Safety warning notice

⚠️ **WARNING!** To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).
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<th>Description</th>
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<tr>
<td><strong>Product Name</strong></td>
<td>HP ProBook 4230s Notebook PC</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Intel® Core™ i7 processor, Dual Core</td>
</tr>
<tr>
<td></td>
<td>2620M, 2.70-GHz (Turbo up to 3.40-MHz) processor 4-MB L3 cache, 4 threads</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5 processors, Dual Core</td>
</tr>
<tr>
<td></td>
<td>2540M, 2.60-GHz (Turbo up to 3.30-MHz) processor 3-MB L3 cache, 4 threads</td>
</tr>
<tr>
<td></td>
<td>2520M, 2.50-GHz (Turbo up to 3.20-MHz) processor 3-MB L3 cache, 4 threads</td>
</tr>
<tr>
<td></td>
<td>2430M, 2.40-GHz (Turbo up to 3.0-MHz) processor 3-MB L3 cache, 4 threads</td>
</tr>
<tr>
<td></td>
<td>2410M, 2.30-GHz (Turbo up to 2.90) processor 3-MB L3 cache, 4 threads</td>
</tr>
<tr>
<td></td>
<td>Intel Core i3 processors, Dual Core</td>
</tr>
<tr>
<td></td>
<td>2350M, 2.30-GHz processor 3-MB L3 cache</td>
</tr>
<tr>
<td></td>
<td>2330M, 2.20-GHz processor 3-MB L3 cache</td>
</tr>
<tr>
<td></td>
<td>2310M, 2.10-GHz processor 3-MB L3 cache</td>
</tr>
<tr>
<td></td>
<td>Intel Pentium Dual-Core processors</td>
</tr>
<tr>
<td></td>
<td>B940, 2.1-GHz processor 2-MB L3 cache, 2 threads</td>
</tr>
<tr>
<td></td>
<td>B910, 2.0-GHz processor 2-MB L3 cache, 2 threads</td>
</tr>
<tr>
<td></td>
<td>Intel Celeron processors</td>
</tr>
<tr>
<td></td>
<td>B840, 1.90-GHz processor 2-MB L3 cache, 2 threads</td>
</tr>
<tr>
<td></td>
<td>B810, 1.60-GHz processor 2-MB L3 cache, 2 threads</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>Mobile Intel HM65 chipset</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>Intel HD Graphics 3000 (UMA)(non-Celeron)</td>
</tr>
<tr>
<td></td>
<td>Intel HD Graphics (Celeron only)</td>
</tr>
<tr>
<td></td>
<td>Integrated with shared video memory, dynamically allocated</td>
</tr>
<tr>
<td><strong>Panel</strong></td>
<td>All display assemblies include 2 wireless local area network (WLAN) antennas</td>
</tr>
<tr>
<td></td>
<td>All displays are LED backlit</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, 1280x800, anti-glare</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, 1280x800 with camera, anti-glare</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Category</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, 1280x800 with camera and WWAN, anti-glare</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, 1280x800, BrightView</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, 1280x800 with camera, BrightView</td>
</tr>
<tr>
<td></td>
<td>Support privacy filter</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Two customer-accessible/upgradeable memory module slots supporting up to 8 GB of RAM</td>
</tr>
<tr>
<td></td>
<td>Supports dual-channel memory</td>
</tr>
<tr>
<td></td>
<td>PC3-10600, 1333-MHz, DDR3</td>
</tr>
<tr>
<td></td>
<td>Supports the following configurations:</td>
</tr>
<tr>
<td></td>
<td>* 8192 (4096 × 2)</td>
</tr>
<tr>
<td></td>
<td>* 4096 (2048 × 2)</td>
</tr>
<tr>
<td></td>
<td>* 4096 (4096 × 1)</td>
</tr>
<tr>
<td></td>
<td>* 3072 (2048 + 1024)</td>
</tr>
<tr>
<td></td>
<td>* 2048 (2048 × 1)</td>
</tr>
<tr>
<td></td>
<td>* 2048 (1024 × 2)</td>
</tr>
<tr>
<td></td>
<td>* 1024 (1024 × 1) (not available with 64-bit operating system or Restore Media)</td>
</tr>
<tr>
<td><strong>Hard drives</strong></td>
<td>Supports 9.5-mm or 7-mm, 6.35-cm (2.50-in) SATA hard drives with HP DriveGuard</td>
</tr>
<tr>
<td></td>
<td>Customer-accessible</td>
</tr>
<tr>
<td></td>
<td>Supports the following drives:</td>
</tr>
<tr>
<td></td>
<td>* 750-GB, 7200-rpm</td>
</tr>
<tr>
<td></td>
<td>* 500-GB, 7200-rpm</td>
</tr>
<tr>
<td></td>
<td>* 320-GB, 7200-rpm</td>
</tr>
<tr>
<td></td>
<td>* 250-GB, 7200-rpm</td>
</tr>
<tr>
<td></td>
<td>* 640-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td>* 500-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td>* 320-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td>* 250-GB, 5400-rpm</td>
</tr>
<tr>
<td><strong>Audio/Visual</strong></td>
<td>Integrated dual-array microphone (webcam models only)</td>
</tr>
<tr>
<td></td>
<td>Integrated microphone (non-webcam models)</td>
</tr>
<tr>
<td></td>
<td>Stereo speakers (2)</td>
</tr>
<tr>
<td></td>
<td>Integrated webcam (720p HD), fixed focus</td>
</tr>
<tr>
<td></td>
<td>Supports no camera option</td>
</tr>
<tr>
<td><strong>Modem</strong></td>
<td>56K V.92 MDC data/fax modem</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Modem</td>
<td>Cable not included</td>
</tr>
<tr>
<td></td>
<td>Supports “No Modem” option</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Realtek RTL8151EH-CG 10/100/1000</td>
</tr>
<tr>
<td></td>
<td>S3/S4/S5 wake on LAN</td>
</tr>
<tr>
<td></td>
<td>Ethernet cable not included</td>
</tr>
<tr>
<td>Wireless</td>
<td>Integrated WLAN options by way of wireless module:</td>
</tr>
<tr>
<td></td>
<td>Two WLAN antennas built into display assembly</td>
</tr>
<tr>
<td></td>
<td>Supports “no WLAN” option</td>
</tr>
<tr>
<td></td>
<td>Supports the following WLAN formats:</td>
</tr>
<tr>
<td></td>
<td>● Ralink 802.11 b/g/n 1×1</td>
</tr>
<tr>
<td></td>
<td>● Realtek 802.11 b/g/n 1×1</td>
</tr>
<tr>
<td></td>
<td>● Atheros 802.11 b/g/n +BT Combo</td>
</tr>
<tr>
<td></td>
<td>● Ralink 802.11 a/b/g/n +BT Combo</td>
</tr>
<tr>
<td></td>
<td>● Realtek 802.11 b/g/n +BT Combo</td>
</tr>
<tr>
<td></td>
<td>● Intel 802.11 a/b/g/n 2×2 +BT Combo</td>
</tr>
<tr>
<td></td>
<td>Integrated WWAN options by way of wireless module:</td>
</tr>
<tr>
<td></td>
<td>Two WWAN antennas built into display assembly (world-wide 5 band, configured with panels on all units)</td>
</tr>
<tr>
<td></td>
<td>Subscriber identity module (SIM) security (customer-accessible in battery bay)</td>
</tr>
<tr>
<td></td>
<td>Supports “no WWAN” option</td>
</tr>
<tr>
<td></td>
<td>Qualcomm Gobi 3000 HSPA/CDMA with GPS</td>
</tr>
<tr>
<td></td>
<td>Integrated personal area network (PAN) options by way of Bluetooth® module:</td>
</tr>
<tr>
<td></td>
<td>Bluetooth 3.0 only supported by combo card</td>
</tr>
<tr>
<td>External media card</td>
<td>6-in-1 Digital Media Reader Slot</td>
</tr>
<tr>
<td>Ports</td>
<td>Audio-in (stereo microphone)</td>
</tr>
<tr>
<td></td>
<td>Audio-out (stereo headphone)</td>
</tr>
<tr>
<td></td>
<td>RJ-11 (modem)</td>
</tr>
<tr>
<td></td>
<td>RJ-45 (Ethernet, includes link and activity lights)</td>
</tr>
<tr>
<td></td>
<td>USB 3.0 (1)</td>
</tr>
<tr>
<td></td>
<td>USB 2.0 + power port</td>
</tr>
<tr>
<td></td>
<td>USB 2.0 (1)</td>
</tr>
<tr>
<td></td>
<td>VGA (Dsub 15-pin) supporting 1600 × 1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)</td>
</tr>
<tr>
<td></td>
<td>HDMI</td>
</tr>
<tr>
<td></td>
<td>Multi-pin AC port</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>Keyboard/pointing devices</strong></td>
<td>Full-sized keyboard</td>
</tr>
<tr>
<td></td>
<td>Touchpad includes: supports 2-way scroll with legend, taps enabled by default, 2-finger scrolling and zoom enabled by default</td>
</tr>
<tr>
<td><strong>Power requirements</strong></td>
<td>Smart AC adapter with localized cable plug support (3-wire plug with ground pin):</td>
</tr>
<tr>
<td></td>
<td>65-W “Smart” AC adapter</td>
</tr>
<tr>
<td></td>
<td>65-W “Slim” AC adapter (ABJ and ACF only)</td>
</tr>
<tr>
<td><strong>In-line cavity</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>6-cell, 62-Wh Li-ion battery</td>
</tr>
<tr>
<td></td>
<td>4-cell, 41-Wh Li-ion battery</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>Integrated fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>Intel AT support</td>
</tr>
<tr>
<td></td>
<td>Support Kensington security lock</td>
</tr>
<tr>
<td></td>
<td>Trusted Platform Module (TPM) support</td>
</tr>
<tr>
<td></td>
<td>Support no fingerprint reader option</td>
</tr>
<tr>
<td><strong>Operating system</strong></td>
<td><strong>Preinstalled:</strong></td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft® Basics</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Basics</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 64 with Microsoft Basics</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Basics</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Home Basic 32 with Microsoft Basics</td>
</tr>
<tr>
<td></td>
<td>Novell™: SuSE Linux™ – SLED 11</td>
</tr>
<tr>
<td></td>
<td>FreeDOS</td>
</tr>
<tr>
<td></td>
<td><strong>Preinstalled with Microsoft Office:</strong></td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft Office 2010 Starter EDGI</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft Office 2010 Personal</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft Office 2010 Home &amp; Business</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 32 with Microsoft Office 2010 Professional</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Office 2010 Starter EDGI</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Office 2010 Personal</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Office 2010 Home &amp; Business</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Professional 64 with Microsoft Office 2010 Professional</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Office 2010 Starter EDGI</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Office 2010 Personal</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Office 2010 Home &amp; Business</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 32 with Microsoft Office 2010 Professional</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 64 with Microsoft Office 2010 Starter EDGI</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Premium 64 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Premium 64 with Microsoft Office 2010 Personal</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Premium 64 with Microsoft Office 2010 Home &amp; Business</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Premium 64 with Microsoft Office 2010 Professional</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Basic 32 with Microsoft Office 2010 Starter EDGI</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Home Basic 32 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Basic 32 with Microsoft Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Basic 32 with Microsoft Office 2010 Personal</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Basic 32 with Microsoft Office 2010 Home &amp; Business</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Basic 32 with Microsoft Office 2010 Professional</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Starter with Office 2010 Starter</td>
</tr>
<tr>
<td></td>
<td>Windows 7 Starter with Office 2010 Starter - EDGI</td>
</tr>
</tbody>
</table>

**Restore Media:**

- 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

**Web-only support:**

- Windows XP Professional

**Certified:**

- Microsoft WHQL

**Serviceability End-user replaceable parts:**

- AC adapter
- Battery (system)
- Hard drive
- Memory module
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>WLAN module</td>
<td></td>
</tr>
<tr>
<td>WWAN module, SIM</td>
<td></td>
</tr>
<tr>
<td>Keyboard</td>
<td></td>
</tr>
</tbody>
</table>
2 External component identification

Display

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) WWAN antennas (2)* (select models only)</td>
<td>Send and receive wireless signals to communicate with wireless wide-area networks (WWAN).</td>
</tr>
<tr>
<td>(2) WLAN antennas (2)*</td>
<td>Send and receive wireless signals to communicate with wireless local area networks (WLAN).</td>
</tr>
<tr>
<td>(3) Internal microphone(s) (1 or 2 depending on model)</td>
<td>Record sound.</td>
</tr>
<tr>
<td>(4) Webcam light (select models only)</td>
<td>On: The webcam is in use.</td>
</tr>
</tbody>
</table>
Component | Description
--- | ---
(5) Webcam (select models only) | Records video and captures still photographs.

To use the webcam, select Start > All Programs > ArcSoft Camera Suite > WebCam Companion.

---

*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**

![Diagram of TouchPad with labeled components](image)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) TouchPad on/off button</td>
<td>Turns the TouchPad on and off.</td>
</tr>
<tr>
<td>(2) TouchPad</td>
<td>Moves the pointer and selects or activates items on the screen.</td>
</tr>
<tr>
<td>(3) Left TouchPad button</td>
<td>Functions like the left button on an external mouse.</td>
</tr>
<tr>
<td>(4) Right TouchPad button</td>
<td>Functions like the right button on an external mouse.</td>
</tr>
</tbody>
</table>
## Lights

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power light</strong></td>
<td>• On: The computer is on.</td>
</tr>
<tr>
<td></td>
<td>• Blinking: The computer is in the Sleep state.</td>
</tr>
<tr>
<td></td>
<td>• Off: The computer is off or in Hibernation.</td>
</tr>
<tr>
<td><strong>QuickWeb light</strong></td>
<td>• On: The computer is on or the default Web browser is in use.</td>
</tr>
<tr>
<td></td>
<td>• Blinking: When the QuickWeb button is pressed, the light blinks 5 times, and then the default Web browser opens.</td>
</tr>
<tr>
<td><strong>Wireless light</strong></td>
<td>• White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</td>
</tr>
<tr>
<td></td>
<td>• Amber: All wireless devices are off.</td>
</tr>
<tr>
<td><strong>Caps lock light</strong></td>
<td>On: Caps lock is on.</td>
</tr>
<tr>
<td><strong>TouchPad light</strong></td>
<td>• Off: The TouchPad is on.</td>
</tr>
<tr>
<td></td>
<td>• Amber: The TouchPad is off.</td>
</tr>
</tbody>
</table>
Buttons and fingerprint reader (select models only)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) Power button | - When the computer is off, press the button to turn on the computer.  
- When the computer is on, press the button briefly to initiate Sleep.  
- When the computer is in the Sleep state, press the button briefly to exit Sleep.  
- When the computer is in Hibernation, press the button briefly to exit Hibernation.  

If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.  

To learn more about your power settings:  
- **Windows 7**—Select Start > Control Panel > System and Security > Power Options.  
- **Windows Vista**—Select Start > Control Panel > System and Maintenance > Power Options  
- Or refer to the *HP Notebook Reference Guide*. |
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (2) ![HP QuickWeb light](image) | • When the computer is off or in Hibernation, press the button to open HP QuickWeb.  
• When the computer is in Microsoft Windows, press the button to open the default Web browser.  
• When the computer is in HP QuickWeb, press the button to open the default Web browser.  
**NOTE:** 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. |
| (3) ![Wireless button](image) | Turns the wireless feature on or off but does not establish a wireless connection. |
| (4) ![Fingerprint reader](image) | Allows a fingerprint logon to Windows, instead of a password logon. |
### Keys

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) <strong>esc key</strong></td>
<td>Displays system information when pressed in combination with the <strong>fn</strong> key.</td>
</tr>
<tr>
<td>(2) <strong>fn key</strong></td>
<td>Executes frequently used system functions when pressed in combination with a function key, the <strong>num lk</strong> key, or the <strong>esc</strong> key.</td>
</tr>
<tr>
<td>(3) <strong>Start key</strong></td>
<td>Displays the Start menu.</td>
</tr>
<tr>
<td>(4) <strong>Function keys</strong></td>
<td>Execute frequently used system functions when pressed in combination with the <strong>fn</strong> key.</td>
</tr>
<tr>
<td>(5) <strong>Menu key</strong></td>
<td>Displays the active programs's shortcut menu (same as the right-click menu).</td>
</tr>
<tr>
<td>(6) <strong>Embedded numeric keypad keys</strong></td>
<td>Can be used like the keys on an external numeric keypad when pressed in combination with the <strong>fn</strong> and <strong>num lk</strong> keys.</td>
</tr>
<tr>
<td>(7) <strong>num lk key</strong></td>
<td>Enables/disables the embedded numeric keypad when pressed in combination with the <strong>fn</strong> key.</td>
</tr>
<tr>
<td>Component</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| (1) Drive light   | ● Blinking white: The hard drive is being accessed.  
● Amber: HP 3D DriveGuard has temporarily parked the hard drive.                           |
| (2) Media Card Reader | Supports the following digital card formats:  
● Memory Stick Pro  
● Memory Stick Duo Pro  
● MultiMediaCard  
● MultiMediaCard Micro  
● Secure Digital (SD) Card  
● Secure Digital (SD) Card Micro |
| (3) Speakers (2)  | Produce sound.                                                                                                                                  |
| (4) Audio-out (headphone) jack | Connects optional headphones, earbuds, a headset, or television audio.  
**WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset.  
For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*.  
**NOTE:** When a device is connected to the jack, the computer speakers are disabled. |
<p>| (5) Audio-in (microphone) jack | Connects an optional computer headset microphone, stereo array microphone, or monaural microphone. |</p>
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) Security cable slot | Attaches an optional security cable to the computer.  
**NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. |
| (2) RJ-11 (modem) jack (select models only) | Connects a modem cable. |
| (3) Vent | Enables airflow to cool internal components.  
**NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |
<p>| (4) External monitor port | Connects an external VGA monitor or projector. |
| (5) HDMI port | Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component. |
| (6) SuperSpeed 3.0 USB port | Connects an optional USB device. |</p>
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) AC adapter light | - White: The computer is connected to external power and the battery is 90 to 99% charged.  
- Amber: The computer is connected to external power and the battery is 0 to 90% charged.  
- 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.  
- Off: The battery is fully charged.  
**NOTE:** 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. |
| (2) USB 2.0 powered/charging port | Connects optional USB devices. |
| (3) USB port | Connects optional USB devices. |
| (4) RJ-45 (network) jack | Connects a network cable. |
| (5) Power connector | Connects an AC adapter. |
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Battery and access cover release latches</td>
</tr>
<tr>
<td>(2)</td>
<td>Battery bay</td>
</tr>
<tr>
<td>(3)</td>
<td>SIM slot</td>
</tr>
<tr>
<td>(4)</td>
<td>Vents (2)</td>
</tr>
<tr>
<td>(5)</td>
<td>Access door</td>
</tr>
</tbody>
</table>
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

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Display panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, anti-glare</td>
<td>646017-001</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, anti-glare with webcam</td>
<td>646019-001</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, anti-glare with webcam and WWAN</td>
<td>646021-001</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, BrightView</td>
<td>646023-001</td>
</tr>
<tr>
<td></td>
<td>30.7-cm (12.1-inch) WXGA, BrightView with webcam</td>
<td>646025-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Keyboard (includes cable)</td>
<td>646029-xx1</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For a detailed list of available keyboards, see Sequential part number listing on page 28.</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>Top cover (includes Touchpad board)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in models with USB 3.0 and with a fingerprint reader</td>
<td>646041-001</td>
</tr>
<tr>
<td></td>
<td>For use in models with USB 3.0 and without a fingerprint reader</td>
<td>646047-001</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Spare part number</td>
</tr>
<tr>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td></td>
<td>With a fingerprint reader slot insert for use in computers that do not support a fingerprint reader</td>
<td>657232-001</td>
</tr>
<tr>
<td></td>
<td>For use in computers with USB 2.0 and a fingerprint reader</td>
<td>657960-001</td>
</tr>
<tr>
<td></td>
<td>For use in computers with USB 2.0 and without a fingerprint reader</td>
<td>657961-001</td>
</tr>
<tr>
<td></td>
<td>With no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader</td>
<td>666893-001</td>
</tr>
<tr>
<td></td>
<td>With no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader</td>
<td>666894-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Power button board</td>
<td>647132-001</td>
</tr>
<tr>
<td>(5)</td>
<td>Quick Launch board</td>
<td>646048-001</td>
</tr>
<tr>
<td>(6)</td>
<td>Modem module</td>
<td>628824-001</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> 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 646016-001. See Cable Kit on page 26 for more Cable Kit spare part number information.</td>
<td></td>
</tr>
<tr>
<td>(7)</td>
<td>Speaker assembly</td>
<td>646038-001</td>
</tr>
<tr>
<td>(8)</td>
<td><strong>System board</strong> (includes replacement thermal material)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in models without WWAN</td>
<td>646039-001</td>
</tr>
<tr>
<td></td>
<td>For use models with WWAN</td>
<td>646040-001</td>
</tr>
<tr>
<td></td>
<td>For use in models with WWAN in Russia and the People's Republic of China</td>
<td>646040-AA1</td>
</tr>
<tr>
<td>(9)</td>
<td>Fan</td>
<td>646027-001</td>
</tr>
<tr>
<td>(10)</td>
<td><strong>Heat sink</strong> (includes replacement thermal material)</td>
<td>646028-001</td>
</tr>
<tr>
<td>(11)</td>
<td><strong>Processor</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Intel Core i7 processors, Dual Core</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2620M, 2.7-GHz (turbo up to 3.4-GHz) processor 4-MB L3 cache</td>
<td>631252-001</td>
</tr>
<tr>
<td></td>
<td><strong>Intel Core i5 processors, Dual Core</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2540M, 2.6-GHz (turbo up to 3.3-GHz) processor 3-MB L3 cache (includes phase change material (PCM))</td>
<td>631255-001</td>
</tr>
<tr>
<td></td>
<td>2520M, 2.5-GHz (turbo up to 3.2-GHz) processor 3-MB L3 cache (includes phase change material (PCM))</td>
<td>631253-001</td>
</tr>
<tr>
<td></td>
<td>2430M, 2.4-GHz (turbo up to 3.0-GHz) processor 3-MB L3 cache</td>
<td>653341-001</td>
</tr>
<tr>
<td></td>
<td>2410M, 2.3-GHz (turbo up to 2.9-GHz) processor 3-MB L3 cache</td>
<td>638039-001</td>
</tr>
<tr>
<td></td>
<td><strong>Intel Core i3 processors, Dual Core</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2350M, 2.3-GHz processor 3-MB L3 cache (includes thermal grease)</td>
<td>653340-001</td>
</tr>
<tr>
<td></td>
<td>2330M, 2.2-GHz processor 3-MB L3 cache (includes thermal grease)</td>
<td>653339-001</td>
</tr>
<tr>
<td></td>
<td>2310M, 2.1-GHz processor 3-MB L3 cache (includes thermal grease)</td>
<td>638037-001</td>
</tr>
<tr>
<td></td>
<td><strong>Intel Pentium Dual-Core processors</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>B950, 2.1-GHz, with 2-MB L3 cache</td>
<td>653338-001</td>
</tr>
<tr>
<td></td>
<td>B940, 2.0-GHz, with 2-MB L3 cache</td>
<td>653337-001</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
<td>Spare part number</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>Intel Celeron processors</td>
<td>B840, 1.9-GHz, with 2-MB L3 cache</td>
<td>664663-001</td>
</tr>
<tr>
<td></td>
<td>B810, 1.6-GHz, with 2-MB L3 cache</td>
<td>646760-001</td>
</tr>
<tr>
<td>(12) WWAN modules</td>
<td>HP un2430 EV-DO/HSPA Mobile Broadband Module</td>
<td>634400-001</td>
</tr>
<tr>
<td></td>
<td>HP hs2340 HSPA+ Mobile Broadband Module</td>
<td>632155-001</td>
</tr>
<tr>
<td>(13) WLAN modules</td>
<td>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 Hercegovina, 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</td>
<td>593127-001</td>
</tr>
<tr>
<td>Item Description</td>
<td>Spare part number</td>
<td></td>
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<tr>
<td>------------------</td>
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<td></td>
</tr>
<tr>
<td>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</td>
<td>602993-001</td>
<td></td>
</tr>
<tr>
<td>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-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</td>
<td>630703-001</td>
<td></td>
</tr>
<tr>
<td>Item Description</td>
<td>Spare part number</td>
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<td></td>
</tr>
<tr>
<td>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, Austria, 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, 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</td>
<td>630813-001</td>
<td></td>
</tr>
</tbody>
</table>

<p>| Realtek 8188GN 802.11b/g/n 1x1 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Austria, 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, 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 |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>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, Gibralta, 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</td>
<td>636672-001</td>
<td></td>
</tr>
<tr>
<td>(14)</td>
<td>Hard drive</td>
<td></td>
</tr>
<tr>
<td>750-GB, 7200-rpm</td>
<td>633252-001</td>
<td></td>
</tr>
<tr>
<td>640-GB, 5400-rpm</td>
<td>603785-001</td>
<td></td>
</tr>
<tr>
<td>500-GB, 7200-rpm</td>
<td>634926-001</td>
<td></td>
</tr>
<tr>
<td>500-GB, 5400-rpm</td>
<td>634638-001</td>
<td></td>
</tr>
<tr>
<td>320-GB, 5400-rpm</td>
<td>645193-001</td>
<td></td>
</tr>
<tr>
<td>320-GB, 7200-rpm</td>
<td>634862-001</td>
<td></td>
</tr>
<tr>
<td>250-GB, 7200-rpm</td>
<td>634861-001</td>
<td></td>
</tr>
<tr>
<td>250-GB, 5400-rpm</td>
<td>645191-001</td>
<td></td>
</tr>
<tr>
<td>(15)</td>
<td>RTC battery</td>
<td>650924-001</td>
</tr>
<tr>
<td>(16)</td>
<td>Memory modules (PC3-10600, 1333-MHz, DDR3)</td>
<td></td>
</tr>
<tr>
<td>Before adding new memory, make sure you update the computer to the latest BIOS.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CAUTION: Failure to update the computer to the latest BIOS prior to installing new memory may result in various system problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-GB</td>
<td>621569-001</td>
<td></td>
</tr>
<tr>
<td>2-GB</td>
<td>621565-001</td>
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</tr>
<tr>
<td>1-GB</td>
<td>639736-001</td>
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<tr>
<td>(17)</td>
<td>Battery, Li-ion</td>
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</tr>
<tr>
<td>6-cell (62 Whr, 2.8 Ah)</td>
<td>633803-001</td>
<td></td>
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### Display components

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>6-cell, 55 WHr, 2.8 Ah Li-ion battery</td>
<td>660151-001</td>
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</tr>
<tr>
<td>4-cell (41 WHr, 2.8 Ah)</td>
<td>633801-001</td>
<td></td>
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<tr>
<td>(18) Base enclosure</td>
<td>646013-001</td>
<td></td>
</tr>
<tr>
<td>(19) Access door</td>
<td>646049-001</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Display bezel</td>
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<td></td>
</tr>
<tr>
<td>For use on models with a webcam</td>
<td>646014-001</td>
<td></td>
</tr>
<tr>
<td>For use on models without a webcam</td>
<td>646015-001</td>
<td></td>
</tr>
<tr>
<td>(2) Display hinge cover</td>
<td>646043-001</td>
<td></td>
</tr>
<tr>
<td>(3) Display hinge/bracket kit (includes left and right hinges and brackets)</td>
<td>646042-001</td>
<td></td>
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<tr>
<td>(4) Webcam module</td>
<td>642795-001</td>
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<tr>
<td>Microphone module (not illustrated)</td>
<td>642797-001</td>
<td></td>
</tr>
<tr>
<td>(5) Display Cable Kit (includes integrated webcam cable)</td>
<td>646044-001</td>
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<tr>
<td>(6) WLAN antennas</td>
<td>646010-001</td>
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</tr>
<tr>
<td>(7) WWAN antennas</td>
<td>646011-001</td>
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</table>
## Plastics Kit

<table>
<thead>
<tr>
<th>Item</th>
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<tbody>
<tr>
<td>(8)</td>
<td>Display enclosure</td>
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<tr>
<td></td>
<td><strong>Bracket Kit</strong> (includes RJ-11 bracket and power bracket; not illustrated)</td>
<td>646045-001</td>
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</table>

### Plastics Kit

1. RJ-11 holder
2. Secure Digital card protective insert
3. SIM protective insert

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plastics Kit</td>
<td>646035-001</td>
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<tr>
<td>(1)</td>
<td>RJ-11 holder</td>
<td>646035-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Secure Digital card protective insert</td>
<td>646035-001</td>
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<tr>
<td>(3)</td>
<td>SIM protective insert</td>
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</table>
Cable Kit

<table>
<thead>
<tr>
<th>Item</th>
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<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cable Kit</td>
<td>646016-001</td>
</tr>
<tr>
<td>(1)</td>
<td>Hard drive cable</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>RJ-11 connector cable</td>
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</table>

Mass storage devices

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
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</thead>
<tbody>
<tr>
<td>Hard drives</td>
<td></td>
</tr>
<tr>
<td>750-GB, 7200-rpm</td>
<td>633252-001</td>
</tr>
<tr>
<td>640-GB, 5400-rpm</td>
<td>603785-001</td>
</tr>
<tr>
<td>500-GB, 7200-rpm</td>
<td>634926-001</td>
</tr>
<tr>
<td>500-GB, 5400-rpm</td>
<td>634638-001</td>
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<tr>
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<td>645193-001</td>
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<td>320-GB, 7200-rpm</td>
<td>634862-001</td>
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<tr>
<td>250-GB, 7200-rpm</td>
<td>634861-001</td>
</tr>
<tr>
<td>250-GB, 5400-rpm</td>
<td>645191-001</td>
</tr>
<tr>
<td><strong>Hard Drive Hardware Kit</strong> (includes hard drive bracket, insulator, and screws)</td>
<td>646046-001</td>
</tr>
<tr>
<td><strong>External DVD±RW and CD-RW DL Combo Drive</strong></td>
<td>602041-001</td>
</tr>
</tbody>
</table>
## Miscellaneous parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC adapters</strong></td>
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</tr>
<tr>
<td>65-W AC adapter</td>
<td>609939-001</td>
</tr>
<tr>
<td>65-W AC adapter for use in India</td>
<td>609948-001</td>
</tr>
<tr>
<td>65-W travel adapter</td>
<td>592814-001</td>
</tr>
<tr>
<td><strong>Power cords:</strong></td>
<td></td>
</tr>
<tr>
<td>For use in Australia and New Zealand</td>
<td>490371-011</td>
</tr>
<tr>
<td>For use in the People's Republic of China</td>
<td>490371-AA1</td>
</tr>
<tr>
<td>For use in Europe, the Middle East, and Africa</td>
<td>490371-021</td>
</tr>
<tr>
<td>For use in India</td>
<td>490371-D61</td>
</tr>
<tr>
<td>For use in South Korea</td>
<td>490371-AD1</td>
</tr>
<tr>
<td>For use in Taiwan</td>
<td>490371-AB1</td>
</tr>
<tr>
<td>For use in the United Kingdom</td>
<td>490371-031</td>
</tr>
<tr>
<td>For use in the United States</td>
<td>490371-001</td>
</tr>
<tr>
<td><strong>Rubber Kit (includes bottom feet)</strong></td>
<td>646036-001</td>
</tr>
<tr>
<td><strong>Screw Kit</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Power cable, 65-W</strong></td>
<td>414135-001</td>
</tr>
<tr>
<td><strong>Adapter, plug head for use in the Asia/Pacific region</strong></td>
<td>601451-371</td>
</tr>
<tr>
<td><strong>Adapter, USB power</strong></td>
<td>619240-001</td>
</tr>
<tr>
<td><strong>HP keyed cable lock</strong></td>
<td>626729-001</td>
</tr>
<tr>
<td><strong>Mouse, optical, 2-button</strong></td>
<td>390632-001</td>
</tr>
<tr>
<td><strong>HP optical travel mouse</strong></td>
<td>434594-001</td>
</tr>
<tr>
<td><strong>HP basic carrying case</strong></td>
<td>455084-001</td>
</tr>
<tr>
<td><strong>Professional slim, top load case</strong></td>
<td>592923-001</td>
</tr>
<tr>
<td><strong>Notebook combination lock</strong></td>
<td>591699-001</td>
</tr>
<tr>
<td><strong>Nylon case</strong></td>
<td>612757-001</td>
</tr>
</tbody>
</table>
## Sequential part number listing

<table>
<thead>
<tr>
<th>Spare part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>390632-001</td>
<td>Mouse, optical, 2-button</td>
</tr>
<tr>
<td>414135-001</td>
<td>Power cable, 65-W</td>
</tr>
<tr>
<td>434594-001</td>
<td>HP optical travel mouse</td>
</tr>
<tr>
<td>455084-001</td>
<td>HP basic carrying case</td>
</tr>
<tr>
<td>490371-001</td>
<td>Power cord for use in North America</td>
</tr>
<tr>
<td>490371-011</td>
<td>Power cord for use in Australia and New Zealand</td>
</tr>
<tr>
<td>490371-021</td>
<td>Power cord for use in Europe, the Middle East, and Africa</td>
</tr>
<tr>
<td>490371-031</td>
<td>Power cord for use in the United Kingdom</td>
</tr>
<tr>
<td>490371-021</td>
<td>Power cord for use in Japan</td>
</tr>
<tr>
<td>490371-AA1</td>
<td>Power cord for use in the People's Republic of China</td>
</tr>
<tr>
<td>490371-AB1</td>
<td>Power cord for use in Taiwan</td>
</tr>
<tr>
<td>490371-AD1</td>
<td>Power cord for use in South Korea</td>
</tr>
<tr>
<td>490371-D61</td>
<td>Power cord for use in India</td>
</tr>
<tr>
<td>591699-001</td>
<td>Notebook combination lock</td>
</tr>
<tr>
<td>592814-001</td>
<td>65-W travel adapter</td>
</tr>
<tr>
<td>592923-001</td>
<td>Professional slim, top load case</td>
</tr>
<tr>
<td>593127-001</td>
<td>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</td>
</tr>
<tr>
<td>601451-371</td>
<td>Adapter, plug head for use in the Asia/Pacific region</td>
</tr>
<tr>
<td>602041-001</td>
<td>External DVD±RW and CD-RW DL Combo Drive</td>
</tr>
<tr>
<td>Spare part number</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>602993-001</td>
<td>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, 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</td>
</tr>
<tr>
<td>603785-001</td>
<td>640-GB, 5400-rpm hard drive</td>
</tr>
<tr>
<td>609939-001</td>
<td>65-W AC adapter</td>
</tr>
<tr>
<td>609948-001</td>
<td>65-W AC adapter for use in India</td>
</tr>
<tr>
<td>612757-001</td>
<td>Nylon case</td>
</tr>
<tr>
<td>619240-001</td>
<td>Adapter, USB power</td>
</tr>
<tr>
<td>621565-001</td>
<td>2-GB memory module (PC3-10600, 1333-MHz, DDR3)</td>
</tr>
<tr>
<td>621569-001</td>
<td>4-GB memory module (PC3-10600, 1333-MHz, DDR3)</td>
</tr>
<tr>
<td>626729-001</td>
<td>HP keyed cable lock</td>
</tr>
<tr>
<td>628824-001</td>
<td>Modem module</td>
</tr>
</tbody>
</table>

**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 646016-001. See **Cable Kit on page 26** for more Cable Kit spare part number information.
<table>
<thead>
<tr>
<th>Spare part number</th>
<th>Description</th>
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<tbody>
<tr>
<td>630703-001</td>
<td>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-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Iran, 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 Georgia, Romania, Russia, Rwanda, Samoa, 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, the United Arab Emirates, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</td>
</tr>
<tr>
<td>630705-001</td>
<td>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-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Iraq, Iran, 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 Georgia, Romania, Russia, Rwanda, Samoa, 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, the United Arab Emirates, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe</td>
</tr>
<tr>
<td>631252-001</td>
<td>Intel Core i7 processor, 2620M, 2.7-GHz (turbo up to 3.4-GHz) processor, 4-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>631253-001</td>
<td>Intel Core i5 processor, 2520M, 2.5-GHz (turbo up to 3.2-GHz) processor, 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>631255-001</td>
<td>Intel Core i7 processor, 2540M, 2.6-GHz (turbo up to 3.3-GHz) processor, 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>632155-001</td>
<td>HP hs2340 HSPA+ Mobile Broadband Module (WWAN)</td>
</tr>
<tr>
<td>633252-001</td>
<td>750-GB, 7200-rpm hard drive</td>
</tr>
<tr>
<td>633801-001</td>
<td>4-cell, 41 WHr, 2.8 Ah Li-ion battery</td>
</tr>
<tr>
<td>Spare part number</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>633803-001</td>
<td>6-cell, 62 Whr, 2.8 Ah Li-ion battery</td>
</tr>
<tr>
<td>634400-001</td>
<td>HP un2430 EV-DO/HSPA Mobile Broadband Module</td>
</tr>
<tr>
<td>634638-001</td>
<td>500-GB, 5400-rpm hard drive</td>
</tr>
<tr>
<td>634861-001</td>
<td>250-GB, 7200-rpm hard drive</td>
</tr>
<tr>
<td>634862-001</td>
<td>320-GB, 7200-rpm hard drive</td>
</tr>
<tr>
<td>634926-001</td>
<td>500-GB, 7200-rpm hard drive</td>
</tr>
<tr>
<td>636672-001</td>
<td>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-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, 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</td>
</tr>
<tr>
<td>638037-001</td>
<td>Intel Core i3 processor, 2310M, 2.1-GHz, 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>638039-001</td>
<td>Intel Core i5 processor, 2410M, 2.3-GHz (turbo up to 2.9-GHz), 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>639736-001</td>
<td>1-GB memory module (PC3-10600, 1333-MHz, DDR3)</td>
</tr>
<tr>
<td>Spare part number</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>640926-001</td>
<td>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, Equitorial 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</td>
</tr>
</tbody>
</table>

<p>| 642795-001 | Webcam module |
| 642797-001 | Microphone module |
| 645191-001 | 250-GB, 5400-rpm hard drive |
| 645193-001 | 320-GB, 5400-rpm hard drive |
| 646010-001 | WLAN antennas |
| 646011-001 | WWAN antennas |
| 646012-001 | Display enclosure |
| 646013-001 | Base enclosure |
| 646014-001 | Display bezel for use with models with a webcam |
| 646015-001 | Display bezel for use with models without a webcam |
| 646016-001 | Cable Kit (see Cable Kit on page 26 for more Cable Kit spare part information) |
| 646017-001 | Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare |
| 646019-001 | Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare with webcam |
| 646021-001 | Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare with webcam and WWAN |
| 646023-001 | Display assembly, 30.7-cm (12.1-inch) WXGA, BrightView |
| 646025-001 | Display assembly, 30.7-cm (12.1-inch) WXGA, BrightView with webcam |
| 646027-001 | Fan |
| 646028-001 | Heat sink |
| 646029-001 | Keyboard for use in the United States |
| 646029-281 | Keyboard for use in Thailand |
| 646029-291 | Keyboard for use in Japan |</p>
<table>
<thead>
<tr>
<th>Spare part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>646029-AB1</td>
<td>Keyboard for use in Taiwan</td>
</tr>
<tr>
<td>646029-AD1</td>
<td>Keyboard for use in South Korea</td>
</tr>
<tr>
<td>646029-D61</td>
<td>Keyboard for use in India</td>
</tr>
<tr>
<td>646035-001</td>
<td>Plastics Kit</td>
</tr>
<tr>
<td>646036-001</td>
<td>Rubber Kit (includes bottom feet)</td>
</tr>
<tr>
<td>646037-001</td>
<td>Screw Kit</td>
</tr>
<tr>
<td>646038-001</td>
<td>Speaker Kit</td>
</tr>
<tr>
<td>646039-001</td>
<td>System board for use in models without WWAN</td>
</tr>
<tr>
<td>646040-001</td>
<td>System board for models with WWAN</td>
</tr>
<tr>
<td>646040-AA1</td>
<td>System board for use in models with WWAN in Russia and the People's Republic of China</td>
</tr>
<tr>
<td>646041-001</td>
<td>Top cover for use in models with USB 3.0 and a fingerprint reader</td>
</tr>
<tr>
<td>646042-001</td>
<td>Display hinge/bracket kit</td>
</tr>
<tr>
<td>646043-001</td>
<td>Display hinge cover</td>
</tr>
<tr>
<td>646044-001</td>
<td>Display Cable Kit (includes integrated webcam cable)</td>
</tr>
<tr>
<td>646045-001</td>
<td>Bracket Kit (includes RJ-11 bracket and power bracket)</td>
</tr>
<tr>
<td>646046-001</td>
<td>Hard Drive Hardware Kit (includes hard drive bracket, insulator, and screws)</td>
</tr>
<tr>
<td>646047-001</td>
<td>Top cover for use in models with USB 3.0 and without a fingerprint reader</td>
</tr>
<tr>
<td>646048-001</td>
<td>Quick Launch board</td>
</tr>
<tr>
<td>646049-001</td>
<td>Access door</td>
</tr>
<tr>
<td>646760-001</td>
<td>Intel Celeron processor, B810, 1.6-GHz, 2-MB L3 cache (include thermal material)</td>
</tr>
<tr>
<td>647132-001</td>
<td>Power button board</td>
</tr>
<tr>
<td>650924-001</td>
<td>RTC battery</td>
</tr>
<tr>
<td>653337-001</td>
<td>Intel Pentium Dual-Core processor, B940, 2.0-GHz, 2-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>653338-001</td>
<td>Intel Pentium Dual-Core processor, B950, 2.1-GHz, 2-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>653339-001</td>
<td>Intel Core i3 processor, 2330M, 2.2-GHz, 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>653340-001</td>
<td>Intel Core i3 processor, 2350M, 2.3-GHz, 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>653341-001</td>
<td>Intel Core i5 processor, 2430M, 2.4-GHz (turbo up to 3.0-GHz), 3-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>657232-001</td>
<td>Top cover with a fingerprint reader slot insert for use in computers that do not support a fingerprint reader</td>
</tr>
<tr>
<td>657960-001</td>
<td>Top cover for use in computers with USB 2.0 and a fingerprint reader</td>
</tr>
<tr>
<td>657961-001</td>
<td>Top cover for use in computers with USB 2.0 and without a fingerprint reader</td>
</tr>
<tr>
<td>660151-001</td>
<td>6-cell, 55 WHr, 2.8 Ah Li-ion battery</td>
</tr>
<tr>
<td>664663-001</td>
<td>Intel Celeron processor, B840, 1.9-GHz, 2-MB L3 cache (includes thermal material)</td>
</tr>
<tr>
<td>666893-001</td>
<td>Top cover with no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader</td>
</tr>
<tr>
<td>666894-001</td>
<td>Top cover with no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader</td>
</tr>
</tbody>
</table>
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.

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

Plastic parts

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

⚠️ **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠️ **CAUTION:** Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

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

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing a hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package “FRAGILE.”
Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, 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.

<table>
<thead>
<tr>
<th>Event</th>
<th>Relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10%</td>
</tr>
<tr>
<td>Walking across carpet</td>
<td>35,000 V</td>
</tr>
<tr>
<td>Walking across vinyl floor</td>
<td>12,000 V</td>
</tr>
<tr>
<td>Motions of bench worker</td>
<td>6,000 V</td>
</tr>
<tr>
<td>Removing DIPS from plastic tube</td>
<td>2,000 V</td>
</tr>
<tr>
<td>Removing DIPS from vinyl tray</td>
<td>11,500 V</td>
</tr>
<tr>
<td>Removing DIPS from Styrofoam</td>
<td>14,500 V</td>
</tr>
<tr>
<td>Removing bubble pack from PCB</td>
<td>26,500 V</td>
</tr>
<tr>
<td>Packing PCBs in foam-lined box</td>
<td>21,000 V</td>
</tr>
</tbody>
</table>
Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.
Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids
- Nonconductive foam
- Conductive tabletop workstations with ground cords of one megohm resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials

The following table lists the shielding protection provided by antistatic bags and floor mats.

<table>
<thead>
<tr>
<th>Material</th>
<th>Use</th>
<th>Voltage protection level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antistatic plastic</td>
<td>Bags</td>
<td>1,500 V</td>
</tr>
<tr>
<td>Carbon-loaded plastic</td>
<td>Floor mats</td>
<td>7,500 V</td>
</tr>
<tr>
<td>Metallized laminate</td>
<td>Floor mats</td>
<td>5,000 V</td>
</tr>
</tbody>
</table>
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.
Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Kit, spare part number 646036-001. There are 4 rubber feet that attach to the base enclosure in the locations illustrated below.
Battery

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-cell, 62 Wh, 2.8 Ah Li-ion battery</td>
<td>633803-001</td>
</tr>
<tr>
<td>6-cell, 55 Wh, 2.8 Ah Li-ion battery</td>
<td>660151-001</td>
</tr>
<tr>
<td>4-cell, 41 Wh, 2.8 Ah Li-ion battery</td>
<td>633801-001</td>
</tr>
</tbody>
</table>

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 latches (1) to release the battery.

3. Rotate the battery upward (2), and then remove it from the computer (3).

Install the battery by inserting it into the battery bay until you hear a click.
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 41).

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.
Access door

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access door</td>
<td>646049-001</td>
</tr>
</tbody>
</table>

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 41).

Remove the access 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 access door release latches (2) to release the cover.
3. Slide the door toward the front of the computer, and then lift the door off the computer (3).

**NOTE:** The access door screw may be placed in the secure slot (4) for safekeeping while the cover is removed or if the screw is not inserted after replacing the access door.

Reverse the removal procedures to install the access door.
Hard drive

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>750-GB, 7200-rpm hard drive</td>
<td>633252-001</td>
</tr>
<tr>
<td>640-GB, 5400-rpm hard drive</td>
<td>603785-001</td>
</tr>
<tr>
<td>500-GB, 7200-rpm hard drive</td>
<td>634926-001</td>
</tr>
<tr>
<td>500-GB, 5400-rpm hard drive</td>
<td>634638-001</td>
</tr>
<tr>
<td>320-GB, 7200-rpm hard drive</td>
<td>634862-001</td>
</tr>
<tr>
<td>320-GB, 5400-rpm hard drive</td>
<td>645193-001</td>
</tr>
<tr>
<td>250-GB, 7200-rpm hard drive</td>
<td>634861-001</td>
</tr>
<tr>
<td>250-GB, 5400-rpm hard drive</td>
<td>645191-001</td>
</tr>
<tr>
<td>Hard Drive Hardware Kit (includes hard drive</td>
<td>646046-001</td>
</tr>
<tr>
<td>bracket, insulator, and screws)</td>
<td></td>
</tr>
</tbody>
</table>

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 41).
5. Remove the access door (see Access door on page 43).

Remove the hard drive:

1. Position the computer upside-down with the front toward you.
2. Disconnect the hard drive cable from the system board (1).
3. Remove the four Phillips PM2.0×4.0 screws (2) that secure the hard drive to the computer.
4. Lift the hard drive (3) from the hard drive bay far enough to access the hard drive cable.
5. Disconnect the hard drive cable from the hard drive (4).

6. 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).

7. Remove the two Phillips PM3.0×3.0 hard drive bracket screws (3) from each side of the hard drive (4 total screws).

8. 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: This procedure is valid for either memory module.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-GB (PC3-10600, 1333-MHz, DDR3)</td>
<td>639736-001</td>
</tr>
<tr>
<td>2-GB (PC3-10600, 1333-MHz, DDR3)</td>
<td>621565-001</td>
</tr>
<tr>
<td>4-GB (PC3-10600, 1333-MHz, DDR3)</td>
<td>621569-001</td>
</tr>
</tbody>
</table>

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:

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 41).
5. Remove the access door (see Access door on page 43).

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.

Reverse this procedure to install a memory module.

**WWAN module**

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP un2430 EV-DO/HSPA Mobile Broadband Module</td>
<td>634400-001</td>
</tr>
<tr>
<td>HP hs2340 HSPA+ Mobile Broadband Module</td>
<td>632155-001</td>
</tr>
</tbody>
</table>

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 41**).

5. Remove the SIM (see **SIM on page 42**).

6. Remove the access door (see **Access door on page 43**).
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 PM2.0×4.0 screws (2) that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

4. Remove the WWAN module (3) by pulling 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

   ![Figure 4-1 Removing the WWAN module](image)

   **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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>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, Equitorial 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, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovak, 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</td>
<td>593127-001</td>
</tr>
</tbody>
</table>

| 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, Equitorial 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, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovak, 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 |

Component replacement procedures 49
Description Spare part number

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, Equitorial 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, 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

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, Equitorial 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, 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
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 41).

5. Remove the access door (see Access door on page 43).

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.

   **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.

3. Remove the two Phillips PM2.0×4.0 screws (2) that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)
4. Remove the WLAN module (3) by pulling 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 28.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard</td>
<td>646029-xxx</td>
</tr>
</tbody>
</table>

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 41).
5. Remove the access door (see Access door on page 43).

Remove the keyboard:

1. Position the computer upside-down with the front toward you.
2. Remove the two Torx T8M2.5×7.0 screws that secure the keyboard to the computer.
3. Keep the computer upside-down and open it to allow the keyboard room to disengage.
4. Using a pointed tool placed through the access hole in the battery bay, press to disengage the keyboard.
5. Position the computer upright and open it as far as possible.

6. Using a slim screwdriver, release the four top keyboard tabs at the indicated locations and lift the top of the keyboard up and place it on the palm rest.

7. Lift the keyboard connector latch and disconnect the keyboard cable from the system board.

8. Remove the keyboard from the computer.
   Reverse this procedure to install the keyboard.

**Top cover**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top cover for use in models with USB 3.0 and a fingerprint reader</td>
<td>646041-001</td>
</tr>
<tr>
<td>Top cover for use in models with USB 3.0 and without a fingerprint reader</td>
<td>646047-001</td>
</tr>
<tr>
<td>Top cover with a fingerprint reader slot insert for use in computers that do not support a fingerprint reader</td>
<td>657232-001</td>
</tr>
<tr>
<td>Top cover for use in computers with USB 2.0 and a fingerprint reader</td>
<td>657960-001</td>
</tr>
<tr>
<td>Top cover for use in computers with USB 2.0 and without a fingerprint reader</td>
<td>657961-001</td>
</tr>
<tr>
<td>Top cover with no USB logo for use in USB 2.0 or USB 3.0 computers with a fingerprint reader</td>
<td>666893-001</td>
</tr>
<tr>
<td>Top cover with no USB logo for use in USB 2.0 or USB 3.0 computers without a fingerprint reader</td>
<td>666894-001</td>
</tr>
</tbody>
</table>
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 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)

Remove the top cover:

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

2. Remove the 4 rubber screw covers (1) and 6 Torx T8M2.5×8.0 screws (2) that secure the top cover to the computer:

3. Turn the computer upright and open it as far as possible.

4. Remove the 5 Torx T8M2.5×6.0 screws (1) and the Phillips PM2.0×4.0 screw (2) that secures the top cover to the computer.
5. Remove the following cables from the system board:
   (3) Power button
   (4) QuickLaunch board
   (5) Card reader
   (6) Touchpad

6. Position the upside-down with the battery bay toward you.

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

8. Position the computer upright with the front toward you.
To remove the top cover, lift the top and pull the cover away from the display until it clears the front audio ports, and then lift it off the computer.

Reverse this procedure to install the top cover.
Quick Launch board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick Launch board</td>
<td>646048-001</td>
</tr>
</tbody>
</table>

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 41).
5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)

Remove the Quick Launch board:

1. Position the top cover upside-down with the front toward you.
2. Remove the two Phillips PM2.0×4.0 screws (1) that secure the board to the top cover.
3. Lift the board straight up and off the top cover (2).

Reverse this procedure to install the Quick Launch board.
Before removing the power button board, follow these steps:

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

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)

Remove the power button board:

1. Position the top cover upside-down.

2. Remove the Phillips PM2.0×4.0 screw (1) that secures the power button board to the top cover.

3. Lift the side of the board up at an angle, and then slide it out from under the tab to remove it from the top cover (2).

Reverse this procedure to install the power button board.
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 646016-001. See Cable Kit on page 26 for more Cable Kit spare part number information.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modem module</td>
<td>628824-001</td>
</tr>
</tbody>
</table>

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 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)

Remove the modem module:

1. Position the computer upright and open it.

2. Remove the two Phillips PM2.0×4.0 screws (1) that secure the modem module to the system board.

3. Lift the modem straight up (2) to disconnect it from the system board.
4. Disconnect the modem module cable (3) from the modem module.

Reverse this procedure to install the modem module.

**Speaker assembly**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker Kit</td>
<td>646038-001</td>
</tr>
</tbody>
</table>

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 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)
   f. Modem module (see Modem module on page 61)
Remove the speaker assembly:
1. Position the computer upright with the front toward you.
2. Disconnect the cable from the system board (1).
3. Remove the tape that secures the speaker cable to the system board (2).
4. Lift the speaker from the computer (3).

Reverse this procedure to install the speaker assembly.

**System board**

![Image of system board]

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System board for use in models without WWAN</td>
<td>646039-001</td>
</tr>
<tr>
<td>System board for use in models with WWAN</td>
<td>646040-001</td>
</tr>
<tr>
<td>System board for use in models with WWAN in Russia and the People's Republic of China</td>
<td>646040-AA1</td>
</tr>
</tbody>
</table>

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 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. Hard drive (see Hard drive on page 44).
   c. Keyboard (see Keyboard on page 54).
   d. Top cover (see Top cover on page 55).
   e. Speaker assembly (see Speaker assembly on page 62).

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 42)
- Memory module (see Memory modules on page 46)
- WLAN module (see WLAN/Bluetooth combo card on page 49)
- WWAN module (see WWAN module on page 47)
- Modem module (see Modem module on page 61)
- Processor (see Processor on page 71)

Remove the system board:

1. Position the computer upright and open it.
2. Disconnect the display cable from the system board (1) and lift it aside.
3. Remove the Phillips PM2.5×5.0 screw (2) that secures the system board to the base enclosure.
4. Remove the Phillips PM2.5×7.0 screw (3) that secures the system board to the base enclosure.
5. Lift to remove the power connector bracket on the right side of the system board (4).

The power connector bracket is available in the Bracket Kit, spare part number 646045-001.
6. Lift the right side of the system board up at an angle (5), and then lift the system board from the computer (6).

Reverse this procedure to install the system board.

**RTC battery**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTC battery</td>
<td>650924-001</td>
</tr>
</tbody>
</table>

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 41*).

5. Remove the following components:
   a. Access door (see *Access door on page 43*).
   b. WLAN module (see *WLAN/Bluetooth combo card on page 49*).
   c. WWAN module (see *WWAN module on page 47*).
   d. Keyboard (see *Keyboard on page 54*).
   e. Top cover (see *Top cover on page 55*).
   f. Modem module (see *Modem module on page 61*).
   g. System board (see *System board on page 63*).
Remove the RTC battery:

1. Position the system board upside-down.
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.
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 41).
5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)
   f. Modem module (see Modem module on page 61)
   g. System board (see System board on page 63)

Remove the fan:

1. Position the system board upside-down.
2. Remove the Phillips PM2.5×4.0 screw (1) that secures the fan to the system board.
3. Disconnect the fan cable (2) from the system board.
4. Remove the fan from the system board (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.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat sink</td>
<td>646028-001</td>
</tr>
</tbody>
</table>

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 41).

5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)
   f. Modem module (see Modem module on page 61)
   g. System board (see System board on page 63)
   h. Fan (see Fan on page 67)

Remove the heat sink:

1. Position the system board upside-down.

2. To remove the heat sink, in the order indicated, loosen the four captive Phillips screws (1) — (4) that secure the heat sink to the system board.
3. Remove the heat sink from the system board (5).

**NOTE:** Thoroughly clean thermal material from the surfaces of the system board component (1) and the 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.

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

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 41**).
5. Remove the following components:
   a. Access door (see **Access door on page 43**).
   b. WLAN module (see **WLAN/Bluetooth combo card on page 49**)
   c. WWAN module (see **WWAN module on page 47**)
   d. Keyboard (see **Keyboard on page 54**)
   e. Top cover (see **Top cover on page 55**)
f. Modem module (see Modem module on page 61)
g. System board (see System board on page 63)
h. Fan (see Fan on page 67)
i. Heat sink (see Heat sink on page 69).

Remove the processor:

1. Position the system board upside-down.

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.
RJ-11 jack cable

**NOTE:** The RJ-11 jack cable is included in the Cable Kit, spare part number 646016-001.

The RJ-11 bracket is available in the Bracket Kit, spare part number 646045-001.

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 41).
5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. WLAN module (see WLAN/Bluetooth combo card on page 49)
   c. WWAN module (see WWAN module on page 47)
   d. Keyboard (see Keyboard on page 54)
   e. Top cover (see Top cover on page 55)
   f. Modem module (see Modem module on page 61)
   g. System board (see System board on page 63)

Remove the RJ-11 jack cable:

1. Position the base enclosure upright with the front toward you.
2. Remove the Phillips PM2.0×4.0 screw (1) that secures the RJ-11 jack to the enclosure.
3. Remove the RJ-11 jack cable (2) from the tape, clips, and routing channel (3) built into the base enclosure.

![Diagram of RJ-11 jack cable removal](image)
Reverse this procedure to install the RJ-11 jack cable.

# Display assembly

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare</td>
<td>646017-001</td>
</tr>
<tr>
<td>Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare with webcam</td>
<td>646019-001</td>
</tr>
<tr>
<td>Display assembly, 30.7-cm (12.1-inch) WXGA, anti-glare with webcam and WWAN</td>
<td>646021-001</td>
</tr>
<tr>
<td>Display assembly, 30.7-cm (12.1-inch) WXGA, BrightView</td>
<td>646023-001</td>
</tr>
<tr>
<td>Display assembly, 30.7-cm (12.1-inch) WXGA, BrightView with webcam</td>
<td>646025-001</td>
</tr>
</tbody>
</table>

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 41).
5. Remove the following components:
   a. Access door (see Access door on page 43).
   b. Hard drive (see Hard drive on page 44)
   c. WLAN module (see WLAN/Bluetooth combo card on page 49)
   d. WWAN module (see WWAN module on page 47)
   e. Keyboard (see Keyboard on page 54)
   f. Top cover (see Top cover on page 55)
   g. System board (see System board on page 63)

Remove the display assembly:

1. Position the computer upright with the front toward you.
2. Open the computer as far as possible.
3. Remove the antenna cables from their routing paths in the base enclosure (1).
4. Remove the five Phillips PM2.5×8.0 screws (2) from the hinges, the Phillips PM2.5×8.0 screw (3) from the security bracket, and then lift the display from the computer (4).

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.

5. To replace the display bezel, remove the two rubber screw covers and the two Phillips PM2.5×5.0 screws (1) in the bottom corners of the display bezel.

6. Flex the bottom (2) of the bezel, the inside edges of the left and right sides (3), and then the top (4) of the bezel until it disengages from the display enclosure.

The bezel is available using the following spare part numbers:

- 646015-001: models without a webcam
- 646014-001: models with a webcam

7. The hinge covers (5) slide off the hinges when you remove the bezel.

The hinge covers are available using spare part number 646043-001

8. Remove the display bezel.
9. 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.

10. If it is necessary to remove the display panel, remove the two Phillips PM2.5×5.0 screws (1) at the bottom and two Phillips PM2.5×5.0 broadhead screws (2) at the top that secure the panel to the display enclosure.

11. Lift the panel out of the display enclosure (3).
12. Disconnect the display panel cable from the back of the display panel by pressing the latches on the side of the connector (1), and then disconnecting the cable from the panel (2).

The display cable is available using spare part number 646044-001, and includes the integrated webcam cable.

13. If it is necessary to replace the display hinges, remove the two Phillips PM2.5×3.0 screws that secure each display hinge to the display panel, and then remove the hinges from the panel.

Display hinges are available using spare part number 646042-001.
14. 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 built into the display enclosure.

The WLAN antennas are available using spare part number 646010-001, and the WWAN antennas are available using spare part number 646011-001.

⚠️ 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.

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.

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

Starting Computer Setup

**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**

**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.

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.

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.

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

<table>
<thead>
<tr>
<th></th>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>21.2 cm</td>
<td>8.4 in</td>
</tr>
<tr>
<td>Width</td>
<td>28.8 cm</td>
<td>11.3 in</td>
</tr>
<tr>
<td>Height (front to rear)</td>
<td>2.5 to 3.2 cm</td>
<td>1.0 to 1.3 in</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>1.6 kg</td>
<td>3.5 lbs</td>
</tr>
<tr>
<td>(equipped with optical drive, 1 DIMM, hard drive, optical drive, WLAN module, 6 cell battery)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Input power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>18.5 V dc @ 3.5 A - 65 W</td>
<td></td>
</tr>
<tr>
<td>Operating current</td>
<td>3.5 A</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating (not writing to optical disc)</td>
<td>0°C to 35°C</td>
<td>32°F to 95°F</td>
</tr>
<tr>
<td>Operating (writing to optical disc)</td>
<td>5°C to 35°C</td>
<td>41°F to 95°F</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>-20°C to 60°C</td>
<td>-4°F to 140°F</td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 90%</td>
<td></td>
</tr>
<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
<td></td>
</tr>
<tr>
<td><strong>Maximum altitude</strong></td>
<td>(unpressurized)</td>
<td></td>
</tr>
<tr>
<td>Operating (14.7 to 10.1 psia)</td>
<td>-15 m to 3,048 m</td>
<td>50 ft to 10,000 ft</td>
</tr>
<tr>
<td>Nonoperating (14.7 to 4.4 psia)</td>
<td>-15 m to 12,192 m</td>
<td>-50 ft to 40,000 ft</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>125 g, 2 ms, half-sine</td>
<td></td>
</tr>
<tr>
<td>Nonoperating</td>
<td>200 g, 2 ms, half-sine</td>
<td></td>
</tr>
<tr>
<td><strong>Random vibration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate</td>
<td></td>
</tr>
</tbody>
</table>
### 30.7-cm (12.1-in), HD+ display specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active diagonal size</td>
<td>30.7-cm</td>
</tr>
<tr>
<td>Resolution</td>
<td>128x800</td>
</tr>
<tr>
<td>Active area</td>
<td>344.16x193.59</td>
</tr>
<tr>
<td>PPI</td>
<td>118</td>
</tr>
<tr>
<td>Surface treatment</td>
<td>Anti-glare</td>
</tr>
<tr>
<td></td>
<td>BrightView</td>
</tr>
<tr>
<td>Contrast ratio</td>
<td>300:1 (typical) – Anti-glare</td>
</tr>
<tr>
<td>Response time</td>
<td>2 ms</td>
</tr>
<tr>
<td>Brightness</td>
<td>250 nits (typical)</td>
</tr>
<tr>
<td>Viewing angle</td>
<td>WVA</td>
</tr>
<tr>
<td>Backlight</td>
<td>LED</td>
</tr>
<tr>
<td>Display colors</td>
<td>262,144</td>
</tr>
<tr>
<td>Pixel arrangement</td>
<td>RGB vertical stripe</td>
</tr>
<tr>
<td>Pixel pitch</td>
<td>0.204, 0.204</td>
</tr>
</tbody>
</table>
## Hard drive specifications

<table>
<thead>
<tr>
<th></th>
<th>750-GB*</th>
<th>640-GB*</th>
<th>500-GB*</th>
<th>320-GB*</th>
<th>250-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>9.5 mm</td>
<td>9.5 mm</td>
<td>9.5 mm</td>
<td>9.5 mm</td>
<td>9.5 mm</td>
</tr>
<tr>
<td>Width</td>
<td>70 mm</td>
<td>70 mm</td>
<td>70 mm</td>
<td>70 mm</td>
<td>70 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>115 g</td>
<td>101 g</td>
<td>101 g</td>
<td>101 g</td>
<td>101 g</td>
</tr>
<tr>
<td><strong>Interface type</strong></td>
<td>SATA</td>
<td>SATA</td>
<td>SATA</td>
<td>SATA</td>
<td>SATA</td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>100 MB/sec</td>
<td>100 MB/sec</td>
<td>100 MB/sec</td>
<td>100 MB/sec</td>
<td>100 MB/sec</td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>ATA security</td>
<td>ATA security</td>
<td>ATA security</td>
<td>ATA security</td>
<td>ATA security</td>
</tr>
<tr>
<td><strong>Seek times</strong> (typical read, including setting)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single track</td>
<td>1.5 ms</td>
<td>2 ms</td>
<td>3 ms</td>
<td>3 ms</td>
<td>3 ms</td>
</tr>
<tr>
<td>Average</td>
<td>11 ms</td>
<td>12 ms</td>
<td>13 ms</td>
<td>13 ms</td>
<td>13 ms</td>
</tr>
<tr>
<td>Maximum</td>
<td>14 ms</td>
<td>22 ms</td>
<td>24 ms</td>
<td>24 ms</td>
<td>24 ms</td>
</tr>
<tr>
<td>Logical blocks</td>
<td>1,465,149,168</td>
<td>1,250,263,728</td>
<td>1,048,576,000</td>
<td>625,141,400</td>
<td>488,397,168</td>
</tr>
<tr>
<td>Disc rotational speed</td>
<td>7200 rpm</td>
<td>7200 rpm or 5400 rpm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>5°C to 55°C (41°F to 131°F)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

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

**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.

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:

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 90.
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 90.

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 reinstall 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 90.
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 reformating 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 93.

**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 reformating 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 93.

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 reinstallst 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 93.

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](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

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>EANSW</td>
<td>1</td>
</tr>
<tr>
<td>Austria</td>
<td>OVE</td>
<td>1</td>
</tr>
<tr>
<td>Belgium</td>
<td>CEBC</td>
<td>1</td>
</tr>
<tr>
<td>Canada</td>
<td>CSA</td>
<td>2</td>
</tr>
<tr>
<td>Denmark</td>
<td>DEMKO</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>FIMKO</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>UTE</td>
<td>1</td>
</tr>
<tr>
<td>Germany</td>
<td>VDE</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>IMQ</td>
<td>1</td>
</tr>
<tr>
<td>Japan</td>
<td>METI</td>
<td>3</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>KEMA</td>
<td>1</td>
</tr>
<tr>
<td>Norway</td>
<td>NEMKO</td>
<td>1</td>
</tr>
<tr>
<td>The People's Republic of China</td>
<td>CCC</td>
<td>5</td>
</tr>
<tr>
<td>South Korea</td>
<td>EK</td>
<td>4</td>
</tr>
<tr>
<td>Sweden</td>
<td>SEMKO</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
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<td>1</td>
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<tr>
<td>Taiwan</td>
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<td>4</td>
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<tr>
<td>The United Kingdom</td>
<td>BSI</td>
<td>1</td>
</tr>
<tr>
<td>The United States</td>
<td>UL</td>
<td>2</td>
</tr>
</tbody>
</table>

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

5. The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
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](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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