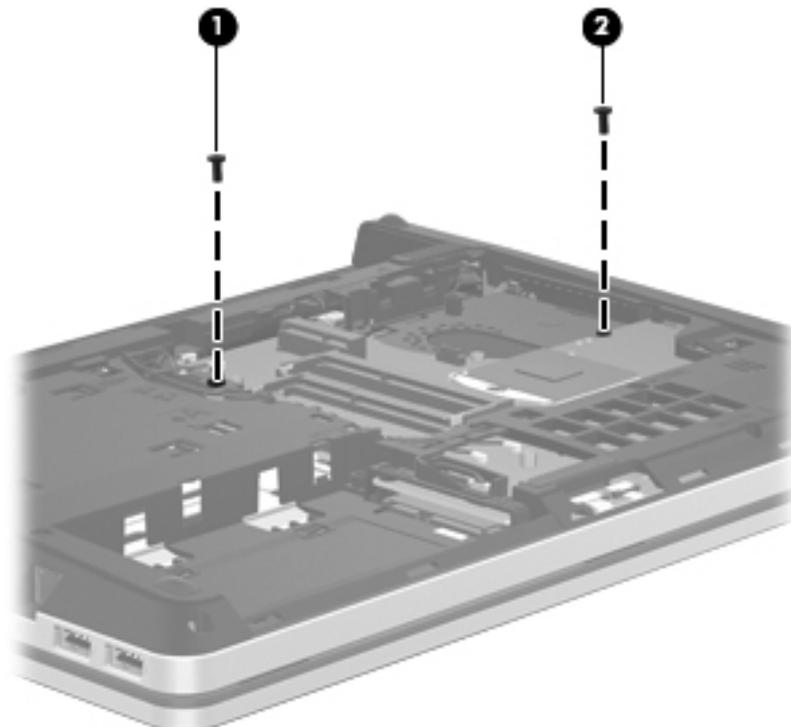
Description	Spare part number
Keyboard	646365-xxx

Before removing the keyboard, follow these steps:

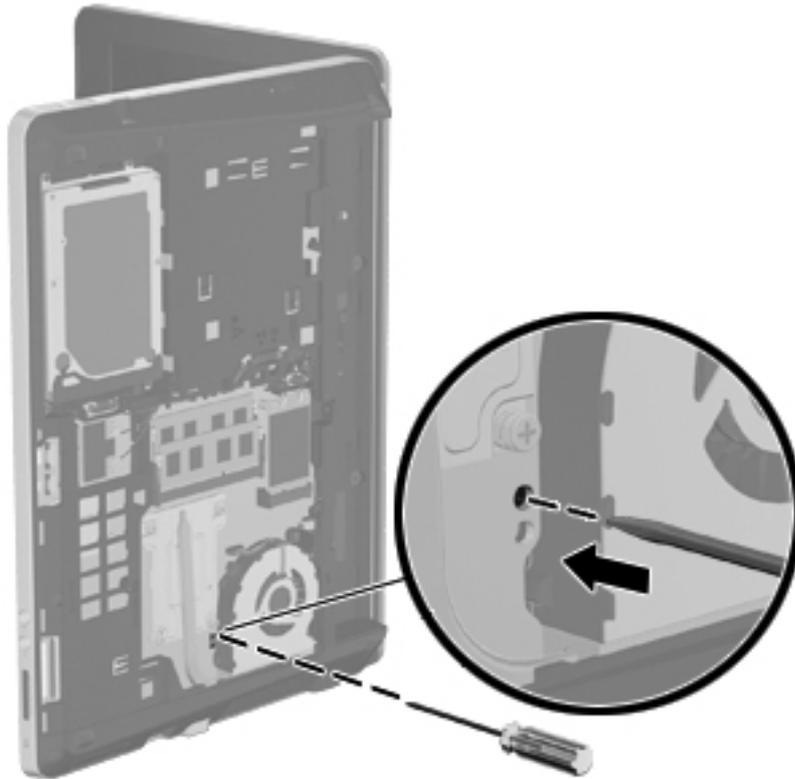
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

Remove the keyboard:

1. Position the computer upside-down with the front toward you.
2. Remove the Phillips PM2.5×6.0 screw **(1)** that secures the keyboard to the computer.
3. Remove the Phillips PM2.5×4.0 screw **(2)** that secures the keyboard to the computer.

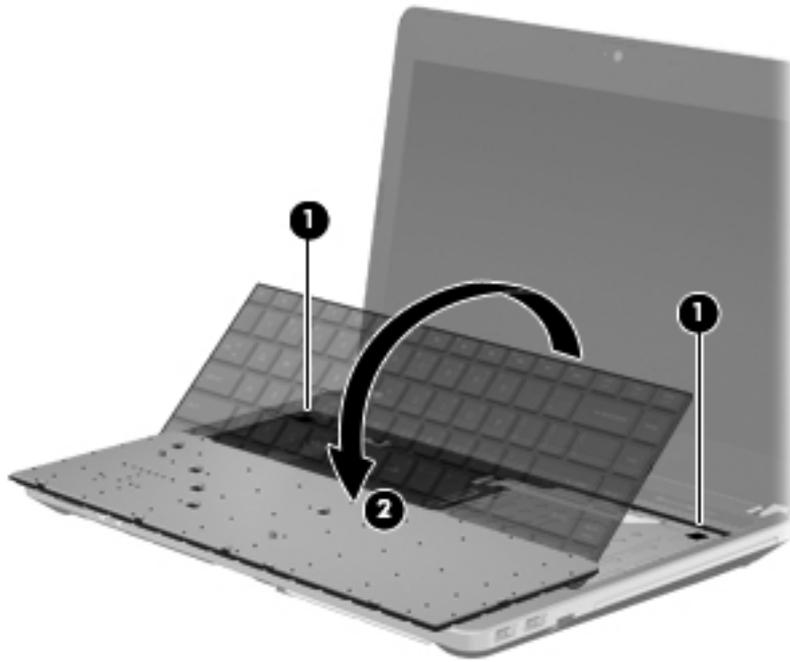


4. Insert a screwdriver or similar tool into the gap near the fan and push to disengage the keyboard.

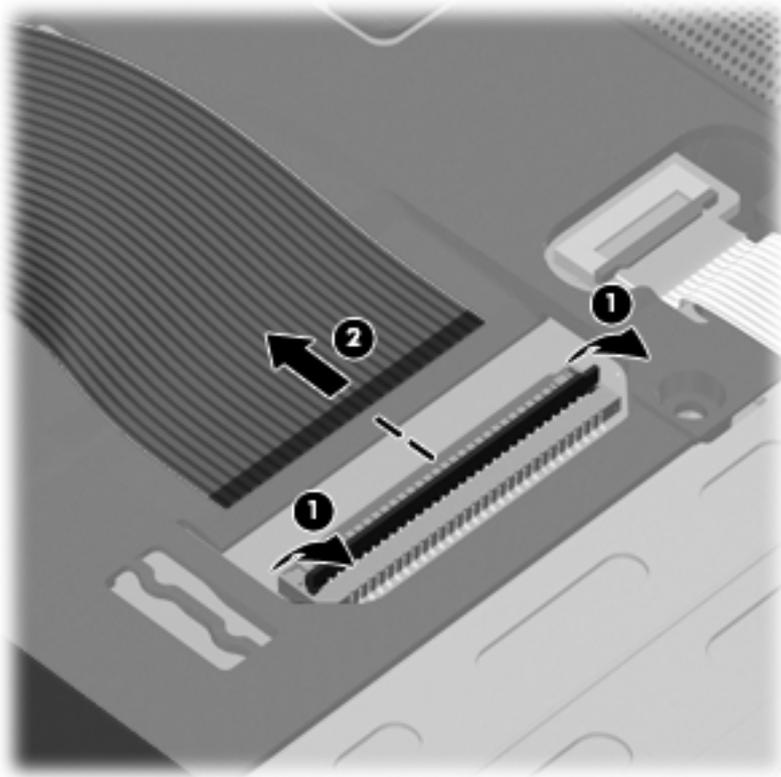


5. Position the computer right-side up with the front toward you.
6. Open the computer as far as possible.
7. When lifting the keyboard, note that some models have tape (1) that secures the keyboard to the top cover.

8. Lift and rotate the keyboard until it rests on the palm rest (2).



9. Lift the keyboard connector latch (1), and then disconnect the keyboard cable from the system board (2).



10. Remove the keyboard.

Reverse this procedure to install the keyboard.

## Fan

Description	Spare part number
Fan	646358-001

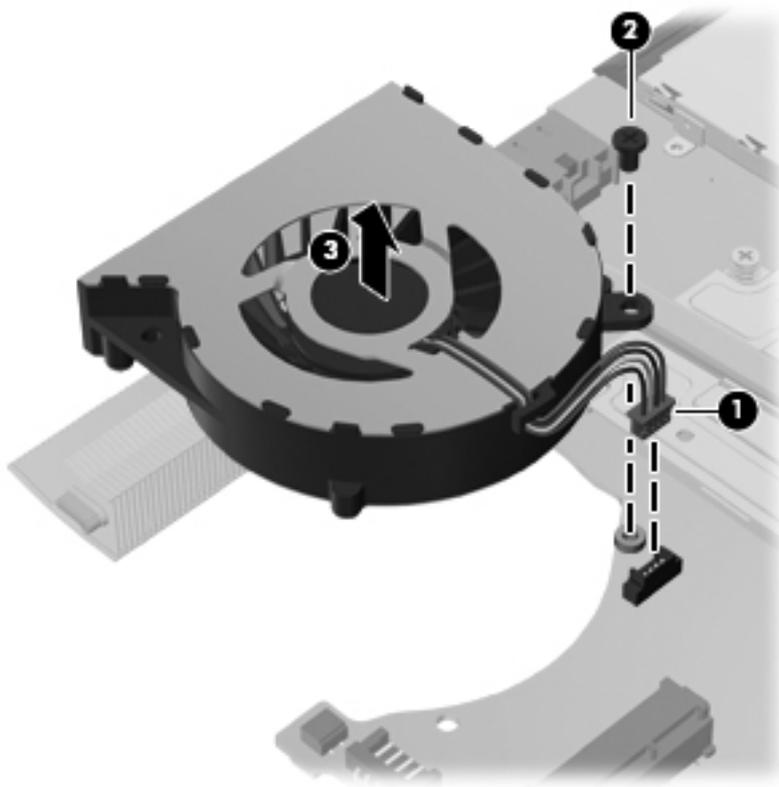
Before removing the fan, follow these steps:

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 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).

Remove the fan:

1. Position the computer upside-down with the front toward you.
2. Disconnect the fan cable **(1)** from the system board.
3. Remove the Phillips PM2.0×3.5 screw **(2)** that secures the fan to the base enclosure.

4. Lift the fan out of the computer (3).



Reverse this procedure to install the fan.

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

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

## Heat sink

All heat sink spare part kits include replacement thermal material.

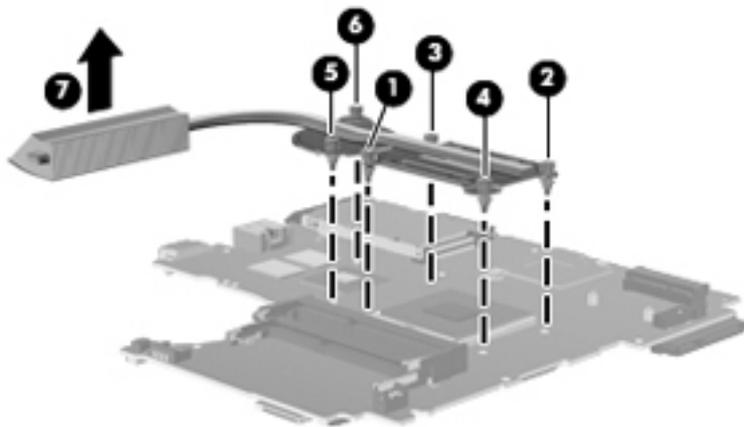
Description	Spare part number
Heat sink for use in computers with discrete graphics	646356-001
Heat sink for use in computers with UMA graphics	646357-001

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 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).
6. Remove the fan (see [Fan on page 67](#)).

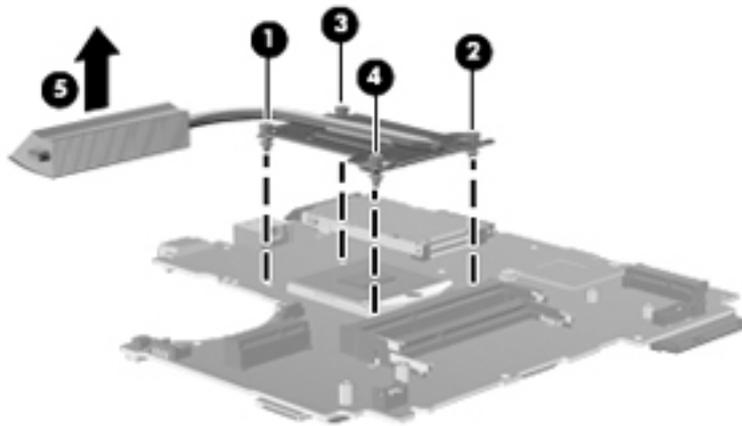
Remove the heat sink:

1. Position the computer upside-down with the front toward you.
2. To remove the discrete heat sink, in the order indicated, loosen the six captive Phillips screws **(1)** — **(6)** that secure the heat sink to the system board.
3. Lift the heat sink up and out of the computer **(7)**.

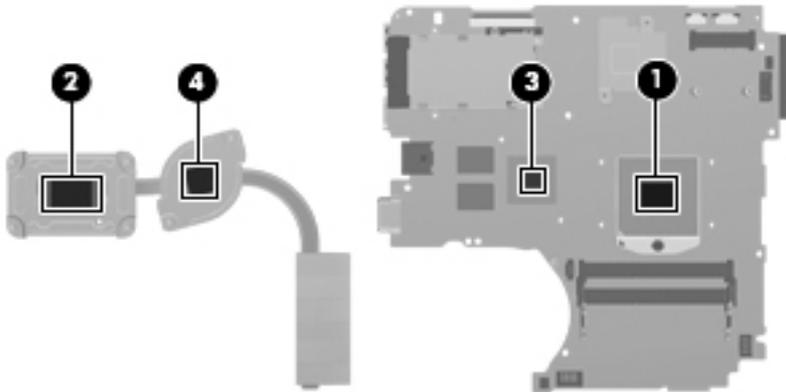


4. To remove the UMA heat sink, in the order indicated, loosen the four captive Phillips screws **(1)** — **(4)** that secure the heat sink to the system board.

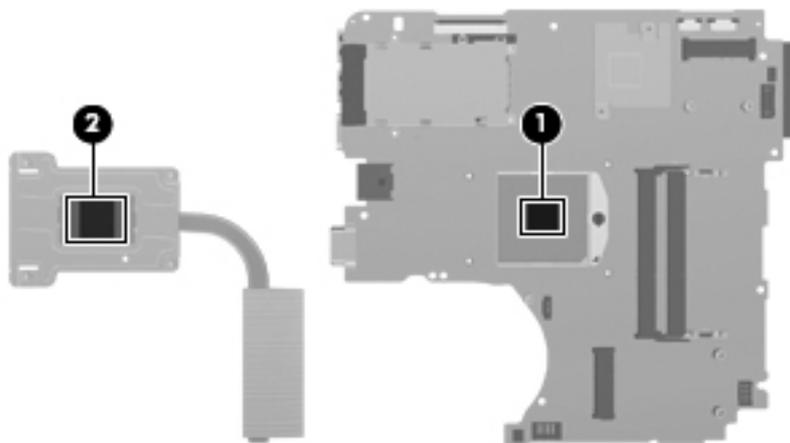
5. Lift the heat sink up and out of the computer (5).



 **NOTE:** For discrete models, thoroughly clean thermal material from the surfaces of the system board components (1)(3) and the heat sink (2)(4) each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.



 **NOTE:** For UMA models, thoroughly clean thermal material from the surface of the system board (1) and heat sink (2) each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.



Reverse this procedure to install the heat sink.

## Processor



**NOTE:** All processor spare part kits include replacement thermal material.

Description	Spare part number
<b>Intel Core i7 processor, Dual Core</b>	
2620M, 2.7-GHz (turbo up to 3.4-GHz) processor with 4-MB L3 cache	631252-001
<b>Intel Core i5 processors, Dual Core</b>	
2540M, 2.6-GHz (turbo up to 3.3-GHz) processor with 3-MB L3 cache (includes thermal grease)	631255-001
2520M, 2.5-GHz (turbo up to 3.2-GHz) processor with 3-MB L3 cache (includes thermal grease)	631253-001
2430M, 2.4-GHz (turbo up to 3.0-GHz) processor with 3-MB L3 cache	653341-001
2410M, 2.3-GHz (turbo up to 2.9-GHz) processor with 3-MB L3 cache	638039-001
<b>Intel Core i3 processors, Dual Core</b>	
2350M, 2.3-GHz processor with 3-MB L3 cache (includes thermal grease)	653340-001
2330M, 2.2-GHz processor with 3-MB L3 cache (includes thermal grease)	653339-001
2310M, 2.1-GHz processor with 3-MB L3 cache (includes thermal grease)	638037-001
<b>Intel Pentium processors, Dual-Core</b>	
B950, 2.1-GHz processor with 2-MB L3 cache	653338-001
B940, 2.0-GHz processor with 2-MB L3 cache	653337-001
<b>Intel Celeron processor, Dual Core</b>	
B840, 1.9-GHz processor with 2-MB L3 cache	664663-001
B810, 1.6-GHz processor with 2-MB L3 cache	646760-001

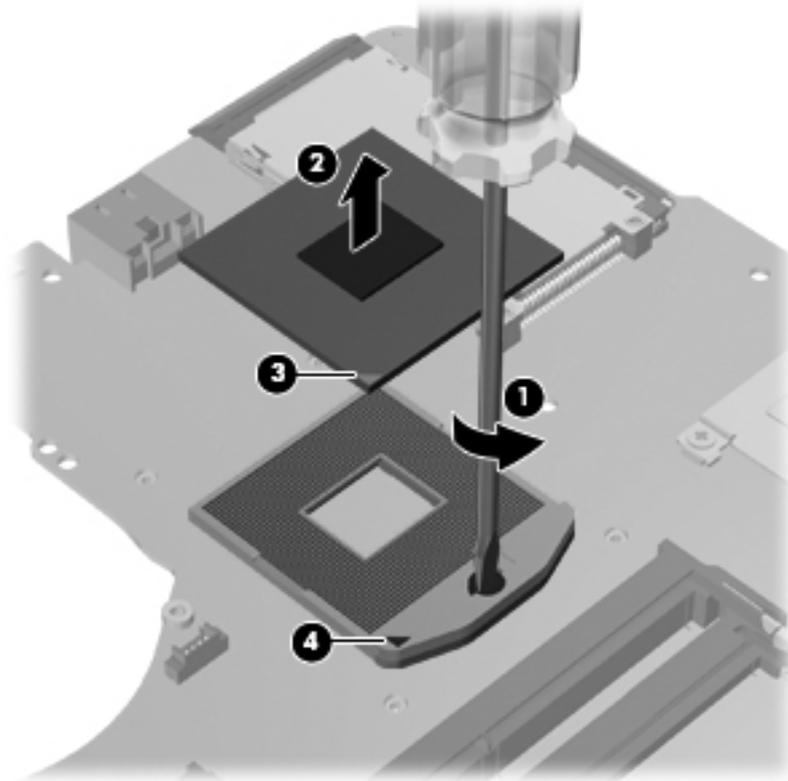
Before removing the processor, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).
6. Remove the fan (see [Fan on page 67](#)).
7. Remove the heat sink (see [Heat sink on page 69](#)).

Remove the processor:

1. Position the computer upside-down with the front toward you.
2. Use a flat-bladed screwdriver to turn the processor locking screw **(1)** one-half turn counterclockwise until you hear a click.
3. Lift the processor **(2)** straight up and remove it.

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



Reverse this procedure to install the processor.

## Top cover

Description	Spare part number
<b>For use in model 4330s/4331s:</b>	
With a fingerprint reader and USB 3.0	646331-001
Without a fingerprint reader and with USB 3.0	646333-001
With a fingerprint reader and USB 2.0	658336-001
Without a fingerprint reader and with USB 2.0	658337-001
With no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader	667660-001
With no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader	667661-001

Description	Spare part number
<b>For use in model 4430s/4431s:</b>	
With a fingerprint reader and USB 3.0	646335-001
Without a fingerprint reader and with USB 3.0	646337-001
With a fingerprint reader and USB 2.0	658338-001
Without a fingerprint reader and with USB 2.0	658339-001
With no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader	667662-001
With no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader	667663-001

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))

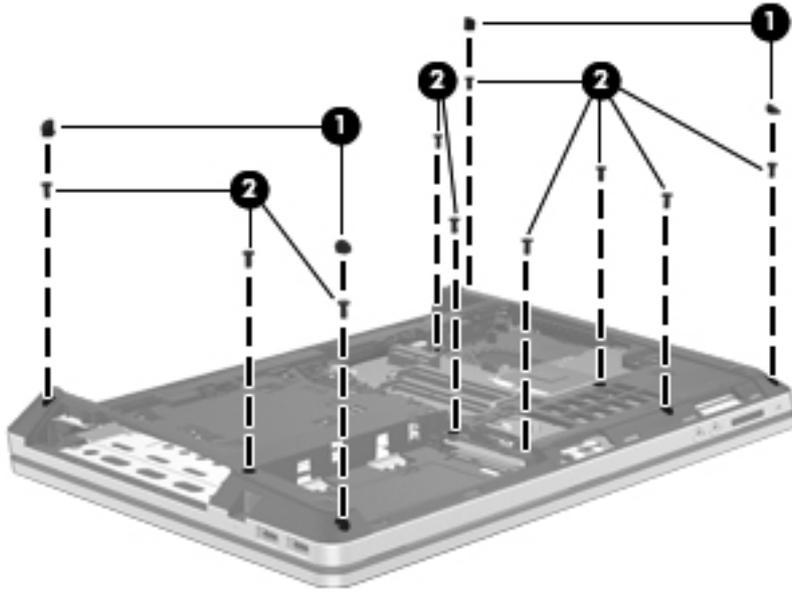
Remove the top cover:

1. Position the computer upside-down with the front toward you.

2. Remove the following covers and screws that secure the top cover to the computer:

(1): 4 rubber screw covers

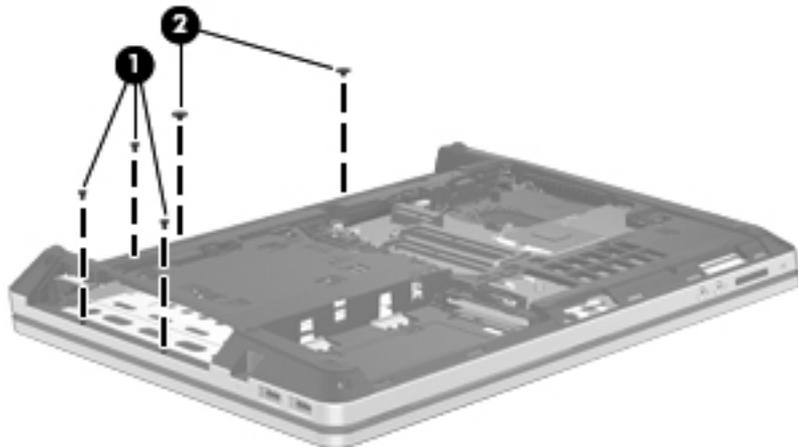
(2): 10 Torx PM2.5×6.0 screws



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

(1): 3 Phillips PM2.0×3.0 screws from the optical drive bay and left side of the battery bay

(2): 2 Phillips PM2.5×2.5 broadhead screws from the battery bay

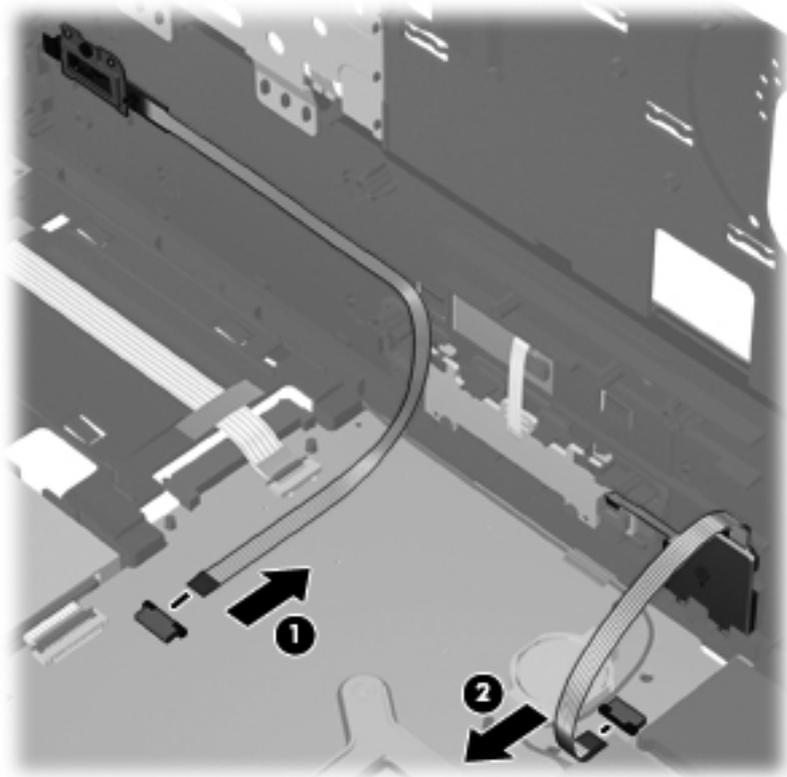


4. Position the computer upright with the front toward you.

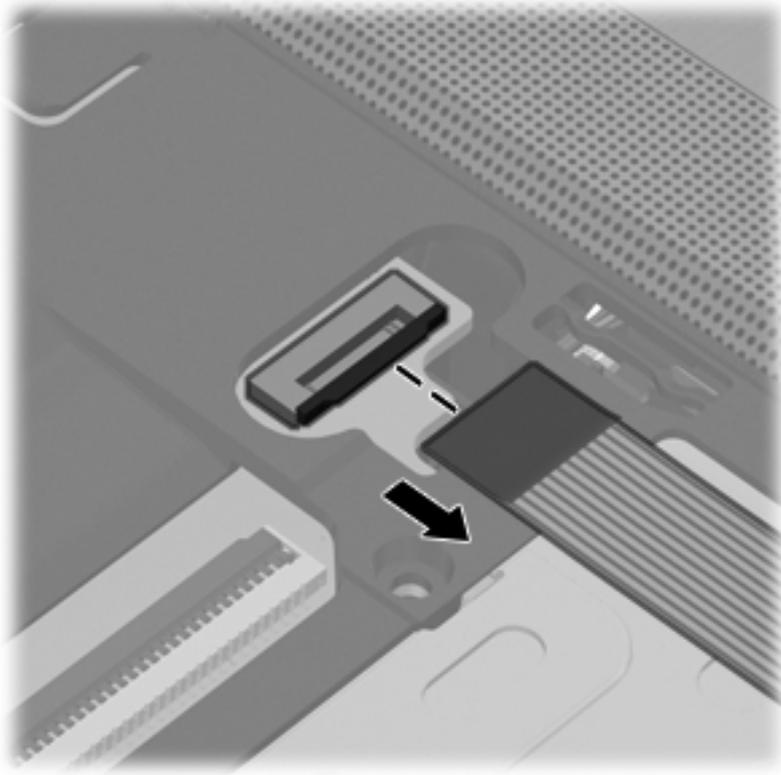
5. Remove the following cables from the system board:

(1): Fingerprint reader cable

(2): Touchpad cable

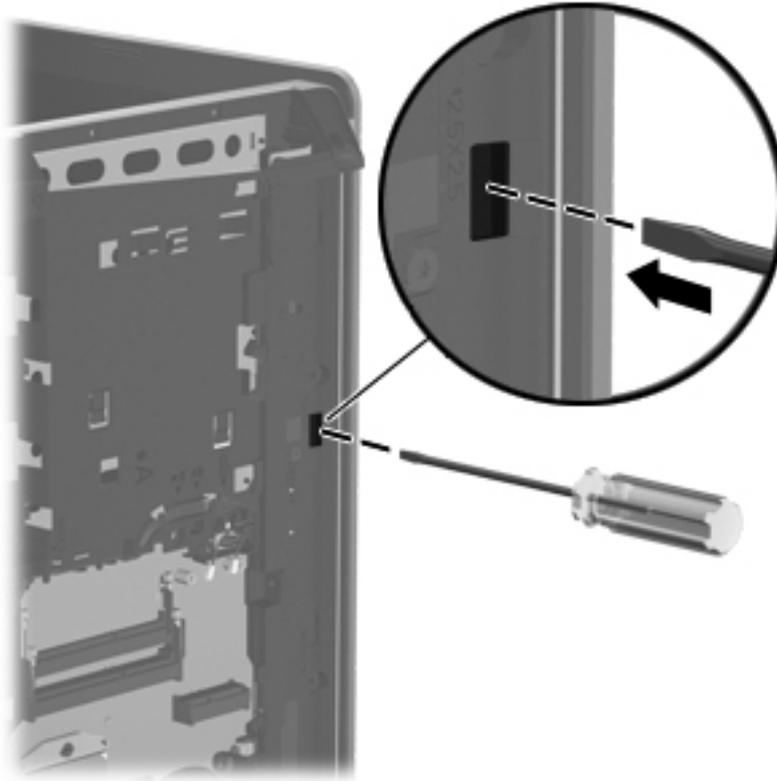


6. Disconnect the Quick Launch board cable from the system board.

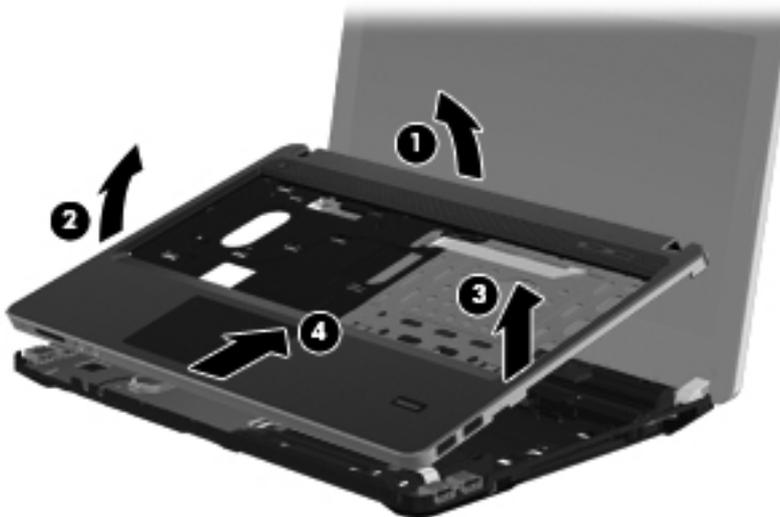


7. Position the computer on its side with the display open.

8. Insert a screwdriver through the hole in the battery bay and press to disengage the top cover from the computer.



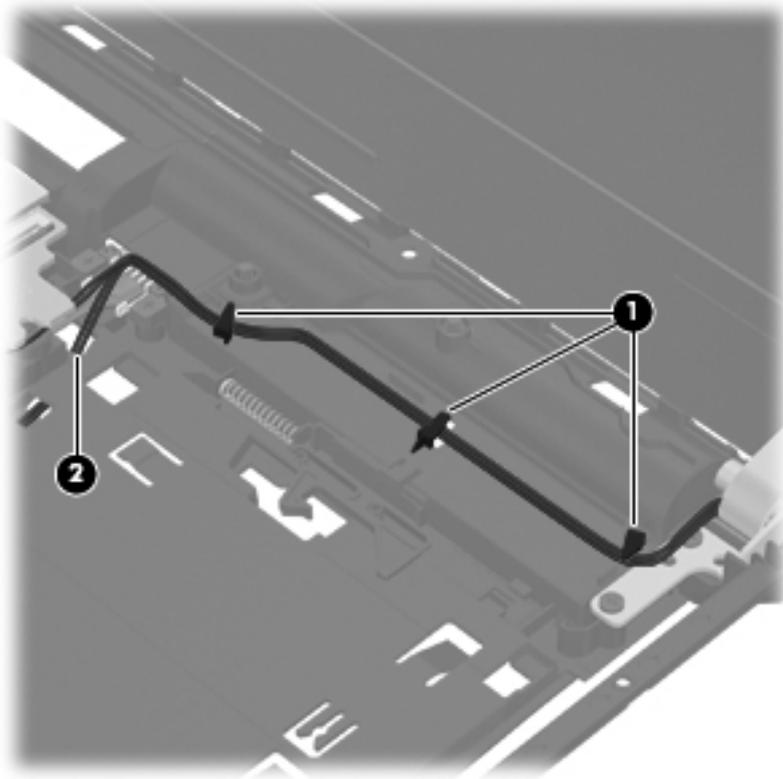
9. Pull up on the top of the top cover (1), pull upward on the left (2) and right sides (3), and then remove the top cover from the computer (4).



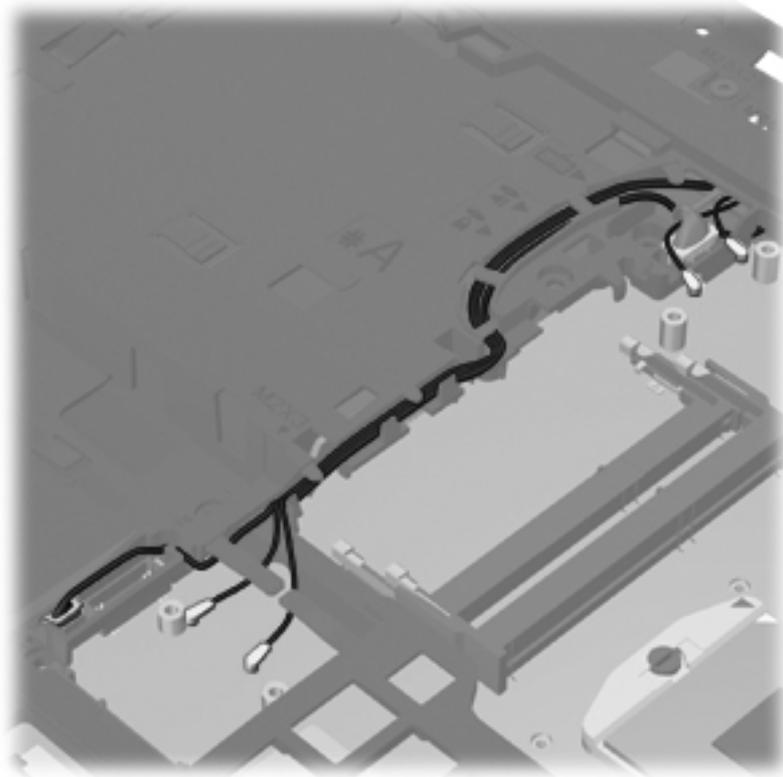
Reverse this procedure to install the top cover.

Note the correct cable routing paths for the antenna cables. Make sure you properly route all cables when installing the top cover as shown in the following images.

**Cable routing path – top**



**Cable routing path – bottom**



## RTC battery

Description	Spare part number
RTC battery	449137-001

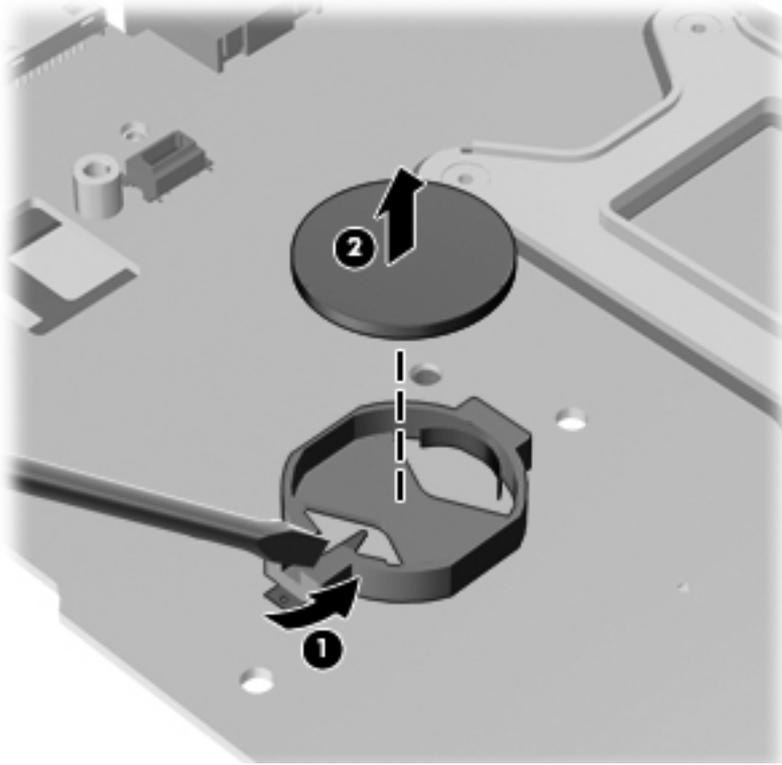
Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).
6. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))

Remove the RTC battery:

1. Position the computer upside-down, with the front toward you.
2. Use a screwdriver to loosen the battery from the slot **(1)**.

3. Lift the battery from the system board (2).



Reverse this procedure to install the RTC battery.

## Modem module

 **NOTE:** The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646369-001. See [Cable Kit on page 32](#) for more Cable Kit spare part number information.

Description	Spare part number
Modem module	628824-001

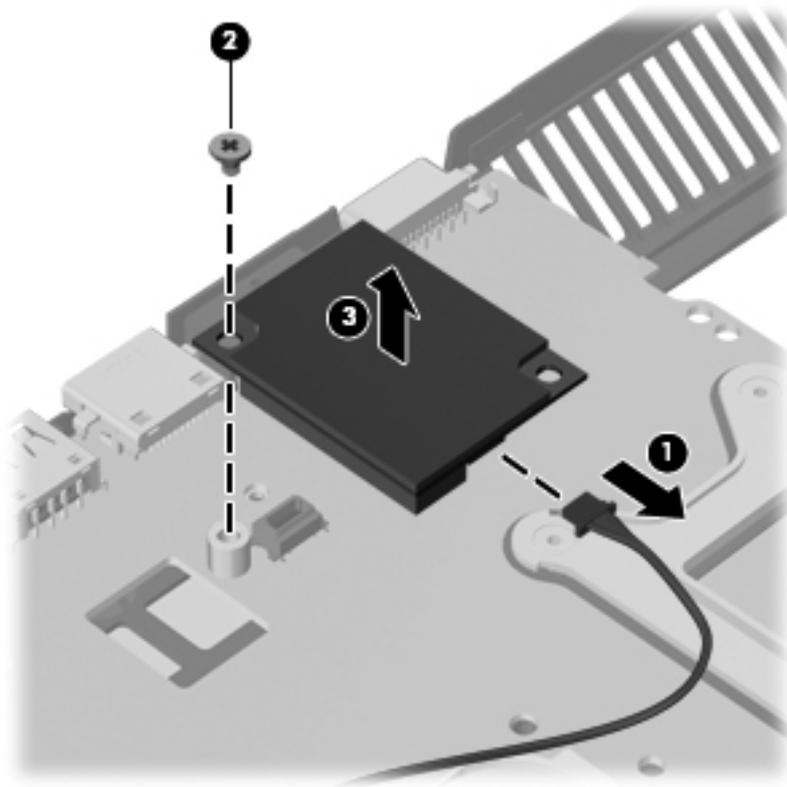
Before removing the modem module, follow these steps:

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 48](#)).
5. Remove the bottom door (see [Bottom door on page 50](#)).
6. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))

Remove the modem module:

1. Position the computer upside-down with the front toward you.
2. Disconnect the modem module cable **(1)** from the modem module.
3. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the modem module to the system board.

4. Disconnect the modem module (3) from the system board by lifting it straight up.



Reverse this procedure to install the modem module.

## Audio board

Description	Spare part number
Audio board	646361-001

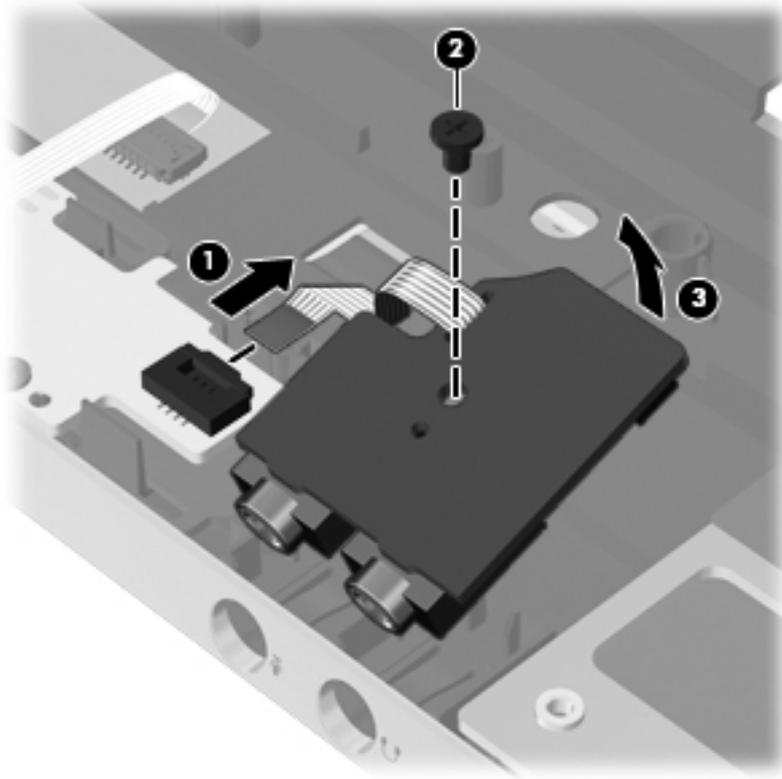
Before removing the audio board, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))

Remove the audio board:

1. Position the top cover upside-down with the front toward you.
2. Disconnect the audio board cable **(1)**.
3. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the audio board to the top cover.

4. Rotate the audio board upward (3) and then remove it from the top cover.



Reverse this procedure to install the audio board.

## Speaker assembly

Description	Spare part number
Speaker assembly	646364-001

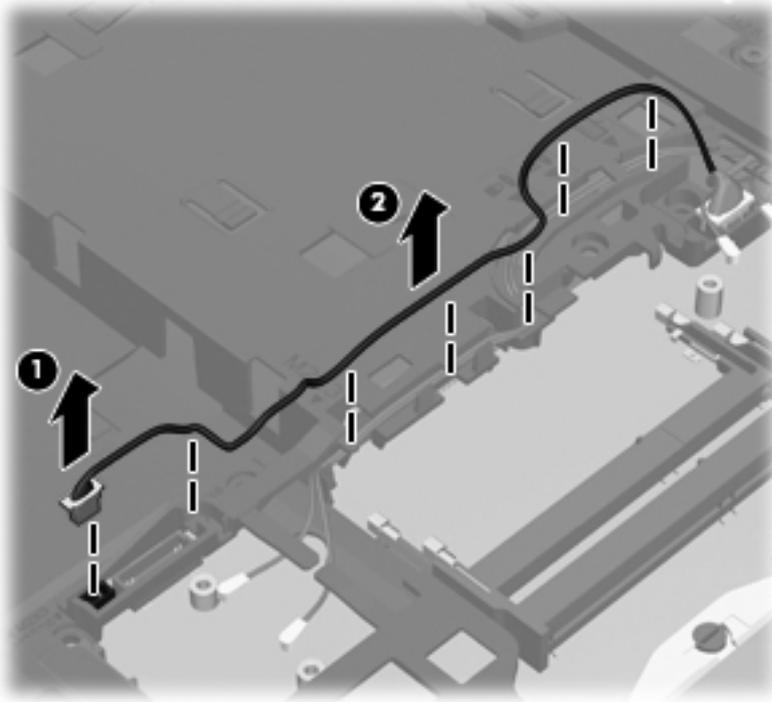
Before removing the speaker assembly, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))

- d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
- e. WWAN module (see [WWAN module on page 57](#))
- f. Fan (see [Fan on page 67](#))
- g. Heat sink (see [Heat sink on page 69](#))
- h. Keyboard (see [Keyboard on page 64](#))
- i. Top cover (see [Top cover on page 72](#))

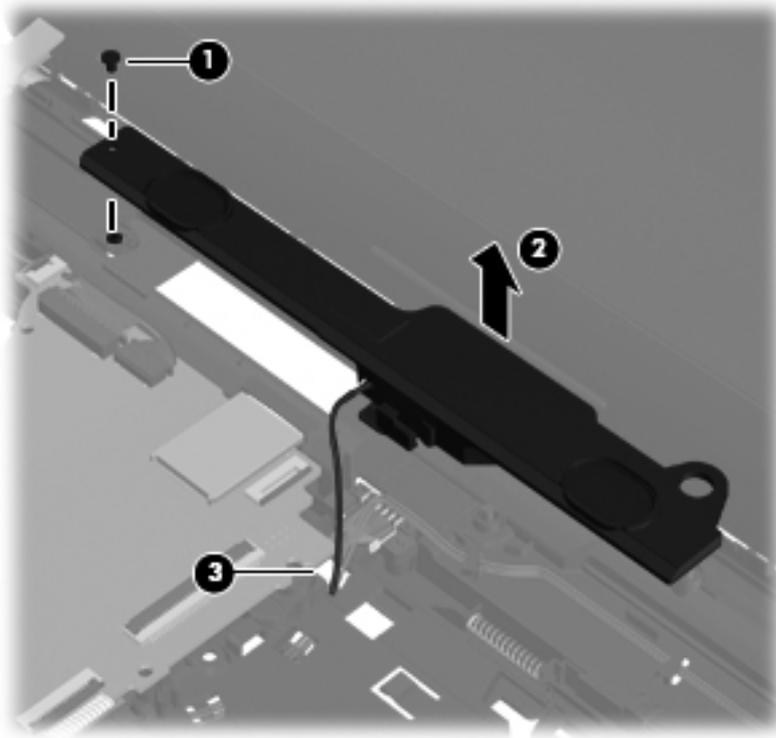
Remove the speaker assembly:

1. Position the computer upside-down with the front toward you.
2. Disconnect the speaker cable from the system board (1).
3. Remove the speaker cable from the routing path (2) built into the computer.



4. Position the computer right-side up with the front toward you.
5. Remove the Phillips PM2.0×3.0 screw (1) that secures the speaker assembly to the computer.

6. Lift the speaker from the computer (2) while routing the cable through the hole in the chassis (3).



Reverse this procedure to install the speaker assembly.

## RJ-11 jack cable



**NOTE:** The RJ-11 jack cable is included in the Cable Kit, spare part number 646369-001.

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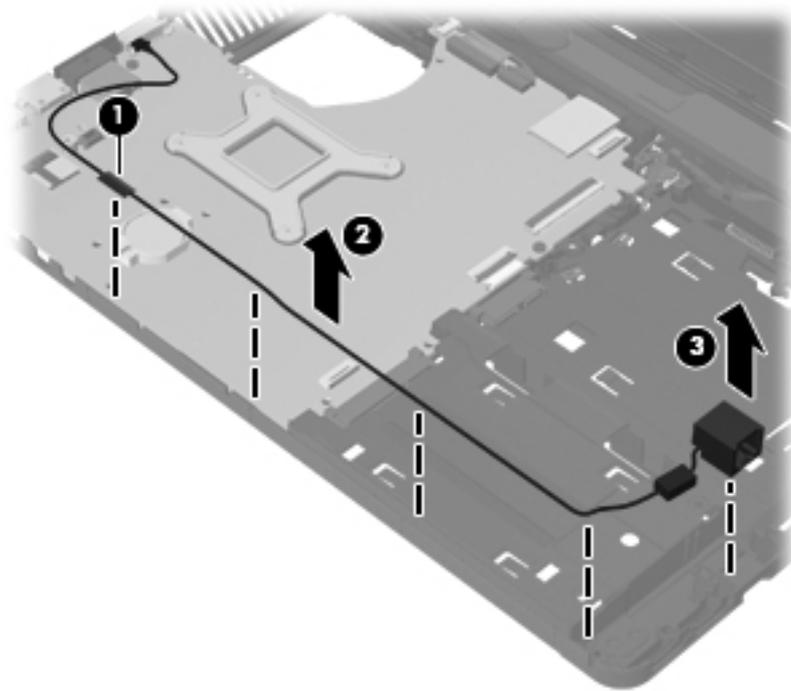
Before removing the RJ-11 jack cable, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Modem module (see [Modem module on page 81](#))
  - g. Fan (see [Fan on page 67](#))
  - h. Heat sink (see [Heat sink on page 69](#))
  - i. Keyboard (see [Keyboard on page 64](#))
  - j. Top cover (see [Top cover on page 72](#))

Remove the RJ-11 jack cable:

1. Position the computer right-side up with the front toward you.
2. Remove the tape **(1)** that secures the cable to the computer.
3. Remove the RJ-11 jack cable from the clips and routing channel **(2)** built into the base enclosure.

4. Remove the RJ-11 jack from the clip built into the base enclosure (3).



Reverse this procedure to install the RJ-11 jack cable.

## Quick Launch board

Description	Spare part number
Quick Launch board	646362-001

Before removing the Quick Launch 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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))

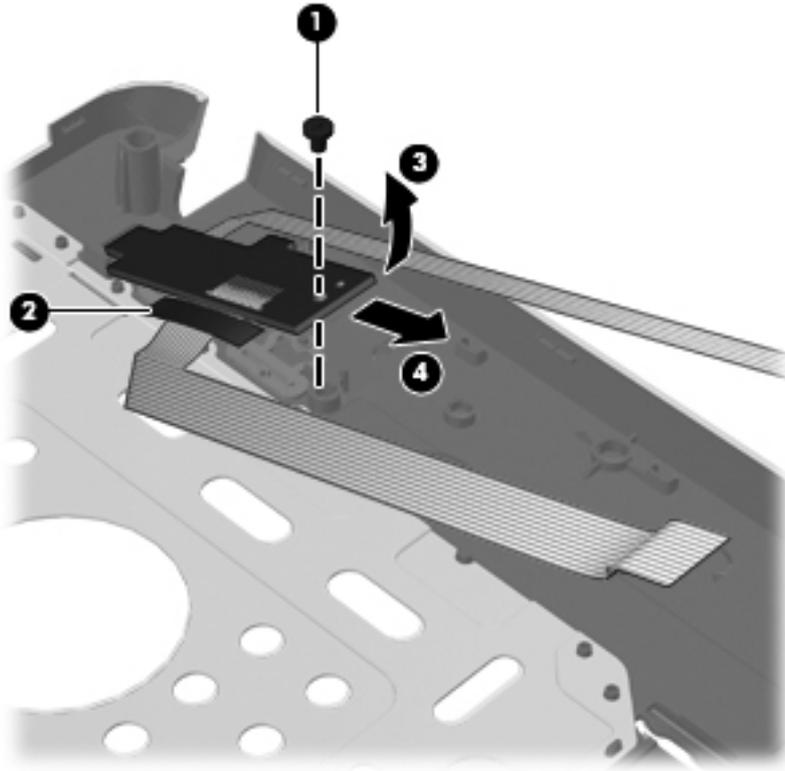
Remove the Quick Launch board:



**NOTE:** The Quick Launch board is hard-wired to the power button board. You must remove both boards to for replacement.

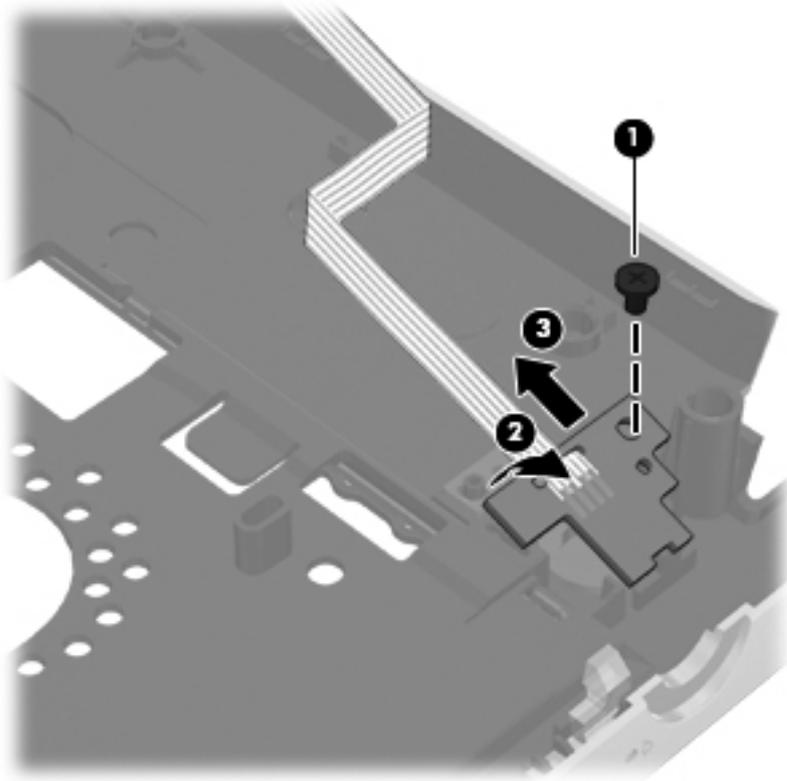
1. Position the top cover upside-down with the front toward you.
2. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the board to the top cover.
3. Remove the tape **(2)** that secures the cable to the top cover.

4. Lift the side of the board (3), slide it out from under the tab, and then remove the board from the top cover (4).



5. Remove the Phillips PM2.0×3.0 screw (1) that secures the board to the top cover.

6. Lift the side of the board (2), slide it out from under the tab, and then remove the board from the top cover (3).



Reverse this procedure to install the Quick Launch board.

## USB board

Description	Spare part number
USB 2.0 board	646360-001

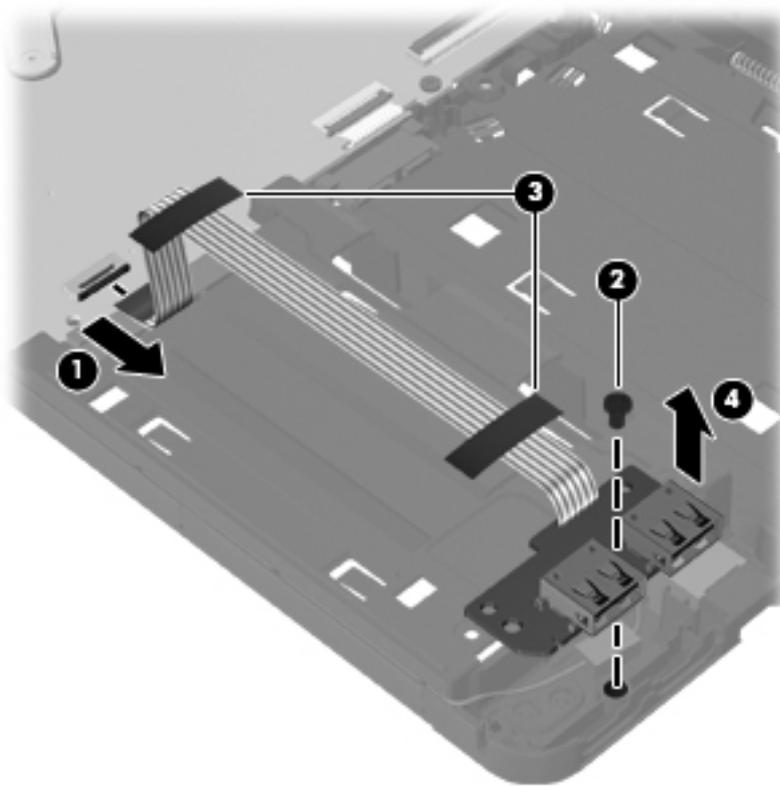
Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))

Remove the USB board:

1. Position the computer upright with the front toward you.
2. Disconnect the USB board cable from the system board **(1)**.
3. Remove the Phillips PM2.5×4.0 screw **(2)** that secures the USB board to the computer.
4. Remove the tape **(3)** that secures the cable to the computer.

5. Lift the board straight up out of the computer (4)



Reverse this procedure to install the USB board.

## System board

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

Description	Spare part number
For use in UMA models with USB 3.0 and WWAN	646325-001
For use in UMA models with USB 3.0 and without WWAN	646326-001
For use in discrete models with USB 3.0 and 512-MB graphics memory	646327-001
For use in discrete models with USB 3.0 and 1-GB graphics memory	646328-001
For use in discrete models with USB 2.0 and 512-MB graphics memory	658334-001
For use in discrete models with USB 2.0 and 1-GB graphics memory	658335-001

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. Modem module (see [Modem module on page 81](#))
  - e. Fan (see [Fan on page 67](#))
  - f. Heat sink (see [Heat sink on page 69](#))
  - g. Keyboard (see [Keyboard on page 64](#))
  - h. Top cover (see [Top cover on page 72](#))

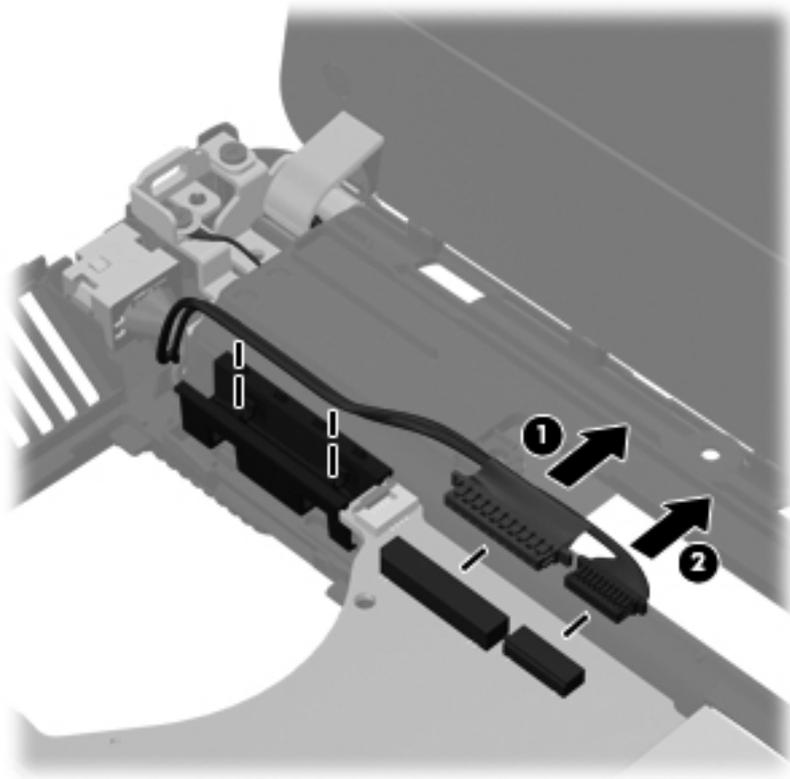
When replacing the system board, be sure to remove the following components from the defective system board and install on the replacement system board:

- SIM (see [SIM on page 49](#))
- Memory module (see [Memory modules on page 55](#))
- WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
- WWAN module (see [WWAN module on page 57](#))
- Modem module (see [Modem module on page 81](#))
- Processor (see [Processor on page 71](#))

Remove the system board:

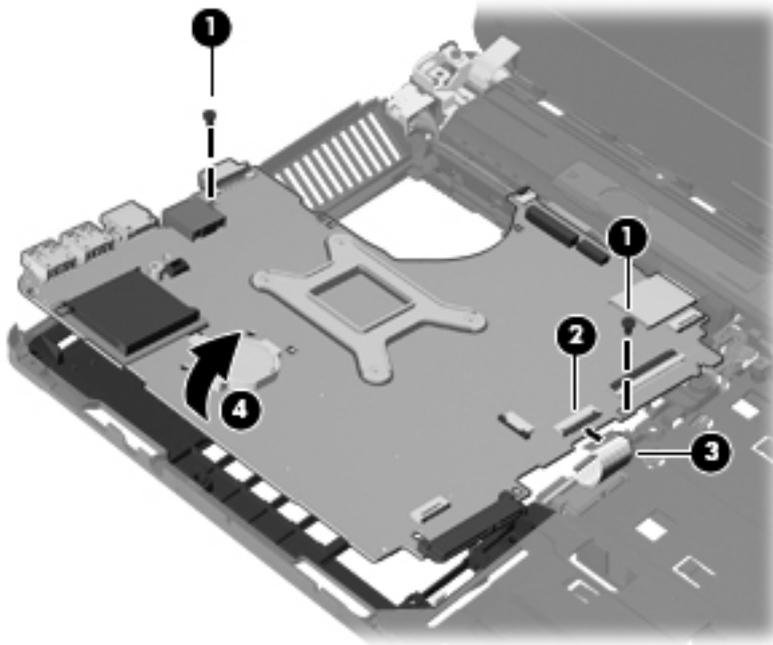
1. Position the computer upright with the front toward you.

2. Disconnect the display cable (1) and webcam cable (2) from the system board.

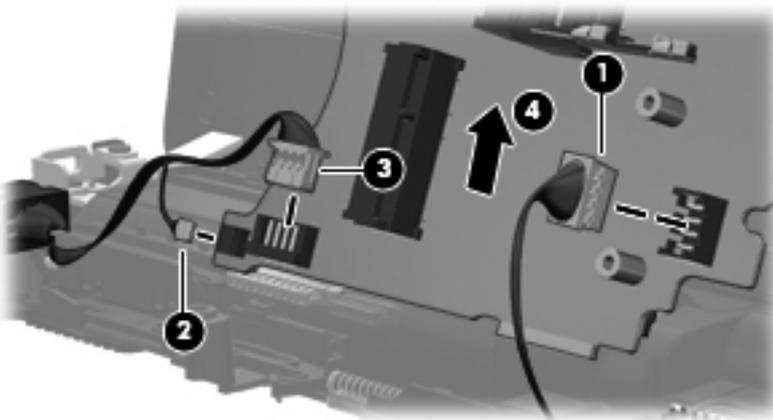


3. Remove the two Phillips PM2.5×4.0 screws (1) that secure the system board to the base enclosure.
4. Lift the optical drive connector latch (2), and then disconnect the optical drive cable (3).

5. Lift the system board up at an angle (4) to gain access to the cables underneath.



6. On the bottom of the system board, disconnect the battery connector cable (1) from the system board.
7. Disconnect the smaller power cable (2) and the larger power cable (3) from the system board.
8. Lift the system board out of the computer (4).



Reverse this procedure to install the system board.

## Card reader board

Description	Spare part number
Card reader board	646361-001

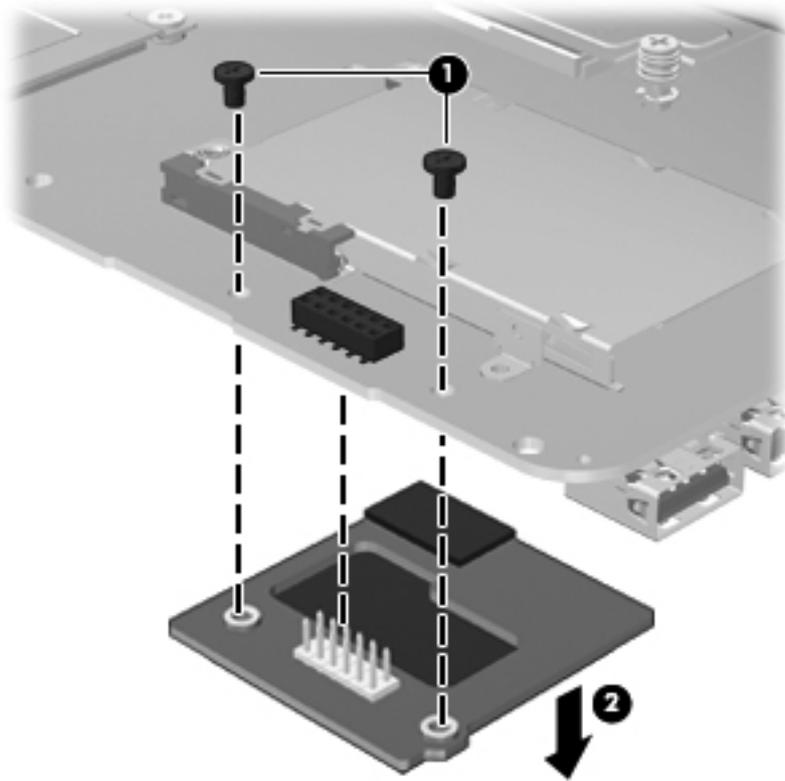
Before removing the card reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))
  - j. System board (see [System board on page 93](#))

Remove the card reader board:

1. Position the system board upside-down.
2. Remove the two Phillips PM2.0×3.0 screws (1) that secure the card reader board to the system board.

3. Pull the card reader board downward **(2)** to disconnect it from the system board connector, and then remove it from the system board.



Reverse this procedure to install the card reader board.

## Power cable

The power cable is included in the Cable Kit, spare part number 646369-001.

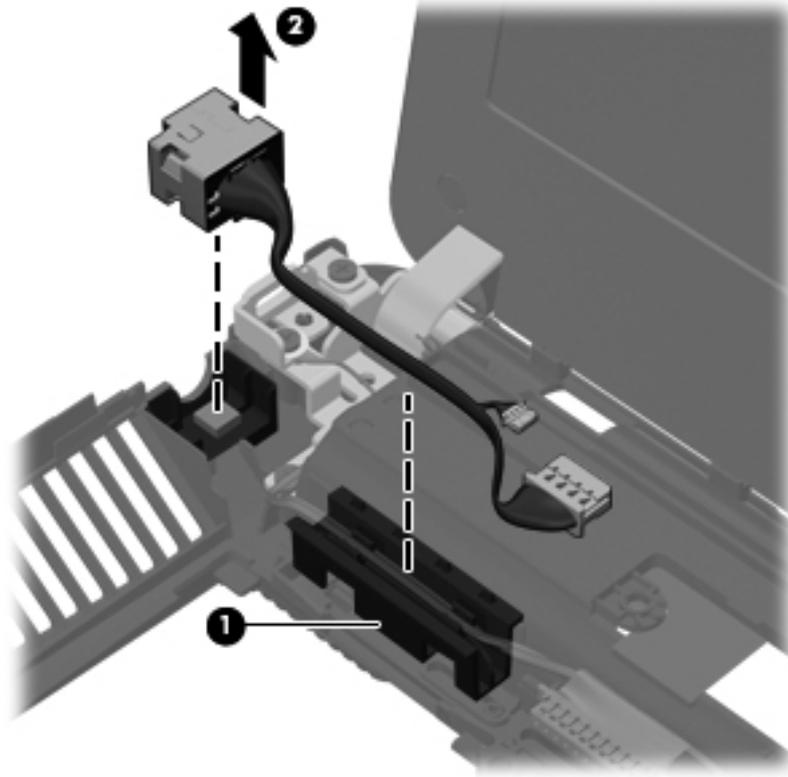
Before removing the power cable, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))
  - j. System board (see [System board on page 93](#))

Remove the power cable:

1. Position the computer upright with the front toward you.
2. Remove the cable from the plastic routing clamp (1).

3. Lift the power cable assembly from the computer (2).



Reverse this procedure to install the power cable.

## Optical drive connector

Description	Spare part number
Optical drive connector	646359-001

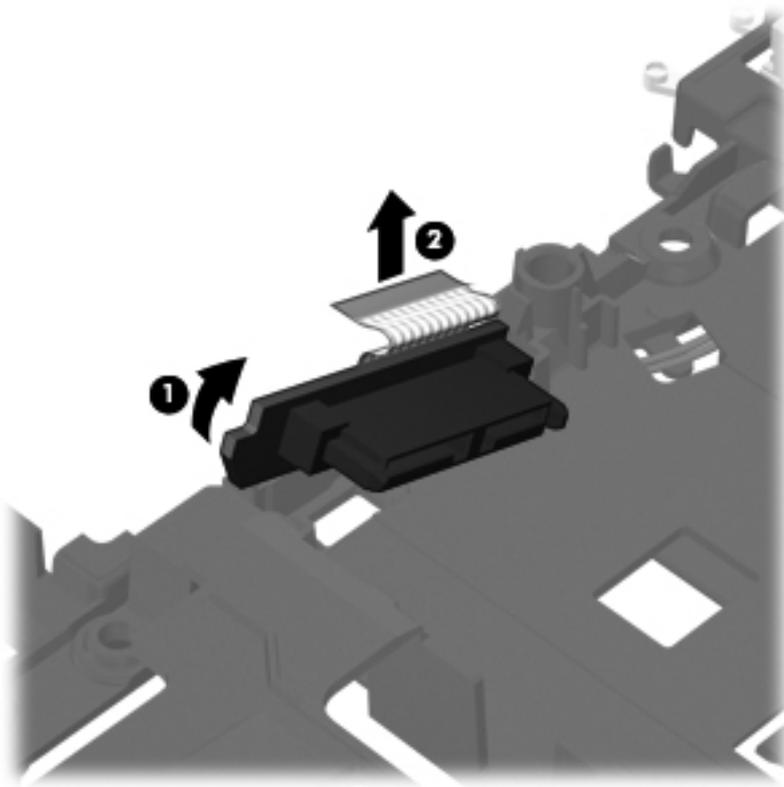
Before removing the optical drive connector, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Keyboard (see [Keyboard on page 64](#))
  - i. Top cover (see [Top cover on page 72](#))
  - j. System board (see [System board on page 93](#))

Remove the optical drive connector:

1. Position the computer upright with the front toward you.
2. Lift the left side of the connector to disengage it from the computer (1).

3. Lift the optical drive connector from the computer (2).



Reverse this procedure to install the optical drive connector.

## Display assembly

All display assemblies include WLAN antenna transceivers and cables. WWAN models include 2 WWAN antenna transceivers and cables.

Description	Spare part number
For use in HP ProBook 4330s/4331s models:	
• 33.8-cm (13.3-inch) HD, Anti-glare, without webcam	646995-001
• 33.8-cm (13.3-inch) HD, Anti-glare, with webcam	646996-001
• 33.8-cm (13.3-inch) HD, BrightView, without webcam	646997-001
• 33.8-cm (13.3-inch) HD, BrightView, with webcam	646998-001
• 33.8-cm (13.3-inch) HD, Anti-glare, with webcam and WWAN	646999-001
• 33.8-cm (13.3-inch) HD, BrightView, with webcam and WWAN	647000-001
For use in HP ProBook 4430s/4431s models:	
• 35.6-cm (14.0-inch), Anti-glare, without webcam	646991-001
• 35.6-cm (14.0-inch), Anti-glare, with webcam	646992-001
• 35.6-cm (14.0-inch), BrightView, without webcam	646993-001
• 35.6-cm (14.0-inch), BrightView, with webcam	646994-001

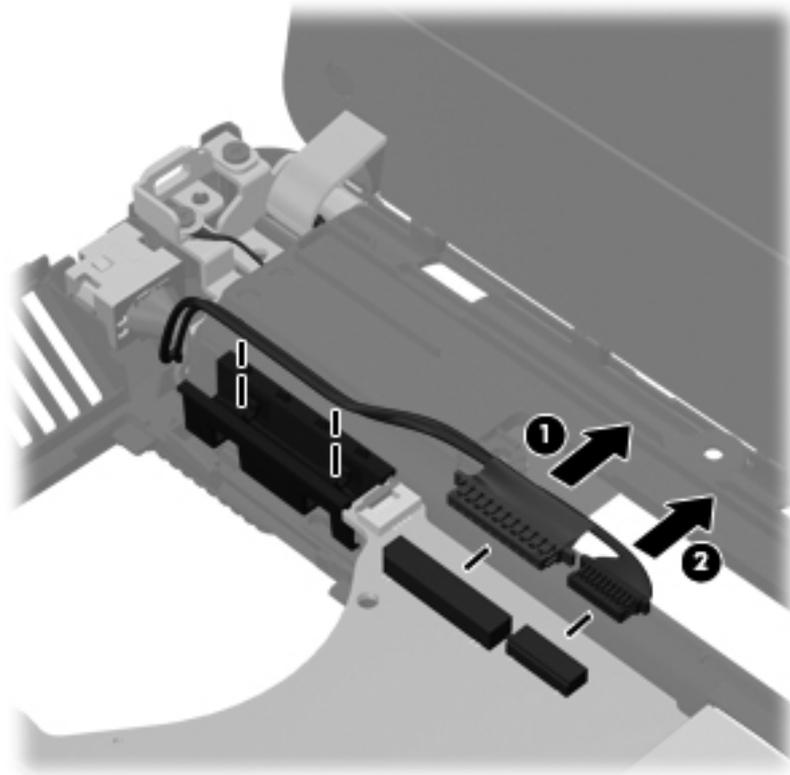
Before removing the display assembly, follow these steps:

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 48](#)).
5. Remove the following components:
  - a. Bottom door (see [Bottom door on page 50](#)).
  - b. Hard drive (see [Hard drive on page 53](#))
  - c. Optical drive (see [Optical drive on page 51](#))
  - d. WLAN module (see [WLAN/Bluetooth combo card on page 59](#))
  - e. WWAN module (see [WWAN module on page 57](#))
  - f. Fan (see [Fan on page 67](#))
  - g. Heat sink (see [Heat sink on page 69](#))
  - h. Modem module (see [Modem module on page 81](#))

- i. Keyboard (see [Keyboard on page 64](#))
- j. Top cover (see [Top cover on page 72](#))

Remove the display assembly:

1. Position the computer upright with the front toward you.
2. Open the computer as far as possible.
3. If necessary, disconnect the display cable (1) and webcam cable (2) from the system board.

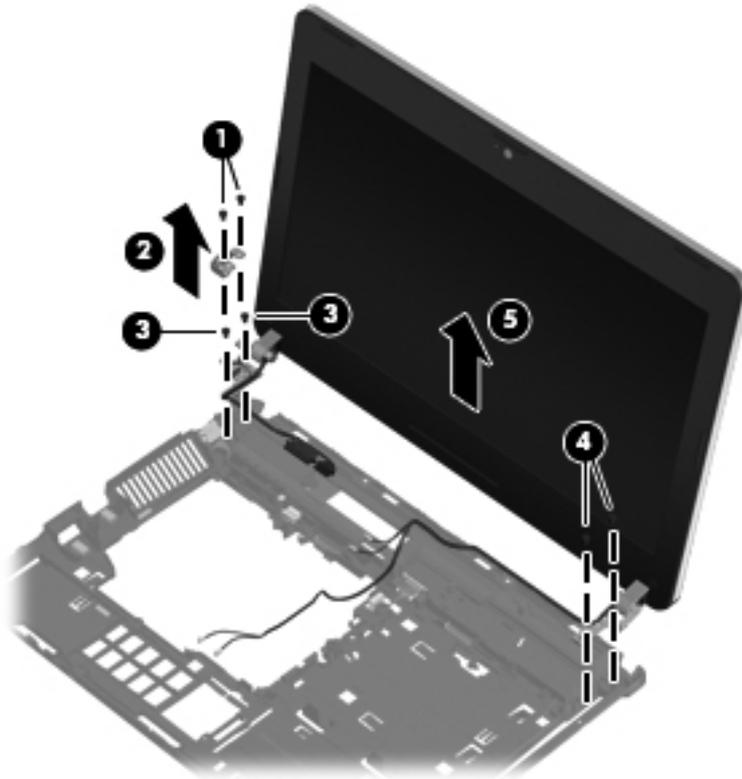


4. Remove the two Phillips PM2.5×4.0 screws (1) that secure the security bracket to the computer, and then lift the security bracket from the computer (2).

The security bracket is available using spare part number 646367-001 for 4330s/4331s models and 646368-001 for 4430s/4431s models.

5. Remove the two Phillips PM2.5×4.0 screws (3) from the left hinge and the Phillips PM2.5×4.0 screw (4) from the right hinge.

6. Lift the display assembly straight up and remove it (5).

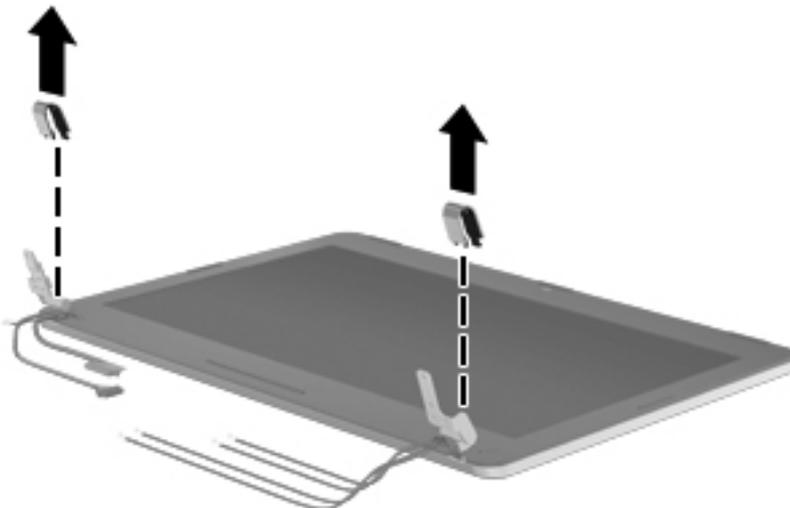


**⚠ CAUTION:** When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

Failure to properly route the antennas can result in degradation of the computer's WLAN and WWAN performance.

7. If you need to remove the hinge covers from the display hinges, pull the hinges straight up and off the display to remove them.

Display hinge covers are available using spare part number 646355-001.



8. To replace the display bezel, remove the two rubber screw covers **(1)** and the two Phillips PM2.5×4.0 screws **(2)** in the bottom corners of the display bezel.
9. Flex the top **(3)** of the bezel, the inside edges of the left and right sides **(4)**, and then the bottom **(5)** of the bezel until it disengages from the display enclosure.

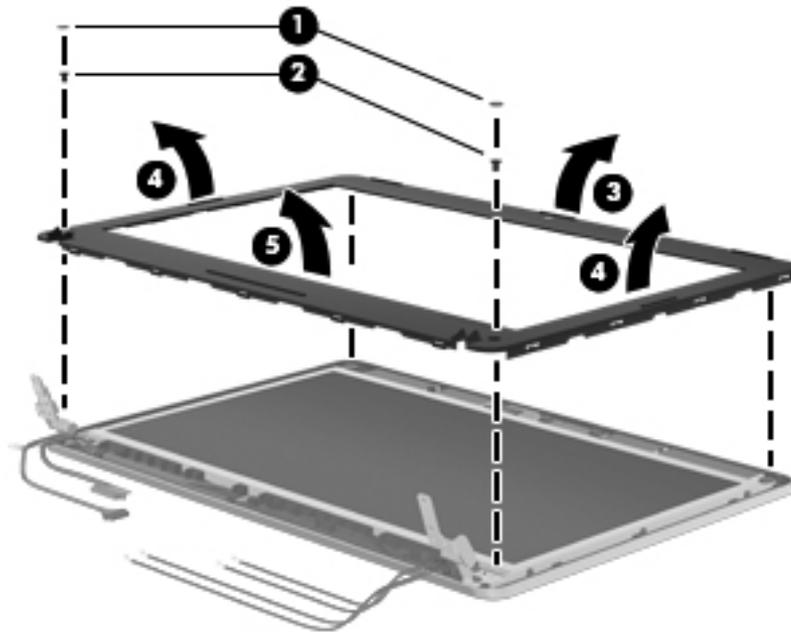
The bezel is available using the following spare part numbers:

646342-001: 4330s/4331s models without a webcam

646343-001: 4330s/4331s models with a webcam

646344-001: 4430s/4431s models without a webcam

646345-001: 4430s/4431s models with a webcam

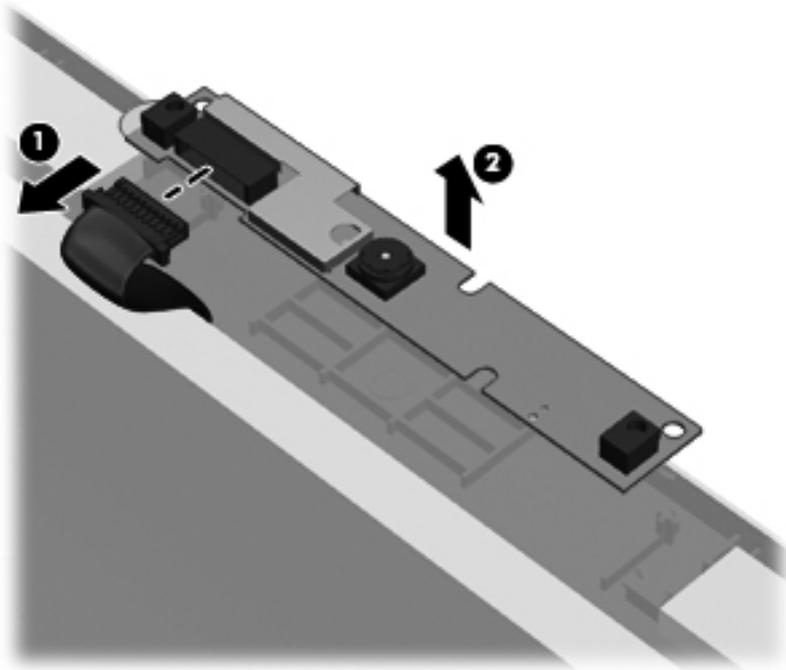


10. Remove the display bezel.

11. If it is necessary to replace the webcam module (shown in the following image) or microphone module from the display enclosure, disconnect the cable from the module **(1)**, and then gently pull the module away from the double-sided tape on the display enclosure **(2)**.

The webcam module is available using spare part number 642795-001.

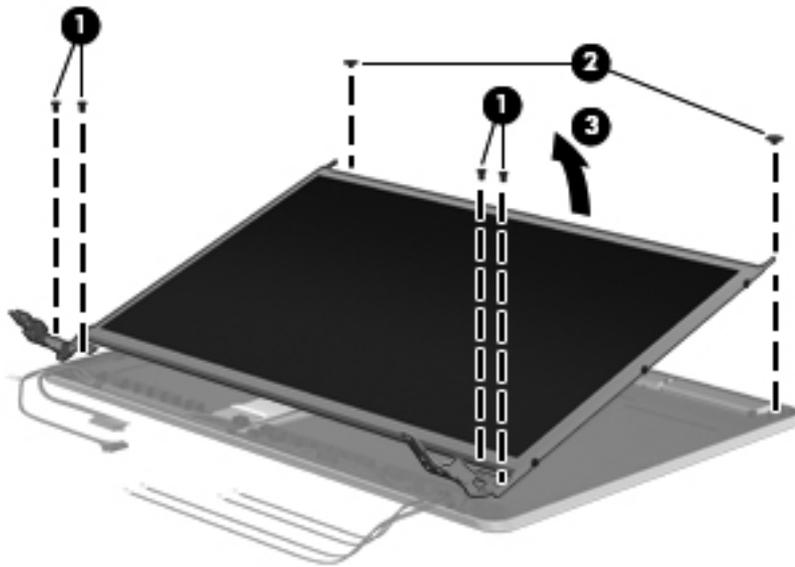
The microphone module is removed using the same procedure and is available using spare part number 642797-001.



12. If it is necessary to replace the display panel, remove the four Phillips PM2.5×4.0 screws **(1)** at the bottom and two Phillips PM2.5×2.5 broadhead screws **(2)** at the top that secure the panel to the display enclosure.
13. Rotate the top of the panel upward **(3)**.

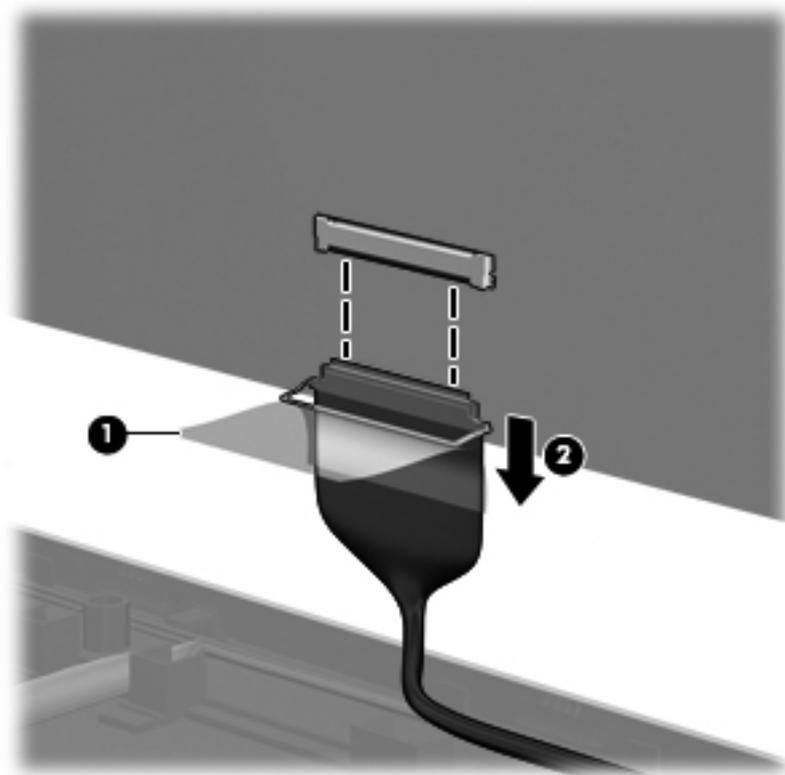
The display panel is available using the following spare part numbers:

- 646374-001: 33.8-cm (13.3-inch), anti-glare
- 646990-001: 33.8-cm (13.3-inch), Brightview
- 646375-001: 35.6-cm (14.0-inch), anti-glare
- 646989-001: 35.6-cm (14.0-inch), BrightView



14. Disconnect the display panel cable from the back of the display panel by lifting the tape over the connector (1), and then disconnecting the cable from the panel (2).

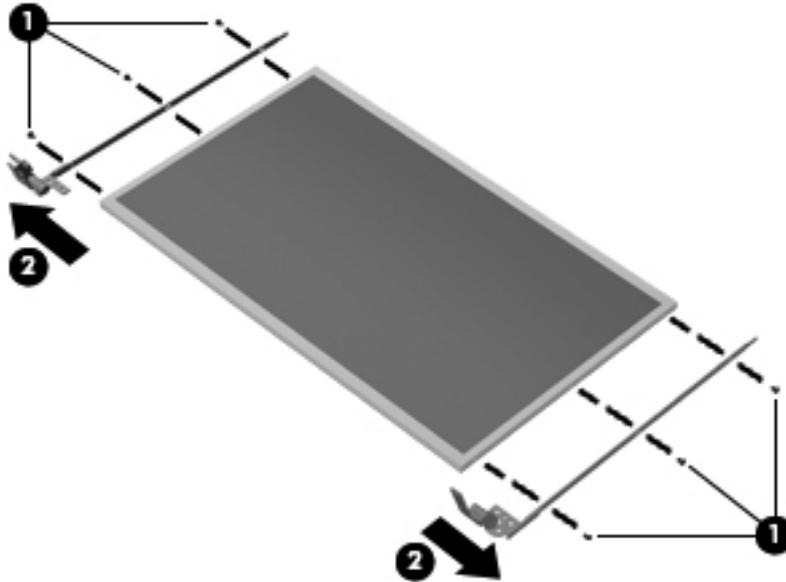
The display cable is available using spare part number 605766-001.



15. If it is necessary to replace the display hinges, remove the three Phillips PM2.0×3.0 screws (1) that secure each display hinge to the display panel.

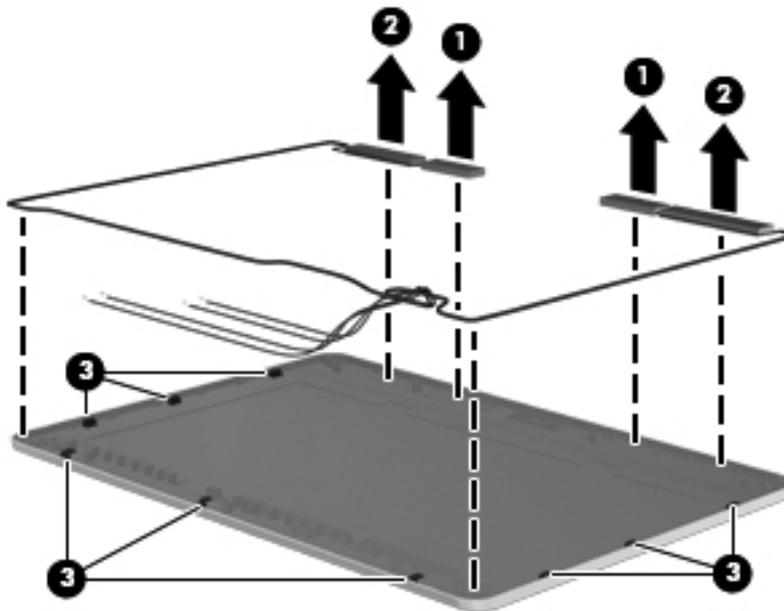
16. Remove the display hinges (2).

Display hinges are available using spare part number 646354-001.



17. If you need to remove the WLAN or WWAN antennas, lift the WLAN antenna cables (1) or WWAN antenna cables (2) from the clips and routing paths (3) built into the display enclosure.

The WLAN antennas are available using spare part number 646352-001, and the WWAN antennas are available using spare part number 646353-001.

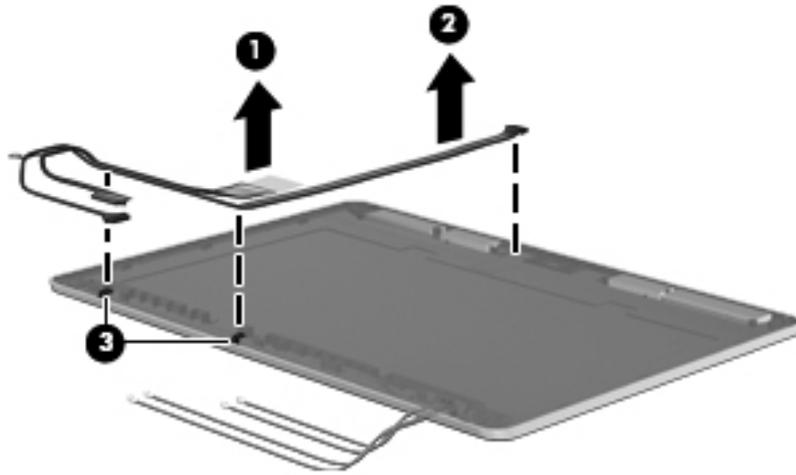


**⚠ CAUTION:** When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

Failure to properly route the antennas can result in degradation of the computer's wireless performance.

18. To remove the display cable (1) or webcam cable (2) from the display enclosure, remove the cable from the clips (3) and routing paths in the display enclosure.

The display cable is available using spare part number 605766-001. The webcam cable is available using spare part number 646275-001.



Reverse this procedure to reassemble and install the display assembly.

---

# 5 Computer Setup (BIOS) and System Diagnostics

## Using Computer Setup

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

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

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## Starting Computer Setup

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 **NOTE:** An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

---

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Computer Setup.

## Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
  - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press **enter**, or use a pointing device to click the item.
  - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.
  - To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

---

 **NOTE:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

---

2. Press **f10** to enter Computer Setup.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

Click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press [enter](#).

- To save your changes and exit Computer Setup menus:

Click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

## Restoring factory settings in Computer Setup



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**NOTE:** Restoring defaults will not change the hard drive mode.

---

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.



---

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

---

## Updating the BIOS

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

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

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

### Determining the BIOS version

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

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

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

### Downloading a BIOS update

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

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

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

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

1. Select **Start > Help and Support > Maintain**.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
  - a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
  - b. Follow the on-screen instructions to download your selection to the hard drive.

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

---

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

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

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

The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

---

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

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## Using System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in System Diagnostics:

- **Start-up test**—This test analyzes the main computer components that are required to start the computer.
- **Run-in test**—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- **Hard disk test**—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- **Memory test**—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- **Battery test**—This test analyzes the condition of the battery. If the battery fails the test, contact HP Customer Support to report the issue and purchase a replacement battery.

You can also view system information and error logs in the System Diagnostics window.

To start System Diagnostics:

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

---

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

---

# 6 Specifications

## Computer specifications

	Metric	U.S.
<b>Dimensions</b>		
Length	23.5 cm	9.3 in
Width	33.0 cm	13.0 in
Height (front to rear)	2.8 to 3.5 cm	1.1 to 1.4 in
<b>Weight</b> (equipped with optical drive, 1 SODIMM, hard drive, WLAN module, 6 cell battery)	2.1 kg	4.6 lbs
<b>Input power</b>		
Operating voltage	19.0 V dc @ 4.74 A – 90 W or 18.5 V dc @ 3.5 A - 65 W	
Operating current	4.74 A or 3.5 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 (14.7 to 10.1 psia)	-15 m to 3,048 m	50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
<b>Shock</b>		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
<b>Random vibration</b>		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	

	Metric	U.S.
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	

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

## 33.8-cm (13.3-in), HD display specifications

	Metric	U.S.
Active diagonal size	33.8-cm	13.3-in
Resolution	1366x768 (HD)	
Active area	293.38x165.02	
PPI	118	
Surface treatment	Anti-glare or BrightView	
Contrast ratio	300:1 (typical) – Anti-glare 500:1 – BrightView	
Response time	16 ms	
Brightness	200 nits (typical)	
Viewing angle	SVA	
Backlight	LED	
Luminance uniformity @ 13 points	1.4 (typ), 1.6 (max)	
Lifetime (1/2 luminance)	12,000 hours	
Color coordinate (white)	(0.313, 0.329)	
Color tolerance (white)	+/- 0.02	
Color tolerance (R, G, B)	+/- 0.03	
Color gamut	45% NTSC @CIE1931	

## 35.6-cm (14.0-in), HD display specifications

	<b>Metric</b>	<b>U.S.</b>
Active diagonal size	35.6-cm	14.0-in
Resolution	1366x768 (HD)	
Active area	309.399x173.952	
PPI	112	
Surface treatment	Anti-glare or BrightView	
Contrast ratio	300:1 (typical) – Anti-glare 500:1 – BrightView	
Response time	8 ms	
Brightness	200 nits (typical)	
Viewing angle	SVA	
Backlight	LED	
Luminance uniformity @ 13 points	1.4 (typ), 1.6 (max)	
Lifetime (1/2 luminance)	12,000 hours	
Color coordinate (white)	(0.313, 0.329)	
Color tolerance (W, R, G, B)	+/- 0.03	
Color gamut	45% typ	

## Hard drive specifications

	750-GB*	640-GB*	500-GB*	320-GB*	250-GB*
<b>Dimensions</b>					
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	115 g	101 g	101 g	101 g	101 g
<b>Interface type</b>	SATA	SATA	SATA	SATA	SATA
<b>Transfer rate</b>	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
<b>Security</b>	ATA security	ATA security	ATA security	ATA security	ATA security
<b>Seek times</b> (typical read, including setting)					
Single track	1.5 ms	2 ms	3 ms	3 ms	3 ms
Average	11 ms	12 ms	13 ms	13 ms	13 ms
Maximum	14 ms	22 ms	24 ms	24 ms	24 ms
<b>Logical blocks</b>	1,465,149,168	1,250,263,728	1,048,576,000	625,141,400	488,397,168
<b>Disc rotational speed</b>	7200 rpm or 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. Actual drive specifications may differ slightly.					
<b>NOTE:</b> Certain restrictions and exclusions apply. Contact technical support for details.					

# Blu-ray BD-R/RE DVD±RW SuperMulti DL Drive

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, BD-ROM, BD-R, BD-RE	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, BD-R, BD-RE	
Access time	CD	DVD	BD-ROM
Random	<180 ms	<180 ms	<230 ms
Maximum Media Capacity (read)	50 GB		
Maximum Media Capacity (write)	8.5 GB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		
2X BD-ROM	9,000 KB/sec		
16X CD-R	3,600 KB/sec		
16X CD-RW	2,400 KB/sec		
8X DVD+R	10,800 KB/sec		
6X DVD+RW	8,100 KB/sec		
8X DVD-R	10,800 KB/sec		
6X DVD-RW	8,100 KB/sec		
4X DVD+R Dual Layer	5,400 KB/sec		
4X DVD-R Dual Layer	5,400 KB/sec		
5X DVD-RAM	6,750 KB/sec		
2X BD-R	9,000 KB/sec		
2X BD-RE	9,000 KB/sec		

# DVD±RW and CD-RW SuperMulti DL 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
<b>Center hole diameter</b>	1.5 cm (0.59 in)	
<b>Disc diameter</b>		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
<b>Disc thickness</b>	1.2 mm (0.047 in)	
<b>Track pitch</b>	0.74 µm	
<b>Access time</b>	<b>CD</b>	<b>DVD</b>
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
<b>Audio output level</b>	Line-out, 0.7 Vrms	
<b>Cache buffer</b>	2 MB	
<b>Data transfer rate</b>		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
<b>Transfer mode</b>	Multiword DMA Mode	
<b>Startup time</b>	< 15 seconds	
<b>Stop time</b>	< 6 seconds	

# Blu-ray ROM DVD±RW SuperMulti DL Drive

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	
Access time	CD	DVD	HD
Random	170 ms	170 ms	230 ms
Cache buffer	8 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		
1X BD-ROM	4,500 KB/sec		
1X BD-R read	4,500 KB/sec		
1X BD-RE read	4,500 KB/sec		
Transfer mode	Multiword DMA Mode		

## DVD-ROM Drive specifications

<b>Applicable disc</b>	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18, CD-ROM (Mode 1 and 2), CD Digital Audio, CD-XA ready (Mode 2, Form 1 and Form 2), CD-I (Mode 2, Form 1 and Form 2), CD-R, CD-RW, Photo CD (single and multisession), CD-Bridge	
<b>Center hole diameter</b>	1.5 cm (0.59 in)	
<b>Disc diameter</b>		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
<b>Disc thickness</b>	1.2 mm (0.047 in)	
<b>Track pitch</b>	0.74 $\mu$ m	
<b>Access time</b>	<b>CD</b>	<b>DVD</b>
Random	< 100 ms	< 125 ms
Full stroke	< 175 ms	< 225 ms
<b>Audio output level</b>	Line-out, 0.7 Vrms	
<b>Cache buffer</b>	512 KB	
<b>Data transfer rate</b>		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	
<b>Startup time</b>	< 10 seconds	
<b>Stop time</b>	< 3 seconds	

# Specification information in Device Manager

Device Manager allows you to view and control the hardware attached to the computer, as well as provides hardware specification information.

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



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**NOTE:** Windows 7 and Windows Vista include the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Windows Help and Support for more information.

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After you open Device Manager, drill-down to a device and double-click it to access its properties.

## To access Device Manager in Windows 7:

1. Select **Start > Computer > System properties**.
2. In the left pane, click **Device Manager**.

## To access Device Manager in Windows Vista:

1. Select **Start > Computer > System properties**.
2. In the left pane, click **Device Manager**.

## To access Device Manager in Windows XP:

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

---

# 7 Backup and recovery

## Windows 7

- [Backing up your information](#)
- [Performing a system recovery](#)

To protect your information, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive (select models only), create system repair discs (select models only) by using the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

Windows Backup and Restore provides the following options:

- Creating a system repair disc (select models only) by using the installed optical drive (select models only) or an optional external optical drive
- Backing up your information
- Creating a system image (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools



**NOTE:** For detailed instructions, perform a search for these topics in Help and Support.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.



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

---

## Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair discs (select models only) by using the installed optical drive (select models only) or an optional external optical drive, and your initial backup 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. The system repair discs (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear 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.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer or the type of external optical drive you are using.

---

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

---

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

To create a backup using Backup and Restore:

---

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

---

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

---

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create a system repair disc (select models only).

## Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

---

 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 127](#).

---

## Using the Windows recovery tools

To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.

To recover your information using Startup Repair, follow these steps:

---

 **CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

---

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition and the HP Recovery partition.

To check for the Windows partition, select **Start > Computer**.

To check for the HP Recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

---

 **NOTE:** If the Windows partition and the HP Recovery partition are not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 127](#).

---

3. If the Windows partition and the HP Recovery partition are listed, restart the computer, and then press **F8** before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.

---

 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

---

## Using f11 recovery tools

---

 **CAUTION:** Using **F11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **F11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

---

To recover the original hard drive image using **F11**:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

---

 **NOTE:** If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 127](#).

---

3. If the HP Recovery partition is listed, restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

## Using a Windows 7 operating system DVD (purchased separately)

To order a Windows 7 operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

---

 **CAUTION:** Using a Windows 7 operating system DVD completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

---

To initiate recovery using a Windows 7 operating system DVD:

---

 **NOTE:** This process takes several minutes.

---

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

# Windows Vista

To protect your information, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

The Backup and Restore Center provides the following options:

- Backing up individual files and folders
- Backing up the entire hard drive (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools

---

 **NOTE:** For detailed instructions, perform a search for these topics in Help and Support.

 **NOTE:** In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

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

---

## Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup 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.

You can back up your information to an optional external hard drive, a network drive, or discs.

Note the following when backing up:

- Store personal files in the Documents folder, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear 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.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

---

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

---

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

To create a backup using Backup and Restore Center:

---

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

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

---

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to back up your entire computer (select models only) or your files.

## Performing a recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use the Backup and Restore Center to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

---

 **NOTE:** If you are unable to boot (start up) your computer, you must purchase a Windows Vista® operating system DVD to reboot the computer and repair the operating system. For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 130](#).

---

## Using the Windows recovery tools

To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to recover your entire computer (select models only) or your files.

To recover your information using Startup Repair, follow these steps:

---

 **CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

---

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition and the HP Recovery partition. To find the partitions, select **Start > Computer**.

---

 **NOTE:** If the Windows partition and the HP Recovery partition have been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 130](#).

---

3. Restart the computer, and then press **f8** before the Windows operating system loads.

4. Select **Repair your computer**.
5. Follow the on-screen instructions.

 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

---

## Using f11 recovery tools

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled. Personal files must be restored from a backup.

 **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.

---

To recover the original hard drive image using **f11**, follow these steps:

1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

 **NOTE:** If the HP Recovery partition has been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 130](#).

---

3. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

## Using a Windows Vista operating system DVD (purchased separately)

To order a Windows Vista operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

 **CAUTION:** Using a Windows Vista operating system DVD completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

---

To initiate recovery using a Windows Vista operating system DVD:



---

**NOTE:** This process takes several minutes.

---

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows Vista operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

---

## 8 Power cord set requirements

The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 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 and regions must meet the requirements of the country or region where the computer is used.

### Requirements for all countries and regions

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

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

## Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
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.

---

## 9 Recycling

### Battery

When a battery has reached the end of its useful life, do not dispose of the battery in general household waste. Follow the local laws and regulations in your area for computer battery disposal.

### Display

- 
- ⚠ **WARNING!** The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.
  - ⚠ **CAUTION:** The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the LCD panel and the backlight. When you remove these components, handle them carefully.
  - 📄 **NOTE: Materials Disposal.** This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at <http://www.eiae.org>.
- 

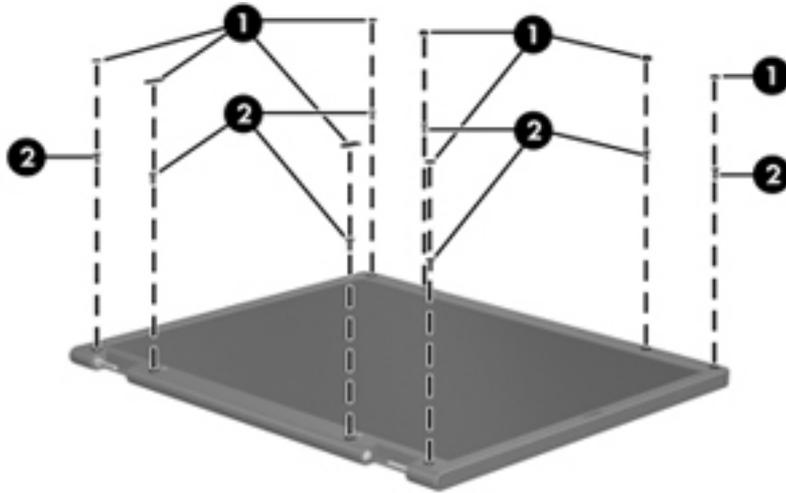
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



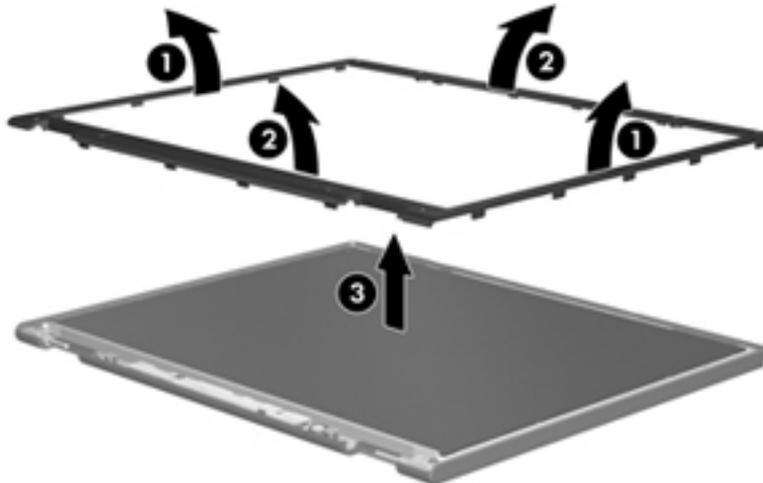
- 
- 📄 **NOTE:** The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.
-

Perform the following steps to disassemble the display assembly:

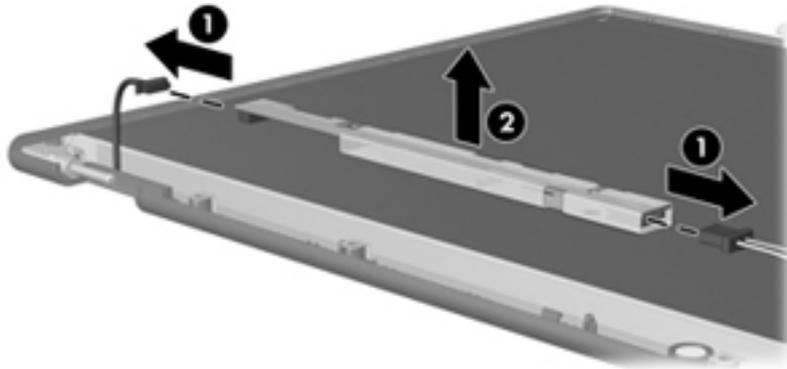
1. Remove all screw covers (1) and screws (2) that secure the display bezel to the display assembly.



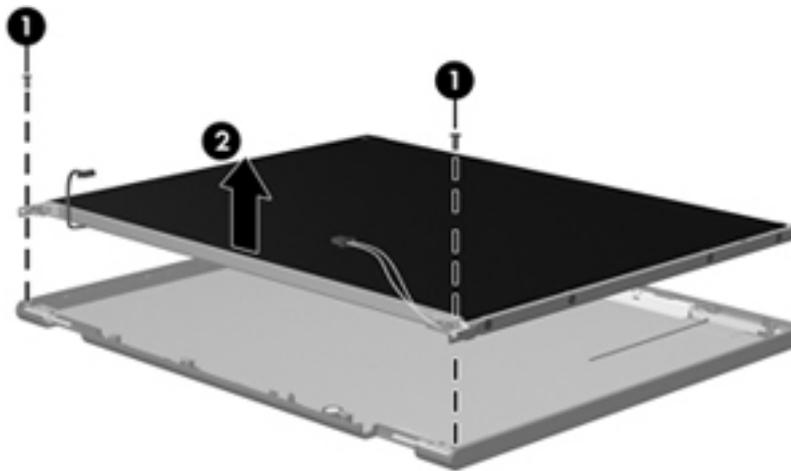
2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel (3).



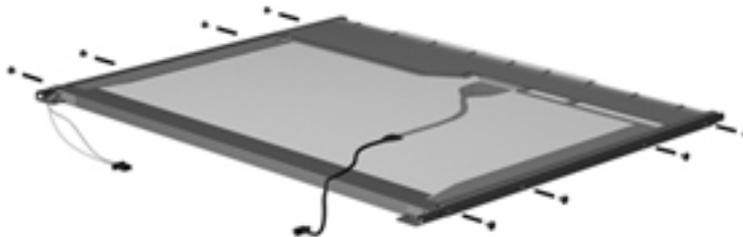
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter (2).



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

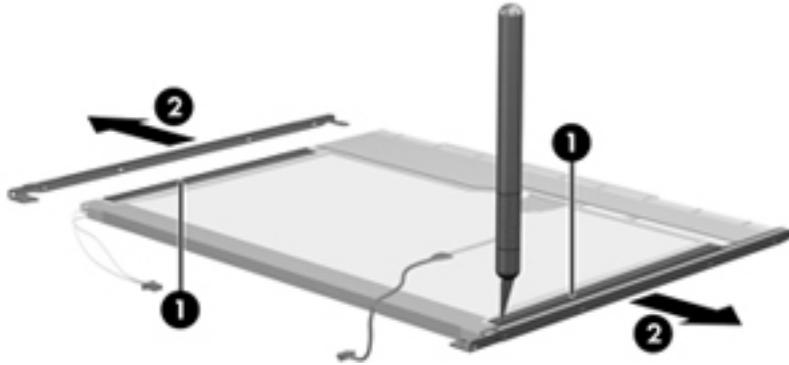


7. Position the display panel assembly upside-down.
8. Remove all screws that secure the display panel frame to the display panel.

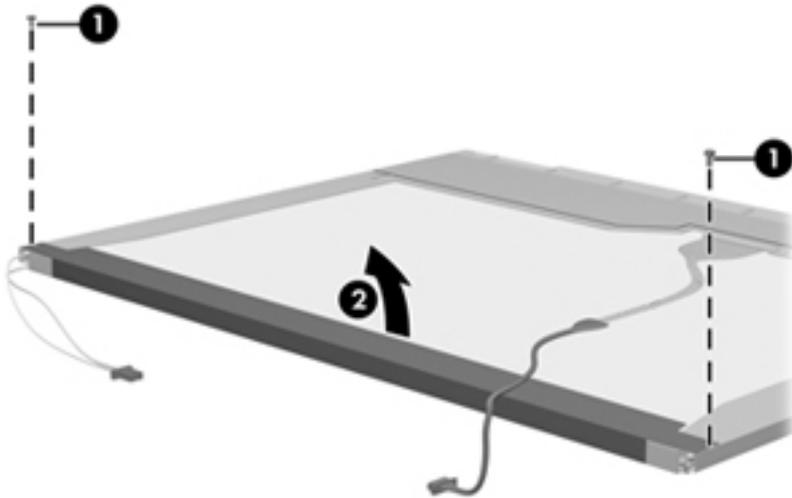


9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

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

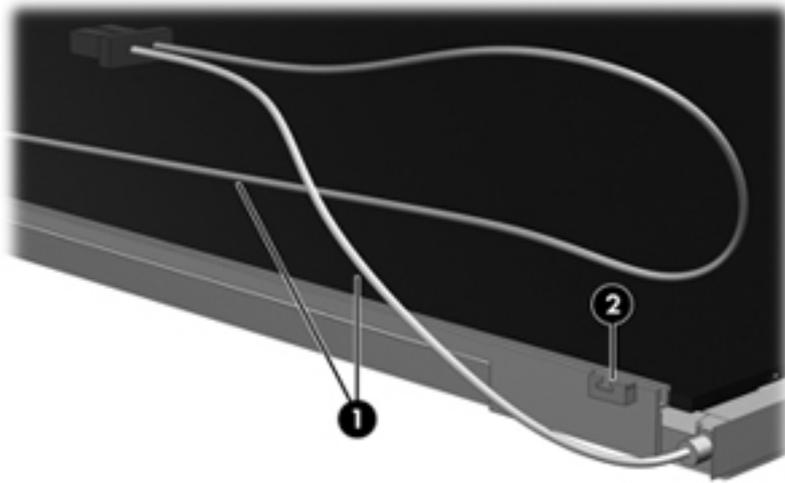


11. Remove the screws (1) that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover (2) and swing it outward.



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

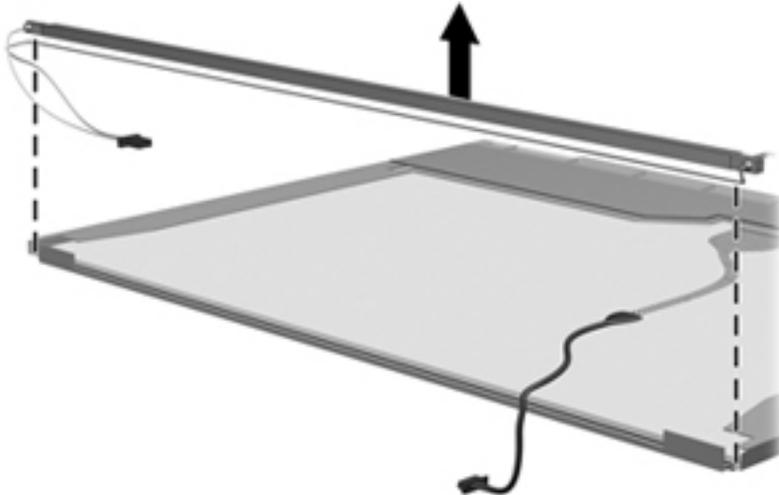
15. Remove the backlight cables (1) from the clip (2) in the display panel.



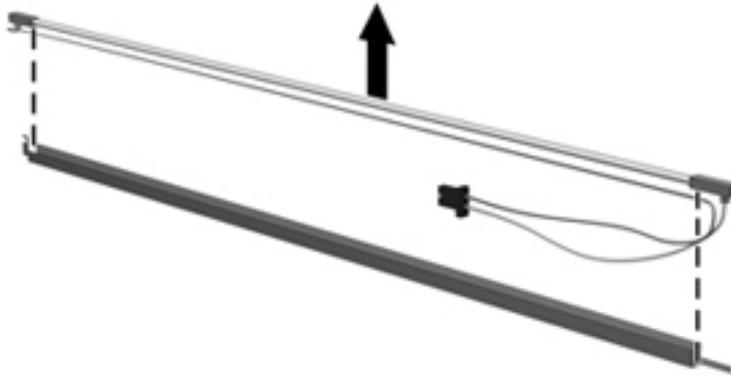
16. Position the display panel upside-down.

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

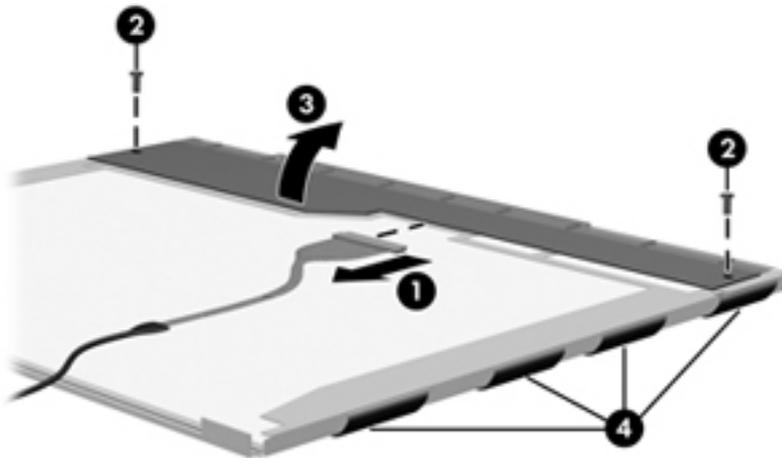
17. Remove the backlight frame from the display panel.



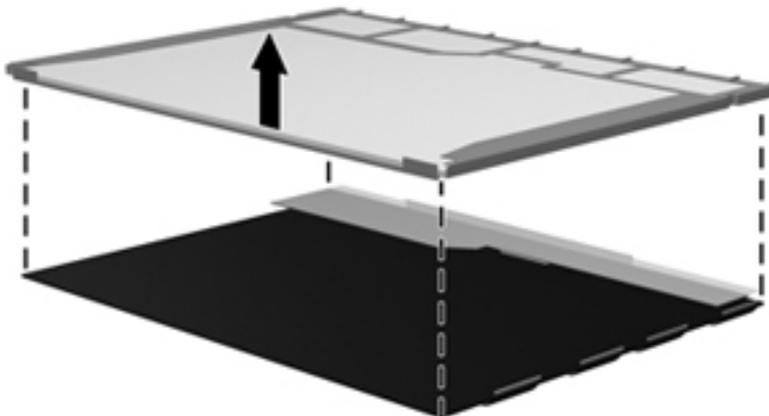
18. Remove the backlight from the backlight frame.



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



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

---

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