Maintenance and Service Guide

HP Pavilion 15 Laptop PC
IMPORTANT! This document is intended for HP authorized service providers only.
Product notice

This user guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available in all editions of Windows. This computer may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Go to http://www.microsoft.com for details.

Software terms

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a full refund subject to the refund policy of your seller.

For any further information or to request a full refund of the price of the computer, please contact your seller.
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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# 1 Product description

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<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Product Name</td>
<td><strong>HP Pavilion 15 Laptop PC</strong></td>
</tr>
</tbody>
</table>

  **Model numbers:**
  - 1St-cs000, 1St-cs100

## Processors

**8th generation Intel® Core™ processors:**

- i7-8565U 1.80-GHz (SC turbo up to 4.60-GHz) quad core processor (8.0-MB L3 cache, 2400-MHz FSB, 15 W)
- i7-8550U 1.80-GHz (SC turbo up to 4.00-GHz) quad core processor (8.0-MB L3 cache, 2400-MHz FSB, 15 W)
- i5-8265U 1.60-GHz (SC turbo up to 3.90-GHz) quad core processor (6.0-MB L3 cache, 2400-MHz FSB, 15 W)
- i5-8250U 1.60-GHz (SC turbo up to 3.40-GHz) quad core processor (6.0-MB L3 cache, 2400-MHz FSB, 15 W)
- i3-8130U 2.20-GHz (SC turbo up to 3.40-GHz) dual core processor (4.0-MB L3 cache, 2400-MHz FSB, 15 W)

**7th generation Intel processors:**

- Core i7-7500U 2.70-GHz (SC turbo up to 3.50-GHz) dual core processor (4.0-MB L3 cache, 2133-MHz FSB, 15 W)
- Pentium® Gold 4415U 2.30-GHz, dual core processor (2.0-MB L3 cache, 2133-MHz FSB, 15 W)

## Graphics

**Support for HD decode, DX12, and high-definition multimedia interface (HDMI)**

- Supports Optimus (select products only)
- Supports GPS (GPU Performance Scaling)
- Supports MR ready

**Internal graphics:**

- Intel UHD Graphics 620 (8th generation Intel Core processors)
- Intel HD Graphics 620 (7th generation Intel Core processors)
- Intel HD Graphics 610 (7th generation Intel Pentium processors)

**Hybrid graphics:**

- GeForce GTX 1050 with 2048-MB of discrete video memory
- GeForce GTX 1050 with 4096-MB of discrete video memory
- GeForce GTX1050Ti with 4096-MB of discrete video memory
- GeForce MX150 with up to 4096-MB of discrete video memory
- GeForce MX150 with up to 2048-MB of discrete video memory
- GeForce MX130 with up to 2048-MB of discrete video memory

## Panel

**15.6-in, white light-emitting (WLED), slim, eDP, 16:9 aspect ratio:**

- HD (1366×768), BrightView, SVA, 220 nits (select products only)
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HD (1366×768)</td>
<td>BrightView, SVA, 220 nits, Touch-on Panel (TOP) (select products only)</td>
</tr>
<tr>
<td>HD (1366×768)</td>
<td>anti glare, SVA, 220 nits (select products only)</td>
</tr>
<tr>
<td>Full high-definition (FHD) (1920×1080)</td>
<td>BrightView, UWVA, 220 nits</td>
</tr>
<tr>
<td>Full high-definition (FHD) (1920×1080)</td>
<td>BrightView, UWVA, 250 nits, Touch-on Panel (TOP); touch solution with bezel, multi-touch enabled (select products only)</td>
</tr>
<tr>
<td>Full high-definition (FHD) (1920×1080)</td>
<td>anti glare, UWVA, 220 nits</td>
</tr>
<tr>
<td>Full high-definition (FHD) (1920×1080)</td>
<td>anti glare, SVA, 220 nits (select products only)</td>
</tr>
</tbody>
</table>

**Memory**

- Two SODIMM memory module slots, non-customer-accessible/non-upgradable
- Supports up to 16-GB of system memory
- DDR4-2400 dual channel support (select products only)
- DDR4-2133 dual channel support (select products only)

Supports the following configurations:

- 16384 MB (8192 MB×2)
- 12288 MB (8192 MB×1 + 4096 MB×1)
- 8192 MB (8192 MB×1 or 4096 MB×2)
- 6144 MB (4096 MB×1 + 2048 MB×1)
- 4096 MB (4096 MB×1)

**Storage**

- Support for 7.2 mm/9.5 mm, SATA, 2.5-inch hard drives (select models only):
- Support for solid-state drive + hard drive (select products only)
- Support for M.2 SATA/PCIe solid-state drive (select products only)
- Accelerometer/Hard drive protection support

Single hard drive configurations (select products only):

- 2-TB, 5400-rpm, 7.0 mm
- 1-TB, 5400-rpm, 7.2 mm
- 500-GB, 5400-rpm, 7.0 mm

Dual storage configurations (select products only):

- 256-GB, PCIe, value, solid-state drive + 1-TB, 5400-rpm, 7.2 mm hard drive
- 256-GB, SATA, TLC, solid-state drive + 1-TB, 5400-rpm, 7.2 mm hard drive
- 128-GB, SATA, TLC, solid-state drive + 2-TB, 5400-rpm, 7.2 mm hard drive
- 128-GB, SATA, TLC, solid-state drive + 1-TB, 5400-rpm, 7.2 mm hard drive
- 128-GB, SATA, TLC, solid-state drive + 500-GB, 5400-rpm, 7.0 mm hard drive

M.2 SATA-3, TLC, solid-state drive (select products only):

- 256-GB
- 128-GB
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>M.2, PCIe, NVMe, value, solid-state drive:</strong></td>
<td></td>
</tr>
<tr>
<td>512-GB</td>
<td></td>
</tr>
<tr>
<td>256-GB</td>
<td></td>
</tr>
<tr>
<td><strong>Intel Optane (3D Xpoint) Solution, PCIe, Gen3×2, M.2, solid-state drive (select products only):</strong></td>
<td></td>
</tr>
<tr>
<td>16 GB (Optane memory module) + 1 TB, 5400–rpm, 7.2mm hard drive</td>
<td></td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td></td>
</tr>
<tr>
<td>HP Wide Vision FHD infrared camera with indicator light and 2 infrared lights, USB 2.0, FHD hybrid BSI sensor, f2.2, 88° wide field of vision</td>
<td>1080p by 30 frames per second</td>
</tr>
<tr>
<td>Supports Windows® Hello</td>
<td></td>
</tr>
<tr>
<td>Dual array Digital Microphones with appropriate software - beam forming, echo cancellation, noise suppression</td>
<td></td>
</tr>
<tr>
<td><strong>HP Wide Vision HD camera</strong> with indicator light, USB 2.0, HD BSI sensor, f2.0, 88° wide field of vision</td>
<td>720p by 30 frames per second</td>
</tr>
<tr>
<td>Dual array Digital Microphones w/ appropriate software - beam forming, echo cancellation, noise suppression</td>
<td></td>
</tr>
<tr>
<td><strong>Audio</strong></td>
<td></td>
</tr>
<tr>
<td>Audio brand: B&amp;O Play</td>
<td></td>
</tr>
<tr>
<td>Audio control panel: B&amp;O Play Audio Control</td>
<td>Supports HP Audio Boost</td>
</tr>
<tr>
<td>Dual speakers</td>
<td></td>
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<tr>
<td><strong>Ethernet</strong></td>
<td></td>
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<tr>
<td>Ethernet Integrated 10/100/1000 NIC</td>
<td></td>
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<tr>
<td><strong>Sensors</strong></td>
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<tr>
<td>Accelerometer (select products only)</td>
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<tr>
<td><strong>Wireless</strong></td>
<td></td>
</tr>
<tr>
<td>Compatible with Miracast-certified devices</td>
<td><strong>Integrated wireless options with a single antenna</strong></td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC 9461 802.11ac 1 × 1 WiFi+Bluetooth® 5 Combo Adapter (non-vPro) (select products only)</td>
<td></td>
</tr>
<tr>
<td><strong>Integrated wireless options with dual antennas (M.2/CNVi):</strong></td>
<td></td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC 9560 802.11ac 2 × 2 WiFi + Bluetooth (non-vPro) (MU-MIMO supported)</td>
<td></td>
</tr>
<tr>
<td>Intel Dual band wireless-AC 316B 802.11ac 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td></td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC 7265 802.11ac 2 × 2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td></td>
</tr>
<tr>
<td>Realtek RTL8822BE 802.11ac 2 × 2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported) (select products only)</td>
<td></td>
</tr>
<tr>
<td><strong>Integrated wireless options with single antenna (M.2/PCIe):</strong></td>
<td></td>
</tr>
<tr>
<td>Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported) (select products only)</td>
<td></td>
</tr>
<tr>
<td>Realtek RTL8723DE 802.11bgn 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (select products only)</td>
<td></td>
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<tr>
<td><strong>External media cards</strong></td>
<td></td>
</tr>
<tr>
<td>HP Multi-Format Digital Memory Card Reader</td>
<td>Supports SD/SDHC/SDXC</td>
</tr>
<tr>
<td>Push-push insertion/removal</td>
<td></td>
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<td>Description</td>
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<tr>
<td>Internal card expansion</td>
<td>One M.2 slot for solid-state drive</td>
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<td></td>
<td>One M.2 slot for WLAN</td>
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<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>
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<td>AC Smart Pin adapter plug</td>
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<td></td>
<td>Audio-out (headphone)/audio-in (microphone) combo jack</td>
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<tr>
<td></td>
<td>HDMI v1.4 supporting up to 1920×1080 @ 60Hz</td>
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<tr>
<td></td>
<td>RJ-45/ethernet</td>
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<td>USB 3.0 ports (2, right side)</td>
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<td></td>
<td>USB Type-C port; USB 3.1 Gen 1 (left side); supports data transfer</td>
</tr>
<tr>
<td></td>
<td>HDMI supporting up to 4096×2160 @ 60Hz (select products only)</td>
</tr>
<tr>
<td>Keyboard/TouchPad</td>
<td><strong>Keyboard:</strong></td>
</tr>
<tr>
<td></td>
<td>Full-sized, two coat paint, island-style keyboard with numeric keypad</td>
</tr>
<tr>
<td></td>
<td>Full-sized, three-coat paint, backlit, island-style keyboard with numeric keypad</td>
</tr>
<tr>
<td></td>
<td><strong>TouchPad:</strong></td>
</tr>
<tr>
<td></td>
<td>Image sensor</td>
</tr>
<tr>
<td></td>
<td>MultiTouch gestures enabled</td>
</tr>
<tr>
<td></td>
<td>Support for Modern TrackPad gestures</td>
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<tr>
<td></td>
<td>Taps enabled as default</td>
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<tr>
<td>Power requirements</td>
<td><strong>Battery:</strong></td>
</tr>
<tr>
<td></td>
<td>4-cell, 68-WHr, 4416-mAh prismatic/polymer battery (select models only)</td>
</tr>
<tr>
<td></td>
<td>3-cell, 41-WHr, 3549-mAh, prismatic/polymer battery</td>
</tr>
<tr>
<td></td>
<td>Supports battery fast charge</td>
</tr>
<tr>
<td></td>
<td><strong>AC adapter:</strong></td>
</tr>
<tr>
<td></td>
<td>120-W HP Smart AC adapter with power cord</td>
</tr>
<tr>
<td></td>
<td>90-W HP Smart AC adapter with power cord</td>
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<tr>
<td></td>
<td>65-W HP Smart AC adapter (EM) with power cord</td>
</tr>
<tr>
<td></td>
<td>65-W HP Smart AC adapter with power cord</td>
</tr>
<tr>
<td></td>
<td>45-W HP Smart AC adapter with power cord</td>
</tr>
<tr>
<td></td>
<td><strong>Power cord:</strong></td>
</tr>
<tr>
<td></td>
<td>1.0 m conventional power cord with a C5 connector</td>
</tr>
<tr>
<td></td>
<td>1.0 m conventional power cord with a C5 connector + Japan plug adapter</td>
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<tr>
<td>Security</td>
<td>Nano security cable slot</td>
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<td></td>
<td>Support for Trusted Platform Module (TPM) 2.0</td>
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<td>Operating system</td>
<td>FreeDOS 2.0</td>
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<td>Category</td>
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<td>-----------------------------------------------------------------------------</td>
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<td></td>
<td>Windows 10 Home 64</td>
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<tr>
<td></td>
<td>Windows 10 Home 64 Chinese Market CPPP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 High-End Chinese Market CPPP</td>
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<td>Windows 10 Home 64 Plus</td>
</tr>
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<td>Windows 10 Home 64 Plus Microsoft Signature</td>
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<td></td>
<td>Windows 10 Home 64 Plus QVC</td>
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<td></td>
<td>Windows 10 Home 64 Plus Single Language</td>
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<td></td>
<td>Windows 10 Home 64 Plus Single Language APAC EM PPP</td>
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<td></td>
<td>Windows 10 Home 64 Plus Single Language India Market PPP</td>
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<td></td>
<td>Windows 10 Home 64 Plus Single Language Indonesia Market PPP</td>
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<tr>
<td></td>
<td>Windows 10 Home 64 Plus Web/Kiosk</td>
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<tr>
<td></td>
<td>Windows 10 Home 64 QVC</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language APAC EM PPP</td>
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<td></td>
<td>Windows 10 Home 64 Single Language India Market PPP</td>
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<td></td>
<td>Windows 10 Home 64 Single Language Indonesia Market PPP</td>
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<td></td>
<td>Windows 10 Home 64 Single Language Value APAC EM PPP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language Value India Market PPP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language Value Indonesia Market PPP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Value Notebook Single Language</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Value Notebook Single Language SEAP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Value Notebook Single Language select GEO</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Web/Kiosk</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64 Web/Kiosk</td>
</tr>
</tbody>
</table>

**Serviceability**

**End user replaceable parts:**

- AC adapter
# Getting to know your computer

Your computer features top-rated components. This chapter provides details about your components, where they’re located, and how they work.

## Right side

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| Memory card reader (1) | Reads optional memory cards that enable you to store, manage, share, or access information.  
To insert a card:  
1. Hold the card label-side up, with connectors facing the computer.  
2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.  
To remove a card:  
▲ Press in on the card, and then remove it from the memory card reader. |
| Security cable slot (2) | Attaches an optional security cable to the computer.  
**NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.  
See the Security section in [Product description](#) on page 1 for the specific security lock type. |
| USB SuperSpeed ports (2) (3) | Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer. |
| AC adapter and battery light (4) | • 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. |
| Power connector (5) | Connects an AC adapter. |
### Component Description

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) HDMI port</td>
<td>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.</td>
</tr>
</tbody>
</table>
| (2) RJ-45 (network) jack/status lights | Connects a network cable.  
- White: The network is connected.  
- Amber: Activity is occurring on the network. |
| (3) USB Type-C port | Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.  
**NOTE:** Cables and/or adapters (purchased separately) may be required. |
| (4) Drive light |  
- Blinking white: The hard drive is being accessed.  
- Amber: HP 3D DriveGuard has temporarily parked the hard drive. |
| (5) Audio-out (headphone)/Audio-in (microphone) combo jack | 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.  
**WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*.  
To access this guide:  
▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**.  
**NOTE:** When a device is connected to the jack, the computer speakers are disabled. |
### Display

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

![Illustration of computer display with components labeled]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) WLAN antennas*</td>
<td>Send and receive wireless signals to communicate with wireless local area networks (WLANs). If your computer has a single antenna, it is located on the right side.</td>
</tr>
<tr>
<td>(2) Internal microphones</td>
<td>Record sound.</td>
</tr>
<tr>
<td>(3) Camera light(s)</td>
<td>On: One or more cameras are in use.</td>
</tr>
<tr>
<td>(4) Camera</td>
<td>Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon.</td>
</tr>
</tbody>
</table>

*The antennas are not visible from the outside of the computer. 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:

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 notebook**, select the **Specifications** tab, and then select **User Guides**.
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) WLAN antennas*</td>
<td>Send and receive wireless signals to communicate with wireless local area networks (WLANS). <strong>NOTE:</strong> If your camera has a single antenna, it is located on the right side.</td>
</tr>
<tr>
<td>(2) Internal microphones</td>
<td>Record sound.</td>
</tr>
<tr>
<td>(3) Camera light(s)</td>
<td>On: One or more cameras are in use.</td>
</tr>
<tr>
<td>(4) Camera(s)</td>
<td>Allow(s) you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. <strong>NOTE:</strong> Camera functions vary depending on the camera hardware and software installed on your product.</td>
</tr>
</tbody>
</table>

*The antennas are not visible from the outside of the computer. 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:

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 notebook, select the Specifications tab, and then select User Guides.
Keyboard area

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

<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 | • On: Computer sound is off.  
• Off: Computer sound is on. |
Button, speakers, and vent

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</table>
| (1) Power button | ● When the computer is off, press the button to turn on the computer.  
● When the computer is on, press the button briefly to initiate Sleep.  
● When the computer is in the Sleep state, press the button briefly to exit Sleep.  
● When the computer is in Hibernation, press the button briefly to exit Hibernation.  
**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:  
▲ Right-click the Power icon and then select Power Options. |
| (2) Speakers | Produce sound. |
| (3) Vent | Enables airflow to cool internal components.  
**NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |
## Special 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 functions when pressed in combination with another key.</td>
</tr>
<tr>
<td>(3) Windows key</td>
<td>Opens the Start menu.</td>
</tr>
<tr>
<td><strong>NOTE:</strong> Pressing the Windows key again will close the Start menu.</td>
<td></td>
</tr>
<tr>
<td>(4) Action keys</td>
<td>Execute frequently used system functions.</td>
</tr>
<tr>
<td><strong>NOTE:</strong> On select products, the f5 action key turns the keyboard backlight feature off or on.</td>
<td></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>A separate keypad to the right of the alphabet keyboard. When num lock is pressed, the keypad can be used like an external numeric keypad.</td>
</tr>
<tr>
<td><strong>NOTE:</strong> If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.</td>
<td></td>
</tr>
</tbody>
</table>
**Action keys**

An action key performs the function indicated by the icon on the key. To determine which keys are on your product, see [Special keys on page 13](#).

▲ To use an action key, press and hold the key.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Opens the “How to get help in Windows 10” webpage.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Decreases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Increases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td><img src="#" 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>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Turns the keyboard backlight off or on (select products only).&lt;br&gt;&lt;br&gt;<strong>NOTE:</strong> To conserve battery power, turn off this feature.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Mutes or restores speaker sound.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Decreases speaker volume incrementally while you hold down the key.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Increases speaker volume incrementally while you hold down the key.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Plays the previous track of an audio CD or the previous section of a DVD or a Blu-ray Disc (BD). Plays the next track of an audio CD or the next section of a DVD or a BD.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Starts, pauses, or resumes playback of an audio CD, a DVD, or a BD. Plays the next track of an audio CD or the next section of a DVD or a BD.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Plays the next track of an audio CD or the next section of a DVD or a BD.</td>
</tr>
<tr>
<td><img src="#" alt="Icon" /></td>
<td>Turns the airplane mode and wireless feature on or off.&lt;br&gt;&lt;br&gt;<strong>NOTE:</strong> The airplane mode key is also referred to as the wireless button.&lt;br&gt;<strong>NOTE:</strong> A wireless network must be set up before a wireless connection is possible.</td>
</tr>
<tr>
<td>Component</td>
<td>Description</td>
</tr>
<tr>
<td>-----------</td>
<td>-------------</td>
</tr>
</tbody>
</table>
| Vent      | Enables airflow to cool internal components.  
**NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.

**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, on the back of the display, or on the bottom of a tablet kickstand.

- **Service label**—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information 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.

![Service label example]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HP product name (select products only)</td>
</tr>
<tr>
<td>2</td>
<td>Model number</td>
</tr>
<tr>
<td>3</td>
<td>Product ID</td>
</tr>
<tr>
<td>4</td>
<td>Serial number</td>
</tr>
<tr>
<td>5</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

**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.

Computer components
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Display assembly: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly components on page 21.</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Top cover with keyboard:</td>
<td>L24752-xx1, L24753-xx1</td>
</tr>
<tr>
<td></td>
<td>Natural silver, backlit</td>
<td>L35339-xx1</td>
</tr>
<tr>
<td></td>
<td>Natural silver, no backlight</td>
<td>L35340-xx1</td>
</tr>
<tr>
<td></td>
<td>Pale gold, backlit</td>
<td>L24754-xx1</td>
</tr>
<tr>
<td></td>
<td>Pale gold, no backlight</td>
<td>L24755-xx1</td>
</tr>
<tr>
<td></td>
<td>Top cover with keyboard (on models equipped with GTX graphics)</td>
<td>L35339-xx1, L35340-xx1</td>
</tr>
<tr>
<td>(3)</td>
<td>Power connector cable:</td>
<td>810327-006</td>
</tr>
<tr>
<td></td>
<td>Power connector cable EMI tape is available in the Miscellaneous Parts Kit using spare part number L28015-001.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Power connector cable in models equipped with GTX graphics</td>
<td>L45827-001</td>
</tr>
<tr>
<td>(4)</td>
<td>TouchPad:</td>
<td>L24934-001, L24933-001</td>
</tr>
<tr>
<td></td>
<td>NOTE: The TouchPad cable is available using spare part number L23893-001.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural silver</td>
<td>L24934-001</td>
</tr>
<tr>
<td></td>
<td>Pale gold</td>
<td>L24933-001</td>
</tr>
<tr>
<td>(5)</td>
<td>TouchPad bracket</td>
<td>L23892-001</td>
</tr>
<tr>
<td>(6)</td>
<td>Speakers (includes cable)</td>
<td>L23900-001</td>
</tr>
<tr>
<td></td>
<td>Speakers (on models equipped with GTX graphics) (include cable)</td>
<td>L41588-001</td>
</tr>
<tr>
<td>(7)</td>
<td>System board (includes processor and replacement thermal material):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in models with discrete graphics equipped with the following processors:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8565U and 4 GB of GeForce MX150 discrete video memory</td>
<td>L34172-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8565U and 4 GB of GeForce MX150 discrete video memory</td>
<td>L34171-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8565U and 4 GB of GeForce MX150 discrete video memory</td>
<td>L34176-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8565U and 2 GB of GeForce MX150 discrete video memory</td>
<td>L34175-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8550U processor and 4 GB of GeForce MX150 discrete video memory</td>
<td>L22820-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8550U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22817-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i7-8550U processor and 2 GB GeForce MX130 discrete video memory</td>
<td>L22814-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-8265U and 2 GB of GeForce MX150 discrete video memory</td>
<td>L34170-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-8265U and 2 GB of GeForce MX150 discrete video memory</td>
<td>L34173-xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-8265U and 2 GB of GeForce MX150 discrete video memory</td>
<td>L34174-xx1</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>1</td>
<td>Intel Core i5-8250U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22818-xx1</td>
</tr>
<tr>
<td>2</td>
<td>Intel Core i5-8250U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22815-xx1</td>
</tr>
<tr>
<td>3</td>
<td>Intel Core i5-8250U processor and 2 GB of GeForce MX130 discrete video memory</td>
<td>L22813-xx1</td>
</tr>
<tr>
<td>4</td>
<td>Intel Core i7-7500U processor and 4 GB of GeForce MX150 discrete video memory</td>
<td>L22819-xx1</td>
</tr>
<tr>
<td>5</td>
<td>Intel Core i7-7500U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22816-xx1</td>
</tr>
<tr>
<td>6</td>
<td>Intel Core i3-8130U and 2 GB of GeForce MX150 discrete video memory</td>
<td>L37245-xx1</td>
</tr>
<tr>
<td></td>
<td>For use in models with UMA graphics equipped with the following processors:</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Intel Core i7-8550U processor</td>
<td>L22822-xx1</td>
</tr>
<tr>
<td>8</td>
<td>Intel Core i5-8250U processor</td>
<td>L22821-xx1</td>
</tr>
<tr>
<td>9</td>
<td>Intel Core i3-8130U processor</td>
<td>L22824-xx1</td>
</tr>
<tr>
<td>10</td>
<td>Intel Core i5-8265U processor</td>
<td>L34169-xx1</td>
</tr>
<tr>
<td>11</td>
<td>Intel Pentium 4415U processor</td>
<td>L22823-xx1</td>
</tr>
<tr>
<td></td>
<td>For use in models with discrete GTX graphics equipped with the following processors:</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Intel Core i7-8565U processor with 1150 GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L46520-xx1</td>
</tr>
<tr>
<td>13</td>
<td>Intel Core i7-8565U processor with 1150Ti GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L46518-xx1</td>
</tr>
<tr>
<td>14</td>
<td>Intel Core i7-8565U processor with 1050 Ti GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L34172-xx1</td>
</tr>
<tr>
<td>15</td>
<td>Intel Core i7-8565U processor with 1050 GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L34171-xx1</td>
</tr>
<tr>
<td>16</td>
<td>Intel Core i5-8265U processor with 1150 GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L46519-xx1</td>
</tr>
<tr>
<td>17</td>
<td>Intel Core i5-8265U processor with 1050 GTX and 2 GB of GeForce MX150 discrete video memory</td>
<td>L44879-xx1</td>
</tr>
<tr>
<td>18</td>
<td>Intel Core i5-8265U processor with 1050Ti GTX and 4 GB of GeForce MX150 discrete video memory</td>
<td>L44879–xx1</td>
</tr>
<tr>
<td></td>
<td>Intel Core i5-8265U processor with 1050 GTX and 2 GB of GeForce MX150 discrete video memory</td>
<td>L34170–xx1</td>
</tr>
<tr>
<td></td>
<td>(8) <strong>Heat sink, discrete graphics</strong> (on models equipped with GTX graphics) (includes replacement thermal material)</td>
<td>L35251-001</td>
</tr>
<tr>
<td></td>
<td>(9) <strong>Heat sink:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Heat sink, discrete graphics</strong> (includes replacement thermal material)</td>
<td>L35251-001</td>
</tr>
<tr>
<td></td>
<td><strong>Heat sink, UMA graphics</strong> (not pictured) for use only on computer models equipped with Intel Core i7-8550U/i5-8250U processors (includes replacement thermal material)</td>
<td>L23898-001</td>
</tr>
<tr>
<td></td>
<td><strong>Heat sink, UMA graphics</strong> (not pictured) for use only on computer models equipped with Intel Core i7-7500U/Pentium 4415U processors (includes replacement thermal material)</td>
<td>L23899-001</td>
</tr>
<tr>
<td></td>
<td>(10) <strong>Fan for use in models with UMA graphics memory</strong></td>
<td>L27902-001</td>
</tr>
<tr>
<td></td>
<td>(11) <strong>Fan for use in models with discrete graphics memory</strong></td>
<td>L23895-001</td>
</tr>
<tr>
<td></td>
<td><strong>Fan for use in models with discrete graphics memory</strong> (on models equipped with GTX graphics)</td>
<td>L35338-001</td>
</tr>
<tr>
<td></td>
<td>(12) <strong>Memory modules</strong> (2, DDR4-2400, 1.2-V):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8-MB</td>
<td>862398-855</td>
</tr>
<tr>
<td></td>
<td>4-MB</td>
<td>862397-855</td>
</tr>
<tr>
<td></td>
<td>2-MB</td>
<td>864271-855</td>
</tr>
</tbody>
</table>

Computer components 19
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(13)</td>
<td>Solid-state drive (2280 M.2):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>512-GB, PCIe</td>
<td>L25329-001</td>
</tr>
<tr>
<td></td>
<td>256-GB, SATA-3, TLC</td>
<td>L25327-001</td>
</tr>
<tr>
<td></td>
<td>256-GB, PCIe</td>
<td>L25328-001</td>
</tr>
<tr>
<td></td>
<td>128-GB, SATA-3, TLC</td>
<td>L25326-001</td>
</tr>
<tr>
<td></td>
<td>Optane memory module, 16-GB, PCIe</td>
<td>L27309-001</td>
</tr>
<tr>
<td>(14)</td>
<td>WLAN module:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intel Dual Band Wireless-AC 7265 802.11ac 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td>901229-855</td>
</tr>
<tr>
<td></td>
<td>Intel Dual Band Wireless-AC 3168 802.11ac 1×1 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td>863934-855</td>
</tr>
<tr>
<td></td>
<td>Realtek RTL8822BE 802.11ac 2×2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</td>
<td>924813-855</td>
</tr>
<tr>
<td></td>
<td>Realtek RTL8821CE 802.11ac 1×1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</td>
<td>L17365-005</td>
</tr>
<tr>
<td></td>
<td>Realtek RTL8723DE-CG 802.11 bgn 1×1 WiFi + Bluetooth 4.2 Combo Adapter</td>
<td>L21480-005</td>
</tr>
<tr>
<td></td>
<td>Intel Dual Band Wireless-AC+Bluetooth 5 Combo Adapter (non-vPro)</td>
<td>L22634-005</td>
</tr>
<tr>
<td></td>
<td>Intel Dual Band Wireless-AC 9461 802.11ac 1×1 WiFi+Bluetooth 5 Combo Adapter (non-vPro)</td>
<td>L25889-005</td>
</tr>
<tr>
<td>(15)</td>
<td>Hard drive (SATA, 7.0-mm; does not include hard drive bracket or hard drive cable):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-TB, 5400-rpm</td>
<td>912487-855</td>
</tr>
<tr>
<td></td>
<td>1-TB, 5400-rpm</td>
<td>762990-005</td>
</tr>
<tr>
<td></td>
<td>500-GB, 5400-rpm</td>
<td>778186-005</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Hard drive brackets are available using spare part number L19469-001. The hard drive cable is available using spare part number L23889-001</td>
<td></td>
</tr>
<tr>
<td>(16)</td>
<td>USB board (select products only)</td>
<td>L23896-001</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The USB board cable is available using spare part number L23901-001.</td>
<td></td>
</tr>
<tr>
<td>(17)</td>
<td>Memory card reader board</td>
<td>L23890-001</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> The memory card reader board cable is available using spare part number L23891-001 and L41586-001 on models equipped with GTX graphics</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Memory card reader board (on models equipped with GTX graphics)</td>
<td>L41585-001</td>
</tr>
<tr>
<td>(18)</td>
<td>Lock bracket</td>
<td>L23902-001</td>
</tr>
<tr>
<td>(19)</td>
<td>Battery</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4-cell 68-WHr, 4416-AHr Li-ion</td>
<td>L32654-005</td>
</tr>
<tr>
<td></td>
<td>3-cell, 41-WHr, 3549-AHr, Li-ion</td>
<td>L11119-855</td>
</tr>
<tr>
<td>(20)</td>
<td>Bottom cover:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Natural silver</td>
<td>L23885-001</td>
</tr>
<tr>
<td></td>
<td>Natural silver (on models equipped with GTX graphics)</td>
<td>L41587-001</td>
</tr>
<tr>
<td></td>
<td>Pale gold</td>
<td>L23886-001</td>
</tr>
<tr>
<td>(21)</td>
<td>Rubber Foot Kit (includes Mylar screw cover):</td>
<td></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></td>
<td>For use in natural silver models</td>
<td>L23887-001</td>
</tr>
<tr>
<td></td>
<td>For use in pale gold models</td>
<td>L23888-001</td>
</tr>
</tbody>
</table>

Display assembly components
<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 use on computer models equipped with a FHD infrared camera</td>
<td>L23909-001</td>
</tr>
<tr>
<td></td>
<td>For use on computer models equipped with an HD non-infrared camera</td>
<td>L23908-001</td>
</tr>
<tr>
<td>(2)</td>
<td>IR camera/microphone module (includes display bezel adhesive)</td>
<td>L28107-001</td>
</tr>
<tr>
<td>(3)</td>
<td>HD camera/microphone module (includes display bezel adhesive)</td>
<td>L28108-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Display panel (includes display bezel adhesive and display rear cover adhesive):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>FHD, anti glare, SVA, non-touch</td>
<td>L25331-001</td>
</tr>
<tr>
<td></td>
<td>FHD, anti glare, UWVA, non-touch</td>
<td>L25332-001</td>
</tr>
<tr>
<td></td>
<td>FHD, BrightView, UWVA, non-touch</td>
<td>L25334-001</td>
</tr>
<tr>
<td></td>
<td>FHD, BrightView, UWVA, touch screen</td>
<td>L25333-001</td>
</tr>
<tr>
<td></td>
<td>HD, anti glare, non-touch</td>
<td>L25335-001</td>
</tr>
<tr>
<td></td>
<td>HD, BrightView, non-touch</td>
<td>L25336-001</td>
</tr>
<tr>
<td></td>
<td>HD, BrightView, touch</td>
<td>L25330-001</td>
</tr>
<tr>
<td>(5)</td>
<td>Hinge covers (include display bezel adhesive and display rear cover adhesive):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pale gold</td>
<td>L23913-001</td>
</tr>
<tr>
<td></td>
<td>Natural silver</td>
<td>L23914-001</td>
</tr>
<tr>
<td>(6)</td>
<td>Hinges (include left and right display hinges, display bezel adhesive, and display rear cover adhesive)</td>
<td>L23884-001</td>
</tr>
<tr>
<td>(7)</td>
<td>Wireless Antenna kits:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Wireless Dual Antenna kit (includes left and right wireless antenna cables, display bezel adhesive, and display back cover adhesive):</td>
<td>L24790-001</td>
</tr>
<tr>
<td></td>
<td>Wireless Single Antenna kit (includes wireless antenna cable, display bezel adhesive, and display back cover adhesive)</td>
<td>L31502-001</td>
</tr>
<tr>
<td>(8)</td>
<td>Display panel cable for use in models with an HD, non-infrared camera (include display bezel adhesive and display rear cover adhesive):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Touch screen</td>
<td>L23905-001</td>
</tr>
<tr>
<td></td>
<td>Non-touch screen</td>
<td>L23903-001</td>
</tr>
<tr>
<td></td>
<td>Non-touch screen on models equipped with GTX graphics</td>
<td>L43924-001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>L43925-001</td>
</tr>
<tr>
<td>(9)</td>
<td>Display panel cable for use in models with an infrared camera (include display bezel adhesive and display rear cover adhesive):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Touch screen</td>
<td>L23906-001</td>
</tr>
<tr>
<td></td>
<td>Non-touch screen</td>
<td>L23904-001</td>
</tr>
<tr>
<td>(10)</td>
<td>Display back cover (includes antenna cables, display bezel adhesive and display panel adhesive tape kit):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pale gold</td>
<td>L23880-001</td>
</tr>
<tr>
<td></td>
<td>Ceramic white</td>
<td>L23878-001</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></td>
<td></td>
<td>Sapphire blue</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Velvet burgundy</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mineral silver</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Tranquil pink</td>
</tr>
<tr>
<td></td>
<td>Adhesive tape kit (includes display bezel adhesive and display rear cover adhesive; not illustrated)</td>
<td>L23912-001</td>
</tr>
<tr>
<td></td>
<td>Display panel connector tape (not illustrated)</td>
<td>L28015-001</td>
</tr>
</tbody>
</table>

#### Mass storage devices

1. **Solid-state drives** (M.2):
   - 512-GB, PCIe: L25329-001
   - 256-GB, SATA-3, TLC: L25327-001
   - 256-GB, PCIe: L25328-001
   - 128-GB, SATA-3, TLC: L25326-001

2. **Optane memory module** (16-GB, PCIe): L27309-001

3. **Hard drives** (does not include hard drive cable or brackets):
   - 2-TB, 5400-rpm: 912487-855
### Hard Drives

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-TB, 5400-rpm</td>
<td>762990-005</td>
<td></td>
</tr>
<tr>
<td>500-GB, 5400-rpm</td>
<td>778186-005</td>
<td></td>
</tr>
<tr>
<td>(3)</td>
<td>Hard drive brackets</td>
<td>L19469-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Hard drive cable</td>
<td>L23889-001</td>
</tr>
</tbody>
</table>

### Cables

#### Cables

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Memory card reader board cable</td>
<td>L23891-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Memory card reader board cable on models equipped with GTX graphics</td>
<td>L41586-001</td>
</tr>
<tr>
<td>(3)</td>
<td>TouchPad cable</td>
<td>L23893-001</td>
</tr>
<tr>
<td>(4)</td>
<td>TouchPad cable on models equipped with GTX graphics</td>
<td>L23893-001</td>
</tr>
<tr>
<td>(5)</td>
<td>USB board cable (select models only)</td>
<td>L23901-001</td>
</tr>
<tr>
<td>(6)</td>
<td>Hard drive cable</td>
<td>L23889-001</td>
</tr>
<tr>
<td>(7)</td>
<td>Display cable for use in models with an HD, non-infrared camera (includes display bezel adhesive and display rear cover adhesive):</td>
<td></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></td>
<td>Touch screen</td>
<td>L23905-001</td>
</tr>
<tr>
<td></td>
<td>Non-touch screen</td>
<td>L23903-001</td>
</tr>
<tr>
<td>(8) Display cable for use in models with an infrared camera</td>
<td>(includes display bezel adhesive and display rear cover adhesive):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Touch screen</td>
<td>L23906-001</td>
</tr>
<tr>
<td></td>
<td>Non-touch screen</td>
<td>L23904-001</td>
</tr>
</tbody>
</table>

**Miscellaneous parts**

<table>
<thead>
<tr>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>AC adapter:</strong></td>
<td></td>
</tr>
<tr>
<td>120-W HP Smart AC adapter (PFC, Slim Barrel, 7.4–mm)</td>
<td>710415-001</td>
</tr>
<tr>
<td>90-W HP Smart AC adapter (PFC,RA, 4.5–mm)</td>
<td>937532-850</td>
</tr>
<tr>
<td>65-W HP Smart AC adapter (non-PFC, EM, RC, 4.5-mm)</td>
<td>913691-850</td>
</tr>
<tr>
<td>65-W AC adapter (non-PFC, S-3P, 4.5-mm)</td>
<td>710412-001</td>
</tr>
<tr>
<td>65-W AC adapter (non-PFC, S-3P, 4.5-mm) for use in Argentina</td>
<td>710340-850</td>
</tr>
<tr>
<td>45-W HP Smart AC adapter (non-PFC, RC, 4.5-mm, non-slim)</td>
<td>741553-852</td>
</tr>
<tr>
<td>45-W HP Smart AC adapter (non-PFC, RC, 4.5-mm) for use in Argentina</td>
<td>741727-001</td>
</tr>
<tr>
<td><strong>Power cord</strong> (C5 connector, 1.0 m):</td>
<td></td>
</tr>
<tr>
<td>For use in Argentina</td>
<td>L19357-001</td>
</tr>
<tr>
<td>For use in Australia</td>
<td>L19358-001</td>
</tr>
<tr>
<td>For use in Brazil</td>
<td>L19359-001</td>
</tr>
<tr>
<td>For use in Denmark</td>
<td>L19360-001</td>
</tr>
<tr>
<td>For use in Europe</td>
<td>L19361-001</td>
</tr>
<tr>
<td>For use in India</td>
<td>L19363-001</td>
</tr>
<tr>
<td>For use in Israel</td>
<td>L19362-001</td>
</tr>
<tr>
<td>For use in Italy</td>
<td>L19364-001</td>
</tr>
<tr>
<td>For use in Japan</td>
<td>L19365-001</td>
</tr>
<tr>
<td>For use in North America</td>
<td>L19367-001</td>
</tr>
<tr>
<td>For use in the People's Republic of China</td>
<td>L19368-001</td>
</tr>
<tr>
<td>For use in South Africa</td>
<td>L19369-001</td>
</tr>
<tr>
<td>For use in South Korea</td>
<td>L19366-001</td>
</tr>
<tr>
<td>For use in Switzerland</td>
<td>L19370-001</td>
</tr>
<tr>
<td>For use in Taiwan</td>
<td>L19372-001</td>
</tr>
<tr>
<td>For use in Thailand</td>
<td>L19371-001</td>
</tr>
<tr>
<td>Component</td>
<td>Spare part number</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>-------------------</td>
</tr>
<tr>
<td>For use in the United Kingdom</td>
<td>L19373-001</td>
</tr>
<tr>
<td>Duck head power cord for use in Japan</td>
<td>L33157-001</td>
</tr>
<tr>
<td><strong>Power adapter, C5</strong>, for use in Japan</td>
<td>226768-001</td>
</tr>
<tr>
<td><strong>External DVD±RW DL SuperMulti Drive</strong></td>
<td>747080-001</td>
</tr>
<tr>
<td><strong>Rubber Foot Kit</strong> for use in natural silver models (includes bottom cover rear feet)</td>
<td>L23887-001</td>
</tr>
<tr>
<td><strong>Rubber Foot Kit</strong> for use in pale gold models (includes bottom cover rear feet)</td>
<td>L23888-001</td>
</tr>
<tr>
<td><strong>Miscellaneous Parts Kit</strong> (includes power connector cable EMI tape and display panel connector tape)</td>
<td>L28015-001</td>
</tr>
<tr>
<td><strong>Screw Kit</strong></td>
<td>L23915-001</td>
</tr>
</tbody>
</table>
4  Removal and replacement preliminary requirements

Tools required

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

- Plastic, non-marking, pry tool
- Phillips P0 magnetic screw driver
- Phillips P1 magnetic screw driver
- Tweezers

Service considerations

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

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

Plastic parts

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

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

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

Drive handling

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

Before removing or inserting a 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.

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 drive, place it in a static-proof bag.

Avoid exposing a 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.”
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 tablet 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 Styrofoam</td>
<td>14,500 V</td>
</tr>
<tr>
<td>Removing bubble pack from PCB</td>
<td>26,500 V</td>
</tr>
<tr>
<td>Packing PCBs in foam-lined box</td>
<td>21,000 V</td>
</tr>
</tbody>
</table>
Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

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

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

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

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

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

⚠️ **CAUTION:** Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

### 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 16](#) 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](http://partsurfer.hp.com), select your country or region, and then follow the on-screen instructions.

There are as many as 60 screws that must be removed, replaced, and/or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

### Bottom cover

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom cover for use in natural silver models</td>
<td>L23885-001</td>
</tr>
<tr>
<td>Bottom cover for use in natural silver models on models equipped with GTX graphics</td>
<td>L41587-001</td>
</tr>
<tr>
<td>Bottom cover for use in pale gold models</td>
<td>L23886-001</td>
</tr>
</tbody>
</table>

Before removing the bottom cover, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

Remove the bottom cover:

1. Remove the two rubber feet (1).

   The rubber feet are available using spare part number L23887-001 for natural silver models and L23888-001 for pale gold models.
2. Remove the three Phillips M2.5×6.0 screws (P1 driver) (2) from under the feet and the three Phillips M2.0×4.0 screws (P0 driver) (3) along the bottom edge of the bottom cover that secure the bottom cover to the computer.

3. Starting under the hinges (1), use a thin plastic tool to disengage the bottom cover from the computer (2).

4. Remove the bottom cover (3).

To remove the bottom cover on models equipped with GTX graphics:

1. Remove the four rubber feet (1).

The rubber feet are available using spare part number L23887-001 for natural silver models and L23888-001 for pale gold models.
2. Remove the five Phillips M2.5×6.0 screws (P1 driver) \((2)\) from under the feet and the three Phillips M2.0×4.0 screws (P0 driver) \((3)\) along the bottom edge of the bottom cover that secure the bottom cover to the computer.

3. Starting under the hinges \((1)\), use a thin plastic tool to disengage the bottom cover from the computer \((2)\).

4. Remove the bottom cover \((3)\).

Reverse this procedure to install the bottom cover.
### Battery

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-cell, 68-WHr, 4416-AHr, Li-ion battery</td>
<td>L32654-005</td>
</tr>
<tr>
<td>3-cell, 41-WHr, 3539-AHr, Li-ion battery</td>
<td>L11119-855</td>
</tr>
</tbody>
</table>

Before removing the battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 32](#)).

Remove the battery:

1. Remove the four Phillips M2.0×4.0 screws (1) that secure the battery to the computer.
2. Remove the battery from the computer (2).

To remove the battery on models equipped with GTX graphics:

1. Disconnect the battery cable (1).
2. Remove the three Phillips M2.0×4.0 screws (2) that secure the battery to the computer.
3. Remove the battery from the computer (3).

Reverse this procedure to install the battery.
**Display assembly**

**NOTE:** The display assembly is spared at the subcomponent level. For display assembly spare part information, see the individual removal subsections.

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see *Bottom cover on page 32*).
5. Remove the battery (see *Battery on page 35*).

Remove the display assembly:

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

**NOTE:** The WLAN antenna cable labeled "1/MAIN" connects to the WLAN module "Main" terminal. The WLAN antenna cable labeled "2/AUX" connects to the WLAN module "Aux" terminal.

2. Release the WLAN antenna cables from the retention clips and routing channel built into the right speaker (2).
3. Disconnect the display cable from the system board ZIF connector (3).
4. Release the display panel from the retention clips and routing channel built into the left speaker (4).

5. Remove the four Phillips M2.5×6.0 screws (1) that secure the display assembly to the computer.
6. Open the display to open the hinges (2).
7. Separate the display from the computer (3).

8. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
   a. Release the top edge of the display bezel (1) from the display assembly.
   b. Release the left and right edges of the display bezel (2) from the display assembly.
   c. Release the bottom edge of the display bezel (3) from the display assembly.
   d. Remove the display bezel (4) from the display assembly.

The display bezel is available using the following spare part numbers:
9. If it is necessary to replace the camera/microphone module:
   a. Disconnect the cable (1) from the camera/microphone module.
   
   **NOTE:** Cables connect to both sides of IR cameras. A single cable connects to only one side of HD cameras.

   b. Detach the camera/microphone module (2) from the display back cover. (The module is attached with double-sided adhesive.)

   The camera/microphone module is available using spare part number L28108-001 for HD non-infrared camera/microphone modules.

   **Models with an HD camera**
c. The camera/microphone module is available using spare part number L28107-001 for FHD infrared camera/microphone modules.

**Models with an IR camera**

10. If it is necessary to replace the display panel:

   a. Use tweezers to grasp the ends of the tape that secures the display panel to the display rear cover (1).
b. Pull the tape out from behind the left and right sides of the panel (2).

**NOTE:** You have to pull on the tape multiple times before it is completely removed.

Display panel adhesive tape is available using spare part number L23912-001.

c. Swing the top edge of the display panel (1) up and forward until the panel rests upside down on the keyboard.

d. Release the adhesive support strip (2) that secures the display panel cable connector to the display panel.

e. Lift the connector support bracket (3).
f. Disconnect the display panel cable (4) from the display panel, and then remove the display panel (5).

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

- L25331-001 – FHD, anti-glare, SVA, non-touch
- L25332-001 – FHD, anti-glare, UWVA, non-touch
- L25334-001 – FHD, BrightView, UWVA, non-touch
- L25333-001 – FHD, BrightView, UWVA, touch screen
- L25335-001 – HD, anti-glare, SVA, non-touch
- L25336-001 – HD, BrightView, SVA, non-touch
- L25330-001 – HD, BrightView, SVA, touch

Display panel connector tape is available in the Miscellaneous Parts Kit using spare part number L28015-001.
11. If it is necessary to remove the hinge covers, pull up on the sides of the covers to remove them.

Hinge covers are available using spare part number L23913-001 for pale gold models and L23914-001 for natural silver models.

12. If it is necessary to remove the display hinges:
   a. Remove the six Phillips M2.0×2.5 broad head screws (1) from the bottom of the hinges.
   b. Remove the two Phillips M2.0×2.5 screws (2) from the top of the hinges.
   c. Remove the display hinges (3).

The display hinges are available using spare part number L23884-001.
13. If it is necessary to remove the display panel cable:
   a. Disconnect the cable from the camera module (1).

   **NOTE:** Cables connect to both sides of IR cameras. A single cable connects to only one side of HD cameras.

   b. Release the cable from the retention clips (2) and routing channel built into the bottom edge of the display back cover.

   c. Remove the display panel cable (3).

   **Models with an IR camera**
d. Models with an HD camera

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

L23903-001 – non-touch display assembly and an HD camera
L23904-001 – non-touch display assembly and an infrared camera
L23905-001 – touch display assembly and an HD camera
L23906-001 – touch display assembly and an infrared camera

14. If it is necessary to remove the wireless antenna cables and transceivers:
   a. Detach the wireless antenna transceivers (1) from the display back cover. The wireless antenna transceivers are attached to with double-sided adhesive.
   b. Release the wireless antenna cables from the retention clips (2) and routing channels built into the sides of the display back cover.
c. Remove the antennas from the display back cover.

The wireless antenna cables and transceivers are available using spare part number L24790-001.

Remove the display assembly on models equipped with GTX graphics:

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

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

2. Release the WLAN antenna cables from the retention clips and routing channel built into the right speaker (2).

3. Disconnect the display cable from the system board ZIF connector (3).

4. Remove the left speaker (4).
5. Release the display panel from the retention clips and routing channel built into the left speaker (5).

6. Remove the four Phillips M2.5×6.0 screws (1) that secure the display assembly to the computer.

7. Open the display to open the hinges (2).

8. Separate the display from the computer (3).

**NOTE:** If it is necessary to replace the display bezel or any of the display assembly subcomponents, please see the instructions above.

Reverse this procedure to reassemble and install the display assembly.
**Hard drive**

**NOTE:** The hard drive spare part kit does not include the hard drive brackets or the hard drive cable. The hard drive brackets are available using spare part number L19469-001. The hard drive cable is available using spare part number L23889-001.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-TB, 5400-rpm</td>
<td>912487-855</td>
</tr>
<tr>
<td>1-TB, 5400-rpm</td>
<td>762990-005</td>
</tr>
<tr>
<td>500-GB, 5400-rpm</td>
<td>778186-005</td>
</tr>
</tbody>
</table>

Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 32](#)).
5. Remove the battery (see [Battery on page 35](#)).

Remove the hard drive:

1. Disconnect the hard drive cable from the ZIF connector on the system board (1).
2. Remove the two Phillips M2.0×4.0 screws (2) that secure the hard drive to the computer.
3. Lift the inside of the hard drive up (3), and then remove the hard drive from the computer (4).
4. If it is necessary to disassemble the hard drive, pull the rubber bracket away from the hard drive (1), remove the two Phillips M3.0×3.0 screws (2), remove the metal bracket (3), and then disconnect the hard drive cable (4).

Reverse this procedure to reassemble and install the hard drive.
### WLAN module

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intel Dual Band Wireless-AC 7265 802.11ac 2×2 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td>901229-855</td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC 3168 802.11ac 1×1 WiFi + Bluetooth 4.2 Combo Adapter (non-vPro)</td>
<td>863934-855</td>
</tr>
<tr>
<td>Realtek RTL8822BE 802.11ac 2×2 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</td>
<td>924813-855</td>
</tr>
<tr>
<td>Realtek RTL8821CE 802.11ac 1×1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</td>
<td>L17365-005</td>
</tr>
<tr>
<td>Realtek RTL8723DE-CG 802.11 bgn 1×1 WiFi + Bluetooth 4.2 Combo Adapter</td>
<td>L21480-005</td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC+Bluetooth 5 Combo Adapter (non-vPro)</td>
<td>L22634-005</td>
</tr>
<tr>
<td>Intel Dual Band Wireless-AC 9461 802.11ac 1×1 WiFi+Bluetooth 5 Combo Adapter (non-vPro)</td>
<td>L25889-005</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 bottom cover** (see Bottom cover on page 32).

5. **Remove the battery** (see Battery on page 35).

Remove the WLAN module:

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

2. **Remove the Phillips M2.0×3.0 screw (2)** that secures the WLAN module to the computer. (The WLAN module tilts up.)

**NOTE:** The WLAN antenna cable labeled “1/MAIN” connects to the WLAN module “Main” terminal. The WLAN antenna cable labeled “2/AUX” connects to the WLAN module “Aux” terminal.
3. Remove the WLAN module (3) by pulling the module away from the slot at an angle.

**NOTE:** The WLAN module is designed with a notch to prevent incorrect insertion.

Reverse this procedure to install the WLAN module.
## Solid-state drive

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>512-GB, PCIe</td>
<td>L25329-001</td>
</tr>
<tr>
<td>256-GB, SATA-3, TLC</td>
<td>L25327-001</td>
</tr>
<tr>
<td>256-GB, PCIe</td>
<td>L25328-001</td>
</tr>
<tr>
<td>128-GB, SATA-3, TLC</td>
<td>L25326-001</td>
</tr>
</tbody>
</table>

Before removing the solid-state drive, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the bottom cover (see [Bottom cover on page 32](#)).

5. Remove the battery (see [Battery on page 35](#)).

Remove the solid-state drive module:

1. Remove the Phillips M2.0×3.0 screw (1) that secures the drive to the computer.

2. Remove the drive (2) by pulling it away from the socket.

Reverse this procedure to reassemble and install the solid-state drive.
**Optane memory module**

**IMPORTANT:** The M.2 connector that supports the Optane memory module can also support a solid-state drive. You cannot simultaneously install both an Optane memory module and a solid-state drive in the computer.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Optane memory module, 16 GB</td>
<td>L27309-001</td>
</tr>
</tbody>
</table>

Before removing the Optane 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 bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the Optane memory module:

▲ Remove the Phillips M2.0×3.0 screw (1), and then pull the module from the socket (2).

Reverse this procedure to install the Optane memory module.
Memory module

NOTE: Primary and expansion memory is installed in a side-by-side configuration in the bottom of the computer. If only one memory module is installed, it must be installed in the socket labeled 1.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>8-MB, DDR4-2400, 1.2-V</td>
<td>862398-855</td>
</tr>
<tr>
<td>4-MB, DDR4-2400, 1.2-V</td>
<td>862397-855</td>
</tr>
<tr>
<td>2-MB, DDR4-2400, 1.2-V</td>
<td>864271-855</td>
</tr>
</tbody>
</table>

Before removing the 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 bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the memory module:

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

⚠️ **CAUTION:** To prevent damage to the memory module, hold the memory module by the edges only. Do not touch the components on the memory module.

🔍 **NOTE:** Memory modules are designed with a notch to prevent incorrect insertion.

To protect a memory module after removal, place it in an electrostatic-safe container.

Reverse this procedure to install a memory module.
Memory card reader board

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory card reader board</td>
<td>L23890-001</td>
</tr>
<tr>
<td></td>
<td>L25889-005</td>
</tr>
<tr>
<td>Memory card reader board cable</td>
<td>L23891-001</td>
</tr>
<tr>
<td>Memory card reader board cable on models equipped with GTX graphics</td>
<td>L41586-001</td>
</tr>
</tbody>
</table>

Before removing the memory card reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the memory card reader board:

1. Disconnect the cable from the ZIF connector on the memory card reader board (1).
2. Remove the Phillips M2.0×4.0 screw (2) that secures the board to the computer.
3. Remove the board from the computer (3).

Remove the memory card reader board on models equipped with GTX graphics:
1. Disconnect the cable from the ZIF connector on the memory card reader board (1).
2. Remove the Phillips M2.0×4.0 screw (2) that secures the board to the computer.
3. Remove the board from the computer (3).

Reverse this procedure to install the memory card reader board.
USB board (select products only)

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB board</td>
<td>L23896-001</td>
</tr>
<tr>
<td>USB board cable</td>
<td>L23901-001</td>
</tr>
</tbody>
</table>

NOTE: On models equipped with GTX graphics, the USB board is soldered on to the system board, and cannot be removed.

Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the USB board:

1. Disconnect the cable from the ZIF connector on the USB board (1).
2. Remove the three Phillips M2.0×4.0 screws (2) that secure the board to the computer.
3. Remove the board from the computer (3).

Reverse this procedure to install the USB board.
**TouchPad**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TouchPad for use in natural silver models</td>
<td>L24934-001</td>
</tr>
<tr>
<td>TouchPad for use in pale gold models</td>
<td>L24933-001</td>
</tr>
<tr>
<td>TouchPad cable</td>
<td>L23893-001</td>
</tr>
<tr>
<td>TouchPad bracket</td>
<td>L23892-001</td>
</tr>
</tbody>
</table>

Before removing the TouchPad, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 32](#)).
5. Remove the battery (see [Battery on page 35](#)).

Remove the TouchPad:

1. Remove the three Phillips M2.0×2.5 screws (1) that secure the TouchPad bracket to the computer.
2. Remove the bracket (2).
3. Disconnect the cable from the ZIF connector on the TouchPad (1).
4. Lift the clear plastic from on top of the screws (2).
5. Lift the keyboard cable up so you can access the TouchPad screws (3).
6. Remove the three Phillips M2.0×2.0 broad head screws (4) that secure the TouchPad to the computer.

7. Remove the TouchPad from the computer (5).

Remove the TouchPad on models equipped with GTX graphics:

1. Remove the three Phillips M2.0×2.5 screws (1) that secure the TouchPad bracket to the computer.

2. Remove the bracket (2).

3. Disconnect the cable from the ZIF connector on the TouchPad (1).

4. Lift the clear plastic from on top of the screws (2).
5. Lift the keyboard cable up so you can access the TouchPad screws (3).
6. Remove the three Phillips M2.0×2.0 broad head screws (4) that secure the TouchPad to the computer.
7. Remove the TouchPad from the computer (5).

Reverse this procedure to install the TouchPad.
Before removing the lock bracket, 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 bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the lock bracket:

1. Remove the two Phillips M2.0×2.0 broad head screws (1) that secure the lock bracket to the computer.
2. Remove the lock bracket from the computer (2).

Remove the lock bracket on models equipped with GTX graphics:

1. Remove the two Phillips M2.0×2.0 broad head screws (1) that secure the lock bracket to the computer.
2. Remove the lock bracket from the computer (2).

Reverse this procedure to install the lock bracket.
### Fan(s)

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fans for use in models with discrete graphics memory</td>
<td>L23895-001</td>
</tr>
<tr>
<td>Fans for use in models with discrete graphics memory (on models equipped with GTX graphics)</td>
<td>L35338-001</td>
</tr>
<tr>
<td>Fan for use in models with UMA graphics memory</td>
<td>L27902-001</td>
</tr>
</tbody>
</table>

Before removing the fan(s), follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 32](#)).
5. Remove the battery (see [Battery on page 35](#)).

Remove the fan in models with **UMA graphics memory**:

1. Disconnect the fan cable (1) from the system board.
2. Remove the three Phillips M2.0×4.0 screws (2) that secure the fan to the computer.
3. Remove the fan from the computer (3).

Remove the fans in models with **discrete graphics memory**:

1. Disconnect the fan cables (1) from the system board.
2. Remove the five Phillips M2.0×4.0 screws (2) that secure the fans to the computer.
3. Remove the fans from the computer (3).

Remove the fans on models equipped with GTX graphics:

1. Disconnect the fan cables (1) from the system board.
2. Remove the six Phillips M2.0×4.0 screws (2) that secure the fans to the computer.
3. Remove the fans from the computer (3).

Reverse this procedure to install the fan(s).
Heat sink

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

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat sink for use only on computer models equipped with a graphics subsystem with discrete memory</td>
<td>L23897-001</td>
</tr>
<tr>
<td>Heat sink for use only on computer models equipped with a graphics subsystem with discrete memory (on models equipped with GTX graphics)</td>
<td>L35251-001</td>
</tr>
<tr>
<td>Heat sink for use only on computer models equipped with Intel Core i7-8550U/i5-8250U processors and a graphics subsystem with UMA memory</td>
<td>L23898-001</td>
</tr>
<tr>
<td>Heat sink for use only on computer models equipped with Intel Core i7-7500U/Pentium 4415U processors and a graphics subsystem with UMA memory</td>
<td>L23899-001</td>
</tr>
</tbody>
</table>

Before removing the heat sink, 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 bottom cover (see Bottom cover on page 32).
5. Remove the battery (see Battery on page 35).

Remove the heat sink:

1. **Discrete graphics:** In the order indicated on the heat sink, remove the six Phillips M2.0×2.5 screws (1) that secure the heat sink to the system board.
2. Remove the heat sink (2).

3. **UMA graphics:** In the order indicated on the heat sink, remove the four Phillips M2.0×2.5 screws (1) that secure the heat sink to the system board.

4. Remove the heat sink (2).

On models equipped with GTX graphics, follow these instructions to remove the heat sink:

1. In the order indicated on the heat sink, remove the six Phillips M2.0×2.5 screws (1) that secure the heat sink to the system board.
2. Remove the heat sink (2).

**NOTE:** 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.

**Discrete memory:** Thermal paste (1), (2), and thermal pads, (3), (4), are used on the heat sink (2), (4) and associated system board components (1), (3).
UMA memory: Thermal paste is used on the processor (1) and the heat sink (2).

Reverse this procedure to install the heat sink.
NOTE: All system board spare part kits include a processor and replacement thermal material.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>System board for use in models with discrete graphics equipped with the following processors:</td>
<td></td>
</tr>
<tr>
<td>• Intel Core i7-8550U processor and 4 GB of GeForce MX150 discrete video memory</td>
<td>L22820-xx1</td>
</tr>
<tr>
<td>• Intel Core i7-8550U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22817-xx1</td>
</tr>
<tr>
<td>• Intel Core i7-8550U processor and 2 GB GeForce MX130 discrete video memory</td>
<td>L22814-xx1</td>
</tr>
<tr>
<td>• Intel Core i5-8250U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22818-xx1</td>
</tr>
<tr>
<td>• Intel Core i5-8250U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22815-xx1</td>
</tr>
<tr>
<td>• Intel Core i5-8250U processor and 2 GB of GeForce MX130 discrete video memory</td>
<td>L22813-xx1</td>
</tr>
<tr>
<td>• Intel Core i7-7500U processor and 4 GB of GeForce MX150 discrete video memory</td>
<td>L22819-xx1</td>
</tr>
<tr>
<td>• Intel Core i7-7500U processor and 2 GB of GeForce MX150 discrete video memory</td>
<td>L22816-xx1</td>
</tr>
<tr>
<td>System board for use in models with UMA graphics equipped with the following processors:</td>
<td></td>
</tr>
<tr>
<td>• Intel Core i7-8550U processor</td>
<td>L22822-xx1</td>
</tr>
<tr>
<td>• Intel Core i5-8250U processor</td>
<td>L22821-xx1</td>
</tr>
<tr>
<td>• Intel Core i3-8130U processor</td>
<td>L22824-xx1</td>
</tr>
<tr>
<td>• Intel Pentium 4415U processor</td>
<td>L22823-xx1</td>
</tr>
</tbody>
</table>

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see **Bottom cover on page 32**), and then remove the following components:
   a. Battery (see **Battery on page 35**)
   b. Solid-state drive (see **Solid-state drive on page 52**) or Optane memory module (**Optane memory module on page 53**)
   c. Fan(s) (see **Fan(s) on page 64**)

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

- WLAN module (see **WLAN module on page 50**)
- Memory modules (see **Memory module on page 54**)
- Heat sink (see **Heat sink on page 66**)

Remove the system board:
1. Disconnect the following cables:
   (1) USB board cable
   (2) Power connector cable
   (3) Memory card reader board cable
   (4) Hard drive connector cable
   (5) Backlight cable (select products only)
   (6) Keyboard cable
   (7) TouchPad cable
   (8) Display cable
   (9) Speaker cable

2. Remove the four Phillips M2.0×2.0 screws (1) that secure the system board to the computer.

3. Remove the four Phillips M2.0×4.0 screws (2) that secure the system board to the computer.
4. Lift the system board out of the computer (3).

Removing the system board on models equipped with GTX graphics:

1. Disconnect the following cables:
   (1) Power connector cable
   (2) Memory card reader board cable
   (3) Backlight cable
   (4) Keyboard cable
   (5) TouchPad cable
   (6) Speaker cable
   (7) Display cable
2. Remove the four Phillips M2.0×2.0 screws (1) that secure the system board to the computer.
3. Remove the four Phillips M2.0×4.0 screws (2) that secure the system board to the computer.
4. Lift the system board out of the computer (3).

Reverse this procedure to install the system board.
Speakers

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speakers (includes cable)</td>
<td>L23900-001</td>
</tr>
<tr>
<td>Speakers (on models equipped with GTX graphics) (includes cable)</td>
<td>L41588-001</td>
</tr>
</tbody>
</table>

Before removing the speakers, 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 bottom cover (see Bottom cover on page 32), and then remove the following components:
   a. Battery (see Battery on page 35)
   b. Solid-state drive (see Solid-state drive on page 52)
   c. Fan (see Fan(s) on page 64)
   d. System board (see System board on page 70)

Remove the speakers:

1. Release the cable from the retention clips and routing channel built into the right speaker (1).

2. Remove the Phillips M2.0×4.0 screw (2) that secures the right speaker to the computer.

3. Lift the speakers up (3).

4. Release the speaker cable from the retention clips and routing channel built into the computer (4).
On models equipped with GTX graphics, follow these steps:

1. Release the cable from the retention clips and routing channel built into the right speaker (1).
2. Remove the Phillips M2.0×4.0 screw (2) that secures the right speaker to the computer.
3. Lift the speakers up (3).
4. Release the speaker cable from the retention clips and routing channel built into the computer (4).

Reverse this procedure to install the speakers.
Before removing the power connector cable, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the bottom cover (see Bottom cover on page 32), and then remove the following components:
   a. Battery (see Battery on page 35)
   b. Display assembly (see Display assembly on page 37)

Remove the power connector cable:

1. Make sure the left display hinge is in the open position.

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

3. Release the cable from the retention clips and routing channel built into the computer and speaker (2).

4. Remove the power connector cable from the computer (3).

Remove the power connector cable on models equipped with GTX graphics:
1. Make sure the left display hinge is in the open position.
2. Disconnect the power connector cable from the system board (1).
3. Release the cable from the retention clips and routing channel built into the computer and speaker (2).
4. Remove the power connector cable from the computer (3).

Reverse this procedure to install the power connector cable.
Top cover with keyboard

The top cover with keyboard remains after removing all other spared parts from the computer.

In this section, the first table provides the main spare part number for the keyboards. The second table provides the country codes.

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard, backlit, natural silver</td>
<td>L24752-xx1</td>
</tr>
<tr>
<td></td>
<td>L35339–xx1</td>
</tr>
<tr>
<td>Keyboard, no backlight, natural silver</td>
<td>L24753-xx1</td>
</tr>
<tr>
<td></td>
<td>L35340–xx1</td>
</tr>
<tr>
<td>Keyboard, backlit, pale gold</td>
<td>L24755-xx1</td>
</tr>
<tr>
<td>Keyboard, no backlight, pale gold</td>
<td>L24754-xx1</td>
</tr>
</tbody>
</table>

On models equipped with GTX graphics:

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard, backlit, natural silver</td>
<td>L35339–xx1</td>
</tr>
<tr>
<td>Keyboard, no backlight, natural silver</td>
<td>L35340–xx1</td>
</tr>
</tbody>
</table>

### For use in country or region

<table>
<thead>
<tr>
<th>For use in country or region</th>
<th>Spare part number</th>
<th>For use in country or region</th>
<th>Spare part number</th>
<th>For use in country or region</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>-A41</td>
<td>Israel</td>
<td>-BB1</td>
<td>Slovenia</td>
<td>-BA1</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>-261</td>
<td>Italy</td>
<td>-061</td>
<td>South Korea</td>
<td>-AD1</td>
</tr>
<tr>
<td>Canada</td>
<td>-DB1</td>
<td>Japan</td>
<td>-291</td>
<td>Spain</td>
<td>-071</td>
</tr>
<tr>
<td>Czech Republic and Slovakia</td>
<td>-FL1</td>
<td>Latin America</td>
<td>-161</td>
<td>Switzerland</td>
<td>-BG1</td>
</tr>
<tr>
<td>Denmark, Finland, and Norway</td>
<td>-DH1</td>
<td>The Netherlands</td>
<td>-B31</td>
<td>Taiwan</td>
<td>-AB1</td>
</tr>
<tr>
<td>France</td>
<td>-051</td>
<td>Portugal</td>
<td>-131</td>
<td>Thailand</td>
<td>-281</td>
</tr>
<tr>
<td>Germany</td>
<td>-041</td>
<td>Romania</td>
<td>-271</td>
<td>Turkey</td>
<td>-141</td>
</tr>
<tr>
<td>Greece</td>
<td>-151</td>
<td>Russia</td>
<td>-251</td>
<td>United Kingdom</td>
<td>-031</td>
</tr>
<tr>
<td>Hungary</td>
<td>-211</td>
<td>Saudi Arabia</td>
<td>-171</td>
<td>United States</td>
<td>-001</td>
</tr>
<tr>
<td>India</td>
<td>-002</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Using Setup Utility (BIOS)

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 –
  Select the question mark icon in the taskbar.
  2. Select **My notebook**, and then select **Specifications**.

- **Setup Utility (BIOS)**
  2. Select **Main**, and then make note of the BIOS version.
  3. Select **Exit**, select one of the options, and then follow the on-screen instructions.

To check for later BIOS versions, see Downloading a BIOS update on page 80.
Downloading a BIOS update

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

- Do not disconnect power from the computer by unplugging the power cord from the AC outlet.
- Do not shut down the computer or initiate Sleep.
- 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 –  
   Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **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. Select 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.
Using HP PC Hardware Diagnostics Windows (select products only)

HP PC Hardware Diagnostics Windows is a Windows-based utility that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs within the Windows operating system in order to diagnose hardware failures.

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see Downloading HP PC Hardware Diagnostics Windows on page 81.

After HP PC Hardware Diagnostics Windows is installed, follow these steps to access it from HP Help and Support or HP Support Assistant.

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:
   a. Select the Start button, and then select HP Help and Support.
   b. Right-click HP PC Hardware Diagnostics Windows, select More, and then select Run as administrator.
   – or –
   To access HP PC Hardware Diagnostics Windows from HP Support Assistant:
   a. Type support in the taskbar search box, and then select the HP Support Assistant app.
   – or –
   Select the question mark icon in the taskbar.
   b. Select Troubleshooting and fixes.
   c. Select Diagnostics, and then select HP PC Hardware Diagnostics Windows.

2. When the 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 at any time, select Cancel.

3. When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and then provide the Failure ID code.

Downloading HP PC Hardware Diagnostics Windows

- The HP PC Hardware Diagnostics Windows download instructions are provided in English only.
- You must use a Windows computer to download this tool because only .exe files are provided.

Downloading the latest HP PC Hardware Diagnostics Windows version

To download HP PC Hardware Diagnostics Windows, follow these steps:

2. In the HP PC Hardware Diagnostics section, select Download, and then select a location on your computer or a USB flash drive.
The tool is downloaded to the selected location.

**Downloading HP Hardware Diagnostics Windows by product name or number (select products only)**

- **NOTE:** For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics Windows by product name or number, follow these steps:

2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **HP PC Hardware Diagnostics** section, select **Download**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

**Installing HP PC Hardware Diagnostics Windows**

To install HP PC Hardware Diagnostics Windows, follow these steps:

- Navigate to the folder on your computer or the USB flash drive where the .exe file was downloaded, double-click the .exe file, and then follow the on-screen instructions.

**Using HP PC Hardware Diagnostics UEFI**

- **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 83](#).

HP PC Hardware Diagnostics UEFI (Unified Extensible Firmware Interface) 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.

If your PC will not boot into Windows, you can use HP PC Hardware Diagnostics UEFI to diagnose hardware issues.

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in correcting the problem, contact support, and provide the Failure ID code.

- **NOTE:** To start diagnostics on a convertible computer, your computer must be in notebook mode, and you must use the attached keyboard.
- **NOTE:** If you need to stop a diagnostic test, press **esc**.

**Starting HP PC Hardware Diagnostics UEFI**

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:

- Connected USB flash drive
NOTE: To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see Downloading the latest HP PC Hardware Diagnostics UEFI version on page 83.

3. When the diagnostic tool opens, select a language, select the type of diagnostic test you want to run, and then follow the on-screen instructions.

### Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive can be useful in the following situations:

- HP PC Hardware Diagnostics UEFI is not included in the preinstall image.
- HP PC Hardware Diagnostics UEFI is not included in the HP Tool partition.
- The hard drive is damaged.

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 provided.

### Downloading the latest HP PC Hardware Diagnostics UEFI version

To download the latest HP PC Hardware Diagnostics UEFI version to a USB flash drive:

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

### Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)

NOTE: For some products, it may be necessary to download the software to a USB flash drive by using the product name or number.

To download HP PC Hardware Diagnostics UEFI by product name or number (select products only) to a USB flash drive:

2. Enter the product name or number, select your computer, and then select your operating system.
3. In the Diagnostics section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

### Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)

Remote HP PC Hardware Diagnostics UEFI is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer. It can then execute the diagnostics on your computer, and it may upload results to a preconfigured server. For more information on Remote HP PC Hardware Diagnostics UEFI, go to http://www.hp.com/go/techcenter/pcdiags, and then select Find out more.
Downloading Remote HP PC Hardware Diagnostics UEFI

NOTE: HP Remote PC Hardware Diagnostics UEFI is also available as a Softpaq that can be downloaded to a server.

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:
2. In the HP PC Hardware Diagnostics UEFI section, select Download Remote Diagnostics, and then select Run.

Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number

NOTE: For some products, it may be necessary to download the software by using the product name or number.

To download HP Remote PC Hardware Diagnostics UEFI by product name or number, follow these steps:
2. Select Get software and drivers, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the Diagnostics section, follow the on-screen instructions to select and download the Remote UEFI version for the product.

Customizing Remote HP PC Hardware Diagnostics UEFI settings

Using the Remote HP PC Hardware Diagnostics setting in Computer Setup (BIOS), you can perform the following customizations:

● Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting Execute Remote HP PC Hardware Diagnostics.

● Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.

● Set a location for storing the test results. You can also set the user name and password settings used for uploads.

● Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:
1. Turn on or restart the computer, and when the HP logo appears, press f10 to enter Computer Setup.
2. Select Advanced, and then select Settings.
3. Make your customization selections.
4. Select Main, and then Save Changes and Exit to save your settings.
Your changes take effect when the computer restarts.
8 Backing up, restoring, and recovering

This chapter provides information about the following processes, which are standard procedure for most products:

- **Back up your personal information** — You can use Windows tools to back up your personal information (see Using Windows tools on page 85).

- **Creating a restore point** — You can use Windows tools to create a restore point (see Using Windows tools on page 85).

- **Creating recovery media** (select products only) — You can use HP Recovery Manager or HP Cloud Recovery Download Tool (select products only) to create recovery media (see Creating HP Recovery media (select products only) on page 85).

- **Restoring and recovery** — Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see Using Windows tools on page 85).

- **Removing the Recovery Partition** — To remove the Recovery partition to reclaim hard drive space (select products only), select the Remove Recovery Partition option of HP Recovery Manager. For more information, see Removing the HP Recovery partition (select products only) on page 89.

Using Windows tools

**IMPORTANT:** Windows is the only option that allows you to back up your personal information. Schedule regular backups to avoid information loss.

You can use Windows tools to back up personal information and create system restore points and recovery media, allowing you to restore from backup, refresh the computer, and reset the computer to its original state.

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

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

1. Select the Start button, and then select the Get Help app.
2. Enter the task you want to perform.

**NOTE:** You must be connected to the Internet to access the Get Help app.

Creating HP Recovery media (select products only)

After you have successfully set up the computer, use HP Recovery Manager to create a backup of the HP Recovery partition on the computer. This backup is called HP Recovery media. In cases where the hard drive is corrupted or has been replaced, the HP Recovery media can be used to reinstall the original operating system.

To check for the presence of the Recovery partition in addition to the Windows partition, right-click the Start button, select File Explorer, and then select This PC.

**NOTE:** If your computer does not list the Recovery partition in addition to the Windows partition, contact support to obtain recovery discs. Go to http://www.hp.com/support, select your country or region, and then follow the on-screen instructions.
On select products, you can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive. For more information, see Using the HP Cloud Recovery Download Tool to create recovery media on page 87.

Using HP Recovery Manager to create recovery media

**NOTE:** If you cannot create recovery media yourself, contact support to obtain recovery discs. Go to [http://www.hp.com/support](http://www.hp.com/support), select your country or region, and then follow the on-screen instructions.

**Before you begin**

Before you begin, note the following:

- 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 media storage capacity.
- To create recovery media, use one of the following options:

**NOTE:** If the computer does not have a recovery partition, HP Recovery Manager displays the Windows Create a Recovery Drive feature. Follow the on-screen instructions to create a recovery image on a blank USB flash drive or hard drive.

- If your computer has an optical drive with DVD writer capability, be sure to 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, which are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive with DVD writer capability, you can use an external optical drive (purchased separately) to create recovery discs, as described above. If an external optical drive is used, you must connect it directly to a USB port on the computer. It cannot be connected to a USB port on an external device, such as a USB hub.
- To create a recovery USB flash drive, use a high-quality blank USB flash drive.
- 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 this process.
- If necessary, you can exit the program before you have finished creating all of the recovery media. HP Recovery Manager will finish the current DVD or USB flash drive. The next time you start HP Recovery Manager, you will be prompted to continue.

**Creating the recovery media**

To create HP Recovery media using HP Recovery Manager:

**IMPORTANT:** For a tablet with a detachable keyboard, connect the tablet to the keyboard base 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 need to recover the system, see Recovering using HP Recovery Manager on page 87.
Using the HP Cloud Recovery Download Tool to create recovery media

To create HP Recovery media using the HP Cloud Recovery Download Tool:

2. Select Software and Drivers, and then follow the on-screen instructions.

Restoring and recovery

Restoring and recovery can be performed using one or more of the following options: Windows tools, HP Recovery Manager, or the HP Recovery partition.

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

Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see Using Windows tools on page 85.

Restoring using HP Recovery Manager and the HP Recovery partition

You can use HP Recovery Manager and the HP Recovery partition (select products only) to restore the computer to the original factory state:

- **Resolving problems with preinstalled applications or drivers**—To correct a problem with a preinstalled application or driver:
  1. Type recovery in the taskbar search box, and then select HP Recovery Manager.
  2. Select Reinstall drivers and/or applications, and then follow the on-screen instructions.

- **Using System Recovery**—To recover the Windows partition to original factory content, select 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 87. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 85.

- **Using Factory Reset** (select products only)—Restores the computer to its original factory state by deleting all information from the hard drive and recreating the partitions and then reinstalling the operating system and the software that was installed at the factory (select products only). To use the Factory Reset option, you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 85.

  **NOTE:** If you have replaced the hard drive in the computer, you can use the Factory Reset option to install the operating system and the software that was installed at the factory.

Recovering using HP Recovery Manager

You can use HP Recovery Manager software 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 HP Recovery media, see Creating HP Recovery media (select products only) on page 85.

**IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data that you want to retain. See Using Windows tools on page 85.
IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

NOTE: When you start the recovery process, only the options available for your computer are displayed.

Before you begin, note the following:

- 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.
- If the computer hard drive fails, HP Recovery media must be used. This media is created using HP Recovery Manager. See Creating HP Recovery media (select products only) on page 85.
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, contact support to obtain recovery media. Go to http://www.hp.com/support, select your country or region, and then follow the on-screen instructions.

Recovering using the HP Recovery partition (select products only)

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

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

To start HP Recovery Manager from the HP Recovery partition:

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

1. Type recovery in the taskbar search box, select HP Recovery Manager, and then select Windows 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, quickly hold down the volume up button, and then select f11.

2. Select Troubleshoot from the boot options menu.

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

NOTE: If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See Changing the computer boot order on page 89.

Recovering using HP Recovery media

If your computer does not have an HP Recovery partition or if the hard drive is not working properly, you can use HP Recovery media to recover the original operating system and software programs that were installed at the factory.

▲ Insert the HP Recovery media, and then restart the computer.
NOTE: If your computer does not automatically restart in HP Recovery Manager, change the computer boot order, and then follow the on-screen instructions. See Changing the computer boot order on page 89.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order. This 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, depending on the location of your HP Recovery media.

To change the boot order:

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

1. Insert the HP Recovery media.
2. Access the system Startup menu.
   For computers or tablets with keyboards attached:
   ▲ Turn on or restart the computer, quickly press esc, and then press f9 for boot options.
   For tablets without keyboards:
   ▲ Turn on or restart the tablet, quickly hold down the volume up button, and then select f9.
   – or –
   Turn on or restart the tablet, quickly hold down the volume down button, and then select f9.
3. Select the optical drive or USB flash drive from which you want to boot, and then 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 (select products only) 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. Before removing the Recovery partition, create HP Recovery media. See Creating HP Recovery media (select products only) on page 85.

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.
## Specifications

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer dimensions</strong></td>
<td></td>
</tr>
<tr>
<td>Width</td>
<td>361.6 mm</td>
</tr>
<tr>
<td>Depth</td>
<td>245.6 mm</td>
</tr>
<tr>
<td>Height</td>
<td>17.9 mm</td>
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<tr>
<td><strong>Weight</strong></td>
<td></td>
</tr>
<tr>
<td>Solid-state drive models</td>
<td>1852 g</td>
</tr>
<tr>
<td>Hard drive models</td>
<td>1927 g</td>
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<tr>
<td>Solid-state drive + hard drive models</td>
<td>1938 g</td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
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</tr>
<tr>
<td>Operating</td>
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</tr>
<tr>
<td>Nonoperating</td>
<td>-20°C to 60°C</td>
</tr>
<tr>
<td><strong>Relative humidity (noncondensing)</strong></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
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<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
</tr>
<tr>
<td><strong>Maximum altitude (unpressurized)</strong></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>-15 m to 3,048 m</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>-15 m to 12,192 m</td>
</tr>
</tbody>
</table>

**NOTE:** Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.
10 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC, or from 220 to 240 volts AC.

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

Power cord sets for use in other countries and regions must meet the requirements of the country or 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 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>EANSW</td>
<td>1</td>
</tr>
<tr>
<td>Austria</td>
<td>OVE</td>
<td>1</td>
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<tr>
<td>Belgium</td>
<td>CEBC</td>
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<tr>
<td>Canada</td>
<td>CSA</td>
<td>2</td>
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<tr>
<td>Denmark</td>
<td>DEMKO</td>
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<td>Japan</td>
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<tr>
<td>Norway</td>
<td>NEMKO</td>
<td>1</td>
</tr>
<tr>
<td>The People’s Republic of China</td>
<td>COC</td>
<td>5</td>
</tr>
<tr>
<td>Country/region</td>
<td>Accredited agency</td>
<td>Applicable note number</td>
</tr>
<tr>
<td>-----------------------</td>
<td>-------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>South Korea</td>
<td>EK</td>
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<tr>
<td>Sweden</td>
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<tr>
<td>The United Kingdom</td>
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<td>1</td>
</tr>
<tr>
<td>The United States</td>
<td>UL</td>
<td>2</td>
</tr>
</tbody>
</table>

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

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

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

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

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