## MSG revision history

<table>
<thead>
<tr>
<th>Revision</th>
<th>Publication date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>November 2009</td>
<td>The power connector bracket is included in the base enclosure kits. The information was updated in the following location: <a href="#">Computer major components on page 19</a>. The part number for the optical drive connector board was incorrect in the system board removal and replacement procedures. It has been corrected to part number 432992-001.</td>
</tr>
</tbody>
</table>
Safety warning notice

⚠️ WARNING! To reduce the possibility of heat-related injuries or of overheating the computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer only on a hard, flat surface. Do not allow another hard surface, such as an adjoining optional printer, or a soft surface, such as pillows or rugs or clothing, to block airflow. Also, do not allow the AC adapter to contact the skin or a soft surface, such as pillows or rugs or clothing, during operation. The computer and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950).
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# 1 Product description

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<tr>
<th><strong>Category</strong></th>
<th><strong>Description</strong></th>
<th><strong>Full-featured models (AMD)</strong></th>
<th><strong>Defeatured models (AMD)</strong></th>
<th><strong>8m GM system board (Intel)</strong></th>
<th><strong>8m PM system board (Intel)</strong></th>
<th><strong>8p PM system board (Intel)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>HP Pavilion dv9500, dv9600, and dv9700 Entertainment PCs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Intel® Core™ 2 Duo processor:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>T7700 (2.4-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<td></td>
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<tr>
<td></td>
<td>Intel® Core™ Duo processors:</td>
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</tr>
<tr>
<td></td>
<td>T7500 (2.2-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
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<td>✓</td>
<td>✓</td>
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<td>T7300 (2.0-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
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<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td></td>
<td>T7100 (1.8-GHz, 2-MB L2 cache, 800-MHz FSB)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>T5250e (1.5-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
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<td>✓</td>
<td>✓</td>
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<td></td>
<td>T2300 (1.6-GHz, L2 cache, 533-MHz FSB)</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>TJ85 (1.67-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td><strong>AMD Turion™ 64 X2 Dual-Core Mobile Technology and AMD Athlon™ 64 X2 Dual-Core processors:</strong></td>
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<tr>
<td></td>
<td>Turion TL-68 (2.4-GHz, 1-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
<td></td>
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<tr>
<td></td>
<td>Turion TL-66 (2.3-GHz, 1-MB L2 cache)</td>
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<td>✓</td>
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<td>Turion TL-64 (2.2-GHz, 1-MB L2 cache)</td>
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<td></td>
<td>Turion TL-62 (2.1-GHz, 1-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<td></td>
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<tr>
<td></td>
<td>Turion TL-60 (2.0-GHz, 1-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Category</td>
<td>Description</td>
<td>Full-featured models (AMD)</td>
<td>Defeateread models (AMD)</td>
<td>8m GM system board (Intel)</td>
<td>8m PM system board (Intel)</td>
<td>8p PM system board (Intel)</td>
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<tr>
<td></td>
<td>Turion TL-58 (1.9 GHz, 1-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Turion TL-56 (1.8 GHz, 1-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Athlon TK-55 (1.86-GHz, 512-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<td>Athlon TK-53 (1.7-GHz, 512-MB L2 cache)</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Chipset</td>
<td>Northbridge: Intel PM965</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td></td>
<td>Northbridge: Intel GM965</td>
<td></td>
<td></td>
<td>✓</td>
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<tr>
<td></td>
<td>Southbridge: ICH8m</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Northbridge/Southbridge: nVidia MCP67D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
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</tr>
<tr>
<td>Graphics</td>
<td>nVidia Discrete PCI Express × 16</td>
<td>✓</td>
<td></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tbody>
</table>

nVidia NB8P-SE (GeForce 8600M GS, G86M-128 bit) with at least 256 MB of dedicated video memory (16M×16 DDR2 × 8 PCs), with:

- 511 MB of video memory when system memory = 1 GB (256 MB + 255 MB Turbo Cache)
- 1023 MB of video memory when system memory = 2 GB (256 MB + 767 MB Turbo Cache)
- 2047 MB of video memory when system memory = 4 GB (256 MB + 1791 MB Turbo Cache)

System design supports up to 55-W GPU requirement.
### Category Description

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>Full-featured models (AMD)</th>
<th>Defeatured models (AMD)</th>
<th>8m GM system board (Intel)</th>
<th>8m PM system board (Intel)</th>
<th>8p PM system board (Intel)</th>
</tr>
</thead>
<tbody>
<tr>
<td>nVidia NB8M-SE -GS (GeForce 8400M GS) with at least 128 MB of dedicated video memory (16M × 16 DDR2 × 4 PCs), with:</td>
<td><img src="https://via.placeholder.com/150" alt="image" /></td>
<td>✓</td>
<td></td>
<td>✓</td>
<td></td>
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<tr>
<td></td>
<td>• 192 MB of video memory when system memory = 512 MB (128 MB + 64 MB Turbo Cache)</td>
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</tr>
<tr>
<td></td>
<td>• 383 MB of video memory when system memory = 1 GB (128 MB + 255 MB Turbo Cache)</td>
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</tr>
<tr>
<td></td>
<td>• 895 MB of video memory when system memory = 2 GB (128 MB + 767 MB Turbo Cache)</td>
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<tr>
<td></td>
<td>• 1919 MB of video memory when system memory = 4 GB (128 MB + 1535 MB Turbo Cache)</td>
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</tbody>
</table>

System design supports up to 55-W GPU requirement.

<table>
<thead>
<tr>
<th>Intel Extreme Graphics - Intel GMA X3100 UMA (integrated) with shared video memory:</th>
<th><img src="https://via.placeholder.com/150" alt="image" /></th>
<th></th>
<th>✓</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>• Up to 64 MB when system memory = 512 MB</td>
<td></td>
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<tr>
<td>• Up to 251 MB when system memory = 1024 MB</td>
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</tr>
<tr>
<td>• Up to 358 MB when system memory &gt; 2047 MB</td>
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</tbody>
</table>

Memory size is dynamically allocated.
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Full-featured models (AMD)</strong></td>
<td>UMA nVidia MCP67M with shared video memory, and</td>
</tr>
<tr>
<td></td>
<td>- Up to 128 MB on computer models with 512 MB of system RAM</td>
</tr>
<tr>
<td></td>
<td>- Up to 287 MB on computer models with 1024 MB of system RAM</td>
</tr>
<tr>
<td></td>
<td>- Up to 559 MB on computer models with 2048 MB of system RAM</td>
</tr>
<tr>
<td></td>
<td>- Up to 559 MB on computer models with 4096 MB of system RAM</td>
</tr>
<tr>
<td></td>
<td>Memory size is dynamically allocated.</td>
</tr>
<tr>
<td></td>
<td><strong>Defeatured models (AMD)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>8m GM system board (Intel)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>8m PM system board (Intel)</strong></td>
</tr>
<tr>
<td></td>
<td><strong>8p PM system board (Intel)</strong></td>
</tr>
<tr>
<td><strong>Panels</strong></td>
<td>17.0-inch dual lamp WXGA+ BrightView (1440 × 900), 200 nits typical brightness</td>
</tr>
<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>17.0-inch single lamp SXGA+ BrightView 1680 × 1050), 200 nits typical brightness</td>
</tr>
<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>17.0-inch single lamp WXGA BrightView (1440 × 900), 200 nits typical brightness</td>
</tr>
<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>2 SODIMM slots</td>
</tr>
<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Customer-accessible/upgradable</td>
</tr>
<tr>
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<td>√</td>
</tr>
<tr>
<td></td>
<td>PC2-5300, 667-MHz, DDR2</td>
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<td>√</td>
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<td>Dual-channel support</td>
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<td>√</td>
</tr>
<tr>
<td></td>
<td>Supports up to 4096 MB of system memory</td>
</tr>
<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>2048-MB total system memory (1024 MB × 2)</td>
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<td></td>
<td>√</td>
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<tr>
<td></td>
<td>1024-MB total system memory (1024 MB × 1)</td>
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<td><strong>Hard drives</strong></td>
<td>Supports all Serial ATA (SATA) 9.5-mm, 2.5-inch hard drives</td>
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<tr>
<td></td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>RAID software support not required for second hard drive</td>
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<td>√</td>
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<td>Category</td>
<td>Description</td>
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<tr>
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<td>Single hard drive configurations:</td>
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<td>250-GB, 5400-rpm</td>
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<tr>
<td></td>
<td>200-GB, 4200-rpm</td>
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<tr>
<td></td>
<td>160-GB, 5400-rpm</td>
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<tr>
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<td>120-GB, 7200- and 5400-rpm</td>
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<tr>
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<td>100-GB, 7200-rpm</td>
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<td>80-GB, 5400-rpm</td>
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<td>Dual hard drive configurations:</td>
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<td>500-GB, 5400-rpm (250 GB × 2)</td>
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<td>400-GB, 4200-rpm (200 GB × 2)</td>
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<td>320-GB, 5400-rpm (160 GB × 2)</td>
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<td>280-GB, 5400-rpm (160 GB + 120 GB)</td>
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<tr>
<td></td>
<td>240-GB, 7200-rpm (120 GB × 2)</td>
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<tr>
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<td>240-GB, 5400-rpm (120 GB × 2)</td>
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<tr>
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<td>200-GB, 7200-rpm (100 GB × 2)</td>
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<td>200-GB, 5400-rpm (120 GB + 80 GB)</td>
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<tr>
<td>Optical drives</td>
<td>12.7-mm tray load</td>
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<tr>
<td>Parallel ATA</td>
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<tr>
<td>Fixed (1 screw for removal)</td>
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<tr>
<td>Support for the following optical drives:</td>
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<tr>
<td></td>
<td>Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support (select models only)</td>
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<tr>
<td></td>
<td>HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive</td>
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<tr>
<td>Camera</td>
<td>Low-light VGA camera</td>
</tr>
<tr>
<td></td>
<td>Fixed (no tilt)</td>
</tr>
<tr>
<td></td>
<td>640 × 480 by 20 frames per second</td>
</tr>
<tr>
<td>Diskette drive</td>
<td>Supports external USB drive only</td>
</tr>
<tr>
<td>Audio</td>
<td>HD Audio (Realtek ALC861-VD-GR)</td>
</tr>
<tr>
<td></td>
<td>HD Audio - Conexant CX20549-12</td>
</tr>
<tr>
<td></td>
<td>Supports Microsoft Premium Requirements</td>
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<tr>
<td></td>
<td>Pavilion-branded Altec Lansing speakers</td>
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<tr>
<td></td>
<td>2 omnidirectional microphones, dual array with appropriate software (supports beam forming, echo cancellation, and noise suppression)</td>
</tr>
<tr>
<td>Modem</td>
<td>56K V.92 data/fax modem</td>
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<tr>
<td></td>
<td>Supports all world-wide certification requirements</td>
</tr>
<tr>
<td>Ethernet</td>
<td>Integrated Realtek RT8111B 10/100/1000 network interface card (NIC)</td>
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<td>Integrated Realtek RT8101e 10/100 NIC</td>
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<td>Integrated Realtek RTL8211B 10/100 NIC</td>
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<td>Integrated Realtek RT8201CL 10/100 NIC</td>
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<tr>
<td>Wireless</td>
<td>Integrated wireless local area network (WLAN) options by way of wireless module:</td>
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<tr>
<td></td>
<td>Intel PRO wireless 3945 a/b/g and b/g with 2 antennae built into the display assembly</td>
</tr>
<tr>
<td></td>
<td>Intel WLAN + Bluetooth®</td>
</tr>
<tr>
<td></td>
<td>802.11 b/g for use only in North America, includes two 2.4-GHz antennae in display assembly</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------</td>
<td>------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Intel PRO wireless</td>
<td>4965 a/b/g with 2 antennae built into the display assembly and a/b/g/n with 3 antennae built into the display assembly</td>
</tr>
<tr>
<td>Broadcom 4321AGN</td>
<td>Wi-Fi Adapter (802.11 a/b/g/ draft-n) + Bluetooth with 2 antennas</td>
</tr>
<tr>
<td>Broadcom 4321AGN</td>
<td>Wi-Fi Adapter (802.11 a/b/g/ draft-n) with 2 antennas</td>
</tr>
<tr>
<td>External media</td>
<td>card</td>
</tr>
<tr>
<td>One Mini PCIe slot</td>
<td></td>
</tr>
<tr>
<td>Digital Media Slot</td>
<td>supports SD, MMC, SD I/O, MS, MSP, xD</td>
</tr>
<tr>
<td>Ports</td>
<td>Audio-in (mono microphone)</td>
</tr>
<tr>
<td>Audio-out (stereo</td>
<td>headphone)</td>
</tr>
<tr>
<td>Audio-out (stereo</td>
<td>headphone with S/PDIF)</td>
</tr>
<tr>
<td>Consumer infrared</td>
<td></td>
</tr>
<tr>
<td>High-Definition</td>
<td>Multimedia Interface (HDMI, on select models only)</td>
</tr>
<tr>
<td>IEEE 1394a</td>
<td></td>
</tr>
<tr>
<td>RJ-11 (modem)</td>
<td></td>
</tr>
<tr>
<td>RJ-45 (Ethernet,</td>
<td>includes link and activity lights)</td>
</tr>
<tr>
<td>S-Video-out</td>
<td></td>
</tr>
<tr>
<td>USB (4 on computer</td>
<td>models not equipped with a fingerprint reader; 3 on computer models equipped</td>
</tr>
<tr>
<td>VGA (Dsub 15-pin)</td>
<td></td>
</tr>
<tr>
<td>2-pin AC power for</td>
<td>90-W AC adapter</td>
</tr>
<tr>
<td>2-pin AC power for</td>
<td>65-W AC adapter</td>
</tr>
<tr>
<td>Docking</td>
<td>Expansion port 3 supports the HP xb3000 Notebook Expansion Base</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Keybrd/pointing devices</td>
<td>17-inch full-size keyboard with numeric keypad</td>
</tr>
<tr>
<td></td>
<td>Touchpad supports 2-way scrolling</td>
</tr>
<tr>
<td></td>
<td>Taps enabled as default</td>
</tr>
<tr>
<td>Power requirements</td>
<td>8-cell 2.55-Ah Li-ion battery</td>
</tr>
<tr>
<td></td>
<td>8-cell 2.20-Ah Li-ion battery</td>
</tr>
<tr>
<td></td>
<td>90-W AC adapter with localized cable plug support (2-wire plug with</td>
</tr>
<tr>
<td></td>
<td>ground pin, supports 2-pin DC connector)</td>
</tr>
<tr>
<td></td>
<td>65-W AC adapter with localized cable plug support (2-wire plug with</td>
</tr>
<tr>
<td></td>
<td>ground pin, supports 2-pin DC connector)</td>
</tr>
<tr>
<td>Security</td>
<td>Security cable slot</td>
</tr>
<tr>
<td></td>
<td>Fingerprint reader (select models only)</td>
</tr>
<tr>
<td>Operating system</td>
<td>Preinstalled:</td>
</tr>
<tr>
<td></td>
<td>Windows Vista® with embedded QuickPlay Direct</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Business (32-bit)</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Ultimate (64-bit)</td>
</tr>
<tr>
<td></td>
<td>Windows Vista Premium (64-bit)</td>
</tr>
<tr>
<td>Service-ability</td>
<td>End-user replaceable parts:</td>
</tr>
<tr>
<td></td>
<td>AC adapter</td>
</tr>
<tr>
<td></td>
<td>Battery (system)</td>
</tr>
<tr>
<td></td>
<td>Hard drives (2)</td>
</tr>
<tr>
<td></td>
<td>Memory module</td>
</tr>
<tr>
<td></td>
<td>Optical drive</td>
</tr>
<tr>
<td></td>
<td>WLAN module</td>
</tr>
</tbody>
</table>
2 External component identification

Top components

Display and top components

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1)  | Internal microphones (2) (select models only) | Record sound.  
**NOTE:** If there is a microphone icon next to each microphone opening, the computer has internal microphones. |
<p>| (2)  | Integrated camera (select models only) | Records video and captures still photographs. |
| (3)  | Speakers (2) | Produce sound. |
| (4)  | Num lock light | On: Num lock is on or the embedded numeric keypad is enabled. |</p>
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5)</td>
<td>Volume scroll zone</td>
<td>Adjusts speaker volume. Slide your finger to the left to decrease volume and to the right to increase volume. You can also tap the minus sign on the scroll zone to decrease volume, or tap the plus sign on the scroll zone to increase volume.</td>
</tr>
<tr>
<td>(6)</td>
<td>Volume mute button</td>
<td>Mutes and restores the speaker sound.</td>
</tr>
<tr>
<td>(7)</td>
<td>Caps lock light</td>
<td>On: Caps lock is on.</td>
</tr>
</tbody>
</table>
| (8)  | Power button*            | ● When the computer is off, press the button to turn on the computer.  
● When the computer is on, press the button to shut down the computer.  
● 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 power settings, select **Start > Control Panel > System and Maintenance > Power Options**. |

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Media button</td>
<td>Launches the QuickPlay program.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> If the computer has been set up to require a logon password, you may be asked to log on to Windows. QuickPlay launches after you log on. Refer to the QuickPlay online Help for more information.</td>
</tr>
<tr>
<td>(2)</td>
<td>DVD button</td>
<td>Launches the DVD playback feature of the QuickPlay program.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> If the computer has been set up to require a logon password, you may be asked to log on to Windows. QuickPlay launches after you log on. Refer to the QuickPlay online Help for more information.</td>
</tr>
<tr>
<td>(3)</td>
<td>Previous/rewind button</td>
<td>When a disc is playing in the optical drive:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Plays the previous track or chapter, when pressed once.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Rewinds when pressed with the fn key.</td>
</tr>
<tr>
<td>(4)</td>
<td>Play/pause button</td>
<td>Plays or pauses the disc.</td>
</tr>
<tr>
<td>(5)</td>
<td>Next/fast forward button</td>
<td>● Plays the next track or chapter when the button is pressed once.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>● Fast forwards media when pressed simultaneously with the fn key.</td>
</tr>
<tr>
<td>(6)</td>
<td>Stop button</td>
<td>Stops the disc.</td>
</tr>
</tbody>
</table>
## Keys

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Function keys</td>
<td>Execute frequently used system functions when pressed in combination with the fn key.</td>
</tr>
<tr>
<td>(2)</td>
<td>caps lock key</td>
<td>Enables caps lock and turns on the caps lock light.</td>
</tr>
<tr>
<td>(3)</td>
<td>fn key</td>
<td>Executes frequently used system functions when pressed in combination with a function key or the esc key.</td>
</tr>
<tr>
<td>(4)</td>
<td>Windows logo key</td>
<td>Displays the Windows® Start menu.</td>
</tr>
<tr>
<td>(5)</td>
<td>Windows applications key</td>
<td>Displays a shortcut menu for items beneath the pointer.</td>
</tr>
<tr>
<td>(6)</td>
<td>Arrow keys</td>
<td>Move the cursor around the screen.</td>
</tr>
<tr>
<td>(7)</td>
<td>Embedded numeric keypad keys</td>
<td>Can be used like the keys on an external numeric keypad.</td>
</tr>
<tr>
<td>(8)</td>
<td>num lock key</td>
<td>Enables numeric lock, turns on the embedded numeric keypad, and turns on the num lock light.</td>
</tr>
</tbody>
</table>
# TouchPad

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>TouchPad light</td>
<td>- Blue: TouchPad is enabled.&lt;br&gt;- Amber: TouchPad is disabled.</td>
</tr>
<tr>
<td>(2)</td>
<td>TouchPad*</td>
<td>Moves the pointer and selects or activates items on the screen.</td>
</tr>
<tr>
<td>(3)</td>
<td>TouchPad left and right buttons*</td>
<td>Function like the left and right buttons on an external mouse.</td>
</tr>
<tr>
<td>(4)</td>
<td>TouchPad on/off button</td>
<td>Enables/disables the TouchPad.</td>
</tr>
<tr>
<td>(5)</td>
<td>TouchPad scroll zone</td>
<td>Scrolls up or down.</td>
</tr>
</tbody>
</table>

*This table describes factory settings. View or change pointing device preferences by selecting Start > Control Panel > Hardware and Sound > Mouse.
# Front components

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Power light</td>
<td>• On: The computer is on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blinking: The computer is in the Sleep state.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: The computer is off or in Hibernation.</td>
</tr>
<tr>
<td>(2)</td>
<td>Battery light</td>
<td>• On: A battery is charging.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Blinking: A battery that is the only available power source has reached a low battery level or a critical battery level.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Off: If the computer is plugged into an external power source, the light is turned off when all batteries in the computer are fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.</td>
</tr>
<tr>
<td>(3)</td>
<td>Drive light</td>
<td>Blinking: The hard drive or optical drive is being accessed.</td>
</tr>
<tr>
<td>(4)</td>
<td>Wireless switch</td>
<td>Turns the wireless feature on or off, but does not create a wireless connection.</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>NOTE:</strong> To establish a wireless connection, a wireless network must already be set up.</td>
</tr>
<tr>
<td>(5)</td>
<td>Wireless light</td>
<td>• Blue: An integrated wireless device, such as a wireless local area network (LAN) device and/or a Bluetooth® device, is turned on.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Amber: An integrated wireless device is turned off.</td>
</tr>
<tr>
<td>(6)</td>
<td>Consumer infrared lens</td>
<td>Receives a signal from a remote control device, such as the HP Remote Control.</td>
</tr>
<tr>
<td>(7)</td>
<td>Audio-in (microphone) jack</td>
<td>Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.</td>
</tr>
<tr>
<td>(8)</td>
<td>Audio-out (headphone) jack</td>
<td>Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.</td>
</tr>
<tr>
<td></td>
<td>Audio-out (headphone) S/PDIF jack (select models only)</td>
<td>Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.</td>
</tr>
<tr>
<td>(9)</td>
<td>Display lid latch</td>
<td>Opens the computer.</td>
</tr>
</tbody>
</table>
### Right-side components

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>USB ports (select models only)</td>
<td>Connect optional USB devices.</td>
</tr>
<tr>
<td>(2)</td>
<td>ExpressCard slot</td>
<td>Supports optional ExpressCard/54 cards.</td>
</tr>
<tr>
<td>(3)</td>
<td>Optical drive</td>
<td>Reads optical discs, and, on select models, also writes to optical discs.</td>
</tr>
<tr>
<td>(4)</td>
<td>Power connector</td>
<td>Connects an AC adapter.</td>
</tr>
</tbody>
</table>

### Left-side components

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Security cable slot</td>
<td>Attaches an optional security cable to the computer. <strong>NOTE:</strong> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</td>
</tr>
<tr>
<td>(2)</td>
<td>S-Video-out jack</td>
<td>Connects an optional S-Video device such as a television, VCR, camcorder, overhead projector, or video capture card.</td>
</tr>
<tr>
<td>(3)</td>
<td>External monitor port</td>
<td>Connects an external VGA monitor or projector.</td>
</tr>
<tr>
<td>(4)</td>
<td>Expansion port 3</td>
<td>Connects the computer to an optional docking device or expansion product. <strong>NOTE:</strong> The computer has only one expansion port. The term <em>expansion port 3</em> describes the type of expansion port.</td>
</tr>
<tr>
<td>(5)</td>
<td>RJ-45 (network) jack</td>
<td>Connects a network cable. <strong>NOTE:</strong> On select computer models, the network jack provides Gigabit Ethernet functionality.</td>
</tr>
<tr>
<td>(6)</td>
<td>RJ-11 (modem) jack</td>
<td>Connects a modem cable.</td>
</tr>
<tr>
<td>Item</td>
<td>Component</td>
<td>Function</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>(7)</td>
<td>HDMI port (select models only)</td>
<td>Connects an optional video or audio device such as a high-definition television, set-top box, DVD player, or any compatible digital or audio device.</td>
</tr>
</tbody>
</table>
| (8)  | USB ports (1 or 2, depending on computer model) | Connect optional USB devices.  
**NOTE:** Depending on your computer model, the computer may include an HDMI port or a USB port. |
| (9)  | 1394 port (select models only) | Connects an optional IEEE 1394 or 1394a device, such as a camcorder. |
| (10) | Digital Media Slot light (select models only) | On: A digital card is being accessed. |
| (11) | Digital Media Slot (select models only) | Supports the following optional digital card formats:  
- Memory Stick (MS)  
- Memory Stick Pro (MSP)  
- MultiMediaCard (MMC)  
- Secure Digital Input/Output (SD I/O)  
- Secure Digital (SD) Memory Card  
- xD-Picture Card (XD)  
- xD-Picture Card (XD) Type H  
- xD-Picture Card (XD) Type M |
## Bottom components

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Battery bay</td>
<td>Holds the battery.</td>
</tr>
<tr>
<td>(2)</td>
<td>Battery release latch</td>
<td>Releases the battery from the battery bay.</td>
</tr>
<tr>
<td>(3)</td>
<td>Optical drive</td>
<td>Reads optical discs, and, on select models, also writes to optical discs.</td>
</tr>
<tr>
<td>(4)</td>
<td>Secondary hard drive bay</td>
<td>Holds an optional secondary hard drive.</td>
</tr>
<tr>
<td></td>
<td>Primary hard drive bay</td>
<td>Hold the primary hard drive.</td>
</tr>
<tr>
<td>(5)</td>
<td>Vents (5)</td>
<td>Enable airflow to cool internal components.</td>
</tr>
</tbody>
</table>

**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.

| (6)  | Memory/WLAN module compartment          | Contains the memory module slots, the WLAN module slot, and the RTC battery. |

**CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.
Serial number location

When ordering parts or requesting information, provide the computer serial number and model number located on the bottom of 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 assemblies (include wireless antenna transceivers and cables)</td>
<td>For use only with computer models equipped with a camera:</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>17.0-inch, WXGA+, TFT, dual Lamp with BrightView</td>
<td>447991-001</td>
</tr>
<tr>
<td>●</td>
<td>17.0-inch, SXGA+, TFT, single Lamp with BrightView</td>
<td>447990-001</td>
</tr>
<tr>
<td>●</td>
<td>17.0-inch, WXGA+, TFT, single Lamp with BrightView</td>
<td>447989-001</td>
</tr>
</tbody>
</table>

For use only with computer models not equipped with a camera:

| ●    | 17.0-inch, WXGA+, TFT, dual Lamp with BrightView | 447994-001 |
| ●    | 17.0-inch, SXGA+, TFT, Single Lamp with BrightView | 447993-001 |
| ●    | 17.0-inch, WXGA+, TFT, Single Lamp with BrightView | 447992-001 |

**NOTE:** See Display assembly components on page 26 for more information on display assembly spare part numbers.

(2) **Switch cover** (includes LED board and LED board cable) 448014-001

(3) **Power button board** (includes power button board cable) 432987-001

(4) **Speaker assembly** 432994-001

(5) **Keyboards** (include keyboard cable)

<table>
<thead>
<tr>
<th>Country</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>441541-A41</td>
</tr>
<tr>
<td>Denmark, Finland, Norway, and Sweden</td>
<td>441541-DH1</td>
</tr>
<tr>
<td>France</td>
<td>441541-051</td>
</tr>
<tr>
<td>French Canada</td>
<td>441541-121</td>
</tr>
<tr>
<td>Germany</td>
<td>441541-041</td>
</tr>
<tr>
<td>Greece</td>
<td>441541-151</td>
</tr>
<tr>
<td>Israel</td>
<td>441541-BB1</td>
</tr>
<tr>
<td>Italy</td>
<td>441541-061</td>
</tr>
<tr>
<td>Japan</td>
<td>441541-291</td>
</tr>
<tr>
<td>South Korea</td>
<td>441541-AD1</td>
</tr>
<tr>
<td>Latin America</td>
<td>441541-161</td>
</tr>
<tr>
<td>The Netherlands and Europe</td>
<td>441541-B31</td>
</tr>
<tr>
<td>Portugal</td>
<td>441541-131</td>
</tr>
<tr>
<td>Russia</td>
<td>441541-251</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>441541-171</td>
</tr>
<tr>
<td>Spain</td>
<td>441541-071</td>
</tr>
<tr>
<td>Switzerland</td>
<td>441541-111</td>
</tr>
<tr>
<td>Thailand</td>
<td>441541-281</td>
</tr>
<tr>
<td>Turkey</td>
<td>441541-141</td>
</tr>
<tr>
<td>The United Kingdom</td>
<td>441541-031</td>
</tr>
<tr>
<td>The United States</td>
<td>441541-001</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>(6)</td>
<td>Display switch module (includes display switch module cable)</td>
</tr>
<tr>
<td></td>
<td>For use in computer models with Intel processors</td>
</tr>
<tr>
<td></td>
<td>For use in computer models with AMD processors</td>
</tr>
<tr>
<td>(7)</td>
<td>Top cover trim</td>
</tr>
<tr>
<td>(8)</td>
<td>Top covers</td>
</tr>
<tr>
<td></td>
<td>For use in computer models with Intel processors:</td>
</tr>
<tr>
<td></td>
<td>● Equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
</tr>
<tr>
<td></td>
<td>● Not equipped with a fingerprint reader (includes TouchPad and TouchPad cable)</td>
</tr>
<tr>
<td></td>
<td>● Fingerprint reader board (not illustrated; includes fingerprint reader board cable)</td>
</tr>
<tr>
<td></td>
<td>● Plastics Kit (see Plastics Kit on page 28 for more Plastics Kit component information)</td>
</tr>
<tr>
<td></td>
<td>For use in computer models using AMD processors:</td>
</tr>
<tr>
<td></td>
<td>● Equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
</tr>
<tr>
<td></td>
<td>● Fingerprint reader board (not illustrated; includes fingerprint reader board cable)</td>
</tr>
<tr>
<td></td>
<td>● Plastics Kit (see Plastics Kit on page 28 for more Plastics Kit component information)</td>
</tr>
<tr>
<td>(9a)</td>
<td>ExpressCard slot bezel</td>
</tr>
<tr>
<td>(9b)</td>
<td>Left hard drive cover (includes 2 captive screws, secured by C-clips)</td>
</tr>
<tr>
<td>(9c)</td>
<td>Memory/WLAN module compartment cover (includes 2 captive screws, secured by C-clips)</td>
</tr>
<tr>
<td>(9d)</td>
<td>Right hard drive cover (includes 2 captive screws, secured by C-clips)</td>
</tr>
<tr>
<td>(10)</td>
<td>Wireless switch board (includes wireless switch board cable)</td>
</tr>
<tr>
<td>(11)</td>
<td>Audio board (includes audio board cable)</td>
</tr>
<tr>
<td>(12)</td>
<td>Bluetooth module (includes Bluetooth module cable)</td>
</tr>
<tr>
<td>(13)</td>
<td>Front USB board (includes front USB board cable)</td>
</tr>
<tr>
<td>(14)</td>
<td>System boards (include modem module cable and hard drive thermal pads)</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with Intel processors:</td>
</tr>
<tr>
<td></td>
<td>● With 256 MB of video system memory for use with computer models with discrete video system memory</td>
</tr>
<tr>
<td></td>
<td>● With 128 MB of video system memory for use with computer models with discrete video system memory</td>
</tr>
<tr>
<td></td>
<td>● With UMA video system memory</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with AMD processors:</td>
</tr>
<tr>
<td></td>
<td>● With discrete video system memory</td>
</tr>
<tr>
<td></td>
<td>● With UMA video system memory</td>
</tr>
<tr>
<td></td>
<td>Processor bracket v8.1 (not illustrated)</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td>(15)</td>
<td><strong>Processors</strong> (include thermal material)</td>
</tr>
<tr>
<td></td>
<td>Intel Core 2 Duo processor:</td>
</tr>
<tr>
<td></td>
<td>• T7700 (2.4-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
</tr>
<tr>
<td></td>
<td>Intel Core Duo processors:</td>
</tr>
<tr>
<td></td>
<td>• T7500 (2.2-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
</tr>
<tr>
<td></td>
<td>• T7300 (2.0-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
</tr>
<tr>
<td></td>
<td>• T7100 (1.8-GHz, 2-MB L2 cache, 800-MHz FSB)</td>
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<tr>
<td></td>
<td>• TJ85 (1.67-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
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<tr>
<td></td>
<td>• T5250e (1.5-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
</tr>
<tr>
<td></td>
<td>• T2330 (1.6-GHz, L2 cache, 533-MHz FSB)</td>
</tr>
<tr>
<td></td>
<td>AMD processors:</td>
</tr>
<tr>
<td></td>
<td>• Turion TL-66 (2.3-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Turion TL-62 (2.1-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Turion TL-60 (2.0-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Turion TL-58 (1.9-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Turion TL-56 (1.8-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Athlon TK-55 (1.86-GHz, 512-MB L2 cache)</td>
</tr>
<tr>
<td></td>
<td>• Athlon TK-53 (1.7-GHz, 512-MB L2 cache)</td>
</tr>
<tr>
<td>(16a)</td>
<td><strong>Fan/heat sink assemblies</strong> (includes heat sink and thermal material)</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with Intel processors:</td>
</tr>
<tr>
<td></td>
<td>• With discrete video system memory</td>
</tr>
<tr>
<td></td>
<td>• With UMA video system memory</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with AMD processors:</td>
</tr>
<tr>
<td></td>
<td>• With UMA video system memory</td>
</tr>
<tr>
<td></td>
<td>• With discrete video system memory</td>
</tr>
<tr>
<td>(16b)</td>
<td><strong>Heat sink</strong> (included with the fan/heat sink assembly)</td>
</tr>
<tr>
<td>(17)</td>
<td><strong>ExpressCard assembly</strong></td>
</tr>
<tr>
<td>(18)</td>
<td><strong>Optical drive connector board</strong></td>
</tr>
<tr>
<td>(19)</td>
<td><strong>Rear USB board</strong></td>
</tr>
<tr>
<td>(20)</td>
<td><strong>Power connector bracket</strong></td>
</tr>
<tr>
<td>(21)</td>
<td><strong>Base enclosures</strong> (include wireless on/off switch, power connector, power connector cable, power connector bracket, and rear USB board cable)</td>
</tr>
<tr>
<td></td>
<td>For use with computers with Intel processors:</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with discrete video system memory and a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with discrete video system memory but not a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with UMA video system memory and a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with UMA video system memory but not a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>For use with computers with AMD processors:</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with discrete video system memory and a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with discrete video system memory but not a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with UMA video system memory and a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td>● For use only with computer models equipped with UMA video system memory but not a fingerprint reader</td>
</tr>
<tr>
<td></td>
<td><strong>Rubber Feet Kit</strong> (not illustrated; includes computer feet and display bezel rubber screw covers)</td>
</tr>
<tr>
<td>(22)</td>
<td><strong>Batteries</strong></td>
</tr>
<tr>
<td></td>
<td>8-cell, 2.55-Ah</td>
</tr>
<tr>
<td></td>
<td>8-cell, 2.20-Ah</td>
</tr>
<tr>
<td>(23)</td>
<td><strong>Hard drives</strong> (include hard drive bracket)</td>
</tr>
<tr>
<td></td>
<td>250-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td>200-GB, 4200-rpm</td>
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<tr>
<td></td>
<td>200-GB, 4200-rpm</td>
</tr>
<tr>
<td></td>
<td>160-GB, 5400-rpm</td>
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<td></td>
<td>120-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td>100-GB, 7200-rpm</td>
</tr>
<tr>
<td></td>
<td>80-GB, 5400-rpm</td>
</tr>
<tr>
<td></td>
<td><strong>Hard Drive Hardware Kit</strong> (for use only in Asia Pacific countries and regions; not illustrated)</td>
</tr>
<tr>
<td>(24)</td>
<td><strong>RTC battery</strong> (includes 2-sided tape)</td>
</tr>
<tr>
<td>(25)</td>
<td><strong>WLAN modules</strong></td>
</tr>
<tr>
<td></td>
<td>Intel 802.11a/b/g/n WLAN modules:</td>
</tr>
<tr>
<td></td>
<td>● For use in Antigua &amp; Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td></td>
<td>For use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan</td>
</tr>
<tr>
<td></td>
<td>For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea</td>
</tr>
<tr>
<td></td>
<td>For use in Japan</td>
</tr>
<tr>
<td></td>
<td>For use in South Korea</td>
</tr>
<tr>
<td></td>
<td>Broadcom 802.11a/b/g WLAN modules:</td>
</tr>
<tr>
<td></td>
<td>For use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
</tr>
<tr>
<td></td>
<td>For use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
</tr>
<tr>
<td></td>
<td>For use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
</tr>
<tr>
<td></td>
<td>For use in Japan</td>
</tr>
<tr>
<td></td>
<td>Broadcom 802.11b/g WLAN module for use in Thailand</td>
</tr>
<tr>
<td></td>
<td>Broadcom 802.11b/g WLAN modules:</td>
</tr>
<tr>
<td></td>
<td>For use in the United States and Canada</td>
</tr>
<tr>
<td></td>
<td>For use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
</tr>
<tr>
<td></td>
<td>Broadcom 4311AG 802.11a/b/g modules:</td>
</tr>
<tr>
<td></td>
<td>For use in the United States</td>
</tr>
<tr>
<td></td>
<td>For use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
</tr>
<tr>
<td></td>
<td>Broadcom 4321AGN 802.11a/b/g/n modules:</td>
</tr>
<tr>
<td></td>
<td>For use in the United States and Canada</td>
</tr>
<tr>
<td></td>
<td>For use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
</tr>
<tr>
<td>Item</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td><strong>(26)</strong></td>
<td><strong>Memory modules</strong> <em>(667-MHz, PC2-5300, 1-DIMM)</em></td>
</tr>
<tr>
<td></td>
<td>2048-MB</td>
</tr>
<tr>
<td></td>
<td>1024-MB</td>
</tr>
<tr>
<td></td>
<td>512-MB</td>
</tr>
<tr>
<td><strong>(27)</strong></td>
<td><strong>Optical drives</strong> <em>(include bezel and bracket)</em></td>
</tr>
<tr>
<td></td>
<td>Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support (select models only)</td>
</tr>
<tr>
<td></td>
<td>HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support with LightScribe</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive</td>
</tr>
<tr>
<td></td>
<td><strong>Cable Kit</strong> <em>(not illustrated; see Cable Kit on page 29 for more Cable Kit component information)</em></td>
</tr>
</tbody>
</table>
### Display assembly components

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Display bezels</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with dual lamp display assemblies</td>
<td>447998-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with single lamp display assemblies</td>
<td>447997-001</td>
</tr>
<tr>
<td></td>
<td>For use in computer models with AMD processors</td>
<td>436067-001</td>
</tr>
<tr>
<td>2</td>
<td><strong>Display inverters</strong> (include Mylar shield)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with dual lamp display assemblies</td>
<td>432959-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with single lamp display assemblies</td>
<td>431391-001</td>
</tr>
<tr>
<td>3</td>
<td><strong>Camera module</strong> (includes 2-sided tape)</td>
<td>448002-001</td>
</tr>
<tr>
<td>4</td>
<td><strong>Display Hinge Kits</strong> (include left and right display hinges)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with dual lamp display assemblies</td>
<td>432964-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models with single lamp display assemblies</td>
<td>432963-001</td>
</tr>
<tr>
<td>5</td>
<td><strong>Display panels</strong> (include display panel cable)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>17.0-inch, WXGA+ BrightView dual lamp</td>
<td>447988-001</td>
</tr>
<tr>
<td></td>
<td>17.0-inch, SXGA+ BrightView single lamp</td>
<td>447987-001</td>
</tr>
<tr>
<td></td>
<td>17.0-inch, WXGA+ BrightView single lamp</td>
<td>447986-001</td>
</tr>
<tr>
<td>6</td>
<td><strong>Wireless antenna transceivers and cables</strong></td>
<td></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>For use only with computer models equipped with an 802.11a/b/g/n WLAN module</td>
<td>448313-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with an 802.11a/b/g and 802.11b/g WLAN module</td>
<td>448312-001</td>
</tr>
<tr>
<td>(7)</td>
<td>Display hinge covers</td>
<td>432965-001</td>
</tr>
<tr>
<td>(8)</td>
<td>Microphone</td>
<td>432961-001</td>
</tr>
<tr>
<td>(9)</td>
<td>Display Cable Kit (includes camera module cable)</td>
<td>432962-001</td>
</tr>
<tr>
<td>(10)</td>
<td>Display enclosures (include logo and WLAN wireless antenna transceivers and cables)</td>
<td>432967-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with dual lamp display assemblies</td>
<td>448001-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with single lamp display assemblies</td>
<td>448000-001</td>
</tr>
<tr>
<td></td>
<td>For use only with computer models equipped with single lamp display assemblies (non-mica composition)</td>
<td>448000-001</td>
</tr>
<tr>
<td></td>
<td>Display Screw Kit (not illustrated)</td>
<td>432967-001</td>
</tr>
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</table>
## Plastics Kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Plastics Kit</strong></td>
<td>432981-001</td>
</tr>
<tr>
<td>(1)</td>
<td>ExpressCard slot bezel</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Left hard drive cover (includes 2 captive screws, secured by C-clips)</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>Memory/WLAN module compartment cover (includes 2 captive screws, secured by C-clips)</td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>Right hard drive cover (includes 2 captive screws, secured by C-clips)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>USB port cover (not illustrated; for use only with computer models not equipped with a fingerprint reader)</td>
<td></td>
</tr>
</tbody>
</table>
## Cable Kit

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cable Kit</td>
<td></td>
<td>448015-001</td>
</tr>
<tr>
<td>(1)</td>
<td>Bluetooth module cable</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Front USB board cable</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>Fingerprint reader board cable</td>
<td></td>
</tr>
<tr>
<td>(4)</td>
<td>Rear USB board cable</td>
<td></td>
</tr>
</tbody>
</table>
## Mass storage devices

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td><strong>Hard drives</strong> (include hard drive bracket)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>250-GB, 5400-rpm</td>
<td>453775-001</td>
</tr>
<tr>
<td></td>
<td>200-GB, 4200-rpm</td>
<td>441424-001</td>
</tr>
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<td></td>
<td>200-GB, 4200-rpm</td>
<td>449933-001</td>
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<td></td>
<td>160-GB, 5400-rpm</td>
<td>438485-001</td>
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<td>120-GB, 5400-rpm</td>
<td>446498-001</td>
</tr>
<tr>
<td></td>
<td>80-GB, 5400-rpm</td>
<td>446497-001</td>
</tr>
<tr>
<td>(2)</td>
<td><strong>Optical drives</strong> (include bezel and bracket)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support</td>
<td>462356-001</td>
</tr>
<tr>
<td></td>
<td>HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support with LightScribe</td>
<td>448006-001</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe</td>
<td>448005-001</td>
</tr>
<tr>
<td></td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive</td>
<td>448004-001</td>
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</table>
## Miscellaneous parts

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>90-W AC adapter</strong> (for use only with computer models equipped with dual lamp display assemblies)</td>
<td>453198-001</td>
</tr>
<tr>
<td><strong>65-W AC adapter</strong> (for use only with computer models equipped with single lamp display assemblies)</td>
<td>453199-001</td>
</tr>
<tr>
<td>90-W AC adapter</td>
<td>432309-001</td>
</tr>
<tr>
<td>ATSC/NTSC TV tuner antenna</td>
<td>439131-001</td>
</tr>
<tr>
<td>ATSC/NTSC/PAL TV tuner</td>
<td>439130-001</td>
</tr>
<tr>
<td>Composite video cable</td>
<td>407939-001</td>
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<td>DVB-T tuner</td>
<td>412175-001</td>
</tr>
<tr>
<td>DVB-T antenna adapter</td>
<td>412176-001</td>
</tr>
<tr>
<td>ExpressCard Kit (includes software CD)</td>
<td>445170-001</td>
</tr>
<tr>
<td>Backpack</td>
<td>405527-001</td>
</tr>
<tr>
<td>Carrying case</td>
<td>418162-001</td>
</tr>
<tr>
<td>HP Remote Control</td>
<td>435743-001</td>
</tr>
<tr>
<td>Infrared emitter with cable</td>
<td>439129-001</td>
</tr>
<tr>
<td>Optical wired mouse</td>
<td>436238-001</td>
</tr>
<tr>
<td>RF input adapter cable (without ferrite)</td>
<td>407940-001</td>
</tr>
<tr>
<td>USB digital drive</td>
<td>364727-002</td>
</tr>
<tr>
<td>Vista remote control (fits into ExpressCard slot)</td>
<td>439128-001</td>
</tr>
<tr>
<td>Vista remote control (does not fit into ExpressCard slot)</td>
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</tr>
<tr>
<td>Wired headset</td>
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<td><strong>Wireless laser mouse</strong> (includes cable adapter)</td>
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<td><strong>Power cords:</strong></td>
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<tr>
<td>Argentina</td>
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<tr>
<td>Belgium, Europe, Finland, France, Germany, Greece, the Netherlands, Norway, Portugal, Spain, and Sweden</td>
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<tr>
<td>Canada, French Canada, Latin America, Thailand, and the United States</td>
<td>394279-001</td>
</tr>
<tr>
<td>Denmark</td>
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<tr>
<td>India</td>
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<tr>
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<tr>
<td>Italy</td>
<td>394279-061</td>
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<tr>
<td>Japan</td>
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</tr>
<tr>
<td>The People's Republic of China</td>
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<tr>
<td>Switzerland</td>
<td>394279-111</td>
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<tr>
<td>Taiwan</td>
<td>394279–AB1</td>
</tr>
<tr>
<td>The United Kingdom and Hong Kong</td>
<td>394279-031</td>
</tr>
</tbody>
</table>

**Screw Kit**
- Phillips PM3.0×3.0 screw
- Phillips PM2.5×10.0 screw
- Phillips PM2.5×7.0 screw
- Phillips PM2.5×5.0 screw
- Phillips PM2.5×4.0 screw
- Phillips PM2.5×3.0 screw
- Phillips PM2.0×6.0 screw
- Phillips PM2.0×5.0 captive screw
- Phillips PM2.0×4.0 screw
- Phillips PM2.0×3.0 screw

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**Sequential part number listing**

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<th>Description</th>
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<tbody>
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<td>371693-001</td>
<td>Wired headset with volume control</td>
</tr>
<tr>
<td>394279-001</td>
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</tr>
<tr>
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<td>394279-081</td>
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<td>Power cord for use in Switzerland</td>
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<td>Power cord for use in Japan</td>
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<tr>
<td>394279-AA1</td>
<td>Power cord for use in the People's Republic of China</td>
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<td>Power cord for use in Taiwan</td>
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<td>Power cord for use in Israel</td>
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<tr>
<td>394279-D01</td>
<td>Power cord for use in Argentina</td>
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<td>Spare part number</td>
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</tr>
<tr>
<td>405527-001</td>
<td>Backpack</td>
</tr>
<tr>
<td>407674-001</td>
<td>Broadcom 802.11a/b/g WLAN module for use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
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<tr>
<td>407674-002</td>
<td>Broadcom 802.11a/b/g WLAN module for use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
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<tr>
<td>407674-003</td>
<td>Broadcom 802.11a/b/g WLAN module for use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
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<tr>
<td>407674-004</td>
<td>Broadcom 802.11b/g WLAN module for use in Thailand</td>
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<td>Broadcom 802.11a/b/g WLAN module for use in Japan</td>
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<td>407939-001</td>
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<td>412175-001</td>
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<td>412176-001</td>
<td>DVB-T antenna adapter</td>
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<tr>
<td>412766-002</td>
<td>Bluetooth module (includes Bluetooth module cable)</td>
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<tr>
<td>430958-001</td>
<td>Wireless laser mouse (includes cable adapter)</td>
</tr>
<tr>
<td>431391-001</td>
<td>Display inverter for use only with single lamp display assemblies (includes Mylar shield)</td>
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<td>432959-001</td>
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<td>432961-001</td>
<td>Display inverter for use only with dual lamp display assemblies (includes Mylar shield)</td>
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<td>432962-001</td>
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<td>432963-001</td>
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<td>432964-001</td>
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<td>432992-001</td>
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<td>432993-001</td>
<td>Display switch module for use in computer models with AMD processors (includes display switch module cable)</td>
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<td>432994-001</td>
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<td>434674-001</td>
<td>8-cell, 2.55-Ah battery</td>
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<td>434661-001</td>
<td>Broadcom 4321AGN 802.11a/b/g/n module for use in the United States and Canada</td>
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<tr>
<td>434661-002</td>
<td>Broadcom 4321AGN 802.11a/b/g/n module for use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
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<td>435743-001</td>
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<td>436067-001</td>
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<td>439128-001</td>
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<td>439129-001</td>
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<td>439130-001</td>
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<td>439131-001</td>
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<td>439254-001</td>
<td>Vista remote control (does not fit inside ExpressCard slot)</td>
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<td>441075-002</td>
<td>Broadcom 4311AG 802.11a/b/g module for use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
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<tr>
<td>441086-001</td>
<td>Intel 802.11a/b/g/n WLAN module for use in Antigua &amp; Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam</td>
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<tr>
<td>441086-002</td>
<td>Intel 802.11a/b/g/n WLAN module for use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan</td>
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<td>441086-003</td>
<td>Intel 802.11a/b/g/n WLAN module for use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea</td>
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<tr>
<td>441086-291</td>
<td>Intel 802.11a/b/g/n WLAN module for use in Japan</td>
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<td>441086-AD1</td>
<td>Intel 802.11a/b/g/n WLAN module for use in South Korea</td>
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<tr>
<td>441087-002</td>
<td>Intel 802.11a/b/g/n WLAN module for use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan</td>
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<td>441088-003</td>
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<td>441089-291</td>
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<td>441090-001</td>
<td>Broadcom 802.11b/g WLAN module for use in United States and Canada</td>
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<td>441090-002</td>
<td>Broadcom 802.11b/g WLAN module for use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, India</td>
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<tr>
<td>441424-001</td>
<td>200-GB, 4200-rpm hard drive (includes hard drive bracket)</td>
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<td>441541-001</td>
<td>Keyboard for use in the United States</td>
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<td>441541-031</td>
<td>Keyboard for use in the United Kingdom</td>
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<td>441541-041</td>
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<td>441541-051</td>
<td>Keyboard for use in France</td>
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<td>441541-061</td>
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<td>441541-071</td>
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<td>441541-141</td>
<td>Keyboard for use in Turkey</td>
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<td>441541-151</td>
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<td>441541-161</td>
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<td>441541-171</td>
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<td>441541-B31</td>
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<td>441541-DH1</td>
<td>Keyboard for use in Denmark, Finland, Norway, and Sweden</td>
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<tr>
<td>445170-001</td>
<td>ExpressCard Kit (includes software CD)</td>
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<tr>
<td>446478-001</td>
<td>Intel Core Duo T7300 2.0-GHz processor (4-MB L2 cache, 800-MHz FSB; includes thermal material)</td>
</tr>
<tr>
<td>446479-001</td>
<td>Intel Core Duo T7100 1.8-GHz processor (1.8-GHz, 2-MB L2 cache, 800-MHz FSB; includes thermal material)</td>
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<tr>
<td>446494-001</td>
<td>512-MB memory module (667-MHz, PC2-5300, 1-DIMM)</td>
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<tr>
<td>446495-001</td>
<td>1024-MB memory module (667-MHz, PC2-5300, 1-DIMM)</td>
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<td>446497-001</td>
<td>80-GB, 5400-rpm hard drive (includes hard drive bracket)</td>
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<tr>
<td>446498-001</td>
<td>120-GB, 5400-rpm hard drive (includes hard drive bracket)</td>
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<tr>
<td>446894–001</td>
<td>Intel Core 2 Duo T7700 2.4-GHz processor (4-MB L2 cache, 800-MHz FSB; includes thermal material)</td>
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<tr>
<td>447982-001</td>
<td>System board with 128-MB video system memory for use only with computer models with Intel processors with discrete video system memory (includes modem module cable and hard drive thermal pads)</td>
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<tr>
<td>447983-001</td>
<td>System board with 256-MB video system memory for use only with computer models with Intel processors with discrete video system memory (includes modem module cable and hard drive thermal pads)</td>
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<tr>
<td>447984-001</td>
<td>System board for use only with computer models with Intel processors with UMA video system memory (includes modem module cable and hard drive thermal pads)</td>
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<tr>
<td>447985-001</td>
<td>Intel Core Duo T7500 2.2-GHz processor (4-MB L2 cache, 800-MHz FSB; includes thermal material)</td>
</tr>
<tr>
<td>447986-001</td>
<td>17.0-inch, WXGA+, TFT, single lamp, BrightView display panel (includes display panel cable)</td>
</tr>
<tr>
<td>447987-001</td>
<td>17.0-inch, SXGA+, TFT, single lamp, BrightView display panel (includes display panel cable)</td>
</tr>
<tr>
<td>447988-001</td>
<td>17.0-inch, SXGA+, TFT, dual lamp, BrightView display panel (includes display panel cable)</td>
</tr>
<tr>
<td>447989-001</td>
<td>17.0-inch, WXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
</tr>
<tr>
<td>447990-001</td>
<td>17.0-inch, SXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
</tr>
<tr>
<td>447991-001</td>
<td>17.0-inch, WXGA+, TFT, dual lamp, BrightView display assembly for use only with computer models not equipped with a camera (includes wireless antenna transceivers and cables)</td>
</tr>
<tr>
<td>447992-001</td>
<td>17.0-inch, WXGA+, TFT, single lamp, BrightView display assembly for use only with computer models not equipped with a camera (includes wireless antenna transceivers and cables)</td>
</tr>
<tr>
<td>447993-001</td>
<td>17.0-inch, SXGA+, TFT, single lamp, BrightView display assembly for use only with computer models not equipped with a camera (includes wireless antenna transceivers and cables)</td>
</tr>
<tr>
<td>447994-001</td>
<td>17.0-inch, SXGA+, TFT, dual lamp, BrightView display assembly for use only with computer models not equipped with a camera (includes wireless antenna transceivers and cables)</td>
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<tr>
<td>447997-001</td>
<td>Display bezel for use only with computer models equipped with a single lamp display assembly and camera</td>
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<tr>
<td>447998-001</td>
<td>Display bezel for use only with computer models equipped with a dual lamp display assembly and camera</td>
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<tr>
<td>448000-001</td>
<td>Display enclosure for use only with computer models equipped with a single lamp display assembly (includes logo and WLAN wireless antenna transceivers and cables)</td>
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<tr>
<td>448001-001</td>
<td>Display enclosure for use only with computer models equipped with a dual lamp display assembly (includes logo and WLAN wireless antenna transceivers and cables)</td>
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<tr>
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<tr>
<td>448003-001</td>
<td>2048-MB memory module (667-MHz, PC2-5300, 1-DIMM)</td>
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<tr>
<td>448004-001</td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive (includes bezel and bracket)</td>
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<td>448005-001</td>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe (includes bezel and bracket)</td>
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<td>448006-001</td>
<td>HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support (includes bezel and bracket)</td>
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<td>448007-001</td>
<td>8-cell, 2.20-Ah battery</td>
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<tr>
<td>448010-001</td>
<td>Top cover for use only with computer models with Intel processors not equipped with a fingerprint reader (includes TouchPad and TouchPad cable)</td>
</tr>
<tr>
<td>448011-001</td>
<td>Top cover for use only with computer models with Intel processors equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
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<td>448012-001</td>
<td>Fingerprint reader board (not illustrated; includes fingerprint reader board cable)</td>
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<td>448014-001</td>
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<td>448017-001</td>
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<td>Hard Drive Hardware Kit</td>
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<td>448308-001</td>
<td>Base enclosure for use only in computer models with Intel processors equipped with discrete video system memory and a fingerprint reader (includes wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
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<tr>
<td>448309-001</td>
<td>Base enclosure for use only in computer models equipped with Intel processors with discrete video system memory but not a fingerprint reader (includes wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>448310-001</td>
<td>Base enclosure for use only in computer models with Intel processors equipped with UMA video system memory and a fingerprint reader (includes wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>448311-001</td>
<td>Base enclosure for use only in computer models with Intel processors not equipped with discrete video system memory but not a fingerprint reader (includes wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>448312-001</td>
<td>Wireless antenna transceivers and cables for use only with computer models equipped with an 802.11a/b/g and 802.11b/g WLAN module</td>
</tr>
<tr>
<td>448313-001</td>
<td>Wireless antenna transceivers and cables for use only with computer models equipped with an 802.11a/b/g/n WLAN module</td>
</tr>
<tr>
<td>448435-001</td>
<td>Display switch module for use in computer models with Intel processors (includes display switch module cable)</td>
</tr>
<tr>
<td>448437-001</td>
<td>Rear USB board</td>
</tr>
<tr>
<td>449729-001</td>
<td>RTC battery (includes 2-sided tape)</td>
</tr>
<tr>
<td>449762-001</td>
<td>Front USB board (includes front USB board cable)</td>
</tr>
<tr>
<td>449763-001</td>
<td>Audio board (includes audio board cable)</td>
</tr>
<tr>
<td>449933-001</td>
<td>200-GB, 4200-rpm hard drive (includes hard drive bracket)</td>
</tr>
<tr>
<td>450159-001</td>
<td>Display enclosure (non-mica composition)</td>
</tr>
<tr>
<td>450370-001</td>
<td>Processor bracket (7.9)</td>
</tr>
<tr>
<td>450371-001</td>
<td>Processor bracket (8.1)</td>
</tr>
<tr>
<td>450799-001</td>
<td>System board for use only with computer models with AMD processors with discrete video system memory (includes modem module cable and hard drive thermal pads)</td>
</tr>
<tr>
<td>450800-001</td>
<td>System board for use only with computer models with AMD processors with UMA video system memory (includes modem module cable and hard drive thermal pads)</td>
</tr>
<tr>
<td>450801-001</td>
<td>AMD Turion TL-56 processor (1.8-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td>450802-001</td>
<td>AMD Turion TL-58 processor (1.9-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td>450803-001</td>
<td>AMD Turion TL-60 processor (2.0-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td>450804-001</td>
<td>AMD Turion TL-66 processor (2.3-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td>Spare part number</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>450852-001</td>
<td>Top cover for use only with computer models equipped with AMD processors equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
</tr>
<tr>
<td>450853-001</td>
<td>Fingerprint reader board (not illustrated; includes fingerprint reader board cable)</td>
</tr>
<tr>
<td>450863-001</td>
<td>Fan/heat sink assemblies for use only with computer models equipped with AMD processors and UMA video system memory (includes heat sink and thermal material)</td>
</tr>
<tr>
<td>450864-001</td>
<td>Fan/heat sink assemblies for use only with computer models equipped with AMD processors and discrete video system memory (includes heat sink and thermal material)</td>
</tr>
<tr>
<td>450934-001</td>
<td>Fan/heat sink assembly for use only with computer models with Intel processors equipped with UMA video system memory</td>
</tr>
<tr>
<td>451861-001</td>
<td>802.11a/b/g WLAN module for use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
</tr>
<tr>
<td>451861-002</td>
<td>802.11a/b/g WLAN module for use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
</tr>
<tr>
<td>451861-003</td>
<td>802.11a/b/g WLAN module for use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
</tr>
<tr>
<td>451861-004</td>
<td>802.11b/g WLAN module for use in Thailand</td>
</tr>
<tr>
<td>451865-001</td>
<td>802.11a/b/g WLAN module for use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
</tr>
<tr>
<td>451865-002</td>
<td>802.11a/b/g WLAN module for use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
</tr>
<tr>
<td>451865-003</td>
<td>802.11a/b/g WLAN module for use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
</tr>
<tr>
<td>451865-004</td>
<td>802.11b/g WLAN module for use in Thailand</td>
</tr>
<tr>
<td>451865-291</td>
<td>802.11a/b/g WLAN module for use in Japan</td>
</tr>
<tr>
<td>451865-001</td>
<td>802.11a/b/g WLAN module for use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
</tr>
<tr>
<td>451865-002</td>
<td>802.11a/b/g WLAN module for use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
</tr>
<tr>
<td>451865-003</td>
<td>802.11a/b/g WLAN module for use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
</tr>
<tr>
<td>451865-004</td>
<td>802.11b/g WLAN module for use in Thailand</td>
</tr>
<tr>
<td>451865-291</td>
<td>802.11a/b/g WLAN module for use in Japan</td>
</tr>
<tr>
<td>453033-001</td>
<td>Intel Core Duo T5250e 1.50-GHz processor (2-MB L2 cache, 667-MHz FSB; includes thermal material)</td>
</tr>
<tr>
<td>453037-001</td>
<td>AMD Athlon TK-53 processor (1.7-GHz. 512-MB L2 cache)</td>
</tr>
<tr>
<td>453195-001</td>
<td>Intel Core Duo TJ85 1.67-GHz processor (2-MB L2 cache, 667-MHz FSB; includes thermal material)</td>
</tr>
<tr>
<td>453197-001</td>
<td>100-GB, 7200-rpm hard drive (includes hard drive bracket)</td>
</tr>
<tr>
<td>453190-001</td>
<td>90-watt AC adapter (for use only with computer models equipped with dual lamp display assemblies)</td>
</tr>
<tr>
<td>453199-001</td>
<td>65-watt AC adapter (for use only with computer models equipped with single lamp display assemblies)</td>
</tr>
<tr>
<td>453775-001</td>
<td>250-GB, 5400-rpm hard drive (includes hard drive bracket)</td>
</tr>
<tr>
<td>Spare part number</td>
<td>Description</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>454494-001</td>
<td>Base enclosure for use in computer models with AMD processors that are equipped with discrete video system memory and a fingerprint reader (include wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>454495-001</td>
<td>Base enclosure for use in computer models with AMD processors that are equipped discrete video system memory but not a fingerprint reader (include wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>454496-001</td>
<td>Base enclosure for use in computer models with AMD processors that are equipped with UMA video system memory and a fingerprint reader (include wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>454497-001</td>
<td>Base enclosure for use in computer models with AMD processors that are equipped with UMA video system memory but not a fingerprint reader (include wireless on/off switch, power connector, power connector cable, and rear USB board cable)</td>
</tr>
<tr>
<td>455944–001</td>
<td>Intel Core Duo T2330 1.6-GHz processor (L2 cache, 533-MHz FSB)</td>
</tr>
<tr>
<td>456023-001</td>
<td>AMD Turion TL-62 processor (2.1-GHz, 1-MB L2 cache)</td>
</tr>
<tr>
<td>456024-001</td>
<td>AMD Athlon TK-55 processor (1.86-GHz, 512-MB L2 cache)</td>
</tr>
<tr>
<td>462356–001</td>
<td>Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support</td>
</tr>
</tbody>
</table>
Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Electrostatic discharge damage

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

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

An electronic device exposed to ESD may not be affected at all and can work perfectly throughout a normal cycle. Or the device may function normally for a while, then degrade in the internal layers, reducing its life expectancy.

⚠️ CAUTION: To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Use nonmagnetic tools.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠️ CAUTION: A product can be degraded by as little as 700 V.

<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>
Unknown user password

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

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

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 47).
5. Remove the RTC battery (see RTC battery on page 56).
6. Wait approximately 5 minutes.
7. Replace the RTC battery and reassemble the computer.
8. Connect AC power to the computer. Do not reinsert any batteries at this time.
9. Turn on the computer.

All passwords and all CMOS settings have been cleared.
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 107 screws, in 14 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Serial number

Report the computer serial number to HP when requesting information or ordering spare parts. The serial number is located on the bottom of the computer.
Battery

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-cell, 2.55-Ah battery</td>
<td>434674-001 and 451868-001</td>
</tr>
<tr>
<td>8-cell, 2.20-Ah battery</td>
<td>448007-001</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. Turn the computer upside down on a flat surface.

2. Slide the battery release latch (1) to release the computer.

3. Pivot the battery (2) upward and remove it from the computer.

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

NOTE: If it has been determined that the camera module is the component that must be replaced to complete the computer repair, the display assembly does not have to be removed. Follow the procedures in this section to replace the camera module. For information on replacing the display assembly and other display assembly internal components, see Display assembly on page 69.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camera module (includes 2-sided tape)</td>
<td>448002-001</td>
</tr>
</tbody>
</table>

Before removing the camera 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 47).

Remove the camera module:

1. Turn the computer display-side up, with the front toward you.
2. Open the computer as far as possible.
3. Remove the three rubber screw covers (1) on the display bezel top edge. The display rubber screw covers are included in the Display Screw Kit, spare part number 432967-001.
4. Remove the three Phillips PM2.5×8.0 screws (2) on the display bezel top edge.
5. Flex the inside edges of the left and right sides (1) and the top edge (2) of the display bezel until the bezel disengages from the display enclosure.

6. Release the camera module (1) from the display enclosure as far as the camera module cable allows.

7. Disconnect the camera module cable (2) from the camera module.

8. Remove the camera module.

Reverse this procedure to install the camera module.
Display inverter

NOTE: If it has been determined that the display inverter is the component that must be replaced to complete the computer repair, the display assembly does not have to be removed. Follow the procedures in this section to replace the display inverter. For information on replacing the display assembly and other display assembly internal components, see Display assembly on page 69.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>For use only with computer models equipped with dual lamp display assemblies</td>
<td>432959-001</td>
</tr>
<tr>
<td>For use only with computer models equipped with single lamp display assemblies</td>
<td>431391-001</td>
</tr>
</tbody>
</table>

Before removing the display inverter, 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 47).

Remove the display inverter:

1. Turn the computer display-side up, with the front toward you.
2. Open the computer as far as possible.
3. Remove the two rubber screw covers (1) on the display bezel bottom edge. The display rubber screw covers are included in the Display Screw Kit, spare part number 432967-001.
4. Remove the two Phillips PM2.5×8.0 screws (2) that secure the display bezel bottom edge to the display assembly.
5. Flex the inside edges of the left and right sides (1) and the bottom edge (2) of the display bezel until the bezel disengages from the display enclosure.

6. Release the display inverter (1) as far as the display panel cable and the backlight cable allow.

7. Disconnect the display panel cable (2) and the backlight cable (3) from the display inverter.

8. Remove the display inverter.

Reverse this procedure to install the display inverter.
Hard drive

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>250-GB, 5400-rpm</td>
<td>453775-001</td>
</tr>
<tr>
<td>200-GB, 4200-rpm</td>
<td>441424-001</td>
</tr>
<tr>
<td>200-GB, 4200-rpm</td>
<td>449933-001</td>
</tr>
<tr>
<td>160-GB, 5400-rpm</td>
<td>438485-001</td>
</tr>
<tr>
<td>120-GB, 5400-rpm</td>
<td>446498-001</td>
</tr>
<tr>
<td>100-GB, 7200-rpm</td>
<td>453197-001</td>
</tr>
<tr>
<td>80-GB, 5400-rpm</td>
<td>446497-001</td>
</tr>
</tbody>
</table>

Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 47](#)).

Remove the hard drive:

1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.5×8.0 captive screws (1) that secure each hard drive cover to the computer.
3. Lift the right side of the hard drive cover (2), swing it to left, and then remove the cover. The hard drive cover is included in the Plastics Kit, spare part number 432981-001.
4. Use the Mylar tab (1) to lift the hard drive (2) until it disconnects from the computer.

5. Remove the hard drive from the hard drive bay.

6. If it is necessary to replace the hard drive bracket, remove the four Phillips PM3.0×4.0 screws (1) that secure the hard drive bracket to the hard drive.

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

Reverse this procedure to reassemble and install the hard drive.
Computer feet

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rubber Feet Kit (includes computer feet and display bezel rubber screw covers)</td>
<td>448017-001</td>
</tr>
</tbody>
</table>

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

Memory module

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2048-MB (667-MHz, PC2-5300, 1-DIMM)</td>
<td>448003-001</td>
</tr>
<tr>
<td>1024-MB (667-MHz, PC2-5300, 1-DIMM)</td>
<td>446495-001</td>
</tr>
<tr>
<td>512-MB (667-MHz, PC2-5300, 1-DIMM)</td>
<td>446494-001</td>
</tr>
</tbody>
</table>

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 47).

Remove the memory module:

1. Position the computer with the front toward you.
2. Loosen the two Phillips PM2.5×5.0 captive screws (1) that secure the memory/WLAN module compartment cover to the computer.
3. Lift the front of the cover (2), swing it toward the back of the computer, and then remove the cover. The memory/WLAN module compartment cover is included in the Plastics Kit, spare part number 432981-001.

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

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

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

Reverse this procedure to install a memory module.
RTC battery

NOTE: Removing the RTC battery and leaving it uninstalled for 5 or more minutes causes all passwords and CMOS settings to be cleared.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>RTC battery (includes 2-sided tape)</td>
<td>449729-001</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 47).

5. Remove the memory/WLAN module compartment cover (see Memory module on page 54).

Remove the RTC battery:

Remove the RTC battery from the socket on the system board.

NOTE: The RTC battery is secured to the computer by 2-sided tape. All replacement RTC battery spare part kits include 2-sided tape.

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intel 802.11a/b/g/n WLAN modules:</strong></td>
<td></td>
</tr>
<tr>
<td>● For use in Antigua &amp; Barbuda, Argentina, Aruba, the Bahamas, Barbados, Bermuda, Brunei, Canada, the Cayman Islands, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guam, Guatemala, Haiti, Honduras, Hong Kong, India, Indonesia, Malaysia, Mexico, Panama, Paraguay, Peru, Saudi Arabia, Taiwan, Uruguay, the United States, Venezuela, and Vietnam</td>
<td>441086-001</td>
</tr>
<tr>
<td>● For use in Austria, Azerbaijan, Bahrain, Belgium, Brazil, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom, and Uzbekistan</td>
<td>441086-002 and 441087-002</td>
</tr>
<tr>
<td>● For use in Australia, New Zealand, Pakistan, the People's Republic of China, and South Korea</td>
<td>441086-003 and 441088-003</td>
</tr>
<tr>
<td>● For use in Japan</td>
<td>441086-291 and 441089-291</td>
</tr>
<tr>
<td>● For use in South Korea</td>
<td>441086-AD1</td>
</tr>
<tr>
<td><strong>Broadcom 802.11a/b/g WLAN modules:</strong></td>
<td></td>
</tr>
<tr>
<td>● For use in Antigua &amp; Barbuda, Argentina, Australia, the Bahamas, Barbados, Brunei, Canada, Chile, the Dominican Republic, Guam, Guatemala, Hong Kong, India, Indonesia, Malaysia, Mexico, New Zealand, Panama, Paraguay, Saudi Arabia, Taiwan, the United States, and Vietnam</td>
<td>407674-001, 451861-001, and 451865-001</td>
</tr>
<tr>
<td>● For use in Aruba, Austria, Azerbaijan, Bahrain, Belgium, Bermuda, Brazil, Bulgaria, the Cayman Islands, Colombia, Croatia, Cyprus, the Czech Republic, Denmark, Egypt, El Salvador, Estonia, Finland, France, Georgia, Germany, Greece, Hungary, Iceland, Ireland, Italy, Jordan, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Malta, Monaco, the Netherlands, Norway, Oman, the Philippines, Poland, Portugal, Romania, Russia, Serbia and Montenegro, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Turkey, the United Kingdom, and Uzbekistan</td>
<td>407674-002, 451861-002, and 451865-002</td>
</tr>
<tr>
<td>● For use in Ecuador, Haiti, Honduras, Pakistan, Peru, the People's Republic of China, Qatar, South Korea, Uruguay, and Venezuela</td>
<td>407674-003, 451861-003, and 451865-003</td>
</tr>
<tr>
<td>● For use in Japan</td>
<td>407674-291, 451861-291, and 451865-291</td>
</tr>
<tr>
<td><strong>Broadcom 802.11b/g WLAN module for use in Thailand</strong></td>
<td>407674-004, 451861-004, and 451865-004</td>
</tr>
<tr>
<td><strong>Broadcom 802.11b/g WLAN modules:</strong></td>
<td></td>
</tr>
<tr>
<td>● For use in the United States and Canada</td>
<td>441090-001</td>
</tr>
<tr>
<td>● For use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
<td>441090-002</td>
</tr>
<tr>
<td><strong>Broadcom 4311AG 802.11a/b/g modules:</strong></td>
<td></td>
</tr>
<tr>
<td>● For use in the United States and Canada</td>
<td>441075-001</td>
</tr>
<tr>
<td>● For use in France, Germany, Italy, the Netherlands, Spain, the United Kingdom, Nordic region, and India</td>
<td>441075-002</td>
</tr>
</tbody>
</table>

Component replacement procedures  57
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 47).

5. Remove the memory/WLAN module compartment cover (see Memory module on page 54).

Remove the WLAN module:

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

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

   **NOTE:** Computer models equipped with an 802.11ab/g/n WLAN module will have an additional wireless antenna cable (2), yellow in color.

2. Remove the two Phillips PM2.0×11.0 screws (3) that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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

   **NOTE:** WLAN modules are designed with a notch (5) to prevent incorrect installation into the WLAN module slot.
Reverse this procedure to install a WLAN module.

**Optical drive**

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support</td>
<td>462356-001</td>
</tr>
<tr>
<td>HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support with LightScribe</td>
<td>448006-001</td>
</tr>
<tr>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive with LightScribe</td>
<td>448005-001</td>
</tr>
<tr>
<td>DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive</td>
<td>448004-001</td>
</tr>
</tbody>
</table>

Before removing the optical drive, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see *Battery on page 47*).

Remove the optical drive:

1. Position the computer with right side toward you.

2. Remove the Phillips PM2.5×8.0 screw (1) that secures the optical drive to the computer.

3. Insert a thin tool, such as a paper clip (2), into the disc tray release access hole. (The optical drive disc tray is partially ejected from the optical drive.)

4. Use the disc tray frame to slide the optical drive (3) out of the computer.
5. Remove the optical drive.

6. If it is necessary to replace the optical drive bracket, position the optical drive with the optical drive bracket toward you.

7. Remove the two Phillips PM2.0×3.0 screws (1) that secure the optical drive bracket to the optical drive.

8. Remove the optical drive bracket (2).

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switch cover (includes LED board and LED board cable)</td>
<td>448014-001</td>
</tr>
</tbody>
</table>

Before removing the switch 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 47).

Remove the switch cover:

1. Position the computer with the front toward you.

2. Remove the six Phillips PM2.5×5.0 screws that secure the switch cover to the computer.

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

4. Open the computer as far as possible.
5. Lift the rear edge of the switch cover and swing it forward until it rests on the keyboard.

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

7. Remove the switch cover.

Reverse this procedure to install the switch cover.
## Keyboard

### Description

<table>
<thead>
<tr>
<th>For use in:</th>
<th>Spare part number</th>
<th>For use in:</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>441541-A41</td>
<td>Latin America</td>
<td>441541-161</td>
</tr>
<tr>
<td>Denmark, Finland, Norway, and</td>
<td>441541-DH1</td>
<td>Portugal</td>
<td>441541-131</td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td>441541-051</td>
<td>Russia</td>
<td>441541-251</td>
</tr>
<tr>
<td>French Canada</td>
<td>441541-121</td>
<td>Saudi Arabia</td>
<td>441541-171</td>
</tr>
<tr>
<td>Germany</td>
<td>441541-041</td>
<td>Spain</td>
<td>441541-071</td>
</tr>
<tr>
<td>Greece</td>
<td>441541-151</td>
<td>Switzerland</td>
<td>441541-111</td>
</tr>
<tr>
<td>International</td>
<td>441541-B31</td>
<td>Thailand</td>
<td>441541-281</td>
</tr>
<tr>
<td>Israel</td>
<td>441541-BB1</td>
<td>Turkey</td>
<td>441541-141</td>
</tr>
<tr>
<td>Italy</td>
<td>441541-061</td>
<td>The United Kingdom</td>
<td>441541-031</td>
</tr>
<tr>
<td>Japan</td>
<td>441541-291</td>
<td>The United States</td>
<td>441541-001</td>
</tr>
<tr>
<td>South Korea</td>
<td>441541-AD1</td>
<td></td>
<td></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 47*).

5. Remove the switch cover (see *Switch cover on page 61*).

**Remove the keyboard:**

1. Turn the computer upside down, with the front toward you.
2. Remove the Phillips PM2.5×8.0 screw that secures the keyboard to the computer.

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

4. Open the computer as far as possible.

5. Remove the three silver Phillips PM2.5×5.0 screws that secure the keyboard to the computer.

6. Lift the rear edge of the keyboard (1) until it rests at an angle.

7. Slide the keyboard (2) back to disengage the tabs on the front edge of the keyboard from the top cover.
8. Swing the keyboard (3) up and forward until it rests on the palm rest.

9. Release the ZIF connector (1) to which the keyboard cable is attached and disconnect the keyboard cable (2).

10. Remove the keyboard.

   Reverse this procedure to install the keyboard.
### Speaker assembly

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker assembly</td>
<td>432994-001</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 47](#)).

5. **Remove the switch cover** (see [Switch cover on page 61](#)).

6. **Remove the keyboard** (see [Keyboard on page 63](#)).

Remove the speaker assembly:

1. **Disconnect the speaker assembly cable (1)** from the power button board.

2. **Remove the wireless antenna cables and microphone cable** from the clips (2) in the speaker assembly.

3. **Remove the two black Phillips PM2.5×5.0 screws (1)** that secure the speaker assembly to the computer.
4. Remove the speaker assembly (2).

Reverse this procedure to install the speaker assembly.

**Power button board**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power button board (includes power button board cable)</td>
<td>432987-001</td>
</tr>
</tbody>
</table>

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 47).

5. Remove the switch cover (see Switch cover on page 61).

6. Remove the keyboard (see Keyboard on page 63).
Remove the power button board:

1. Disconnect the following cables from the power button board:
   - (1) Power button board cable
   - (2) Speaker assembly cable
   - (3) Display switch module cable
   - (4) Microphone cable

2. Remove the silver Phillips PM2.5×5.0 screw (1) that secures the power button board to the computer.

3. Remove the power button board (2).

Reverse this procedure to install the power button board.
## Display assembly

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>17.0-inch, WXGA+, TFT, dual lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447991-001</td>
</tr>
<tr>
<td>17.0-inch, SXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447990-001</td>
</tr>
<tr>
<td>17.0-inch, WXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447989-001</td>
</tr>
<tr>
<td>17.0-inch, WXGA+, TFT, dual lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447994–001</td>
</tr>
<tr>
<td>17.0-inch, SXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447993-001</td>
</tr>
<tr>
<td>17.0-inch, WXGA+, TFT, single lamp, BrightView display assembly for use only with computer models equipped with a camera (includes wireless antenna transceivers and cables)</td>
<td>447992-001</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 47](#)).
5. Remove the memory/WLAN module compartment cover (see [Memory module on page 54](#)).
6. Disconnect the wireless antenna cables from the WLAN module (see [WLAN module on page 57](#)).
7. Remove the following components:
   a. Switch cover (see [Switch cover on page 61](#))
   b. Keyboard (see [Keyboard on page 63](#))
   c. Speaker assembly (see [Speaker assembly on page 66](#))

Remove the display assembly:

1. Close the computer and turn it upside down, with the front toward you.
2. Remove the two Phillips PM2.5×8.0 screws that secure the display assembly to the computer.

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

4. Open the computer to an upright position.

5. Disconnect the following cables:
   (1) Display panel cable
   (2) Microphone cable
   (3) Camera cable

6. Remove the wireless antenna cables (4) from the routing channels in the top cover.

7. Remove the two Phillips PM2.5×8.0 screws (1) and the two silver Phillips PM2.5×5.0 screws (2) that secure the display assembly to the computer.

⚠️ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.
8. Remove the display assembly (3).

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

   (1) Three rubber screw covers on the display bezel top edge. The display rubber screw covers are included in the Rubber Kit, spare part number 448017-001.

   (2) Two rubber screw covers on the display bezel bottom edge.

   (3) Five Phillips PM2.5×8.0 screws.

10. Flex the inside edges of the left and right sides (1) and the top and bottom sides (2) of the display bezel until the bezel disengages from the display enclosure.
11. Remove the display bezel (3). Display bezels are available using the spare part numbers 447998-001 (for dual lamp display assemblies) and 447997-001 (for single lamp display assemblies).

**NOTE:** See Camera module on page 48 for camera module replacement instructions. See Display inverter on page 50 for display inverter replacement instructions.

12. If it is necessary to replace the display panel, remove the four Phillips PM2.5×8.0 screws (1) and the two Phillips PM2.5×6.0 screws (2) that secure the display panel to the display enclosure.

13. Remove the display panel (3). Display panels are available using the following spare part numbers:
   - 447988-001 (17.0-inch, WXGA+, TFT, dual lamp, BrightView display assembly)
   - 447987-001 (17.0-inch, SXGA+, TFT, single lamp, BrightView display assembly)
   - 447986-001 (17.0-inch, WXGA+, TFT, single lamp, BrightView display assembly)

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

15. Remove the display hinges (2).
16. Remove the left and right hinge covers (3) by sliding them off of the display hinges. The display hinges are available using spare part numbers 432964-001 (for use with dual lamp display assemblies) and 432963-001 (for use with single lamp display assemblies). The display hinge covers are available using spare part number 432965-001.

17. If it is necessary to replace the wireless antenna transceivers and cables, remove the two Phillips PM2.0×4.0 screws (1) that secure each transceiver to the display enclosure.

18. Remove the wireless antenna cables from the clips (2) built into the display enclosure.

19. Detach the wireless antenna transceivers (3) from the display enclosure.

20. Remove the wireless antenna cables (4). The wireless antenna transceivers and cables are available using the following spare part numbers:
   - 448313-001 (for use with computer models equipped with an 802.11a/b/g/n WLAN module)
   - 448312-001 (for use with computer models equipped with an 802.11a/b/g or 802.11b/g WLAN module)

21. If it is necessary to replace the microphones and cables, release the retention tabs (1) built into the display enclosure that secure the microphone cables to the display enclosure.

22. Remove the microphone receivers (2) from the clips in the display enclosure.
23. Remove the microphone cables (3) from the display enclosure. The microphones and cables are available using spare part number 432961-001.

![Diagram of microphone cables]

24. If it is necessary to replace the camera cable, release the retention tabs (1) built into the display enclosure that secure the camera cable to the display enclosure.

25. Remove the camera cable (2) from the display enclosure. The camera cable is available in the Display Cable Kit, spare part number 432962-001.

![Diagram of camera cable]

Reverse this procedure to reassemble and install the display assembly.
**Top cover**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Top cover for use in computer models with Intel processors:</strong></td>
<td></td>
</tr>
<tr>
<td>Top cover for use only with computer models equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
<td>448011-001</td>
</tr>
<tr>
<td>Top cover for use only with computer models not equipped with a fingerprint reader (includes TouchPad and TouchPad cable)</td>
<td>448010-001</td>
</tr>
<tr>
<td>Fingerprint reader board (includes fingerprint reader board cable)</td>
<td>448012-001</td>
</tr>
<tr>
<td><strong>For use in computer models with AMD processors:</strong></td>
<td></td>
</tr>
<tr>
<td>For use only with computer models equipped with a fingerprint reader (includes TouchPad, TouchPad cable, fingerprint reader board, and fingerprint reader board cable)</td>
<td>450852-001</td>
</tr>
<tr>
<td>Fingerprint reader board (not illustrated; includes fingerprint reader board cable)</td>
<td>450853-001</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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)

Remove the top cover:

1. Turn the computer upside down, with the front toward you.
2. Remove the eight Phillips PM2.5×8.0 screws that secure the top cover to the computer.

3. Remove the four silver Phillips PM2.5×5.0 screws secure the top cover to the computer.

4. Turn the computer right-side up, with the front toward you.
5. Disconnect the power button board cable (1) and the LED board cable (2) from the low insertion force (LIF) connectors on the system board.

6. Release the ZIF connector (1) to which the TouchPad cable (2) is attached and disconnect the cable from the system board.
7. Remove the five Phillips PM2.5×8.0 screws (1) and the two silver Phillips PM2.5×5.0 screws (2) that secure the top cover to the base enclosure.

8. Lift the rear edge of the top cover until it disengages from the computer, and then swing it up and forward until the top cover is resting upside down in front of the computer.
9. Release the ZIF connector to which the fingerprint reader board cable (1) is attached and disconnect the cable (2) from the system board.

10. Remove the top cover.

Reverse this procedure to install the top cover.
Wireless switch board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wireless switch board (includes wireless switch board cable)</td>
<td>432991-001</td>
</tr>
</tbody>
</table>

Before removing the wireless switch 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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)

Remove the wireless switch board:

1. Release the ZIF connector to which the wireless switch board cable is connected and disconnect the wireless switch board cable (1) from the system board.
2. Remove the two silver Phillips PM2.5×5.0 screws (2) that secure the wireless switch board to the base enclosure.
3. Remove the wireless switch board (3).

Reverse this procedure to install the wireless switch board.
Bluetooth module

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluetooth module (includes Bluetooth module cable)</td>
<td>412766-002</td>
</tr>
</tbody>
</table>

Before removing the Bluetooth module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)

Remove the Bluetooth module:

1. Disconnect the Bluetooth module cable (1) from the system board. The Bluetooth module cable is included with the Bluetooth module spare part kit and is also included in the Cable Kit, spare part number 448015-001.
2. Route the Bluetooth module cable (2) under the system board.
3. Remove the two silver Phillips PM2.0×3.0 screws (3) that secure the Bluetooth module to the base enclosure.
4. Remove the Bluetooth module (4).

Reverse this procedure to install the Bluetooth module.
Front USB board

Before removing the front USB board, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see Battery on page 47).

5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)

Remove the front USB board:

1. Disconnect the front USB board cable (1) from the ExpressCard assembly. The front USB board cable is included with the front USB board spare part kit and is also included in the Cable Kit, spare part number 448015-001.

2. Remove the silver Phillips PM2.5×5.0 screw (2) that secures the front USB board to the computer.
3. Remove the front USB board (3).

Reverse this procedure to install the front USB board.

**ExpressCard assembly**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExpressCard assembly</td>
<td>432988-001</td>
</tr>
</tbody>
</table>

Before removing the ExpressCard 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 47).

5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
Remove the ExpressCard assembly:

1. Press the ExpressCard slot bezel (1) to release the bezel from the ExpressCard slot.

2. Remove the ExpressCard slot bezel (2). The ExpressCard slot bezel is included in the Plastics Kit, spare part number 432981-001.

3. Remove the four silver Phillips PM2.5×5.0 screws (1) that secure the ExpressCard assembly to the system board.

4. Disconnect the ExpressCard assembly (2) from the system board by sliding it to the right.

5. Remove the ExpressCard assembly (3).
6. If it is necessary to replace the fingerprint reader board cable, release the ZIF connector (1) to which the cable is connected and disconnect the cable (2) from the system board. The fingerprint reader board cable is included in the Cable Kit, spare part number 448015-001.

Reverse this procedure to install the ExpressCard assembly and the fingerprint reader board cable.

**Top cover trim**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top cover trim</td>
<td>432978-001</td>
</tr>
</tbody>
</table>

Before removing the top cover trim, 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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
Remove the top cover trim:

1. Turn the computer upside down with the front toward you.
2. Remove the four Phillips PM2.5×8.0 screws that secure the top cover trim to the computer.

3. Turn the computer right-side up with the front toward you.
4. Remove the Phillips PM2.5×8.0 screw (1) that secures the top cover trim to the computer.
5. Remove the top cover trim (2).

6. Remove the top cover trim.

Reverse this procedure to install the top cover trim.
Display switch module

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Display switch module for use in computer models with Intel processors (includes display switch module cable)</td>
<td>448435-001</td>
</tr>
<tr>
<td>Display switch module for use in computer models with AMD processors (includes display switch module cable)</td>
<td>432993-001</td>
</tr>
</tbody>
</table>

Before removing the display switch 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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
   h. Top cover trim (see Top cover trim on page 87)

Remove the display switch module:

1. Remove the Phillips PM2.5×5.0 screw (1) that secures the display switch module to the fan/heat sink assembly.
2. Remove the display switch module (2).

Reverse this procedure to install the display switch module.

## Rear USB board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rear USB board (includes rear USB board cable)</td>
<td>449762-001</td>
</tr>
</tbody>
</table>

Before removing the rear USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
Remove the rear USB board:

1. Remove the two silver Phillips PM2.5×5.0 screws (1) that secure the power connector bracket to the computer.

2. Remove the power connector bracket (2). The power connector bracket is available using spare part number 432985-001.

3. Remove the silver Phillips PM2.5×5.0 screw (1) that secures the rear USB board to the base enclosure.

4. Remove the rear USB board cable from the clips (2) built into the base enclosure.

5. Release the rear USB board (3) from the base enclosure as far as the rear USB board cable allows.

6. Disconnect the rear USB board cable (4) from the rear USB board.

7. Remove the rear USB board.

Reverse this procedure to install the rear USB board.
System board

NOTE: All system board spare kits include a modem module cable and hard drive thermal pads.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System board for use with computer models with Intel processors:</td>
<td></td>
</tr>
<tr>
<td>With 256 MB of video system memory for use only with computer models with discrete video system memory</td>
<td>447983-001</td>
</tr>
<tr>
<td>With 128 MB of video system memory for use only with computer models with discrete video system memory</td>
<td>447982-001</td>
</tr>
<tr>
<td>System board for use only with computer models with UMA video system memory</td>
<td>447984-001</td>
</tr>
<tr>
<td>System board for use with computer models with AMD processors:</td>
<td></td>
</tr>
<tr>
<td>With discrete video system memory</td>
<td>450799-001</td>
</tr>
<tr>
<td>With UMA video system memory</td>
<td>450800-001</td>
</tr>
<tr>
<td>Processor bracket v8.1</td>
<td>450371-001</td>
</tr>
<tr>
<td>Processor bracket v7.9</td>
<td>450370-001</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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
   h. Wireless switch board (see Wireless switch board on page 80)
   i. Front USB board (see Front USB board on page 84)
   j. ExpressCard assembly (see ExpressCard assembly on page 85)
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory modules (see Memory module on page 54)
- RTC battery (see RTC battery on page 56)
- WLAN module (see WLAN module on page 57)
- Bluetooth module (see Bluetooth module on page 82)
- ExpressCard assembly (see ExpressCard assembly on page 85)
- Optical drive connector board (see System board on page 92)

Remove the system board:

1. Turn the computer upside down with the front toward you.
2. Remove the Phillips PM2.5×8.0 screw that secures the system board to the base enclosure.
3. Turn the computer right-side up, with the front toward you.
4. Remove the three Phillips PM2.5×8.0 screws (1) and the three silver Phillips PM2.5×5.0 screws (2) that secure the system board to the base enclosure.

5. Remove the power connector cable (1) and the rear USB board cable (2) from the clips built into the base enclosure.

6. Use the area immediately behind the optical drive connector board (1) to lift the right side of the system board (2) until it rests at an angle.

7. Remove the optical drive connector board (3). The optical drive connector board is available using spare part number 432992-001.
8. Disconnect the audio board cable (4) from the system board.

9. Disconnect the power connector cable (1) from the system board.

10. Remove the system board (2) from the base enclosure by sliding it up and to the right at an angle.

11. If it is necessary to replace the rear USB board cable, turn the system board upside down with the front toward you.
12. Disconnect the rear USB board cable from the system board. The rear USB board cable is included with the rear USB board spare part kit and is also included in the Cable Kit, spare part number 448015-001.

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

- Fan/heat sink assembly (see Fan/heat sink assembly on page 99)
- Processor (see Processor on page 103)

Reverse the preceding procedure to install the system board.
Audio board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Audio board (includes audio board cable)</td>
<td>449763-001</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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
   g. Top cover (see Top cover on page 75)
   h. Wireless switch board (see Wireless switch board on page 80)
   i. Front USB board (see Front USB board on page 84)
   j. ExpressCard assembly (see ExpressCard assembly on page 85)
   k. Top cover trim (see Top cover trim on page 87)
   l. Rear USB board (see Rear USB board on page 90)
   m. System board (see System board on page 92)

Remove the fan/heat assembly:

1. Remove the silver Phillips PM2.5×5.0 screw (1) that secures the audio board to the base enclosure.
2. Release the audio board (2) by sliding it back until the audio connectors disengage from the openings in the base enclosure.
3. Remove the audio board (3).

Reverse this procedure to install the audio board.
**Fan/heat sink assembly**

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>For use only with computer models using Intel processors:</td>
<td></td>
</tr>
<tr>
<td>Equipped with discrete video system memory</td>
<td>448016-001</td>
</tr>
<tr>
<td>Equipped with UMA video system memory</td>
<td>450934-001</td>
</tr>
<tr>
<td>For use only with computer models using AMD processors:</td>
<td></td>
</tr>
<tr>
<td>Equipped with UMA video system memory</td>
<td>450863-001</td>
</tr>
<tr>
<td>Equipped with discrete video system memory</td>
<td>450864-001</td>
</tr>
</tbody>
</table>

**NOTE:** When replacing the fan/heat sink assembly, be sure that the display switch module is removed from the defective fan/heat sink assembly and installed on the replacement fan/heat sink assembly. See **Display switch module on page 89** for display switch module removal and spare part number information.

**NOTE:** To properly ventilate the computer, allow at least a 7.6-cm (3-inch) clearance on the right side and rear panel of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software applications. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see **Battery on page 47**).
5. Remove the following components:
   a. Hard drive (see **Hard drive on page 52**)
   b. Optical drive (see **Optical drive on page 59**)
   c. Switch cover (see **Switch cover on page 61**)
   d. Keyboard (see **Keyboard on page 63**)
   e. Speaker assembly (see **Speaker assembly on page 66**)
   f. Display assembly (see **Display assembly on page 69**)
   g. Top cover (see **Top cover on page 75**)
   h. Wireless switch board (see **Wireless switch board on page 80**)

**Component replacement procedures 99**
i. Audio board (see Audio board on page 97)
j. Front USB board (see Front USB board on page 84)
k. Top cover trim (see Top cover trim on page 87)
l. System board (see System board on page 92)

Remove the fan/heat assembly:

1. Turn the system board upside down, with the expansion port 3 and external monitor port toward you.

2. Disconnect the fan cable (1) from the system board.

3. Loosen the three Phillips PM2.5×5.0 captive screws (2) that secure the fan/heat sink assembly to the system board.
4. Remove the fan/heat sink assembly (3).

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

**NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly (1), (2), and (3), the system board components (4) and (6), and the processor (5) each time the fan/heat sink assembly is removed. Thermal material must be installed on all surfaces before the fan/heat sink assembly is reinstalled. Thermal material is included with all fan/heat sink assembly, system board, and processor spare part kits.

5. If it is necessary to replace the heat sink, loosen the two Phillips PM2.5×4.0 captive screws (1) that secure the heat sink to the system board.
6. Remove the heat sink (2).

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

**NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink (1), (2), and (3), and the system board components (4), (5), and (6) each time the heat sink is removed. Thermal material must be installed on all surfaces before the heat sink is reinstalled. Thermal material is included with all heat sink and system board spare part kits.

Reverse this procedure to install the fan/heat sink assembly and heat sink.
NOTE: All processor spare part kits include thermal material.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Intel processors:</strong></td>
<td></td>
</tr>
<tr>
<td>Intel Core 2 Duo T7700 processor (2.4-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
<td>446894-001</td>
</tr>
<tr>
<td>Intel Core Duo T7500 processor (2.2-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
<td>447985-001</td>
</tr>
<tr>
<td>Intel Core Duo T7300 processor (2.0-GHz, 4-MB L2 cache, 800-MHz FSB)</td>
<td>446478-001</td>
</tr>
<tr>
<td>Intel Core Duo T7100 processor (1.8-GHz, 2-MB L2 cache, 800-MHz FSB)</td>
<td>446479-001</td>
</tr>
<tr>
<td>Intel Core Duo TJ85 processor (1.67-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
<td>453195-001</td>
</tr>
<tr>
<td>Intel Core Duo T5250e processor (1.50-GHz, 2-MB L2 cache, 667-MHz FSB)</td>
<td>453033-001</td>
</tr>
<tr>
<td>Intel Core Duo T2330 processor (1.6-GHz, L2 cache, 533-MHz FSB)</td>
<td>455944–001</td>
</tr>
<tr>
<td><strong>AMD processors:</strong></td>
<td></td>
</tr>
<tr>
<td>AMD Turion TL-66 processor (2.3-GHz, 1-MB L2 cache)</td>
<td>450804-001</td>
</tr>
<tr>
<td>AMD Turion TL-62 processor (2.1-GHz, 1-MB L2 cache)</td>
<td>456023-001</td>
</tr>
<tr>
<td>AMD Turion TL-60 processor (2.0-GHz, 1-MB L2 cache)</td>
<td>450803-001</td>
</tr>
<tr>
<td>AMD Turion TL-58 processor (1.9-GHz, 1-MB L2 cache)</td>
<td>450802-001</td>
</tr>
<tr>
<td>AMD Turion TL-56 processor (1.8-GHz, 1-MB L2 cache)</td>
<td>450801-001</td>
</tr>
<tr>
<td>AMD Athlon TK-55 processor (1.86-GHz, 512-MB L2 cache)</td>
<td>456024-001</td>
</tr>
<tr>
<td>AMD Athlon TK-53 processor (1.7-GHz, 512-MB L2 cache)</td>
<td>453037-001</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 47).
5. Remove the following components:
   a. Hard drive (see Hard drive on page 52)
   b. Optical drive (see Optical drive on page 59)
   c. Switch cover (see Switch cover on page 61)
   d. Keyboard (see Keyboard on page 63)
   e. Speaker assembly (see Speaker assembly on page 66)
   f. Display assembly (see Display assembly on page 69)
g. Top cover (see Top cover on page 75)
h. Wireless switch board (see Wireless switch board on page 80)
i. Audio board (see Audio board on page 97)
j. Front USB board (see Front USB board on page 84)
k. Top cover trim (see Top cover trim on page 87)
l. System board (see System board on page 92)
m. Fan/heat sink assembly (see Fan/heat sink assembly on page 99)

Remove the processor:

1. Turn the processor locking screw (1) one-half turn counterclockwise until you hear a click.
2. Lift the processor (2) straight up and remove it.

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

Reverse this procedure to install the processor.
Starting the Setup Utility

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

NOTE: The fingerprint reader (select models only) does not work when accessing the Setup Utility.

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

To start the Setup Utility:

1. Turn on or restart the computer.

2. Before Windows opens and while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen, press f10.
Using the Setup Utility

Use this section to understand the Setup Utility.

Changing the language of the Setup Utility

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

1. To start the Setup Utility, turn on or restart the computer, and then press f10 while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.

2. Use the arrow keys to select System Configuration > Language, and then press enter.

3. Press f5 or f6 (or use the arrow keys) to select a language, and then press enter to select a language.

4. When a confirmation prompt with your preference selected is displayed, press enter to save your preference.

5. To set your preferences and exit the Setup Utility, press f10 and then follow the instructions on the screen.

Your preferences go into effect when the computer restarts in Windows.

Navigating and selecting in the Setup Utility

Because the Setup Utility is not Windows-based, it does not support the TouchPad. Navigation and selection are by keystroke.

- To choose a menu or a menu item, use the arrow keys.
- To choose an item in a drop-down list or to toggle a field, for example an Enable/Disable field, use either the arrow keys or f5 or f6.
- To select an item, press enter.
- To close a text box or return to the menu display, press esc.
- To display additional navigation and selection information while the Setup Utility is open, press f1.

Displaying system information

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

1. To start the Setup Utility, turn on or restart the computer, and then press f10 while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.

2. Access the system information by using the Main menu.

3. To exit the Setup Utility without changing any settings, use the arrow keys to select Exit > Exit Discarding Changes, and then press enter. (The computer restarts in Windows.)
Restoring default settings in the Setup Utility

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

1. To start the Setup Utility, turn on or restart the computer, and then press f10 while “Press <F10> to enter setup” is displayed in the lower-left corner of the screen.

2. Select Exit > Load Setup Defaults, and then press enter.

3. When the Setup Confirmation is displayed, press enter to save your preferences.

4. To set your preferences and exit the Setup Utility, press f10, and then follow the instructions on the screen.

The Setup Utility default settings are set when you exit the Setup Utility and go into effect when the computer restarts.

**NOTE:** Your password, security, and language settings are not changed when you restore the factory default settings.
Using advanced Setup Utility features

This guide describes the Setup Utility features recommended for all users. For more information about the Setup Utility features recommended for advanced users only, refer to Help and Support, which is accessible only when the computer is in Windows.

The Setup Utility features available for advanced users include a hard drive self-test, a Network Service Boot, and settings for boot order preferences.

The “<F12> to boot from LAN” message that is displayed in the lower-left corner of the screen each time the computer is started or restarted in Windows is the prompt for a Network Service Boot.

The “Press <F9> to change boot order” message that is displayed in the lower-left corner of the screen each time the computer is started or restarted in Windows is the prompt to change the boot order.

Closing the Setup Utility

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

● To close the Setup Utility and save your changes from the current session, use either of the following procedures:
  ◦ Press f10, and then follow the instructions on the screen.
  ◦ If the Setup Utility menus are not visible, press esc to return to the menu display. Then use the arrow keys to select Exit > Exit Saving Changes, and then press enter.

    When you use the f10 procedure, you are offered an option to return to the Setup Utility. When you use the Exit Saving Changes procedure, the Setup Utility closes when you press enter.

● To close the Setup Utility without saving your changes from the current session:

    If the Setup Utility menus are not visible, press esc to return to the menu display. Then use the arrow keys to select Exit > Exit Discarding Changes, and then press enter.

After the Setup Utility closes, the computer restarts in Windows.

Setup Utility menus

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

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

Main menu

<table>
<thead>
<tr>
<th>Select</th>
<th>To Do This</th>
</tr>
</thead>
<tbody>
<tr>
<td>System information</td>
<td>● View and change the system time and date.</td>
</tr>
<tr>
<td></td>
<td>● View identification information about the computer.</td>
</tr>
<tr>
<td></td>
<td>● View specification information about the processor, memory size, system BIOS, and keyboard controller version (select models only).</td>
</tr>
</tbody>
</table>
## Security menu

<table>
<thead>
<tr>
<th>Select</th>
<th>To Do This</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator password</td>
<td>Enter, change, or delete an administrator password.</td>
</tr>
<tr>
<td>Power-On Password</td>
<td>Enter, change, or delete a power-on password.</td>
</tr>
</tbody>
</table>

## System Configuration menu

<table>
<thead>
<tr>
<th>Select</th>
<th>To Do This</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language Support</td>
<td>Change the Setup Utility language.</td>
</tr>
<tr>
<td>Boot Options</td>
<td>Set the following boot options:</td>
</tr>
<tr>
<td></td>
<td>● f10 and f12 Delay (sec.)—Set the delay for the f10 and f12 functions of the Setup Utility in intervals of 5 seconds each (0, 5, 10, 15, 20).</td>
</tr>
<tr>
<td></td>
<td>● CD-ROM boot—Enable/disable boot from CD-ROM.</td>
</tr>
<tr>
<td></td>
<td>● Floppy boot—Enable/disable boot from Floppy.</td>
</tr>
<tr>
<td></td>
<td>● Internal Network Adapter boot—Enable/disable boot from Internal Network Adapter.</td>
</tr>
<tr>
<td></td>
<td>● Boot Order—Set the boot order for:</td>
</tr>
<tr>
<td></td>
<td>● USB Floppy</td>
</tr>
<tr>
<td></td>
<td>● ATAPI CD/DVD ROM Drive</td>
</tr>
<tr>
<td></td>
<td>● Hard drive</td>
</tr>
<tr>
<td></td>
<td>● USB Diskette on Key</td>
</tr>
<tr>
<td></td>
<td>● USB Hard drive</td>
</tr>
<tr>
<td></td>
<td>● Network adapter</td>
</tr>
<tr>
<td>Button Sound (select models only)</td>
<td>Enable/disable the Quick Launch Button tapping sound.</td>
</tr>
<tr>
<td>Virtualization Technology</td>
<td>Enable/disable the processor Virtualization Technology.</td>
</tr>
<tr>
<td>Processor C4 State</td>
<td>Enable/disable the processor C4 sleep state.</td>
</tr>
</tbody>
</table>

## Diagnostics menu

<table>
<thead>
<tr>
<th>Select</th>
<th>To Do This</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard Disk Self Test</td>
<td>Run a comprehensive self-test on the hard drive.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> On models with two hard drives, this menu option is called the Primary Hard Disk Self Test.</td>
</tr>
<tr>
<td>Secondary Hard Disk Self Test (select models only)</td>
<td>Run a comprehensive self-test on a secondary hard drive.</td>
</tr>
<tr>
<td>Memory Test</td>
<td>Run a diagnostic test on the system memory.</td>
</tr>
</tbody>
</table>
## Computer specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Height (front to back)</td>
<td>3.16 to 4.18 cm</td>
</tr>
<tr>
<td>Width</td>
<td>39.60 cm</td>
</tr>
<tr>
<td>Depth</td>
<td>28.50 cm</td>
</tr>
<tr>
<td>Weight (with optical drive, hard drive, and battery)</td>
<td>3.54 kg</td>
</tr>
<tr>
<td>Second hard drive adds:</td>
<td>0.13 kg</td>
</tr>
<tr>
<td>Camera adds:</td>
<td>0.009 kg</td>
</tr>
<tr>
<td><strong>Input power</strong></td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>18.5 V dc @ 3.5 A - 65 W</td>
</tr>
<tr>
<td>Operating current</td>
<td>3.5 A or 4.74 A</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
</tr>
<tr>
<td>Operating (not writing to optical disc)</td>
<td>0°C to 35°C</td>
</tr>
<tr>
<td>Operating (writing to optical disc)</td>
<td>5°C to 35°C</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>-20°C to 60°C</td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 90%</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
</tr>
<tr>
<td><strong>Maximum altitude</strong> (unpressurized)</td>
<td></td>
</tr>
<tr>
<td>Operating (14.7 to 10.1 psia)</td>
<td>-15 m to 3,048 m</td>
</tr>
<tr>
<td>Nonoperating (14.7 to 4.4 psia)</td>
<td>-15 m to 12,192 m</td>
</tr>
<tr>
<td><strong>Shock</strong></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>125 g, 2 ms, half-sine</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>200 g, 2 ms, half-sine</td>
</tr>
<tr>
<td><strong>Random vibration</strong></td>
<td></td>
</tr>
<tr>
<td>Metric</td>
<td>U.S.</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td><strong>Operating</strong></td>
<td>0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate</td>
</tr>
<tr>
<td><strong>Nonoperating</strong></td>
<td>1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate</td>
</tr>
</tbody>
</table>

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

### 17.0-inch, SXGA+ display specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>23.00 cm</td>
</tr>
<tr>
<td>Width</td>
<td>36.90 cm</td>
</tr>
<tr>
<td>Diagonal</td>
<td>43.40 cm</td>
</tr>
<tr>
<td><strong>Number of colors</strong></td>
<td>Up to 16.8 million</td>
</tr>
<tr>
<td><strong>Contrast ratio</strong></td>
<td>200:1 (typical)</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>180 nits (typical)</td>
</tr>
<tr>
<td><strong>Pixel resolution</strong></td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>0.197 × 0.197 mm</td>
</tr>
<tr>
<td>Format</td>
<td>1680 × 1050</td>
</tr>
<tr>
<td>Configuration</td>
<td>RGB vertical stripe</td>
</tr>
<tr>
<td><strong>Backlight</strong></td>
<td>Edge lit</td>
</tr>
<tr>
<td><strong>Character display</strong></td>
<td>80 × 25</td>
</tr>
<tr>
<td><strong>Total power consumption</strong></td>
<td>4 W</td>
</tr>
<tr>
<td><strong>Viewing angle</strong></td>
<td>+/-65° horizontal, +/-50° vertical (typical)</td>
</tr>
</tbody>
</table>
# 17.0-inch WXGA+ display specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>23.00 cm</td>
</tr>
<tr>
<td>Width</td>
<td>36.90 cm</td>
</tr>
<tr>
<td>Diagonal</td>
<td>43.40 cm</td>
</tr>
<tr>
<td><strong>Number of colors</strong></td>
<td>Up to 16.8 million</td>
</tr>
<tr>
<td><strong>Contrast ratio</strong></td>
<td>200:1</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>180 nits typical</td>
</tr>
<tr>
<td><strong>Pitch resolution</strong></td>
<td></td>
</tr>
<tr>
<td>Pitch</td>
<td>0.259 × 0.259 mm</td>
</tr>
<tr>
<td>Format</td>
<td>1280 × 800</td>
</tr>
<tr>
<td>Configuration</td>
<td>RGB vertical stripe</td>
</tr>
<tr>
<td><strong>Backlight</strong></td>
<td>Edge lit</td>
</tr>
<tr>
<td><strong>Character display</strong></td>
<td>80 × 25</td>
</tr>
<tr>
<td><strong>Total power consumption</strong></td>
<td>4 W</td>
</tr>
<tr>
<td><strong>Viewing angle</strong></td>
<td>+/-40° horizontal, +/-40° vertical typical</td>
</tr>
</tbody>
</table>
# Hard drive specifications

<table>
<thead>
<tr>
<th>Name</th>
<th>200-GB*</th>
<th>160-GB*</th>
<th>120-GB*</th>
<th>100-GB*</th>
<th>80-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>101 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>ATA-7</td>
<td>ATA-7</td>
<td>ATA-7</td>
<td>ATA-7</td>
<td>ATA-7</td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synchronous (maximum)</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>Security</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>3 ms</td>
<td>3 ms</td>
<td>3 ms</td>
<td>3 ms</td>
<td>3 ms</td>
</tr>
<tr>
<td>Average</td>
<td>13 ms</td>
<td>13 ms</td>
<td>13 ms</td>
<td>13 ms</td>
<td>13 ms</td>
</tr>
<tr>
<td>Maximum</td>
<td>24 ms</td>
<td>24 ms</td>
<td>24 ms</td>
<td>24 ms</td>
<td>24 ms</td>
</tr>
<tr>
<td><strong>Logical blocks</strong></td>
<td>396,532,124</td>
<td>317,249,699</td>
<td>237,937,247</td>
<td>198,281,062</td>
<td>158,624,849</td>
</tr>
<tr>
<td><strong>Disc rotational speed</strong></td>
<td>4200-rpm</td>
<td>5400-rpm</td>
<td>5400-rpm</td>
<td>7200-rpm</td>
<td>5400-rpm</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.

**NOTE:** Certain restrictions and exclusions apply. Contact technical support for details.
# DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive specifications

<table>
<thead>
<tr>
<th>Applicable disc</th>
<th>Read:</th>
<th>Write:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Access time</th>
<th>CD</th>
<th>DVD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random</td>
<td>&lt; 175 ms</td>
<td>&lt; 230 ms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cache buffer</th>
<th>2 MB</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Data transfer rate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24X CD-ROM</td>
<td>3,600 KB/sec</td>
</tr>
<tr>
<td>8X DVD</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>24X CD-R</td>
<td>3,600 KB/sec</td>
</tr>
<tr>
<td>16X CD-RW</td>
<td>2,400 KB/sec</td>
</tr>
<tr>
<td>8X DVD+R</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>4X DVD+RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>8X DVD-R</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>4X DVD-RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>2.4X DVD+R(9)</td>
<td>2,700 KB/sec</td>
</tr>
<tr>
<td>5X DVD-RAM</td>
<td>6,750 KB/sec</td>
</tr>
</tbody>
</table>

| Transfer mode | Multiword DMA Mode |
### HD DVD-ROM Drive with SuperMulti DVD±R/RW Double Layer support specifications

<table>
<thead>
<tr>
<th>Applicable disc</th>
<th>Read:</th>
<th>Write:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Access time</th>
<th>CD</th>
<th>DVD</th>
<th>HD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random</td>
<td>170 ms</td>
<td>170 ms</td>
<td>230 ms</td>
</tr>
</tbody>
</table>

| Cache buffer | 8 MB |

<table>
<thead>
<tr>
<th>Data transfer rate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24X CD-ROM</td>
<td>3,600 KB/sec</td>
</tr>
<tr>
<td>8X DVD</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>16X CD-R</td>
<td>2,400 KB/sec</td>
</tr>
<tr>
<td>10X CD-RW</td>
<td>1,500 KB/sec</td>
</tr>
<tr>
<td>4X DVD+R</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>4X DVD+RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>4X DVD-R</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>4X DVD-RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>2.4X DVD+R(9)</td>
<td>2,700 KB/sec</td>
</tr>
<tr>
<td>3X DVD-RAM</td>
<td>4,056 KB/sec</td>
</tr>
<tr>
<td>1X HD-DVD-ROM</td>
<td>4,460 KB/sec</td>
</tr>
</tbody>
</table>

| Transfer mode      | Multiword DMA Mode |
Blu-ray Disc ROM Drive with SuperMulti DVD±R/RW Double-Layer (DL) support specifications

<table>
<thead>
<tr>
<th>Applicable disc</th>
<th>Read:</th>
<th>Write:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Access time</th>
<th>CD</th>
<th>DVD</th>
<th>Blu-ray</th>
</tr>
</thead>
<tbody>
<tr>
<td>Random</td>
<td>150 ms</td>
<td>180 ms</td>
<td>300 ms</td>
</tr>
</tbody>
</table>

| Cache buffer | 8 MB |

<table>
<thead>
<tr>
<th>Data transfer rate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>24X CD-ROM</td>
<td>3,600 KB/sec</td>
</tr>
<tr>
<td>8X DVD</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>24X CD-R</td>
<td>3,600 KB/sec</td>
</tr>
<tr>
<td>16X CD-RW</td>
<td>2,400 KB/sec</td>
</tr>
<tr>
<td>8X DVD+R</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>4X DVD+RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>8X DVD-R</td>
<td>10,800 KB/sec</td>
</tr>
<tr>
<td>4X DVD-RW</td>
<td>5,400 KB/sec</td>
</tr>
<tr>
<td>2.4X DVD+R(9)</td>
<td>2,700 KB/sec</td>
</tr>
<tr>
<td>5X DVD-RAM</td>
<td>6,750 KB/sec</td>
</tr>
<tr>
<td>1X BD-ROM</td>
<td>4,500 KB/sec</td>
</tr>
<tr>
<td>1X BD-R read</td>
<td>4,500 KB/sec</td>
</tr>
<tr>
<td>1X BD-RE read</td>
<td>4,500 KB/sec</td>
</tr>
</tbody>
</table>

| Transfer mode | Multiword DMA Mode |
## System DMA specifications, Intel

<table>
<thead>
<tr>
<th>Hardware DMA</th>
<th>System function</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMA0</td>
<td>Not applicable</td>
</tr>
<tr>
<td>DMA1*</td>
<td>Not applicable</td>
</tr>
<tr>
<td>DMA2*</td>
<td>Not applicable</td>
</tr>
<tr>
<td>DMA3</td>
<td>Not applicable</td>
</tr>
<tr>
<td>DMA4</td>
<td>Direct memory access controller</td>
</tr>
<tr>
<td>DMA5*</td>
<td>Available for PC Card</td>
</tr>
<tr>
<td>DMA6</td>
<td>Not assigned</td>
</tr>
<tr>
<td>DMA7</td>
<td>Not assigned</td>
</tr>
</tbody>
</table>

*PC Card controller can use DMA 1, 2, or 5.
## System DMA specifications, AMD discrete and UMA graphics

<table>
<thead>
<tr>
<th>Hardware DMA</th>
<th>System function</th>
</tr>
</thead>
<tbody>
<tr>
<td>DMA4</td>
<td>Direct memory access controller</td>
</tr>
</tbody>
</table>
## System interrupt specifications, Intel

<table>
<thead>
<tr>
<th>Hardware IRQ</th>
<th>System function</th>
</tr>
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<tbody>
<tr>
<td>IRQ0</td>
<td>System timer</td>
</tr>
<tr>
<td>IRQ1</td>
<td>Standard 101-/102-Key or Microsoft® Natural Keyboard</td>
</tr>
<tr>
<td>IRQ2</td>
<td>Cascaded</td>
</tr>
<tr>
<td>IRQ3</td>
<td>Intel 82801DB/DBM USB2 Enhanced Host Controller—24CD</td>
</tr>
<tr>
<td>IRQ4</td>
<td>COM1</td>
</tr>
<tr>
<td>IRQ5*</td>
<td>Conexant AC—Link Audio Intel 82801DB/DBM SMBus Controller—24C3 Data Fax Modem with SmartCP</td>
</tr>
<tr>
<td>IRQ6</td>
<td>Diskette drive</td>
</tr>
<tr>
<td>IRQ7*</td>
<td>Parallel port</td>
</tr>
<tr>
<td>IRQ8</td>
<td>System CMOS/real-time clock</td>
</tr>
<tr>
<td>IRQ9*</td>
<td>Microsoft ACPI-compliant system</td>
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<tr>
<td>IRQ10*</td>
<td>Intel USB UHCI controller—24C2</td>
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<tr>
<td></td>
<td>Intel 82852/82855 GM/GME Graphic Controller</td>
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<tr>
<td></td>
<td>Realtek RTL8139 Family PCI Fast Ethernet Controller</td>
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<td>IRQ11</td>
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<td>Intel USB UHCI controller—24C4</td>
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<td>Intel USB UHCI controller—24C7</td>
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<td>Intel Pro/Wireless 2200BG</td>
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<tr>
<td></td>
<td>TI OHCI 1394 host controller</td>
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<tr>
<td></td>
<td>TI PCI1410 CardBus controller</td>
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<tr>
<td>IRQ12</td>
<td>Synaptics PS/2 TouchPad</td>
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<tr>
<td>IRQ13</td>
<td>Numeric data processor</td>
</tr>
<tr>
<td>IRQ14</td>
<td>Primary IDE channel</td>
</tr>
<tr>
<td>IRQ15</td>
<td>Secondary IDE channel</td>
</tr>
</tbody>
</table>

*Default configuration; audio possible configurations are IRQ5, IRQ7, IRQ9, IRQ10, or none.

**NOTE:** PC Cards may assert IRQ3, IRQ4, IRQ5, IRQ7, IRQ9, IRQ10, IRQ11, or IRQ15. Either the infrared or the serial port may assert IRQ3 or IRQ4.
<table>
<thead>
<tr>
<th>Hardware</th>
<th>IRQ System function</th>
</tr>
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<tbody>
<tr>
<td>IRQ0</td>
<td>High precision event timer</td>
</tr>
<tr>
<td>IRQ1</td>
<td>Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard</td>
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<td>IRQ5</td>
<td>RICOH OHCI Compliant IEEE 1394 Host Controller</td>
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<td>Ricoh SD/MMC Host Controller</td>
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<td>Ricoh XD-Picture Card Controller</td>
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<td></td>
<td>SDA Standard Compliant SD Host Controller</td>
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<tr>
<td>IRQ8</td>
<td>High precision event timer</td>
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<tr>
<td>IRQ10</td>
<td>nVidia nForce PCI System Management</td>
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<td>IRQ15</td>
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<td>IRQ16</td>
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<tr>
<td>IRQ17</td>
<td>Standard Enhanced PCI to USB Host Controller</td>
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<tr>
<td>IRQ18</td>
<td>Standard OpenHCD USB Host Controller</td>
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<tr>
<td>IRQ19</td>
<td>nVidia GeForce8400M GS</td>
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<tr>
<td>IRQ20</td>
<td>nVidia nForce Networking Controller</td>
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<tr>
<td>IRQ21</td>
<td>HDA Controller</td>
</tr>
<tr>
<td>IRQ23</td>
<td>Standard Dual Channel PCI IDE Controller</td>
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## System interrupt specifications, AMD UMA graphics

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## System I/O address specifications, Intel

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<tr>
<th>I/O address (hex)</th>
<th>System function (shipping configuration)</th>
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<td>000 - 00F</td>
<td>DMA controller no. 1</td>
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<td>020 - 021</td>
<td>Interrupt controller no. 1</td>
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<td>022 - 024</td>
<td>Opti chipset configuration registers</td>
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<td>025 - 03F</td>
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<tr>
<td>02E - 02F</td>
<td>87334 “Super I/O” configuration for CPU</td>
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<tr>
<td>040 - 05F</td>
<td>Counter/timer registers</td>
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<tr>
<td>044 - 05F</td>
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<tr>
<td>060</td>
<td>Keyboard controller</td>
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<tr>
<td>061</td>
<td>Port B</td>
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<td>062 - 063</td>
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<td>Keyboard controller</td>
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<td>070 - 071</td>
<td>NMI enable/RTC</td>
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<td>072 - 07F</td>
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<tr>
<td>080 - 08F</td>
<td>DMA page registers</td>
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<td>090 - 091</td>
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<td>092</td>
<td>Port A</td>
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<td>093 - 09F</td>
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<td>0A0 - 0A1</td>
<td>Interrupt controller no. 2</td>
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<td>0A2 - 0BF</td>
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<tr>
<td>0C0 - 0DF</td>
<td>DMA controller no. 2</td>
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<tr>
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</tr>
<tr>
<td>0F0 - 0F1</td>
<td>Coprocessor busy clear/reset</td>
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<tr>
<td>0F2 - 0FF</td>
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</tr>
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<td>100 - 16F</td>
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<tr>
<td>170 - 177</td>
<td>Secondary fixed disk controller</td>
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<td>178 - 1EF</td>
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<tr>
<td>1F0 - 1F7</td>
<td>Primary fixed disk controller</td>
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<tr>
<td>201</td>
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<td>202 - 21F</td>
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<td>I/O address (hex)</td>
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<td>Entertainment audio</td>
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</tr>
<tr>
<td>2A8 - 2E7</td>
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<tr>
<td>2E8 - 2EF</td>
<td>Reserved serial port</td>
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<td>Unused</td>
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<tr>
<td>2F8 - 2FF</td>
<td>Infrared port</td>
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<tr>
<td>300 - 31F</td>
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</tr>
<tr>
<td>320 - 36F</td>
<td>Unused</td>
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<tr>
<td>370 - 377</td>
<td>Secondary diskette drive controller</td>
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<tr>
<td>378 - 37F</td>
<td>Parallel port (LPT1/default)</td>
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<tr>
<td>380 - 387</td>
<td>Unused</td>
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<tr>
<td>388 - 38B</td>
<td>FM synthesizer—OPL3</td>
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<tr>
<td>38C - 3AF</td>
<td>Unused</td>
</tr>
<tr>
<td>3B0 - 3BB</td>
<td>VGA</td>
</tr>
<tr>
<td>3BC - 3BF</td>
<td>Reserved (parallel port/no EPP support)</td>
</tr>
<tr>
<td>3C0 - 3DF</td>
<td>VGA</td>
</tr>
<tr>
<td>3E0 - 3E1</td>
<td>PC Card controller in CPU</td>
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<td>3E2 - 3E3</td>
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<td>3E8 - 3EF</td>
<td>Internal modem</td>
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<tr>
<td>3F0 - 3F7</td>
<td>“A” diskette controller</td>
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<tr>
<td>3F8 - 3FF</td>
<td>Serial port (COM1/default)</td>
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<tr>
<td>CF8 - CFB</td>
<td>PCI configuration index register (PCIDIVO-1)</td>
</tr>
<tr>
<td>CFC - CFF</td>
<td>PCI configuration data register (PCIDIVO-1)</td>
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<tr>
<th>I/O address (hex)</th>
<th>System function (shipping configuration)</th>
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<tbody>
<tr>
<td>0000 - 0008</td>
<td>DMA controller</td>
</tr>
<tr>
<td>000A - 000F</td>
<td>DMA controller</td>
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<tr>
<td>0020 - 0021</td>
<td>Programmable interrupt controller</td>
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<tr>
<td>0040 - 0043</td>
<td>System timer</td>
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<tr>
<td>0060 - 0060</td>
<td>Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard</td>
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<tr>
<td>0061 - 0061</td>
<td>System speaker</td>
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<td>0062 - 0062</td>
<td>Microsoft ACPI-Compliant Embedded Controller</td>
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<tr>
<td>0064 - 0064</td>
<td>Standard 101-/102-Key or Microsoft® Natural PS/2 Keyboard</td>
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<td>0066 - 0066</td>
<td>Microsoft ACPI-Compliant Embedded Controller</td>
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<tr>
<td>0070 - 0071</td>
<td>System CMOS/real time clock</td>
</tr>
<tr>
<td>0081 - 0083</td>
<td>DMA controller</td>
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<td>0087 - 0087</td>
<td>DMA controller</td>
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<tr>
<td>0089 - 008B</td>
<td>DMA controller</td>
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<tr>
<td>008F - 00F (UMA only)</td>
<td>DMA controller</td>
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<tr>
<td>00A0 - 00A1</td>
<td>Programmable interrupt controller</td>
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<tr>
<td>00C0 - 00D1</td>
<td>DMA controller</td>
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<td>00D4 - 00DF</td>
<td>DMA controller</td>
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<td>Numeric data processor</td>
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<td>0170 - 0177</td>
<td>ATA Channel 1</td>
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<td>0376 - 0376</td>
<td>ATA Channel 1</td>
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<tr>
<td>03B0 - 03BB</td>
<td>nVidia GeForce8400M GS (discrete)</td>
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<tr>
<td></td>
<td>nVidia MCP67M (UMA)</td>
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<tr>
<td>03B0 - 03BB (discrete only)</td>
<td>PCI standard PCI-to-PCI bridge</td>
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<tr>
<td>03C0 - 03DF</td>
<td>nVidia GeForce8400M GS (discrete)</td>
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<td>ATA Channel 0</td>
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<tr>
<td>3000 - 303F</td>
<td>nVidia nForce PCI System Management</td>
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<td>3040 - 307F</td>
<td>nVidia nForce PCI System Management</td>
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<td>3080 - 30BF</td>
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<td>30C0 - 30CF</td>
<td>Standard Dual Channel PCI IDE Controller</td>
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<td>I/O address (hex)</td>
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## System memory map specifications, Intel

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<thead>
<tr>
<th>Size</th>
<th>Memory address</th>
<th>System function</th>
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<tbody>
<tr>
<td>640 KB</td>
<td>00000000-0009FFFF</td>
<td>Base memory</td>
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<tr>
<td>128 KB</td>
<td>000A0000-000BFFFF</td>
<td>Video memory</td>
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<tr>
<td>48 KB</td>
<td>000C0000-000CBFFF</td>
<td>Video BIOS</td>
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<td>000E8000-000FFFFF</td>
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</tr>
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<td>00100000-00FFFFF</td>
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<td>04800000-07FFFFF</td>
<td>Super extended memory</td>
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<tr>
<td>2 MB</td>
<td>08000000-080FFFFF</td>
<td>Video memory (direct access)</td>
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<tr>
<td>4 GB</td>
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<tr>
<td>64 KB</td>
<td>FFFF0000-FFFFFFFF</td>
<td>System BIOS</td>
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<tr>
<td>16 KB</td>
<td>B0000000-B0003FFF</td>
<td>HDA Controller</td>
</tr>
<tr>
<td>8 KB</td>
<td>B0004000-B0005FFF</td>
<td>Standard Dual Channel PCI IDE Controller</td>
</tr>
<tr>
<td>4 KB</td>
<td>B0006000-B0006FFF</td>
<td>Standard OpenHCD USB Host Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B0007000-B00070FF</td>
<td>Standard Enhanced PCI to USB Host Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B0007400-B00074FF</td>
<td>Standard Enhanced PCI to USB Host Controller</td>
</tr>
<tr>
<td>16 B</td>
<td>B0007800-B000780F</td>
<td>nVidia nForce Networking Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B0007C00-B0007CFF</td>
<td>nVidia nForce Networking Controller</td>
</tr>
<tr>
<td>4 KB</td>
<td>B0008000-B0008FFF</td>
<td>Standard OpenHCD USB Host Controller</td>
</tr>
<tr>
<td>4 KB</td>
<td>B0009000-B0009FFF</td>
<td>nVidia nForce Networking Controller</td>
</tr>
<tr>
<td>512 KB</td>
<td>B0080000-B00FFFFF</td>
<td>nVidia nForce System Management Controller</td>
</tr>
<tr>
<td>16 MB</td>
<td>B1000000-B1FFFFFF</td>
<td>nVidia MCP67M</td>
</tr>
<tr>
<td>16 MB</td>
<td>B2000000-B2FFFFFF</td>
<td>nVidia MCP67M</td>
</tr>
<tr>
<td>2 KB</td>
<td>B3000000-B30007FF</td>
<td>RIICOH OHCI Compliant IEEE 1394 Host Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B3000800-B30008FF</td>
<td>SDA Standard Compliant SD Host Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B3000C00-B3000CFF</td>
<td>Ricoh SD/MMC Host Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B3001000-B30010FF</td>
<td>Ricoh Memory Stick Controller</td>
</tr>
<tr>
<td>256 B</td>
<td>B3001400-B30014FF</td>
<td>Ricoh XD-Picture Card Controller</td>
</tr>
<tr>
<td>16 KB</td>
<td>B6000000-B6003FFF</td>
<td>Broadcom WLAN adapter</td>
</tr>
<tr>
<td>256 KB</td>
<td>C0000000-CFFFFFFF</td>
<td>nVidia MCP67M</td>
</tr>
<tr>
<td>1 KB</td>
<td>FED00000-FED003FF</td>
<td>High precision event timer</td>
</tr>
</tbody>
</table>
This section provides specification and reference information for the screws and screw locks used in the computer. All screws and screw locks listed in this section are available in the Screw Kit, spare part number 441140-001, and the Display Screw Kit, spare part number 441124-001.

**Phillips PM2.5×8.0 captive screw**

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>4</td>
<td>8.0 mm</td>
<td>2.4 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

Where used:

4 captive screws (secured by C-clips) that secure the hard drive covers to the computer
Phillips PM3.0×4.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>8</td>
<td>4.0 mm</td>
<td>3.0 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

*Where used:* 8 screws that secure the hard drive brackets to the hard drives
Phillips PM2.5×5.0 captive screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>5</td>
<td>5.0 mm</td>
<td>2.5 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

**Where used:**
- 2 captive screws (secured by C-clips) that secure the memory/WLAN module compartment cover to the computer
- 3 captive screws that secure the fan/heat sink assembly to the computer
Phillips PM2.0×11.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>2</td>
<td>11.0 mm</td>
<td>2.0 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

Where used:

2 screws that secure the WLAN module to the computer
Phillips PM2.5×8.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>37</td>
<td>8.0 mm</td>
<td>2.5 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

Where used:

(1) One screw that secures the optical drive to the computer

(2) One screw that secures the keyboard to the computer

(3) Two screws that secure the display assembly to the computer
**Where used:** 2 screws that secure the display assembly to the computer

**Where used:** 5 screws that secure the display bezel to the display computer

**Where used:** 4 screws that secure the display panel to the display enclosure
Where used: 8 screws that secure the top cover to the computer

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

Where used: 4 screws that secure the top cover trim to the computer
**Where used:** One screw that secures the top cover trim to the computer

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

**Where used:** 3 screws that secure the system board to the computer
Phillips PM2.0×3.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>8</td>
<td>3.0 mm</td>
<td>2.0 mm</td>
<td>4.0 mm</td>
</tr>
</tbody>
</table>

*Where used:* 2 screws that secure the optical drive bracket to the optical drive

*Where used:* 4 screws that secure the display hinges to the display panel
Where used: 2 screws that secure the Bluetooth module to the system board
Phillips PM2.5×5.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>35</td>
<td>5.0 mm</td>
<td>2.5 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

**Where used:** 6 screws that secure the switch cover to the computer

**Where used:** 3 screws that secure the keyboard to the computer
Where used: 2 screws that secure the speaker to the computer

Where used: One screw that secures the power button board to the computer

Where used: 2 screws that secure the display assembly to the computer
**Where used:** 4 screws that secure the top cover to the computer

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

**Where used:**

(1) Two screws that secure the wireless switch board to the computer
(2) One screw that secures the audio board to the computer

Where used:

(1) One screw that secures the front USB board to the base enclosure
(2) Four screws that secure the ExpressCard assembly to the system board

Where used:

(1) One screw that secures the display switch module to the fan/heat sink assembly
(2) Two screws that secure the power connector cable bracket to the base enclosure
(3) One screw that secures the rear USB board to the base enclosure
(4) 3 screws that secure the system board to the base enclosure
Phillips PM2.5\times6.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>2</td>
<td>6.0 mm</td>
<td>2.5 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

*Where used:* 2 screws that secure the display panel to the display assembly
Phillips PM2.0×4.0 screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>4</td>
<td>4.0 mm</td>
<td>2.0 mm</td>
<td>4.5 mm</td>
</tr>
</tbody>
</table>

Where used: 4 screws that secure the wireless antenna transceivers to the display enclosure
Phillips 2.5×4.0 captive screw

<table>
<thead>
<tr>
<th>Color</th>
<th>Quantity</th>
<th>Length</th>
<th>Thread</th>
<th>Head width</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver</td>
<td>2</td>
<td>4.0 mm</td>
<td>2.5 mm</td>
<td>5.0 mm</td>
</tr>
</tbody>
</table>

Where used: 2 captive screws that secure the heat sink to the system board
Recovering system information

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

● Backing up your information regularly to protect your important system files.

● Making a set of recovery discs (Recovery Manager software feature). Recovery discs are used to start up (boot) your computer and restore the operating system and software programs to factory settings in case of system failure or instability.

● Creating system restore points (operating system feature). System restore points allow you to reverse undesirable changes to your computer by restoring the computer to an earlier state.

● Recovering a program or driver (Recovery Manager software feature). This feature helps you reinstall a program or driver without performing a full system recovery.

● Performing a full system recovery (Recovery Manager software feature). With Recovery Manager, you can recover your full factory image if you experience system failure or instability. Recovery Manager works from a dedicated recovery partition on the hard drive or from recovery discs you create.

Creating recovery discs

After setting up the computer for the first time, be sure to create a set of recovery discs of the full factory image. The recovery discs are used to start up (boot) the computer and recover the operating system and software to factory settings in case of system instability or failure.

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

Note the following guidelines before creating recovery discs:

● Use any of the following types of discs: CD-R, DVD+R, DVD+R DL, DVD-R or DVD-R DL (purchased separately). The discs you use will depend on the type of optical drive installed in your computer. Because DVDs store more information than CDs, DVDs and DVDs with double-layer (DL) support reduce the number of discs required.

NOTE: Read-write discs, such as CD-RW, DVD+RW, and DVD-RW, are not compatible with the Recovery Manager software.

● The computer must be connected to AC power during this process.

● Only one set of recovery discs can be created per computer.
Number each disc before inserting it into the computer optical drive.

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

To create a set of recovery discs:

1. Select Start > All Programs > Recovery Manager > Recovery Manager. Recovery Manager opens.

2. Click Advanced Options.

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

3. Click Recovery disc creation, and then click Next.

4. Follow the on-screen instructions.

**Backing up your information**

**When to back up**

- On a regularly scheduled basis

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

- Before the computer is repaired or restored

- Before you add or modify hardware or software

**Backup suggestions**

- Create a set of recovery discs using Recovery Manager.

- Create system restore points using the Windows® System Restore feature, and periodically copy them to disc.

- Store personal files in the Documents folder and back up these folders periodically.

- Back up templates stored in their associated programs.

- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time saver if you have to reset your preferences.

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

a. Display the screen.

b. Copy the screen:

   To copy only the active window, press alt+fn+prt sc.

   To copy the entire screen, press fn+prt sc.

c. Open a word-processing document, and then select **Edit > Paste**.
Using system restore points

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

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

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

When to create restore points

- Before you add or extensively modify software or hardware
- Periodically, whenever the system is performing optimally

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

Create a system restore point

2. In the left pane, click System protection.
3. Click the System Protection tab.
4. Under Automatic restore points, select the disk for which you want to create a restore point.
5. Click Create.
   The System Protection window opens.
6. Follow the on-screen instructions.

Restore to a previous date and time

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

2. In the left pane, click System protection.
3. Click the System Protection tab.
4. Click the System Restore button, and then click Next.
   The System Restore window opens.
5. Follow the on-screen instructions.
Performing a recovery

**NOTE:** You can only recover files that you have previously backed up. HP recommends that you use Recovery Manager to create an entire drive backup as soon as you set up your computer.

Recovery Manager software allows you to repair or restore the system if you experience system failure or instability. Recovery Manager works from recovery discs that you create or from a dedicated recovery partition on the hard drive.

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

**NOTE:** Recovery Manager recovers only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

Recovering from the recovery discs

To restore the system from the recovery discs:

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

Recovering from the partition on the hard drive

You can perform a recovery from the partition on the hard drive from either the Start button or f11.

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

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

   Recovery Manager opens.

2. Click Advanced Options.

3. Click System recovery, and then click Next.

4. Follow the on-screen instructions.
## 9 Connector pin assignments

### Audio-out (headphone)

![Audio-out diagram]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Audio out, left channel</td>
</tr>
<tr>
<td>2</td>
<td>Audio out, right channel</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
</tbody>
</table>

### Audio-in (microphone)

![Audio-in diagram]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Audio signal in</td>
</tr>
<tr>
<td>2</td>
<td>Audio signal in</td>
</tr>
<tr>
<td>3</td>
<td>Ground</td>
</tr>
</tbody>
</table>
## External monitor

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Red analog</td>
</tr>
<tr>
<td>2</td>
<td>Green analog</td>
</tr>
<tr>
<td>3</td>
<td>Blue analog</td>
</tr>
<tr>
<td>4</td>
<td>Not connected</td>
</tr>
<tr>
<td>5</td>
<td>Ground</td>
</tr>
<tr>
<td>6</td>
<td>Ground analog</td>
</tr>
<tr>
<td>7</td>
<td>Ground analog</td>
</tr>
<tr>
<td>8</td>
<td>Ground analog</td>
</tr>
<tr>
<td>9</td>
<td>+5 VDC</td>
</tr>
<tr>
<td>10</td>
<td>Ground</td>
</tr>
<tr>
<td>11</td>
<td>Monitor detect</td>
</tr>
<tr>
<td>12</td>
<td>DDC 2B data</td>
</tr>
<tr>
<td>13</td>
<td>Horizontal sync</td>
</tr>
<tr>
<td>14</td>
<td>Vertical sync</td>
</tr>
<tr>
<td>15</td>
<td>DDC 2B clock</td>
</tr>
</tbody>
</table>
### RJ-11 (modem)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unused</td>
</tr>
<tr>
<td>2</td>
<td>Tip</td>
</tr>
<tr>
<td>3</td>
<td>Ring</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
</tr>
<tr>
<td>6</td>
<td>Unused</td>
</tr>
</tbody>
</table>

### RJ-45 (network)

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Transmit +</td>
</tr>
<tr>
<td>2</td>
<td>Transmit -</td>
</tr>
<tr>
<td>3</td>
<td>Receive +</td>
</tr>
<tr>
<td>4</td>
<td>Unused</td>
</tr>
<tr>
<td>5</td>
<td>Unused</td>
</tr>
<tr>
<td>6</td>
<td>Receive -</td>
</tr>
<tr>
<td>7</td>
<td>Unused</td>
</tr>
<tr>
<td>8</td>
<td>Unused</td>
</tr>
</tbody>
</table>
## S-Video-out

![S-Video-out diagram]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>S-VHS color (C) signal</td>
</tr>
<tr>
<td>2</td>
<td>Composite video signal</td>
</tr>
<tr>
<td>3</td>
<td>S-VHS intensity (Y) signal</td>
</tr>
<tr>
<td>4</td>
<td>S-VHS color ground</td>
</tr>
<tr>
<td>5</td>
<td>TV-CD</td>
</tr>
<tr>
<td>6</td>
<td>S-VHS intensity ground</td>
</tr>
<tr>
<td>7</td>
<td>Composite video ground</td>
</tr>
</tbody>
</table>

## Universal Serial Bus

![Universal Serial Bus diagram]

<table>
<thead>
<tr>
<th>Pin</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>+5 VDC</td>
</tr>
<tr>
<td>2</td>
<td>Data -</td>
</tr>
<tr>
<td>3</td>
<td>Data +</td>
</tr>
<tr>
<td>4</td>
<td>Ground</td>
</tr>
</tbody>
</table>
The wide range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC or from 220 to 240 volts AC.

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

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

**Requirements for all countries or regions**

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

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

<table>
<thead>
<tr>
<th>Country or 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>
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<tr>
<td>Germany</td>
<td>VDE</td>
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<tr>
<td>Italy</td>
<td>IMQ</td>
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</tr>
<tr>
<td>Japan</td>
<td>METI</td>
<td>3</td>
</tr>
<tr>
<td>South Korea</td>
<td>EK</td>
<td>4</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>
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<td>Sweden</td>
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</tr>
<tr>
<td>Taiwan</td>
<td>BSMI</td>
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<tr>
<td>The United Kingdom</td>
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<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.
11 Recycling

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

Display

⚠️ **WARNING!** The backlight contains mercury. Caution must be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

⚠️ **CAUTION:** The procedures in this appendix can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. Careful handling must be exercised when removing these components.

ℹ️ **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 appendix are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.
Perform the following steps to disassemble the display assembly:

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

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

3. Remove the display bezel (3).
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter (2).

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

6. Remove the display panel assembly (2) from the display enclosure.

7. Turn the display panel assembly upside down.

8. Remove all screws that secure the display panel frame to the display panel.

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

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

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

13. Remove the backlight cover.

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

16. Turn the display panel upside down.

17. Remove the backlight frame from the display panel.

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

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

23. Remove the LCD panel.

24. Recycle the LCD panel and backlight.
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