OMEN by HP Laptop PC
Models 17-w001 through 17-w099 and
Models 17-w201 through 17w299

Maintenance and Service Guide
Important Notice about Customer Self-Repair Parts

⚠️ CAUTION: Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, “Removal and replacement procedures for Customer Self-Repair parts,” for details. Accessing parts described in Chapter 6, “Removal and replacement procedures for authorized service provider parts,” can damage the computer or void your warranty.
Important Notice about Customer Self-Repair Parts
**Processor information**

**IMPORTANT:** This version of Windows running with the processor or chipsets used in this system has limited support from Microsoft. For more information about Microsoft's support, please see Microsoft's Support Lifecycle FAQ at [https://support.microsoft.com/lifecycle](https://support.microsoft.com/lifecycle).
Safety warning notice

⚠ WARNING! To reduce the possibility of heat-related injuries or of overheating the device, do not place the device directly on your lap or obstruct the device air vents. Use the device 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 device and the AC adapter comply with the user-accessible surface temperature limits defined by the International Standard for Safety of Information Technology Equipment (IEC 60950-1).
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# Product description

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<th>Category</th>
<th>Description</th>
<th>Intel 6th generation processors</th>
<th>Intel 7th generation processors</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>OMEN by HP Laptop PC</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td><strong>Processors</strong></td>
<td>Intel® Core™ i7-6700HQ (2.6 GHz, turbo up to 3.5 GHz), 2133 MHz/6 MB L3, Quad cTDP 35 W</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-6300HQ (2.3 GHz, turbo up to 3.2 GHz), 2133 MHz/6 MB L3, Quad cTDP 35 W</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-7700HQ (2.8 GHz, turbo up to 3.8 GHz), 2400 MHz/6 MB L3, Quad cTDP 35 W</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-7300HQ (2.5 GHz, turbo up to 3.5 GHz), 2400 MHz/6 MB L3, Quad cTDP 35 W</td>
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<td>√</td>
</tr>
<tr>
<td><strong>Chipset</strong></td>
<td>Intel HM170</td>
<td>√</td>
<td>√</td>
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<tr>
<td></td>
<td>Intel HM 175</td>
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<tr>
<td><strong>Graphics</strong></td>
<td>Internal graphics:</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Intel HD Graphics 530</td>
<td></td>
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<tr>
<td></td>
<td>Intel HD Graphics 630</td>
<td>√</td>
<td>√</td>
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<tr>
<td></td>
<td><strong>Switchable Discrete Graphics:</strong></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>NVIDIA N16E-GR (GeForce GTX 965M) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NVIDIA® N16P-GR (GeForce® GTX 960M) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 960 M) with up to 2048 MB of dedicated video memory (128 M x 32 GDDR5 x 4 PCs)</td>
<td>√</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17P-G1 (GeForce GTX 1050Ti) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)</td>
<td>√</td>
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</tr>
<tr>
<td></td>
<td>NVIDIA N17P-G0 (GeForce GTX 1050) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCS)</td>
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<td></td>
</tr>
<tr>
<td>Category</td>
<td>NV 960M</td>
<td>NV 965M</td>
<td>NV N17P-G0</td>
</tr>
<tr>
<td>-------------------------</td>
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<td>---------</td>
<td>------------</td>
</tr>
<tr>
<td>NVIDIA N17P-G0 (GeForce GTX 1050) with up to 2048 MB of dedicated video memory (128 M x 32 GDDR5 x 4 PCs)</td>
<td>✔️</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supports HD Decode, DX12, and HDMI; Optimus; dynamic switching; and GPU Performance Scaling (GPS)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Panel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43.94 cm (17.3&quot;) 16:9 Ultra Wide Aspect Ratio panel:</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>• Full High Definition (FHD), WLED AntiGlare (1920 x 1080) flat-flat (4.2 mm) UWVA, eDP, typical brightness 300 nits (cd/m²); touch solution with flush glass multitouch enabled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Ultra High Definition (UHD) WLED AntiGlare (3840 x 2160) flat-flat (4.2mm) UWVA, eDP +PSR, typical brightness 300 nits (cd/m²), for non-touch only</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Supports eDP1.3+PSR</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>Two SODIMM slots, not customer accessible or upgradable:</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>DDR4-2133 dual channel support (DDR4-2400 bridge to DDR4-2133)</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>DDR4-2400 dual channel support</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Supports up to 16 GB max system memory with the following:</td>
<td>✔️</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>• 4096 MB (4096 MB x 1)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 6144 MB (2048 MB x 1 + 4096 MB x 1), no support for 32-bit OS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 8192 MB (4096 MB x 2) or 8192 MB (8192 MB x 1), no support for 32-bit OS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 8192 MB (8196 MB x 1), no support for 32-bit OS</td>
<td></td>
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<tr>
<td>• 12288 MB (8192 MB +4096 MB), no support for 32-bit OS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 16384 MB (8192 MB x 2), no support for 32-bit OS or Windows® 7 Home Basic</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hard drive</td>
<td>Single HDD configurations:</td>
<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>• 1 TB (7200) 9.5 mm</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• 2 TB (5400) 9.5 mm</td>
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</tbody>
</table>
## OMEN by HP Laptop PC

<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>NV 960M</th>
<th>NV 965M</th>
<th>NV N17P-G0</th>
<th>NV N17P-G1</th>
</tr>
</thead>
<tbody>
<tr>
<td>● 2 TB (S400) 7.0 mm</td>
<td>Supports all 7 mm/9.5 mm, SATA 2.5” HDDs</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>HP 3D DriveGuard</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Supports a second drive</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>7 mm and 9.5 mm share the same bracket</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

### Hybrid HDD configurations:

- 1 TB 5400 RPM 9.5 mm SSHD with 8 GB NAND

### Dual Storage Configurations:

| 1 TB + 128 GB value solid-state drive (SSD) | ✓ | ✓ | ✓ | ✓ |
| 2 TB + 128 GB value SSD                    | ✓ | ✓ | ✓ | ✓ |
| 4 TB: 2 TB (S400) (for use with Intel Core i7-6700HQ processor GeForce GTX 960M switchable discrete graphics, 4 G memory only) | ✓ | ✓ |
| 1 TB + 256 GB PCI expansion (PCIe) SSD      | ✓ | ✓ | ✓ | ✓ |
| 1 TB + 512 GB PCIe TLC SSD                  | ✓ |   |   |   |

### M.2 SATA configurations (TLC) SSD:

- 256 GB

### M.2 PCIe NVMe (TLC) SSD:

- 256 GB
- 512 GB

### Optical drive

- 9.5 mm tray load - SATA - Fixed (not modular)
  - Supports Zero-Power Optical drive
  - Supports M-disc
  - DVD+/−RW Double-Layer SuperMulti
  - Blu-ray Disc R/RW with SuperMulti

### Audio and video

#### Dual speakers

- Bang & Olufsen
- Supports HP Audio Boost
- Supports HP Noise Cancellation

#### Cameras:

- ✓ | ✓ | ✓ | ✓ | ✓
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
<th>NV 960M</th>
<th>NV 965M</th>
<th>NV N17P-G0</th>
<th>NV N17P-G1</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP Wide Vision HD: HD camera - Indicator LED, USB 2.0, BSI sensor, f2.0, 88° WFOV</td>
<td>• Camera with rubber for non-touch products</td>
<td>√</td>
<td>√</td>
<td></td>
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<tr>
<td></td>
<td>• 720p by 30 frames per second</td>
<td></td>
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</tr>
<tr>
<td>Intel RealSense 3D camera - indicator LED, USB 3.0, 85° WFOV</td>
<td>• 1080p by 30 frames per second, 4x depth resolution</td>
<td></td>
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<tr>
<td></td>
<td>• Supports Windows Hello</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ethernet</td>
<td>Integrated 10/100/1000 NIC</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Wireless</td>
<td>Intel Dual Band Wireless-AC 7265 802.11 ac 2 x 2 WiFi + Bluetooth® 4.2 Combo Adapter (non vPRO)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td></td>
<td>Integrated wireless options with dual antenna (M.2/PCIe)</td>
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<tr>
<td></td>
<td>Intel WiDi support (select products only)</td>
<td></td>
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<tr>
<td></td>
<td>Compatible with Miracast-certified devices, for Windows 10</td>
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<tr>
<td>External media cards</td>
<td>HP Multi-Format Digital Media Card Reader</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td></td>
<td>Supports SD/SDHC/SDXC</td>
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<tr>
<td></td>
<td>Push-Push insertion/removal</td>
<td></td>
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<tr>
<td>Ports</td>
<td>Hot Plug / Unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected)</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
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<tr>
<td></td>
<td>HDMI v2.0 supporting: up to 4096 x 2160 @ 60 Hz</td>
<td></td>
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<tr>
<td></td>
<td>Headphone / Line out</td>
<td>√</td>
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<tr>
<td></td>
<td>Microphone input</td>
<td>√</td>
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<td>USB 2.0 port</td>
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<td>USB 3.0 ports (2)</td>
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<tr>
<td></td>
<td>RJ-45/Ethernet port</td>
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<tr>
<td></td>
<td>AC Smart Pin adapter plug</td>
<td></td>
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<tr>
<td>Keyboard/pointing devices</td>
<td>Full-size standard 3-coat paint island-style backlit keyboard with numeric keypad in Dragon Red</td>
<td>√</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
<td>NV 960M</td>
<td>NV 965M</td>
<td>NV N17P-G0</td>
<td>NV N17P-G1</td>
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<td>-----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td><strong>Power requirements</strong></td>
<td><strong>Batteries:</strong> 6-cell cylindrical battery – 62 Whr (5600 mAh)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Supports battery fast charge (90 minutes to 90% charged)</td>
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<td><strong>AC Adapters:</strong></td>
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<td>120W adapter with 1 M length power cord</td>
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<td>150W adapter with 1 M length power cord</td>
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<td>✓</td>
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<tr>
<td><strong>Security</strong></td>
<td><strong>TPM 2.0</strong></td>
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<td>✓</td>
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<td></td>
<td>Security lock slot</td>
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<tr>
<td><strong>Operating system</strong></td>
<td><strong>Pre-installed:</strong></td>
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<td>✓</td>
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<td>Windows 10 Professional</td>
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<td>Windows 10</td>
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<tr>
<td></td>
<td><strong>For Developed Market (ML):</strong></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Windows 10 Home High End</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Windows 10 Home ML (for use with Intel Core i7 processors with ≥ 1080P screen and ≥ 8 GB)</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td><strong>For Emerging Market (EM/SL):</strong></td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>Windows 10 Home</td>
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<tr>
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<td>Windows 10 Home High End EM/SL/China (for use with Intel Core i7 processors with ≥ 1080P screen and ≥ 8 GB)</td>
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<td>SEAP Windows 10 Home High End</td>
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<td>SEAP Windows 10 Home China Language Edition</td>
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<tr>
<td></td>
<td>FreeDOS 2.0</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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</tr>
<tr>
<td><strong>Serviceability</strong></td>
<td><strong>End user replaceable parts:</strong></td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td></td>
<td>AC adapter</td>
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<td></td>
<td>Memory</td>
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<tr>
<td>Omen by HP Laptop PC</td>
<td>Intel 6th generation processors</td>
<td>Intel 7th generation processors</td>
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<td>---------------------</td>
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<td>-------------------------------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Category</td>
<td>NV 960M</td>
<td>NV N17P-G0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>NV 965M</td>
<td>NV N17P-G1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Battery</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 2 External component identification

### Right side

![Component Identification Diagram](image)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) Drive light (select products only) | - Blinking white: The hard drive or optical drive is being accessed.  
- Amber: HP 3D DriveGuard has temporarily parked the hard drive (select products only). |
| (2) Memory card reader     | Reads optional memory cards that enable you to store, manage, share, or access information. |
| (3) USB 3.0 port           | Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. |
| (4) HDMI port              | Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device. |
| (5) RJ-45 (network) jack/status lights | Connects a network cable.  
- White: The network is connected.  
- Amber: Activity is occurring on the network. |
| (6) Power connector        | Connects an AC adapter.                                                      |
| (7) AC adapter and battery light | - White: The AC adapter is connected and the battery is fully charged.  
- Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.  
- Amber: The AC adapter is connected and the battery is charging.  
- Off: The battery is not charging. |
## Left side

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td><strong>Security cable slot</strong>&lt;br&gt;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><strong>USB 2.0 port</strong>&lt;br&gt;Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.</td>
</tr>
<tr>
<td>(3)</td>
<td><strong>USB 3.0 port</strong>&lt;br&gt;Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.</td>
</tr>
<tr>
<td>(4)</td>
<td><strong>Audio-out (headphone)/Audio-in (microphone) combo jack</strong>&lt;br&gt;Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones. <strong>WARNING!</strong> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <em>Regulatory, Safety, and Environmental Notices</em>. To access this guide:&lt;br&gt;▲ Select the <strong>Start</strong> button, select <strong>All apps</strong> (required on some products), select <strong>HP Help and Support</strong>, and then select <strong>HP Documentation</strong>. <strong>NOTE:</strong> When a device is connected to the jack, the computer speakers are disabled.</td>
</tr>
<tr>
<td>(5)</td>
<td><strong>Optical drive</strong>&lt;br&gt;Depending on your computer, reads an optical disc or reads and writes to an optical disc.</td>
</tr>
<tr>
<td>(6)</td>
<td><strong>Optical drive eject button</strong>&lt;br&gt;Releases the optical drive disc tray.</td>
</tr>
</tbody>
</table>
Display

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

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internal microphones</td>
<td>Record sound.</td>
</tr>
<tr>
<td>Camera light</td>
<td>On: The camera is in use.</td>
</tr>
<tr>
<td>Camera</td>
<td>Allows you to video chat, record video, or record still images. Some products also provide HD (high-definition) or 3D capability, apps for gaming, or facial recognition software like Windows Hello. To use your camera: Type camera in the taskbar search box, and then select Camera.</td>
</tr>
<tr>
<td>WLAN antennas*</td>
<td>Send and receive wireless signals to communicate with wireless local area networks (WLANs).</td>
</tr>
</tbody>
</table>

*The antennas are not visible from the outside of the computer, and antenna location varies. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

For wireless regulatory notices, see the section of the Regulatory, Safety, and Environmental Notices that applies to your country or region.

To access this guide:

Select the Start button, select All apps (required on some products), select HP Help and Support, and then select HP Documentation.
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Internal microphones</td>
<td>Record sound.</td>
</tr>
</tbody>
</table>
| (2) Camera | Allows you to video chat, record video, or record still images. Some products also provide HD (high-definition) or 3D capability, apps for gaming, or facial recognition software like Windows Hello. To use your camera:  
  1. Type camera in the taskbar search box, and then select Camera.  
  2. Type Intel RealSense in the taskbar search box to explore additional features, demos, and apps. When the light is on, the camera is in use. |
| (3) WLAN antennas* | Send and receive wireless signals to communicate with wireless local area networks (WLANs).  
*The antennas are not visible from the outside of the computer, and antenna location varies. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the Regulatory, Safety, and Environmental Notices that applies to your country or region. |

To access this guide:  
▲ Select the Start button, select All apps (required on some products), select HP Help and Support, and then select HP Documentation.
### Top

**TouchPad**

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) TouchPad zone</td>
<td>Reads your finger gestures to move the pointer or activate items on the screen.</td>
</tr>
<tr>
<td>(2) Left TouchPad button</td>
<td>Functions like the left button on an external mouse.</td>
</tr>
<tr>
<td>(3) Right TouchPad button</td>
<td>Functions like the right button on an external mouse.</td>
</tr>
</tbody>
</table>

### Lights
## Component and Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) Power light | ● On: The computer is on.  
                 | ● Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.  
                 | ● Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. |
| (2) Caps lock light | On: Caps lock is on, which switches the key input to all capital letters. |
| (3) Mute light | ● Amber: Computer sound is off.  
                 | ● Off: Computer sound is on. |

### Button and speakers

- **Power button**
  - When the computer is off, press the button to turn on the computer.
  - When the computer is on, press the button briefly to initiate Sleep.
  - When the computer is in the Sleep state, press the button briefly to exit Sleep.
  - When the computer is in Hibernation, press the button briefly to exit Hibernation.

  **CAUTION:** Pressing and holding down the power button results in the loss of unsaved information.
If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.

To learn more about your power settings, see your power options.

▲ Type `power` in the taskbar search box, and then select `Power and sleep settings`.

- or -

Right-click the `Start` button, and then select `Power Options`.

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Speakers</td>
<td>Produce sound.</td>
</tr>
</tbody>
</table>
Keys

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) esc key</td>
<td>Displays system information when pressed in combination with the fn key.</td>
</tr>
<tr>
<td>(2) fn key</td>
<td>Executes specific system functions when pressed in combination with the esc key or the spacebar.</td>
</tr>
<tr>
<td>(3) Windows® key</td>
<td>Opens the Start menu.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Pressing the Windows key again will close the Start menu.</td>
</tr>
<tr>
<td>(4) Action keys</td>
<td>Execute frequently used system functions.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> On select products, the f5 action key turns the keyboard backlight feature off or on.</td>
</tr>
<tr>
<td>(5) num lock key</td>
<td>Alternates between the navigational and numeric functions on the integrated numeric keypad.</td>
</tr>
<tr>
<td>(6) Integrated numeric keypad</td>
<td>When num lock is on, the keypad can be used like an external numeric keypad.</td>
</tr>
</tbody>
</table>

Using the action keys

- An action key performs an assigned function.
- The icon on each action key illustrates the function for that key.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Question Mark" /></td>
<td>Opens the Get started app, which provides a broad range of how-to information and troubleshooting tips.</td>
</tr>
<tr>
<td><img src="image" alt="Star" /></td>
<td>Decreases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td>Icon</td>
<td>Description</td>
</tr>
<tr>
<td>------</td>
<td>-------------</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Increases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td><img src="image" alt="Icon" /></td>
<td>Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display to a simultaneous display on both the computer and the monitor.</td>
</tr>
</tbody>
</table>
| ![Icon](image) | Turns the keyboard backlight off or on.  
**NOTE:** To conserve battery power, turn off this feature. |
| ![Icon](image) | Mutes or restores speaker sound. |
| ![Icon](image) | Decreases speaker volume incrementally while you hold down the key. |
| ![Icon](image) | Increases speaker volume incrementally while you hold down the key. |
| ![Icon](image) | Plays the previous track of an audio CD or the previous section of a DVD or a Blu-ray Disc (BD). |
| ![Icon](image) | Starts, pauses, or resumes playback of an audio CD, a DVD, or a BD. |
| ![Icon](image) | Plays the next track of an audio CD or the next section of a DVD or a BD. |
| ![Icon](image) | Turns the airplane mode and wireless feature on or off.  
**NOTE:** The airplane mode key is also referred to as the wireless button.  
**NOTE:** A wireless network must be set up before a wireless connection is possible. |
## Bottom

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Vents</td>
<td>Enable airflow to cool internal components.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> 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.</td>
</tr>
<tr>
<td>(2) Battery bay</td>
<td>Holds the battery.</td>
</tr>
<tr>
<td>(3) Battery release latch</td>
<td>Releases the battery.</td>
</tr>
</tbody>
</table>
Rear

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vent</td>
<td>Enables 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.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

**IMPORTANT:** Check the following locations for the labels described in this section: the bottom of the computer, inside the battery bay, under the service door, or on the back of the display.

- Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

Your service label will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.

```
Component

(1) Serial number
(2) Product number
(3) Warranty period
(4) Model number (select products only)
```
### Component

<table>
<thead>
<tr>
<th></th>
<th>Component Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Model name (select products only)</td>
</tr>
<tr>
<td>2</td>
<td>Product number</td>
</tr>
<tr>
<td>3</td>
<td>Serial number</td>
</tr>
<tr>
<td>4</td>
<td>Warranty period</td>
</tr>
</tbody>
</table>

- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.
3 Illustrated parts catalog

Computer major components

**NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to [http://partsurfer.hp.com](http://partsurfer.hp.com), select your country or region, and then follow the on-screen instructions.

**NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 17](#) for details.
Item | Component | Spare part number
--- | --- | ---
(1) | Display (spared at the component level; see [Display assembly subcomponents on page 24](#)) | |
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2)</td>
<td><strong>Top cover with keyboard and TouchPad</strong> in Onyx Black, with Carbon Fiber pattern (full-size standard 3-coat paint island-style backlit with numeric keypad)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in the United States</td>
<td>862972-001</td>
</tr>
<tr>
<td></td>
<td>For use in India (for products with Intel 7th generation processors only)</td>
<td>862972-002</td>
</tr>
<tr>
<td></td>
<td>For use in the United Kingdom</td>
<td>862972-031</td>
</tr>
<tr>
<td></td>
<td>For use in Germany</td>
<td>862972-041</td>
</tr>
<tr>
<td></td>
<td>For use in France</td>
<td>862972-051</td>
</tr>
<tr>
<td></td>
<td>For use in Italy</td>
<td>862972-061</td>
</tr>
<tr>
<td></td>
<td>For use in Latin America (for products with Intel 6th generation processors only)</td>
<td>862972-161</td>
</tr>
<tr>
<td></td>
<td>For use in Spain</td>
<td>862972-071</td>
</tr>
<tr>
<td></td>
<td>For use in Portugal</td>
<td>862972-131</td>
</tr>
<tr>
<td></td>
<td>For use in Turkey</td>
<td>862972-141</td>
</tr>
<tr>
<td></td>
<td>For use in Greece</td>
<td>862972-151</td>
</tr>
<tr>
<td></td>
<td>For use in Saudi Arabia</td>
<td>862972-171</td>
</tr>
<tr>
<td></td>
<td>For use in Hungary</td>
<td>862972-211</td>
</tr>
<tr>
<td></td>
<td>For use in Russia</td>
<td>862972-251</td>
</tr>
<tr>
<td></td>
<td>For use in Bulgaria</td>
<td>862972-261</td>
</tr>
<tr>
<td></td>
<td>For use in Romania</td>
<td>862972-271</td>
</tr>
<tr>
<td></td>
<td>For use in Thailand</td>
<td>862972-281</td>
</tr>
<tr>
<td></td>
<td>For use in Japan</td>
<td>862972-291</td>
</tr>
<tr>
<td></td>
<td>For use in Belgium</td>
<td>862972-A41</td>
</tr>
<tr>
<td></td>
<td>For use in Korea</td>
<td>862972-A01</td>
</tr>
<tr>
<td></td>
<td>For use Internationally</td>
<td>862972-B31</td>
</tr>
<tr>
<td></td>
<td>For use in Slovenia</td>
<td>862972-BA1</td>
</tr>
<tr>
<td></td>
<td>For use in Israel</td>
<td>862972-BB1</td>
</tr>
<tr>
<td></td>
<td>For use in Switzerland</td>
<td>862972-BG1</td>
</tr>
<tr>
<td></td>
<td>For use in Canada</td>
<td>862972-DB1</td>
</tr>
<tr>
<td></td>
<td>For use in Nordic Regions</td>
<td>862972-DH1</td>
</tr>
<tr>
<td></td>
<td>For use in Czech/Slovakia</td>
<td>862972-FL1</td>
</tr>
<tr>
<td>(3)</td>
<td><strong>Hard drive</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 TB 5400 RPM SATA RAW HYBRID 8 GB</td>
<td>731999-005</td>
</tr>
<tr>
<td></td>
<td>2 TB 5400 RPM SATA RAW 9.5 mm</td>
<td>801808-005</td>
</tr>
<tr>
<td></td>
<td>1 TB 7200 RPM SATA RAW 9.5 mm</td>
<td>766644-005</td>
</tr>
<tr>
<td></td>
<td>2 TB 5400 RPM SATA RAW 7.0 mm</td>
<td>912487-855</td>
</tr>
<tr>
<td>(4)</td>
<td><strong>Right speaker</strong>, part of the speaker kit, which includes left and right speakers</td>
<td>857474-001</td>
</tr>
<tr>
<td>Item</td>
<td>Component</td>
<td>Spare part number</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>(5)</td>
<td>Left speaker, part of the speaker kit, which includes left and right speakers</td>
<td>857474-001</td>
</tr>
<tr>
<td>(6)</td>
<td>TouchPad board</td>
<td>862959-001</td>
</tr>
<tr>
<td>(7)</td>
<td>Touchpad board cable</td>
<td>857455-001</td>
</tr>
<tr>
<td>(8)</td>
<td>Fan</td>
<td>857463-001</td>
</tr>
<tr>
<td>(9)</td>
<td>Heat sink for discrete memory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For products with Intel 6th generation processors</td>
<td>857895-001</td>
</tr>
<tr>
<td></td>
<td>For products with Intel 7th generation processors</td>
<td>915470-001</td>
</tr>
<tr>
<td>(10)</td>
<td>M.2 SATA SSD, PCIe NVMe TLC</td>
<td></td>
</tr>
<tr>
<td></td>
<td>128 GB 2280 M2 SATA-3 Value PA</td>
<td>827560-026</td>
</tr>
<tr>
<td></td>
<td>256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA</td>
<td>847109-002</td>
</tr>
<tr>
<td></td>
<td>512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA</td>
<td>847110-004</td>
</tr>
<tr>
<td>(11)</td>
<td>Power in connector</td>
<td>858021-001</td>
</tr>
<tr>
<td>(12)</td>
<td>RTC battery</td>
<td>861876-001</td>
</tr>
<tr>
<td>(13)</td>
<td>System board (includes processor and replacement thermal material):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All system boards use the following part numbers:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>xxxxxxx-001: Non-Windows operating systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>xxxxxxx-601 Windows 10 operating systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For products with Intel 6th generation processors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i7-6700HQ</td>
<td>857388-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i7-6700HQ</td>
<td>857389-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i5-6300HQ</td>
<td>857390-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i5-6300HQ</td>
<td>857391-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 965M), 4 GB i7-6700HQ</td>
<td>862259-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N16P-GX (GeForce GTX 965M), 4 GB i5-6300HQ</td>
<td>862260-xxx</td>
</tr>
<tr>
<td></td>
<td>For products with Intel 7th generation processors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G0 (GeForce GTX 1050), 2 GB i7-7700HQ</td>
<td>915466-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G0 (GeForce GTX 1050), 4 GB i7-7700HQ</td>
<td>915467-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G0 (GeForce GTX 1050M), 2 GB i5-7300HQ</td>
<td>915468-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G0 (GeForce GTX 1050M), 4 GB i5-7300HQ</td>
<td>915469-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i7-7700HQ</td>
<td>915550-xxx</td>
</tr>
<tr>
<td></td>
<td>NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i5-7300HQ</td>
<td>915551-xxx</td>
</tr>
<tr>
<td>(14)</td>
<td>USB board</td>
<td>857470-001</td>
</tr>
<tr>
<td>(15)</td>
<td>USB board cable</td>
<td>857454-001</td>
</tr>
<tr>
<td>(16)</td>
<td>WLAN Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + BT 4.2 Combo Adapter (non vPRO)</td>
<td>793840-005</td>
</tr>
<tr>
<td>Item</td>
<td>Component</td>
<td>Spare part number</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>-------------------</td>
</tr>
<tr>
<td>(17)</td>
<td>Heat sink for CPU and graphics</td>
<td>725625-001</td>
</tr>
<tr>
<td>(18)</td>
<td>Memory</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 GB SODIMM 2400 MHz 1.2 v DDR4 shared</td>
<td>862397-850</td>
</tr>
<tr>
<td></td>
<td>8 GB SODIMM 2400 MHz 1.2 v DDR4 shared</td>
<td>862398-850</td>
</tr>
<tr>
<td></td>
<td>2 GB SODIMM 2400 MHz 1.2 v DDR4 shared</td>
<td>864271-850</td>
</tr>
<tr>
<td>(19)</td>
<td>Battery:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6 cell 62 WH 2.8 Ah Li</td>
<td>849911-850</td>
</tr>
<tr>
<td>(20)</td>
<td>Optical drive, SATA 9.5 mm tray</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DVD+/-RW Double-Layer SuperMulti</td>
<td>756564-038</td>
</tr>
<tr>
<td></td>
<td>Blu-ray Disc R/RW with SuperMulti</td>
<td>729050-011</td>
</tr>
<tr>
<td>(21)</td>
<td>Base enclosure in Twinkle Black</td>
<td>862960-001</td>
</tr>
</tbody>
</table>
# Display assembly subcomponents

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Display bezel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For products with 3D camera and Intel 6th generation processors only</td>
<td>857451-001</td>
</tr>
<tr>
<td></td>
<td>For products with HD camera</td>
<td>857450-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Microphone board (for 3D camera only)</td>
<td>857471-001</td>
</tr>
<tr>
<td>(3)</td>
<td>Camera</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3D camera (for products with Intel 6th generation processors only)</td>
<td>781624-005</td>
</tr>
<tr>
<td></td>
<td>HD camera</td>
<td>846006-003</td>
</tr>
<tr>
<td>(4)</td>
<td>43.94 cm (17.3”) raw panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Non-touch screen, FHD, AG, UWVA, 300 eDP, Flat4 GF</td>
<td>798926-009</td>
</tr>
<tr>
<td></td>
<td>• Non-touch screen, UHD, AG, UWVA, 300 eDP, 1.3 PSR, Flat GF</td>
<td>853322-003</td>
</tr>
<tr>
<td>(5)</td>
<td>Hinge kit (includes left and right hinges)</td>
<td>857464-001</td>
</tr>
</tbody>
</table>
Mass storage devices
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Hard drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 TB 5400 RPM SATA RAW HYBRID 8 GB</td>
<td>731999-005</td>
</tr>
<tr>
<td></td>
<td>2 TB 5400 RPM SATA RAW 9.5 mm</td>
<td>801808-005</td>
</tr>
<tr>
<td></td>
<td>1 TB 7200 RPM SATA RAW 9.5 mm</td>
<td>766644-005</td>
</tr>
<tr>
<td></td>
<td>2 TB 5400 RPM SATA RAW 7.0 mm</td>
<td>912487-855</td>
</tr>
<tr>
<td>(2)</td>
<td>Hard drive back connector and hard drive cable</td>
<td>857462-001</td>
</tr>
<tr>
<td>(3)</td>
<td>Hard drive bracket</td>
<td>911227-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Optical drive, SATA, 9.5 mm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>DVD+/-RW Double-Layer SuperMulti</td>
<td>756564-038</td>
</tr>
<tr>
<td></td>
<td>Blu-ray Disc R/RW with SuperMulti</td>
<td>729050-011</td>
</tr>
<tr>
<td>(5)</td>
<td>Optical drive bracket</td>
<td>not spared</td>
</tr>
<tr>
<td>(6)</td>
<td>Optical drive bezel</td>
<td>862962-001</td>
</tr>
<tr>
<td></td>
<td>Optical drive bezel for BlueRay</td>
<td>903305-001</td>
</tr>
</tbody>
</table>

### Miscellaneous parts

<table>
<thead>
<tr>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC adapter:</td>
<td></td>
</tr>
<tr>
<td>150 W PFC, Smart, slim, 4.5 mm (for use with products with NVIDIA N16E-GR (965M) or Intel 7th generation processors only)</td>
<td>776620-001</td>
</tr>
<tr>
<td>120 W PFC, S-3P, slim, 4.5 mm (for use with products with NVIDIA N16P-GX only)</td>
<td>710415-001</td>
</tr>
<tr>
<td>HDMI to VGA adapter</td>
<td>701943-001</td>
</tr>
<tr>
<td>Power cord (black, 1 m):</td>
<td></td>
</tr>
<tr>
<td>For use in North America</td>
<td>213349-009</td>
</tr>
<tr>
<td>For use in South Africa</td>
<td>361240-002</td>
</tr>
<tr>
<td>For use in Denmark</td>
<td>213353-008</td>
</tr>
<tr>
<td>For use in Europe</td>
<td>213350-009</td>
</tr>
<tr>
<td>For use in Israel</td>
<td>398063-003</td>
</tr>
<tr>
<td>For use in Switzerland</td>
<td>213354-008</td>
</tr>
<tr>
<td>For use in Australia</td>
<td>213356-008</td>
</tr>
<tr>
<td>For use in South Korea</td>
<td>267836-008</td>
</tr>
<tr>
<td>For use in Thailand</td>
<td>285096-006</td>
</tr>
<tr>
<td>For use in Japan</td>
<td>349756-002</td>
</tr>
<tr>
<td>For use in the United Kingdom and Singapore</td>
<td>213351-008</td>
</tr>
<tr>
<td>Component</td>
<td>Spare part number</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>For use in China (for products with Intel 7th generation processors only)</td>
<td>286497-008</td>
</tr>
<tr>
<td>Screw kit</td>
<td>857473-001</td>
</tr>
</tbody>
</table>

Miscellaneous parts 27
4  Removal and replacement procedures
preliminary requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

CAUTION: Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic.
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 an optical drive, be sure that a 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 or an optical drive, place it in a static-proof bag.

Avoid exposing an internal 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.

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 plastic foam</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 plastic foam.
- 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 equipment 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 plastics</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>
5  Removal and replacement procedures for Customer Self-Repair parts

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

NOTE: The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 17 for details.

NOTE: HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

There are two screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of the screw sizes and locations during removal and replacement.
Battery

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery 6 cell 62 WH 2.8 Ah LI</td>
<td>849911-850</td>
</tr>
</tbody>
</table>

Before removing the battery, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.

Remove the battery:

⚠️ **WARNING!** To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

⚠️ **CAUTION:** Removing a user-replaceable battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work or shut down the computer through Windows before removing the battery.

1. Position the computer upside down on a flat surface.
2. Slide the battery release latch (1), and then lift the battery (2).
3. Remove the battery from the computer (3).

To insert the battery, reverse the removal procedures.
## Optical drive

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optical drive</td>
<td></td>
</tr>
<tr>
<td>● DVD+/-RW Double-Layer SuperMulti</td>
<td>756564-038</td>
</tr>
<tr>
<td>● Blu-ray Disc R/RW with SuperMulti</td>
<td>729050-011</td>
</tr>
<tr>
<td>Optical drive bezel</td>
<td>862962-001</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the optical drive, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the battery (see Battery on page 34).

Remove the optical drive:

1. Remove the Phillips M2.0 x 2.5 screw (1) securing the optical drive in the computer, and then slide drive (2) away from the computer.

2. If it is necessary to disassemble the optical drive, perform the following steps:
   a. Remove the M2.0 x 2.5 screw (1) that secures the optical drive bracket to the optical drive, and then remove the bracket (2) from the optical drive.
b. Press the release tab (1) and remove the bezel from the tab side (2).

c. Remove the bezel (3) from the optical drive.

Reverse this procedure to install the optical drive.
Removal and replacement procedures for authorized service provider parts

⚠️ CAUTION: Components described in this chapter should be accessed only by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

Component replacement procedures

 располагает информацией о компьютере, включая модель, серийный номер, ключ продукта, и срок гарантии, находится на сервисной метке на дне компьютера. Посмотрите на метку "Labels on page 17" для подробностей.

⚠️ NOTE: HP постоянно улучшает и меняет продукты. Для получения полной и актуальной информации на поддерживаемые компоненты вашего компьютера, посетите сайт http://partsurfer.hp.com, выберите вашу страну или регион, а затем следуйте подсказкам на экране.

Могут быть от 85 до 85 винтов, которые необходимо снять, заменить, и/или отвинтить при обслуживании компонентов, описанных в этой главе. Внимательно следите за размером и местоположением каждого винта во время снятия и замены.

Base enclosure

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base enclosure in Twinkle Black</td>
<td>862960-001</td>
</tr>
</tbody>
</table>

Перед снятием низовой облицовки выполните следующие шаги:

1. Отключите компьютер. Если вы не уверены, включен ли компьютер или находится он в режиме Hibernate, включите компьютер и затем выключите через систему.
2. Отключите питание от компьютера, сначала отсоедините电源插头从AC outlet and then unplugging the AC adapter from the computer.
3. Отключите все внешние устройства, подключенные к компьютеру.
4. Снимите следующие компоненты:
   a. Батарея (см. Battery on page 34)
   b. Оптический привод (см. Optical drive on page 35)

Снимите нижнюю облицовку:

1. Снимите четыре винта M2.0 x 4 (1) на задней части компьютера.
2. Remove the seven M2.0x6 screws (1) in the battery bay and on the bottom.

3. Lift the base enclosure (2) to remove it.

Reverse the removal procedures to install the base enclosure.
**Hard drive**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard drive</td>
<td></td>
</tr>
<tr>
<td>● 1 TB 5400 RPM SATA RAW HYBRID 8 GB</td>
<td>731999-005</td>
</tr>
<tr>
<td>● 2 TB 5400 RPM SATA RAW 9.5 mm</td>
<td>801808-005</td>
</tr>
<tr>
<td>● 1 TB 7200 RPM SATA RAW 9.5 mm</td>
<td>766644-005</td>
</tr>
<tr>
<td>Hard drive connector and cable</td>
<td>857462-001</td>
</tr>
</tbody>
</table>

Before removing the hard drive, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)

Remove the hard drive:

> **NOTE:** Use minimal force when lifting the locking bar up on the ZIF connector and disconnecting the cable.

1. Open the zero insertion force (ZIF) connector to release the hard drive cable (1) from the system board.
2. Lift the hard drive (2) up, and then slide the drive (3) forward to remove it from the computer.

3. If it is necessary to disassemble the hard drive, perform the following steps:
   a. Remove the hard drive cable connector (1) from the hard drive.
   b. Slide the two hard drive brackets (2) off the hard drive.

To remove the second hard drive, follow these steps:
1. Open the zero insertion force (ZIF) connector to release the hard drive cable (1) from the system board.
2. Lift the hard drive (2) up.
3. Release the hard drive from the notch (3), and then slide the drive (4) forward to remove it from the computer.

4. If it is necessary to disassemble the hard drive, perform the following steps:
   a. Remove the hard drive cable connector (1) from the hard drive.
   b. Slide the two hard drive brackets (2) off the hard drive.

Reverse this procedure to reassemble and install the hard drive.
SSD (M.2)

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M.2 SATA SSD, PCIe NVMe TLC</strong></td>
<td></td>
</tr>
<tr>
<td>● 128 GB 2280 M2 SATA-3 Value PA</td>
<td>827560-026</td>
</tr>
<tr>
<td>● 256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA</td>
<td>847109-002</td>
</tr>
<tr>
<td>● 512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA</td>
<td>847110-004</td>
</tr>
</tbody>
</table>

Before removing the SSD, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)

Remove the SSD:

1. Remove the Phillips M2.0 x 2.5 screw (1) that secures the SSD to the system board.
2. Remove the SSD (2) by pulling the drive away from the slot at an angle.

Reverse this procedure to install the SSD.
Update BIOS before adding memory modules

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

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

To update BIOS:

2. Select **Support**, and then select **Software & drivers**.
3. In the **Enter my HP model number** box, type the computer model information, and then select **Find my product**.
   - or -
   Select **Identify now**.
4. Select the link for the computer model.
5. Select the language and the operating system.
6. Under the downloads heading, select the **BIOS** link.
7. Select the link for the most recent BIOS.
8. Select the **Download** button, and then follow the on-screen instructions.

Before removing a memory module, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
   a. Battery (see **Battery on page 34**)
   b. Optical drive (see **Optical drive on page 35**)
   c. Base enclosure (see **Base enclosure on page 37**)

Remove the memory module:

1. Spread the retaining tabs (1) on each side of the memory module slot to release the memory module. (The memory module tilts up.)
2. Remove the memory module (2) by pulling the module away from the slot at an angle.

Reverse this procedure to install a memory module.
**WLAN module**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (non vPRO)</td>
<td>793840-005</td>
</tr>
</tbody>
</table>

⚠️ **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 device functionality, and then contact technical support.

Before removing the WLAN module, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
   - Battery (see **Battery on page 34**)
   - Optical drive (see **Optical drive on page 35**)
   - Base enclosure (see **Base enclosure on page 37**)

Remove the WLAN module:

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

   **NOTE:** The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2”.

2. Remove the Phillips M2.0 x 2.5 screw (2) that secures the WLAN module to the system board. (The WLAN module tilts up.)
3. Remove the WLAN module (3) by pulling the module away from the slot at an angle.

**NOTE:** WLAN modules are notched to prevent incorrect installation.

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

Reverse this procedure to install the WLAN module.
Right speaker

**NOTE:** The speaker spare part kit includes the cable.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speaker Kit (includes right and left speakers)</td>
<td>857474-001</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the speaker, follow these steps:

1. Shut down the computer.
2. 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.
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)

Remove the right speaker:

1. Carefully disconnect the right speaker connector (1) from the system board.
2. Release the display cable from the routing channels (2).
3. Remove the Phillips M2.0 x 4 screw and Phillips M2.5 x 5 screw (3).
4. Lift the right speaker (4) to remove it.

Reverse this procedure to install the right speaker.
### USB board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB board</td>
<td>857470-001</td>
</tr>
</tbody>
</table>

Before removing the USB board, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Right speaker (see Right speaker on page 47)

Remove the USB board:

1. Open the zero insertion force (ZIF) connector (1) and release the USB board cable.

2. Remove the two Phillips M2.0 x 4.0 screws (2) that secure the USB board to the computer.

3. Remove the USB board (3).

Reverse this procedure to install the USB board.
Before removing the fan, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Disconnect the WLAN cable (see WLAN module on page 45)

Remove the fan:

1. Release the WLAN cable (1) from the clips on the left speaker clip and move the WLAN cable out of the way.

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

3. Remove the three Phillips M2.0 x 4.5 screws (3) that secure the fan to the top cover.

4. Remove the fan (4).
Reverse this procedure to install the fan.

**Heat sink for discrete graphics memory**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat sink for discrete graphics memory (for products with Intel 6th generation processors only)</td>
<td>857895-001</td>
</tr>
<tr>
<td>Heat sink for discrete graphics memory (for products with Intel 7th generation processors only)</td>
<td>915470-001</td>
</tr>
</tbody>
</table>

Before removing the heat sink for discrete graphics memory, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see [Battery on page 34](#))
   b. Optical drive (see [Optical drive on page 35](#))
   c. Base enclosure (see [Base enclosure on page 37](#))
   d. Hard drive (see [Hard drive on page 39](#))
   e. SSD (see [SSD (M.2) on page 42](#))
   f. Disconnect the WLAN cable (see [WLAN module on page 45](#))
   g. Remove the fan (see [Fan on page 50](#))

Remove the heat sink for discrete graphics memory:

1. Following the sequence stamped into the heat sink, remove the six Phillips M2.0 x 4 screws (1) and then carefully lift the heat sink (2) to remove it from the system board.

**NOTE:** Due to the adhesive quality of the thermal material located between the heat sink and the system board components, it may be necessary to move the heat sink from side to side to detach it.
2. The following illustration shows the replacement thermal material locations. The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

Thermal paste is used on the system board components (1), (3) and on the heat sink areas (2), (4) that service them.

Reverse this procedure to install the heat sink for discrete graphics memory.
Before removing the speaker, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Disconnect the WLAN cable (see WLAN module on page 45)
   e. Hard drive (see Hard drive on page 39)
   f. SSD (see SSD (M.2) on page 42)
   g. Remove the fan (see Fan on page 50)
   h. Remove the heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

Remove the left speaker:

1. Carefully disconnect the left speaker cable (1) from the computer.
2. Remove the two Phillips M2.0 x 4 screws (2) from the speaker.
3. Remove speaker (3) from the computer.

Reverse this procedure to install the left speaker.
heat sink for CPU and graphics

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>heat sink for CPU and graphics</td>
<td>725625-001</td>
</tr>
</tbody>
</table>

Before removing the heat sink for CPU and graphics, follow these steps:

1.  Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
3.  Disconnect all external devices from the computer.
4.  Remove the following components:
   a.  Battery (see Battery on page 34)
   b.  Optical drive (see Optical drive on page 35)
   c.  Base enclosure (see Base enclosure on page 37)
   d.  Hard drive (see Hard drive on page 39)
   e.  SSD (see SSD (M.2) on page 42)
   f.  Disconnect the WLAN cable (see WLAN module on page 45)
   g.  Right speaker (see Right speaker on page 47)
   h.  USB board (see USB board on page 49)
   i.  Fan (see Fan on page 50)
   j.  Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
   k.  Left speaker (see Left speaker on page 53)

Remove the heat sink for CPU and graphics:

1.  Remove the two Phillips screws (1) securing the heat sink to the system board.
2. Remove the heat sink (2).

Reverse this procedure to install the heat sink for CPU and graphics.
## System board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System board</td>
<td></td>
</tr>
</tbody>
</table>

All system boards use the following part numbers:

**xxxxxx-001**: Non-Windows operating systems  
**xxxxxx-601**: Windows 10 operating systems

### For products with Intel 6th generation processors

- NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i7-6700HQ  
  857388-xxx  
- NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i7-6700HQ  
  857389-xxx  
- NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i5-6300HQ  
  857390-601  
- NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i5-6300HQ  
  857391-601

### For products with Intel 7th generation processors

- NVIDIA N17 P-G0 (GeForce GTX 1060M), 2 GB i7-7700HQ  
  915466-xxx  
- NVIDIA N17 P-G0 (GeForce GTX 1060M), 4 GB i7-7700HQ  
  915467-xxx  
- NVIDIA N17 P-G0 (GeForce GTX 1050M), 2 GB i5-7300HQ  
  915468-xxx  
- NVIDIA N17 P-G0 (GeForce GTX 1050M), 4 GB i5-7300HQ  
  915469-xxx  
- NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i7-7700HQ  
  915550-xxx  
- NVIDIA N17 P-G1 (GeForce GTX 1060M), 4 GB i5-7300HQ  
  915551-xxx

**USB board cable**  
857454-001

---

![IMPORTANT:](image) Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the system board, follow these steps:

1. Shut down the computer.
2. 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.
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
   
   a. Battery (see [Battery on page 34](#))  
   b. Optical drive (see [Optical drive on page 35](#))  
   c. Base enclosure (see [Base enclosure on page 37](#))  
   d. Hard drive (see [Hard drive on page 39](#))  
   e. SSD (see [SSD (M.2) on page 42](#))  
   f. Disconnect the WLAN cable (see [WLAN module on page 45](#))  
   g. Right speaker (see [Right speaker on page 47](#))
h. USB board (see USB board on page 49)
i. Fan (see Fan on page 50)
j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
k. Left speaker (see Left speaker on page 53)

**NOTE:** 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:

- WLAN module (see WLAN module on page 45)
- Memory module (see Memory module on page 43)
- RTC battery (see RTC battery on page 60)
- heat sink for CPU and graphics (see heat sink for CPU and graphics on page 55)

Remove the system board:

1. If they are not already disconnected, disconnect the following cables from the system board (note the routing location of the cables when removing them):

   **NOTE:** Use minimal force when lifting the locking bar up on a ZIF connector and disconnecting the cable.

   (1) USB ribbon cable
   (2) WLAN cable
   (3) Display cable
   (4) Right speaker cable
   (5) Touchpad cable
   (6) Keyboard cable
   (7) Backlight cable
   (8) Power in connection cable
   (9) Left speaker
   (10) WLAN cable
2. Lift the USB board ribbon cable (1) to release it from the adhesive securing it to the computer.
3. Remove the Phillips M2.0 x 4.0 screw (2) securing the system board to the computer.
4. Lift the system board (3), and then remove it (4).

Reverse this procedure to install the system board.

**IMPORTANT:** After system board replacement, be sure to complete post-installation tasks as required that may include:
- Verifying functionality of the computer
- Updating the BIOS; see Using Setup Utility (BIOS) on page 74
Before removing the RTC battery, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Hard drive (see Hard drive on page 39)
   e. SSD (see SSD (M.2) on page 42)
   f. Release the WLAN cable (see WLAN module on page 45)
   g. Right speaker (see Right speaker on page 47)
   h. USB board (see USB board on page 49)
   i. Fan (see Fan on page 50)
   j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
   k. Left speaker (see Left speaker on page 53)
   l. System board (see System board on page 57)

Remove the RTC battery:

1. Carefully place the system board face down.
2. Use a thin tool (1) to release the battery from the battery holder, and then remove the battery (2).

Reverse this procedure to install the RTC battery.
Power in connector

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power in connector</td>
<td>858021-001</td>
</tr>
</tbody>
</table>

Before removing the power in connector, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Hard drive (see Hard drive on page 39)
   e. SSD (see SSD (M.2) on page 42)
   f. Disconnect the WLAN cable (see WLAN module on page 45)
   g. Right speaker (see Right speaker on page 47)
   h. USB board (see USB board on page 49)
   i. Fan (see Fan on page 50)
   j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
   k. Left speaker (see Left speaker on page 53)
   l. System board (see System board on page 57)

Remove the power in connector:

1. Release the clips (1) holding the power in connector.
2. Remove the connector (2).

Reverse this procedure to install the power in connector.
### TouchPad board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TouchPad board</td>
<td>862959-001</td>
</tr>
<tr>
<td>TouchPad cable</td>
<td>857455-001</td>
</tr>
</tbody>
</table>

Before removing the TouchPad board, follow these steps:

1. Turn off 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 the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Hard drive (see Hard drive on page 39)
   e. SSD (see SSD (M.2) on page 42)
   f. Disconnect the WLAN cable (see WLAN module on page 45)
   g. Right speaker (see Right speaker on page 47)
   h. USB board (see USB board on page 49)
   i. Fan (see Fan on page 50)
   j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
   k. Left speaker (see Left speaker on page 53)
   l. System board (see System board on page 57)

Remove the TouchPad board:

1. Lift the plastic protector (1) away from the TouchPad.

2. Carefully remove the three Phillips M2.0 x 2.0 screws (2) that secure the TouchPad bracket to the computer.

3. Remove the TouchPad bracket (3) that secures the TouchPad board.
4. Remove the three Phillips M2.0 x 2.5 screws (4) that secure the TouchPad board, and then remove the TouchPad board (5) from the computer.

Reverse this procedure to install the TouchPad board.
Display assembly

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antenna</strong>, dual</td>
<td>857443-001</td>
</tr>
<tr>
<td><strong>Back cover</strong> in Shadow Mesh, includes dual antenna</td>
<td>862968-001</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td></td>
</tr>
<tr>
<td>• 3D camera (for products with Intel 6th generation processors only)</td>
<td>781624-005</td>
</tr>
<tr>
<td>• HD camera (for all products)</td>
<td>846006-003</td>
</tr>
<tr>
<td><strong>Display bezel</strong></td>
<td></td>
</tr>
<tr>
<td>• For products with 3D camera</td>
<td>857451-001</td>
</tr>
<tr>
<td>• For products with HD camera</td>
<td>857450-001</td>
</tr>
<tr>
<td><strong>Display cable</strong></td>
<td></td>
</tr>
<tr>
<td>• For products with non-touch FHD screen and HD camera</td>
<td>857456-001</td>
</tr>
<tr>
<td>• For products with non-touch FHD screen, 3D camera, and Intel 6th generation processors</td>
<td>857458-001</td>
</tr>
<tr>
<td>• For products with non-touch UHD screen and HD camera</td>
<td>857459-001</td>
</tr>
<tr>
<td>• For products with non-touch UHD screen, 3D camera, and Intel 6th generation processors</td>
<td>857461-001</td>
</tr>
<tr>
<td><strong>Frame for HD camera</strong></td>
<td>857475-001</td>
</tr>
<tr>
<td><strong>Hinge caps</strong></td>
<td>862955-001</td>
</tr>
<tr>
<td><strong>Hinge kit (includes left and right hinges)</strong></td>
<td>857464-001</td>
</tr>
<tr>
<td><strong>Microphone board</strong></td>
<td>857471-001</td>
</tr>
<tr>
<td><strong>Raw panel 43.94 cm (17.3”)</strong></td>
<td></td>
</tr>
<tr>
<td>• Non-touch screen, FHD, AG, UWVA, 300 eDP, Flat4 GF</td>
<td>798926-009</td>
</tr>
<tr>
<td>• Non-touch screen, UHD, AG, UWVA, 300 eDP, 1.3 PSR, Flat GF</td>
<td>853322-003</td>
</tr>
</tbody>
</table>

**IMPORTANT:** Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the display assembly, follow these steps:

1. Shut down the computer.
2. 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.
3. Disconnect all external devices connected to the computer.
4. Remove the following components:
   a. Battery (see Battery on page 34)
   b. Optical drive (see Optical drive on page 35)
   c. Base enclosure (see Base enclosure on page 37)
   d. Hard drive (see Hard drive on page 39)
e. SSD (see SSD (M.2) on page 42)
f. Disconnect the WLAN cable (see WLAN module on page 45)
g. Right speaker (see Right speaker on page 47)
h. USB board (see USB board on page 49)
i. Fan (see Fan on page 50)
j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)
k. Left speaker (see Left speaker on page 53)
l. System board (see System board on page 57)

Remove the display assembly:

1. Remove the two Phillips screws from the right hinge and the two Phillips screws from the left hinge (1), open the hinges (2) as wide as possible, and then remove the display assembly (3).

2. If it is necessary to replace the display bezel or any of the LED display assembly subcomponents:
   a. Use a plastic tool to disengage the bezel starting at the top (1), left and right sides (2), and bottom (3).
b. Remove the display bezel (4).

3. If it is necessary to replace the raw display panel, remove the four Phillips M2.0 x 3 screws (1) that secure the display panel to the display enclosure, and then lift the panel (2) to remove it.
4. Remove the tape (1) covering the display panel connector, disconnect the connector (2) from the display panel, and then remove the panel (3).

5. If it is necessary to replace the hinge brackets, remove the Phillips M2.0 x 3 screw (1) from the top and two Phillips M2.0 x 3 screws (1) from the bottom of each hinge bracket, remove the three Phillips M2.5 x 3 screws (2) from each hinge, and then remove the hinge brackets (3).

6. If it is necessary to replace the camera module:

⚠️ **CAUTION:** Handle the module with caution. This module has a thin profile and is susceptible to damage when not handled carefully.
a. Lift up the camera module and cable (1).
b. Lift the tape (2) covering the from the module, and remove the cable (3).
c. Remove the camera module (3).
d. For HD cameras only, lift the frame (5) to remove it from the display enclosure.

7. If it is necessary to replace the microphone module:

⚠️ **CAUTION:** Handle the module with caution. This module has a thin profile and is susceptible to damage when not handled carefully.

a. Release the module clips (1) from the module, and detach the cable (2).
b. Detach the camera or microphone module (3) from the display enclosure. (The module is attached to the display enclosure with double-sided adhesive.)

8. If it is necessary to replace the WLAN antennas:
   a. Release the WLAN antenna cable from the routing path (1) of the display enclosure.
   b. Carefully peel back the metallic tape (2) to release the wireless antenna transceivers from the display enclosure.
c. Remove the WLAN antenna cable (3) from the display enclosure.

9. If it is necessary to replace the display cable:
   a. Release the cable from the routing path (1) along the display enclosure.
   b. Remove the cable (2).

**IMPORTANT:** Use care when handling and installing the new antennas. Accidental bending of the antenna elements will detune the antenna and degrade the computer’s performance.
Reverse this procedure to install the display assembly.
Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility (BIOS) includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

**NOTE:** To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook.

### Starting Setup Utility (BIOS)

⚠️ **CAUTION:** Use extreme care when making changes in Setup Utility (BIOS). Errors can prevent the computer from operating properly.

▲ Turn on or restart the computer, quickly press `esc`, and then press `f10`.

### Updating Setup Utility (BIOS)

Updated versions of Setup Utility (BIOS) may be available on the HP website.

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

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

### Determining the BIOS version

To decide whether you need to update Setup Utility (BIOS), first determine the BIOS version on your computer.

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*), use one of these options.

- **HP Support Assistant**
  1. Type **support** in the taskbar search box, and then select the **HP Support Assistant** app.
     - or –
     Click the question mark icon in the taskbar.
  2. Select **My PC**, and then select **Specifications**.

- **Setup Utility (BIOS)**
  1. Start Setup Utility (BIOS) (see **Starting Setup Utility (BIOS) on page 74**).
  2. Select **Main**, select **System Information**, and then make note of the BIOS version.
  3. Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see **Downloading a BIOS update on page 75**.
CAUTION: To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
- Do not shut down the computer or initiate Sleep.
- Do not insert, remove, connect, or disconnect any device, cable, or cord.

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

1. Type support in the taskbar search box, and then select the HP Support Assistant app.
   - or -
   Click the question mark icon in the taskbar.
2. Click Updates, and then click Check for updates and messages.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

   1. Type file in the taskbar search box, and then select File Explorer.
2. Click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder that contains the update.
4. Double-click the file that has an .exe extension (for example, filename.exe).

   The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.

NOTE: After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.
HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

**NOTE:** To start diagnostics on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached.

To start HP PC Hardware Diagnostics (UEFI), follow these steps:

1. Turn on or restart the computer, and quickly press *esc*.
2. Press *f2*.

   The BIOS searches three places for the diagnostic tools, in the following order:
   a. Connected USB drive
   **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see **Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 76**.
   b. Hard drive
   c. BIOS
3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

   **NOTE:** If you need to stop a diagnostic test, press *esc*.

---

**Downloading HP PC Hardware Diagnostics (UEFI) to a USB device**

**NOTE:** The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only, and you must use a Windows computer to download and create the HP UEFI support environment because only .exe files are offered.

There are two options to download HP PC Hardware Diagnostics to a USB device.

**Download the latest UEFI version**

2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

**Download any version of UEFI for a specific product**

2. Select **Get software and drivers**.
3. Enter the product name or number.
   – or –
   Select **Identify now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.
9 Backing up, restoring, and recovering

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP support assistant app.

▲ Type support in the taskbar search box, and then select the HP Support Assistant app.

– or –

Click the question mark icon in the taskbar.

**IMPORTANT:** If you will be performing recovery procedures on a tablet, the tablet battery must be at least 70% charged before you start the recovery process.

**IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning any recovery process.

### Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see **Creating HP Recovery media (select products only)** on page 78. For information on the recovery options that are available using the recovery media, see **Using Windows tools on page 79**.

- Use Windows tools to create system restore points and create backups of personal information.

For more information, see **Recovering using HP Recovery Manager on page 80**.

**NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

### Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the Start menu, select File Explorer, and then select This PC.

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the Worldwide Telephone Numbers booklet included with the computer. You can also find contact information on the HP website. Go to [http://www.hp.com/support](http://www.hp.com/support), select your country or region, and follow the on-screen instructions.
You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 79.

- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery installs the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.
  - Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
  - HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.
  - To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.
  - If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your computer from HP. See the Worldwide Telephone Numbers booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.
  - Be sure that the computer is connected to AC power before you begin creating the recovery media.
  - The creation process can take an hour or more. Do not interrupt the creation process.
  - If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

**IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1. Type recovery in the taskbar search box, and then select HP Recovery Manager.
2. Select Create recovery media, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 80.

### Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

**NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

For more information and steps, see the Get started app.

- Select the Start button, and then select the Get started app.
Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

**IMPORTANT:** Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get started app.
  
  ▲ Select the Start button, and then select the Get started app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.
  
  ▲ Type recovery in the taskbar search box, select HP Recovery Manager, select Reinstall drivers and/or applications, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

- On select products, if you want to recover the computer’s original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.
  
  For more information, see Removing the HP Recovery partition (select products only) on page 83.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer’s website or reinstall the software from the media provided by the manufacturer.

**IMPORTANT:** Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, seeCreating HP Recovery media (select products only) on page 78.

- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, seeCreating HP Recovery media (select products only) on page 78.

- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the Worldwide Telephone Numbers booklet included with the computer. You can also find contact information from the HP
website. Go to [http://www.hp.com/support](http://www.hp.com/support), select your country or region, and follow the on-screen instructions.

**IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

**NOTE:** Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

### Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

**IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps (select products only).

1. Type `recovery` in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

   - or-

   For computers or tablets with keyboards attached, press **f11** while the computer boots, or press and hold **f11** as you press the power button.

   For tablets without keyboards:

   Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f11**.

   - or -

   Turn on or restart the tablet, and then quickly hold down the Windows button; then select **f11**.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

### Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media, and then restart the computer.

**NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 82.

3. Follow the on-screen instructions.
Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection to an optical drive or a USB flash drive.

To change the boot order:

**IMPORTANT:** For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps.

1. Insert the HP Recovery media.
2. Access BIOS:
   - For computers or tablets with keyboards attached:
     ▲ Turn on or restart the computer or tablet, quickly press `esc`, and then press `f9` for boot options.
   - For tablets without keyboards:
     ▲ Turn on or restart the tablet, and then quickly hold down the volume down button; then select `f9`.
     - or -
     ▲ Turn on or restart the tablet, and then quickly hold down the Windows button; then select `f9`.
3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.
Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

**IMPORTANT:** After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 78.

**NOTE:** The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.
## 10 Specifications

### Computer specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width</td>
<td>41.68 cm</td>
<td>16.41 in</td>
</tr>
<tr>
<td>Depth</td>
<td>27.95 cm</td>
<td>11.0 in</td>
</tr>
<tr>
<td>Height (front to back)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Touch</td>
<td>3.09 cm</td>
<td>1.22 in</td>
</tr>
<tr>
<td>• Non-touch</td>
<td>2.99 cm</td>
<td>1.18 in</td>
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<tr>
<td>Weight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Touch</td>
<td>3.08 kg (depending on configuration)</td>
<td>6.78 lbs (depending on configuration)</td>
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<td>• Non-touch</td>
<td>2.85 kg (depending on configuration)</td>
<td>6.28 lbs (depending on configuration)</td>
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<td>Input power</td>
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<tr>
<td>Operating voltage and current</td>
<td>19.5 V dc @ 7.70 A – 150 W</td>
<td>19 V dc @ 6.15 A – 120 W</td>
</tr>
<tr>
<td>Temperature</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>5°C to 35°C</td>
<td>41°F to 95°F</td>
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<tr>
<td>Nonoperating</td>
<td>-20°C to 60°C</td>
<td>-4°F to 140°F</td>
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<tr>
<td>Relative humidity (noncondensing)</td>
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<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 90%</td>
<td></td>
</tr>
<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
<td></td>
</tr>
<tr>
<td>Maximum altitude (unpressurized)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>-15 m to 3,048 m</td>
<td>-50 ft to 10,000 ft</td>
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<tr>
<td>Nonoperating</td>
<td>-15 m to 12,192 m</td>
<td>-50 ft to 40,000 ft</td>
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**NOTE:** Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.
### 43.94 cm (17.3 in) display specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
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</tr>
<tr>
<td>Diagonal size</td>
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<tr>
<td>Thickness</td>
<td>4.2 mm</td>
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<tr>
<td><strong>Brightness</strong></td>
<td>300 nits (cd/m²)</td>
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<tr>
<td><strong>Resolution</strong></td>
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<tr>
<td>Touch</td>
<td>1920x1080</td>
</tr>
<tr>
<td>Non-touch</td>
<td>3840x2160</td>
</tr>
<tr>
<td><strong>Backlight</strong></td>
<td>WLED</td>
</tr>
<tr>
<td><strong>Surface treatment</strong></td>
<td>AntiGlare</td>
</tr>
<tr>
<td><strong>Companion standard</strong></td>
<td></td>
</tr>
<tr>
<td>Touch</td>
<td>eDP</td>
</tr>
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<td>Non-touch</td>
<td>eDP+PSR</td>
</tr>
<tr>
<td><strong>Viewing angle</strong></td>
<td>SVA</td>
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</tbody>
</table>

### Hard drive specifications

<table>
<thead>
<tr>
<th></th>
<th>1 TB*</th>
<th>2 TB*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Height</td>
<td>9.5 mm</td>
<td>9.5 mm</td>
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<tr>
<td>Width</td>
<td>70 mm</td>
<td>70 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>115 g</td>
<td>115 g</td>
</tr>
<tr>
<td><strong>Interface type</strong></td>
<td>SATA</td>
<td>SATA</td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>Synchronous (maximum) 300 MB/s (Drive Capability)</td>
<td></td>
</tr>
<tr>
<td><strong>Security</strong></td>
<td>ATA security</td>
<td>ATA security</td>
</tr>
<tr>
<td><strong>Seek times</strong> (typical read, including setting)</td>
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<td></td>
</tr>
<tr>
<td>Single track</td>
<td>1.4 ms</td>
<td>1.4 ms</td>
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<tr>
<td>Average</td>
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<tr>
<td>Maximum</td>
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<td>12 ms</td>
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<td>3,877,842,922</td>
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<td>5400 rpm</td>
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<td><strong>Operating temperature</strong></td>
<td>0°C to 60°C (0°F to 140°F)</td>
<td>0°C to 60°C (0°F to 140°F)</td>
</tr>
</tbody>
</table>

*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

**NOTE:** Certain restrictions and exclusions apply. Contact support for details.
11 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 V ac, or from 220 to 240 V 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 and region where the computer is used.

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least 1.0 m (3.3 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 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.
## Requirements for specific countries and regions

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>IRAM</td>
<td>1</td>
</tr>
<tr>
<td>Australia</td>
<td>SAA</td>
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<td>Austria</td>
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<tr>
<td>Belgium</td>
<td>CEBEC</td>
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<td>ABNT</td>
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<tr>
<td>Canada</td>
<td>CSA</td>
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<td>Chile</td>
<td>IMQ</td>
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<td>Denmark</td>
<td>DEMKO</td>
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<td>IMQ</td>
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<td>The People’s Republic of China</td>
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<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, 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.

2. The flexible cord must be Type SVT/SJT 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 ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.</td>
<td>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 VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard CB303 (7 A, 125 V ac) configuration.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>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 CCC certification mark.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.</td>
<td></td>
</tr>
</tbody>
</table>
When a non-rechargeable or rechargeable 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 battery disposal.

HP encourages customers to recycle used electronic hardware, HP original print cartridges, and rechargeable batteries. For more information about recycling programs, see the HP Web site at http://www.hp.com/recycle.
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