Maintenance and Service Guide

HP 255 G7 Notebook PC
Product notice

This 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 or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to http://www.microsoft.com for details.

To access the latest user guides, go to http://www.hp.com/support, and follow the instructions to find your product. Then select User Guides.

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.
Important Notice about Customer Self-Repair Parts

⚠️ CAUTION: Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, “Removal and replacement procedures for Customer Self-Repair parts,” for details. Accessing parts described in Chapter 6, “Removal and replacement procedures for Authorized Service Provider only parts,” can damage the computer or void your warranty.
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).
Safety warning notice
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## 1 Product description

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<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Name</strong></td>
<td>HP 255 G7 Notebook PC</td>
</tr>
<tr>
<td><strong>Processor</strong></td>
<td><strong>AMD® Dual-Core A9-Series processor</strong></td>
</tr>
<tr>
<td></td>
<td>A9-9425 (3.1 GHz, turbo up to 3.7 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W</td>
</tr>
<tr>
<td></td>
<td><strong>AMD Dual-Core A6-Series processor</strong></td>
</tr>
<tr>
<td></td>
<td>A6-9225 (2.6 GHz, turbo up to 3.0 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W</td>
</tr>
<tr>
<td></td>
<td><strong>AMD Dual-Core A4-Series processor</strong></td>
</tr>
<tr>
<td></td>
<td>A4-9125 (2.3 GHz, turbo up to 2.6 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W</td>
</tr>
<tr>
<td></td>
<td><strong>AMD Quad-Core E2-Series processor</strong></td>
</tr>
<tr>
<td></td>
<td>E2-9000e (1.5 GHz, turbo up to 2.0 GHz), 1866 MHz/1 MB L2 cache, dual core, 6 W</td>
</tr>
<tr>
<td></td>
<td><strong>AMD Dual-Core R3-Series Accelerated processor</strong></td>
</tr>
<tr>
<td></td>
<td>Ryzen 3-2200U (2.5 GHz, turbo up to 3.4 GHz), 1 MB L3 cache, DDR4-2400 MHz, dual core, 15 W</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>Supports HD decode, DX12, HDMI</td>
</tr>
<tr>
<td></td>
<td><strong>Internal graphics</strong></td>
</tr>
<tr>
<td></td>
<td>AMD Radeon™ Vega 3 Mobile Graphics (Ryzen 3 processor)</td>
</tr>
<tr>
<td></td>
<td>AMD Radeon R5 Graphics (A9 processor)</td>
</tr>
<tr>
<td></td>
<td>AMD Radeon R4 Graphics (A6 processor)</td>
</tr>
<tr>
<td></td>
<td>AMD Radeon R2 Graphics (E2 processor)</td>
</tr>
<tr>
<td><strong>Panel</strong></td>
<td><strong>39.6-cm (15.6-in), WLED, anti glare, SVA, eDP, slim-flat (3.2 mm); 220 nits</strong></td>
</tr>
<tr>
<td></td>
<td>High definition (HD)(1366 × 768)</td>
</tr>
<tr>
<td></td>
<td>Full high-definition (FHD) (1920 × 1080)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td><strong>Two memory module slots</strong></td>
</tr>
<tr>
<td></td>
<td>Memory is non-customer accessible/non-upgradeable</td>
</tr>
<tr>
<td></td>
<td>DDR4-2400 dual channel support</td>
</tr>
<tr>
<td></td>
<td>Supports up to 8 GB of system RAM in the following configurations:</td>
</tr>
<tr>
<td></td>
<td>- 8192 MB (8192 MB × 1 + 4096 × 2)</td>
</tr>
<tr>
<td></td>
<td>- 4096 MB (4096 MB × 1)</td>
</tr>
<tr>
<td></td>
<td><strong>One memory module slot (A9, A6, E2 processors)</strong></td>
</tr>
<tr>
<td></td>
<td>Memory is non-customer accessible/non-upgradeable</td>
</tr>
<tr>
<td></td>
<td>DDR4-1866 single channel support</td>
</tr>
</tbody>
</table>

Table 1-1  Product components and their descriptions
<table>
<thead>
<tr>
<th>Category</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Supports up to 8 GB of system RAM in the following configurations:</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>● 8192 MB (8192 MB × 1)</td>
</tr>
<tr>
<td></td>
<td>● 4096 MB (4096 MB × 1)</td>
</tr>
<tr>
<td><strong>Primary storage</strong></td>
<td><strong>Single hard drive configurations, 6.35 cm (2.5-in), 7.0 mm/7.2 mm/9.5 mm, SATA hard drives</strong></td>
</tr>
<tr>
<td></td>
<td>1 TB, 5400 rpm, 9.5 mm</td>
</tr>
<tr>
<td></td>
<td>1 TB, 5400 rpm, 7.2 mm</td>
</tr>
<tr>
<td></td>
<td>500 GB, 7200 rpm, 7.0 mm</td>
</tr>
<tr>
<td></td>
<td>500 GB, 5400 rpm, 7.0 mm</td>
</tr>
<tr>
<td></td>
<td><strong>M.2, SATA-3, solid-state drives</strong></td>
</tr>
<tr>
<td></td>
<td>256 GB, TLC</td>
</tr>
<tr>
<td></td>
<td>128 GB, TLC</td>
</tr>
<tr>
<td><strong>Optical drive</strong></td>
<td>9.0 mm tray load</td>
</tr>
<tr>
<td></td>
<td>DVD+/−RW Double-Layer Writer</td>
</tr>
<tr>
<td><strong>Camera</strong></td>
<td><strong>HP TrueVision HD Camera</strong> - indicator LED, USB2.0, HD BSI sensor, f2.0</td>
</tr>
<tr>
<td></td>
<td>720p by 30 frames per second</td>
</tr>
<tr>
<td></td>
<td>Single digital microphone</td>
</tr>
<tr>
<td></td>
<td><strong>HP Webcam</strong> - VGA camera, indicator LED, USB 2.0, f2.4</td>
</tr>
<tr>
<td></td>
<td>640 × 480 by 30 frames per second</td>
</tr>
<tr>
<td></td>
<td>Single digital microphone</td>
</tr>
<tr>
<td><strong>Audio</strong></td>
<td><strong>Audio Control Panel</strong>: HP Audio Control</td>
</tr>
<tr>
<td></td>
<td>Dual speakers</td>
</tr>
<tr>
<td><strong>Ethernet</strong></td>
<td>Ethernet Integrated 10/100/1000 NIC</td>
</tr>
<tr>
<td><strong>Wireless networking</strong></td>
<td><strong>Integrated Wireless options with single antenna (M.2/PCIe):</strong></td>
</tr>
<tr>
<td></td>
<td>Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)</td>
</tr>
<tr>
<td><strong>External media cards</strong></td>
<td><strong>HP Multi-Format Digital Media Card Reader</strong></td>
</tr>
<tr>
<td></td>
<td>Supports SD/SDHC/SDXC</td>
</tr>
<tr>
<td></td>
<td>Push-push insertion/removal</td>
</tr>
<tr>
<td><strong>Internal card expansion</strong></td>
<td>One M.2 slot for solid-state drive</td>
</tr>
<tr>
<td></td>
<td>One M.2 slot for WLAN</td>
</tr>
<tr>
<td><strong>Ports</strong></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>
</tr>
<tr>
<td></td>
<td>HDMI v1.4 supporting: up to 1920 × 1080 @ 60Hz</td>
</tr>
<tr>
<td></td>
<td>USB 2.0 port (right side)</td>
</tr>
<tr>
<td></td>
<td>(2) USB 3.1 Gen 1 ports (left side)</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>--------------------------</td>
<td>-----------------------------------------------------------------------------</td>
</tr>
<tr>
<td>RJ-45/Ethernet</td>
<td></td>
</tr>
<tr>
<td>Audio-out (headphone)/audio-in (microphone) combo jack</td>
<td></td>
</tr>
<tr>
<td>AC Smart Pin adapter plug</td>
<td></td>
</tr>
<tr>
<td>Keyboard/pointing devices</td>
<td></td>
</tr>
<tr>
<td>Keyboard:</td>
<td>Full-size, textured, island-style keyboard with numeric keypad (ash silver and jet black)</td>
</tr>
<tr>
<td>TouchPad:</td>
<td>Multitouch gestures enabled</td>
</tr>
<tr>
<td></td>
<td>Support Modern Trackpad Gestures</td>
</tr>
<tr>
<td></td>
<td>Taps enabled by default</td>
</tr>
<tr>
<td>Power requirements</td>
<td></td>
</tr>
<tr>
<td>Battery:</td>
<td>3-cell battery, 41 Whr</td>
</tr>
<tr>
<td></td>
<td>Supports long life and battery fast charge</td>
</tr>
<tr>
<td>AC adapter, barrel type:</td>
<td>65 W Smart, nPFC, 4.5 mm, EM</td>
</tr>
<tr>
<td></td>
<td>45 W Smart, nPFC, right angle, 4.5 mm</td>
</tr>
<tr>
<td>Power cord (C5):</td>
<td>1 m, conventional</td>
</tr>
<tr>
<td>Security</td>
<td>Kensington Mini Security Lock</td>
</tr>
<tr>
<td></td>
<td>Supports firmware-based Trusted Platform Module (fTPM) 2.0</td>
</tr>
<tr>
<td>Operating system</td>
<td>FreeDOS 2.0</td>
</tr>
<tr>
<td></td>
<td>Windows® 10 Home 64</td>
</tr>
<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>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Plus</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Plus Single Language</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Home 64 Single Language Africa Market PPP</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64 StF MSNA Emerging Market</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64 StF MSNA Standard</td>
</tr>
<tr>
<td></td>
<td>Windows 10 Pro 64 StF MSNA Strategic</td>
</tr>
<tr>
<td>Serviceability</td>
<td>End user replaceable parts:</td>
</tr>
<tr>
<td>Category</td>
<td>Description</td>
</tr>
<tr>
<td>---------------</td>
<td>---------------</td>
</tr>
<tr>
<td>AC adapter</td>
<td></td>
</tr>
<tr>
<td>Optical drive</td>
<td></td>
</tr>
</tbody>
</table>
2  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>
| (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) Drive light | ● Blinking white: The hard drive is being accessed.                         |
| (3) Memory card reader | 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:  
                | ▲ Pull to remove the card from the memory card reader.                    |
| (4) USB port   | Connects a USB device, such as a cell phone, camera, activity tracker, or  
                |     smartwatch, and provides data transfer.                              |
| (5) Optical drive | Depending on your computer model, reads an optical disc or reads and writes to an  
                |     optical disc.                                                       |
| (6) Optical drive eject button | Releases the optical drive disc tray.                                     |
| (7) Security cable slot | Attaches an optional security cable to the computer.  
                |     NOTE: The security cable is designed to act as a deterrent, but it may not prevent  
                |     the computer from being mishandled or stolen.                       |
**Left side**

![Image of left side components](image)

<table>
<thead>
<tr>
<th>Component Description</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Power connector</strong></td>
<td>Connects an AC adapter.</td>
</tr>
</tbody>
</table>
| **AC adapter and battery light** | - White: The AC adapter is connected and the battery is fully charged.  
- Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.  
- Amber: The AC adapter is connected and the battery is charging.  
- Off: The battery is not charging. |
| **RJ-45 (network) jack/status lights** | Connects a network cable.  
- White: The network is connected.  
- Amber: Activity is occurring on the network. |
| **HDMI port** | Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device. |
| **USB SuperSpeed ports (2)** | Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer. |
| **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

![Display components diagram]

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(1)</strong> WLAN antennas* (1 or 2 depending on model)</td>
<td>Send and receive wireless signals to communicate with wireless local area networks (WLANs).</td>
</tr>
<tr>
<td><strong>(2)</strong> Camera light</td>
<td>On: The camera is in use.</td>
</tr>
</tbody>
</table>
| **(3)** Camera | 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.  

**NOTE:** Camera functions vary depending on the camera hardware and software installed on your product. |
| **(4)** Internal microphone | Records sound. |

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

TouchPad

![Diagram showing TouchPad components](image)

<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

![Diagram of laptop with lights highlighted]

### Table 2-5 Lights and their descriptions

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) Caps lock light</td>
<td>On: Caps lock is on, which switches the key input to all capital letters.</td>
</tr>
</tbody>
</table>
| (2) Mute light | - On: Computer sound is off.  
- Off: Computer sound is on. |
## Button and speakers

Table 2-6  **Button and speakers and their descriptions**

<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 ![Power icon](image) and then select Power Options. |
| (2) Speakers (2) | 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

![Keyboard Image](image)

### Table 2-7 Special keys and their descriptions

<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></td>
<td><strong>NOTE:</strong> Pressing the Windows key again will close the Start menu.</td>
</tr>
<tr>
<td>(4) Action keys</td>
<td>Execute frequently used system functions.</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> On select products, the F5 action key turns the keyboard backlight feature off or on.</td>
</tr>
<tr>
<td>(5) num lock key</td>
<td>Alternates between the navigational and numeric functions on the integrated numeric keypad.</td>
</tr>
<tr>
<td>(6) Integrated numeric keypad</td>
<td>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></td>
<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>
</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 11*.

▲ 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="image1.png" alt="Icon" /></td>
<td>Opens the “How to get help in Windows 10” webpage.</td>
</tr>
<tr>
<td><img src="image2.png" alt="Icon" /></td>
<td>Decreases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Icon" /></td>
<td>Increases the screen brightness incrementally as long as you hold down the key.</td>
</tr>
<tr>
<td><img src="image4.png" 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="image5.png" alt="Icon" /></td>
<td>Turns the keyboard backlight off or on. <strong>NOTE:</strong> To conserve battery power, turn off this feature.</td>
</tr>
<tr>
<td><img src="image6.png" alt="Icon" /></td>
<td>Mutes or restores speaker sound.</td>
</tr>
<tr>
<td><img src="image7.png" alt="Icon" /></td>
<td>Decreases speaker volume incrementally while you hold down the key.</td>
</tr>
<tr>
<td><img src="image8.png" alt="Icon" /></td>
<td>Increases speaker volume incrementally while you hold down the key.</td>
</tr>
<tr>
<td><img src="image9.png" 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).</td>
</tr>
<tr>
<td><img src="image10.png" alt="Icon" /></td>
<td>Starts, pauses, or resumes playback of an audio CD, a DVD, or a BD.</td>
</tr>
<tr>
<td><img src="image11.png" 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="image12.png" alt="Icon" /></td>
<td>Turns the airplane mode and wireless feature on or off. <strong>NOTE:</strong> The airplane mode key is also referred to as the wireless button. <strong>NOTE:</strong> A wireless network must be set up before a wireless connection is possible.</td>
</tr>
</tbody>
</table>

12  Chapter 2  Getting to know your computer
<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
</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.

![Service label](image)

<table>
<thead>
<tr>
<th>Component</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>HP product name</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

Computer major components

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

**NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 14](#) for details.
<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Display</td>
<td>Not spared</td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> Displays are not spared as whole units. Display subcomponent spare parts are available. For spare part information, see Display assembly subcomponents on page 19.</td>
<td></td>
</tr>
<tr>
<td>(2)</td>
<td>Top cover/keyboard</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For a detailed list of country codes, see Top cover with keyboard on page 66.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Keyboard, jet black, for use in the United States</td>
<td>L50000-xx1</td>
</tr>
<tr>
<td></td>
<td>Keyboard, silver, for use in Saudi Arabia</td>
<td>L50001-xx1</td>
</tr>
<tr>
<td>(3)</td>
<td>TouchPad module</td>
<td>L20449-001</td>
</tr>
<tr>
<td>(4)</td>
<td>TouchPad button board</td>
<td>not spared</td>
</tr>
<tr>
<td>(5)</td>
<td>Speakers (includes cable)</td>
<td>L20453-001</td>
</tr>
<tr>
<td>(6)</td>
<td>Power connector cable (DC-in)</td>
<td>L20475-001</td>
</tr>
<tr>
<td>(7)</td>
<td>System board</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> All system board spare part kits include replacement thermal material. All system boards use the following part numbers:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>xxxxxxx-001: Non- Windows operating systems</td>
<td></td>
</tr>
<tr>
<td></td>
<td>xxxxxxx-601: Windows operating system</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AMD Ryzen 3-2200U processor</td>
<td>L50003-xx1</td>
</tr>
<tr>
<td></td>
<td>AMD A9-9425 processor</td>
<td>L50004-xx1</td>
</tr>
<tr>
<td></td>
<td>AMD A6-9225 processor</td>
<td>L50005-xx1</td>
</tr>
<tr>
<td></td>
<td>AMD A4-9125 processor</td>
<td>L54792-xx1</td>
</tr>
<tr>
<td></td>
<td>AMD E2-9000e processor</td>
<td>L50006-xx1</td>
</tr>
<tr>
<td>(8)</td>
<td>Solid-state drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For spare part information, see Mass storage devices on page 21.</td>
<td></td>
</tr>
<tr>
<td>(9)</td>
<td>Memory modules (DDR4-2666)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8 GB</td>
<td>937236-855</td>
</tr>
<tr>
<td></td>
<td>4 GB</td>
<td>L10598-855</td>
</tr>
<tr>
<td>(10)</td>
<td>WLAN module</td>
<td></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>(11)</td>
<td>Hard drive connector board</td>
<td>L20454-001</td>
</tr>
<tr>
<td>(12)</td>
<td>Solid-state drive connector board</td>
<td>L20457-001</td>
</tr>
<tr>
<td>(13)</td>
<td>Fan</td>
<td>L20474-001</td>
</tr>
<tr>
<td></td>
<td><strong>Heat sink</strong></td>
<td></td>
</tr>
<tr>
<td>(14)</td>
<td>For use in models with AMD Ryzen processors</td>
<td>L20483-001</td>
</tr>
<tr>
<td></td>
<td>For use in models with AMD A6/A9 processors</td>
<td>L20491-001</td>
</tr>
<tr>
<td>Item</td>
<td>Component</td>
<td>Spare part number</td>
</tr>
<tr>
<td>------</td>
<td>-----------</td>
<td>------------------</td>
</tr>
<tr>
<td>(15)</td>
<td>For use in fanless models with AMD E2-9000e processors</td>
<td>L20494-001</td>
</tr>
<tr>
<td>(16)</td>
<td>USB/card reader board</td>
<td>L20448-001</td>
</tr>
<tr>
<td></td>
<td>The USB/card reader board cable is available using spare part number L20452-001.</td>
<td></td>
</tr>
<tr>
<td>(17)</td>
<td>Battery (3-cell, 48 Whr)</td>
<td>L11119-855</td>
</tr>
<tr>
<td>(18)</td>
<td>Solid-state drive bracket</td>
<td>L20458-001</td>
</tr>
<tr>
<td>(19)</td>
<td>Hard drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>NOTE:</strong> For spare part information, see Mass storage devices on page 21.</td>
<td></td>
</tr>
<tr>
<td>(20)</td>
<td>DVD+/-RW Double-Layer Writer</td>
<td>L50025-001</td>
</tr>
<tr>
<td>(21)</td>
<td>Bottom cover</td>
<td></td>
</tr>
<tr>
<td></td>
<td>For use in models with an optical drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Asteroid silver</td>
<td>L49982-001</td>
</tr>
<tr>
<td></td>
<td>● Dark ash silver</td>
<td>L49983-001</td>
</tr>
<tr>
<td></td>
<td>For use in models without an optical drive</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Asteroid silver</td>
<td>L49984-001</td>
</tr>
<tr>
<td></td>
<td>● Dark ash silver</td>
<td>L49985-001</td>
</tr>
<tr>
<td>(22)</td>
<td>Rubber feet</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Front feet:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Asteroid silver</td>
<td>L20407-001</td>
</tr>
<tr>
<td></td>
<td>● Dark ash silver</td>
<td>L20406-001</td>
</tr>
<tr>
<td></td>
<td>Rear feet:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Asteroid silver</td>
<td>L20414-001</td>
</tr>
<tr>
<td></td>
<td>● Dark ash silver</td>
<td>L20413-001</td>
</tr>
</tbody>
</table>
Cables

Table 3-2 Cables and their descriptions

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>USB/card reader board cable</td>
<td>L20452-001</td>
</tr>
<tr>
<td>(2)</td>
<td>TouchPad button board cable</td>
<td>L20451-001</td>
</tr>
<tr>
<td>(3)</td>
<td>TouchPad cable</td>
<td>L20450-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Hard drive/solid-state drive cable</td>
<td>L20456-001</td>
</tr>
<tr>
<td>(5)</td>
<td>Display cable</td>
<td>L20443-001</td>
</tr>
<tr>
<td></td>
<td>Display cable, non-touch, HD</td>
<td>L20443-001</td>
</tr>
<tr>
<td></td>
<td>Display cable, non-touch, FHD</td>
<td>L23064-001</td>
</tr>
</tbody>
</table>
Table 3-3 Display components and their descriptions

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>Hinge cover</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Asteroid silver</td>
<td>L49990-001</td>
</tr>
<tr>
<td></td>
<td>Dark ash silver</td>
<td>L49991-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Display bezel</td>
<td>L20421-001</td>
</tr>
<tr>
<td>(3)</td>
<td>Display panel</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HD</td>
<td>L50021-001</td>
</tr>
<tr>
<td></td>
<td>FHD</td>
<td>L50022-001</td>
</tr>
<tr>
<td></td>
<td>Miscellaneous Display Kit (includes gaskets [4] and rubber corner positioning tools [4]; not illustrated)</td>
<td>L23065-001</td>
</tr>
<tr>
<td></td>
<td>Display panel stretchable adhesive tape (not illustrated)</td>
<td>L29080-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Hinge Kit (includes left and right hinges)</td>
<td>L20420-001</td>
</tr>
<tr>
<td>(5)</td>
<td>Display cable</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Non-touch, HD</td>
<td>L20443-001</td>
</tr>
</tbody>
</table>
### Table 3-3 Display components and their descriptions (continued)

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-touch, FHD</td>
<td></td>
<td>L23064-001</td>
</tr>
<tr>
<td><strong>Camera module</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HD camera</td>
<td></td>
<td>L20447-001</td>
</tr>
<tr>
<td>VGA camera</td>
<td></td>
<td>L20446-001</td>
</tr>
<tr>
<td><strong>WLAN antenna cable</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single antenna</td>
<td></td>
<td>L20445-001</td>
</tr>
<tr>
<td>Single antennas, narrow bezel</td>
<td></td>
<td>L23060-001</td>
</tr>
<tr>
<td>Dual antennas</td>
<td></td>
<td>L20444-001</td>
</tr>
<tr>
<td>Dual antennas, narrow bezel</td>
<td></td>
<td>L23059-001</td>
</tr>
<tr>
<td><strong>Back cover</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asteroid silver</td>
<td></td>
<td>L49986-001</td>
</tr>
<tr>
<td>Dark ash silver</td>
<td></td>
<td>L49987-001</td>
</tr>
</tbody>
</table>

### Miscellaneous parts

### Table 3-4 Miscellaneous parts and their descriptions

<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>65 W AC adapter, nPFC, SMART, RC, 4.5 mm, EM</td>
<td>913691-850</td>
</tr>
<tr>
<td>45 W AC adapter, nPFC, SMART, RC, 4.5 mm, non-slim</td>
<td>741727-001</td>
</tr>
<tr>
<td><strong>Power cord (C5, 1 m)</strong></td>
<td></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 Israel</td>
<td>L19362-001</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>L13369-001</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 Thailand</td>
<td>L19371-001</td>
</tr>
<tr>
<td>For use in the United Kingdom</td>
<td>L19373-001</td>
</tr>
<tr>
<td><strong>Power adapter for use in Japan (C5)</strong></td>
<td>226768-001</td>
</tr>
<tr>
<td><strong>Screw Kit</strong></td>
<td>L20476-001</td>
</tr>
</tbody>
</table>
Mass storage devices

Table 3-5  Mass storage devices and their descriptions

<table>
<thead>
<tr>
<th>Item</th>
<th>Component</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1)</td>
<td>DVD+/-RW Double-Layer Writer</td>
<td>L50025-001</td>
</tr>
<tr>
<td>(2)</td>
<td>Optical drive bezel</td>
<td>L49988-001</td>
</tr>
<tr>
<td></td>
<td>Asteroid silver</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dark ash silver</td>
<td>L49989-001</td>
</tr>
<tr>
<td>(3)</td>
<td>Optical drive bracket</td>
<td>L20459-001</td>
</tr>
<tr>
<td>(4)</td>
<td>Hard drive, 7 mm</td>
<td>L20455-001</td>
</tr>
<tr>
<td></td>
<td>1 TB, 5400 rpm</td>
<td>L30422-005</td>
</tr>
<tr>
<td></td>
<td>500 GB, 7200 rpm</td>
<td>703267-005</td>
</tr>
<tr>
<td></td>
<td>500 GB, 5400 rpm</td>
<td>778186-005</td>
</tr>
<tr>
<td>(5)</td>
<td>Hard drive bracket</td>
<td></td>
</tr>
<tr>
<td>(6)</td>
<td>Hard drive connector board</td>
<td>L20454-001</td>
</tr>
<tr>
<td>(7)</td>
<td>Hard drive/solid-state drive cable</td>
<td>L20456-001</td>
</tr>
<tr>
<td>(8)</td>
<td>Solid-state drive bracket</td>
<td>L20458-001</td>
</tr>
<tr>
<td>(9)</td>
<td>Solid-state drive connector board</td>
<td>L20457-001</td>
</tr>
<tr>
<td>(10)</td>
<td>Solid-state drive (M.2)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>256 GB, SATA-3, TLC</td>
<td>L50020-001</td>
</tr>
<tr>
<td></td>
<td>128 GB, SATA-3, TLC</td>
<td>L50019-001</td>
</tr>
</tbody>
</table>
4 Removal and replacement procedures preliminary requirements

Tools required

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

- Non-conductive, non-marking plastic tool
- Magnetic Phillips P1 screwdriver

Service considerations

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

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

Plastic parts

**CAUTION:** Using excessive force during disassembly and reassembly can damage plastic parts.

Cables and connectors

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

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

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

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.

Electrostatic discharge information

A sudden discharge of static electricity from your finger or other conductor can destroy static-sensitive devices or microcircuitry. Often the spark is neither felt nor heard, but damage occurs. An electronic device exposed to electrostatic discharge (ESD) may not appear to be affected at all and can work perfectly throughout a normal cycle. The device may function normally for a while, but it has been degraded in the internal layers, reducing its life expectancy.

Networks built into many integrated circuits provide some protection, but in many cases, the discharge contains enough power to alter device parameters or melt silicon junctions.
**IMPORTANT:** To prevent damage to the device 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.

---

### Generating static electricity

Note the following:

- Different activities generate different amounts of static electricity.
- Static electricity increases as humidity decreases.

<table>
<thead>
<tr>
<th>Event</th>
<th>Relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>55%</td>
</tr>
<tr>
<td>Walking across carpet</td>
<td>7,500 V</td>
</tr>
<tr>
<td>Walking across vinyl floor</td>
<td>3,000 V</td>
</tr>
<tr>
<td>Motions of bench worker</td>
<td>400 V</td>
</tr>
<tr>
<td>Removing DIPs from plastic tube</td>
<td>400 V</td>
</tr>
<tr>
<td>Removing DIPs from vinyl tray</td>
<td>2,000 V</td>
</tr>
<tr>
<td>Removing DIPs from Styrofoam</td>
<td>3,500 V</td>
</tr>
<tr>
<td>Removing bubble pack from PCB</td>
<td>7,000 V</td>
</tr>
<tr>
<td>Packing PCBs in foam-lined box</td>
<td>5,000 V</td>
</tr>
</tbody>
</table>

Electronic components are then multi-packaged inside plastic tubes, trays, or Styrofoam.

---

**NOTE:** As little as 700 volts can degrade a product.

### Preventing electrostatic damage to equipment

Many electronic components are sensitive to ESD. Circuitry design and structure determine the degree of sensitivity. The following packaging and grounding precautions are necessary to prevent static electricity damage to electronic components.

- To avoid hand contact, transport products in static-safe containers such as tubes, bags, or boxes.
- Protect all electrostatic parts and assemblies with conductive or approved containers or packaging.
- Keep electrostatic-sensitive parts in their containers until they arrive at static-free stations.
- Place items on a grounded surface before removing them from their container.
- Always be properly grounded when touching a sensitive component or assembly.
- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

**Personal grounding methods and equipment**

Use the following equipment to prevent static electricity damage to electronic components:

- **Wrist straps** are flexible straps with a maximum of one-megohm ± 10% resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.

- **Heel straps/Toe straps/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 them on both feet with a maximum of one-megohm ± 10% resistance between the operator and ground.

<table>
<thead>
<tr>
<th>Table 4-2 Static shielding protection levels</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Static shielding protection levels</strong></td>
</tr>
<tr>
<td><strong>Method</strong></td>
</tr>
<tr>
<td>Antistatic plastic</td>
</tr>
<tr>
<td>Carbon-loaded plastic</td>
</tr>
<tr>
<td>Metallized laminate</td>
</tr>
</tbody>
</table>

**Grounding the work area**

To prevent static damage at the work area, use the following precautions:

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.

- Use static-dissipative mats, foot straps, or air ionizers to give added protection.

- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.

- Turn off power and input signals before inserting and removing connectors or test equipment.

- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.

- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and Styrofoam.

- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

**Recommended materials and equipment**

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm +/- 10% resistance
- Static-dissipative table or floor mats with hard tie to ground
• Field service kits
• Static awareness labels
• Wrist straps and footwear straps providing one-megohm +/- 10% resistance
• Material handling packages
• Conductive plastic bags
• Conductive plastic tubes
• Conductive tote boxes
• Opaque shielding bags
• Transparent metallized shielding bags
• Transparent shielding tubes

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.
5  Removal and replacement procedures for Customer Self-Repair parts

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

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

### Preparation for disassembly

See [Removal and replacement procedures preliminary requirements on page 22](#) for initial safety procedures.

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

### 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 14](#) 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.
Optical drive

Table 5-1  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVD+/-RW Double-Layer Writer</td>
<td>L50025-001</td>
</tr>
<tr>
<td>Optical drive bracket</td>
<td>L20459-001</td>
</tr>
<tr>
<td>Optical drive bezel - asteroid silver</td>
<td>L49988-001</td>
</tr>
<tr>
<td>Optical drive bezel - dark ash silver</td>
<td>L49989-001</td>
</tr>
</tbody>
</table>

Before removing the optical drive, follow these steps:

▲ Prepare the computer for disassembly (Preparation for disassembly on page 27).

Remove the optical drive:

1. Remove the Phillips M2.5 × 9.0 screw (1) that secures the drive to the computer.
2. Slide the optical drive out of the computer (2).
3. If it is necessary to remove the bracket from the rear of the optical drive, remove the Phillips M2.0 × 3.0 screw (1), and then remove the bracket from the drive (2).

4. If it is necessary to remove the bezel from the front of the optical drive:
   a. Insert a paper clip into the release hole on the front of the bezel (1). The left side of the bezel rotates outward (2).
   b. Press the tab to release the bezel from the drive (3).
   c. Rotate the side of the bezel (4), and then remove it (5).

Reverse this procedure to reassemble and install the optical drive.
6  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.

**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 14](#) 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 46 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 6-1  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom cover for use in models with an optical drive</td>
<td></td>
</tr>
<tr>
<td>● Asteroid silver</td>
<td>L49982-001</td>
</tr>
<tr>
<td>● Dark ash silver</td>
<td>L49983-001</td>
</tr>
<tr>
<td>Bottom cover for use in models without an optical drive</td>
<td></td>
</tr>
<tr>
<td>● Asteroid silver</td>
<td>L49984-001</td>
</tr>
<tr>
<td>● Dark ash silver</td>
<td>L49985-001</td>
</tr>
<tr>
<td>Front rubber feet:</td>
<td></td>
</tr>
<tr>
<td>● Asteroid silver</td>
<td>L20407-001</td>
</tr>
<tr>
<td>● Dark ash silver</td>
<td>L20406-001</td>
</tr>
<tr>
<td>Rear rubber feet:</td>
<td></td>
</tr>
<tr>
<td>● Asteroid silver</td>
<td>L20414-001</td>
</tr>
<tr>
<td>● Dark ash silver</td>
<td>L20413-001</td>
</tr>
</tbody>
</table>

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).

Remove the bottom cover:
1. Peel the rubber feet off the bottom of the computer (1).
2. Remove the 10 Phillips M2.5 × 9.0 screws that secure the bottom cover to the computer.
3. Starting near the middle, bottom of the bottom cover (1), pry the cover up to remove it (2).

Reverse this procedure to install the bottom cover.
Battery

Table 6-2 Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery (3-cell, 48 Wr)</td>
<td>L11119-855</td>
</tr>
</tbody>
</table>

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).

Remove the battery:

1. Remove the three Phillips M2.0 × 8.0 screws (1) that secure the battery to the computer.
2. Remove the battery from the computer (2).

Reverse this procedure to install the battery.

When installing the battery, be sure to install screws in the proper locations. The following image shows the locations around the battery that have holes but do NOT require screws.
## Memory

### Table 6-3  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory module, 8 GB</td>
<td>937236-855</td>
</tr>
<tr>
<td>Memory module, 4 GB</td>
<td>L10598-855</td>
</tr>
</tbody>
</table>

Before removing the memory modules, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the memory modules:

1. Spread the two retention clips outward (1) until the memory module tilts up at a 45-degree angle.
2. Grasp the edge of the memory module (2), and then gently pull the module out of the slot. Use the same procedure to remove both memory modules.

**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.

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

Install the memory modules:

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

1. Align the notched edge of the memory module with the tab in the memory module slot (1).
2. Press the module into the slot until seated (2).
3. Gently press down on the module edges until the side retention clips snap into place (3).
**Hard drive**

### Table 6-4 Sparse part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard drive, 1 TB, 5400 rpm, 7 mm</td>
<td>L30422-005</td>
</tr>
<tr>
<td>Hard drive, 500 GB, 7200 rpm, 7 mm</td>
<td>703267-005</td>
</tr>
<tr>
<td>Hard drive, 500 GB, 5400 rpm, 7 mm</td>
<td>778186-005</td>
</tr>
<tr>
<td>Hard drive bracket</td>
<td>L20455-001</td>
</tr>
</tbody>
</table>

Before removing the hard drive, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the hard drive:

1. Slide the hard drive away from the connector (1), and then lift the hard drive out of the computer (2).
2. If it is necessary to disassemble the hard drive, remove the two Phillips M3.0 × 3.0 screws (1), and then lift the bracket off the drive (2).

Reverse this procedure to reassemble and install the hard drive.
Solid-state drive

Table 6-5  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>256 GB, SATA-3, TLC</td>
<td>L50020-001</td>
</tr>
<tr>
<td>128 GB, SATA-3, TLC</td>
<td>L50019-001</td>
</tr>
</tbody>
</table>

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

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).

Remove the solid-state drive:

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

Reverse this procedure to install the solid-state drive.
Solid-state drive bracket and connector board

Table 6-6  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solid-state drive bracket</td>
<td>L20458-001</td>
</tr>
<tr>
<td>Solid-state drive connector board</td>
<td>L22542-001</td>
</tr>
<tr>
<td>Solid-state drive cable</td>
<td>L20456-001</td>
</tr>
</tbody>
</table>

Before removing the solid-state drive bracket and connector board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).
5. Remove the solid-state drive (see [Solid-state drive on page 39](#)).

Remove the solid-state drive bracket and connector board:

1. Slide the bracket toward the side of the computer (1), and then lift the bracket out of the computer (2).
2. Disconnect the solid-state connector board cable from the system board ZIF connector (1).
3. Remove the Phillips M2.0 × 3.0 screw (2) that secures the board to the computer.
4. Remove the connector board from the computer (3).

Reverse this procedure to install the solid-state drive bracket and connector board.
WLAN module

Table 6-7  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)</td>
<td>L17365-005</td>
</tr>
</tbody>
</table>

Before removing the WLAN, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).

Remove the WLAN module:

1. Disconnect the two antenna cables from the module (1).
2. Remove the Phillips M2.0 × 3.0 screw (2), and then pull the module out of the socket (3).

Reverse this procedure to install the WLAN module.
Hard drive connector board

Table 6-8  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hard drive connector board</td>
<td>L20454-001</td>
</tr>
</tbody>
</table>

Before removing the hard drive connector board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).
5. Remove the hard drive (see Hard drive on page 37).

Remove the hard drive connector:

1. Disconnect the cable from the system board ZIF connector (1).
2. Remove the Phillips M2.0 × 3.0 screw (2) that secures the board to the computer.
3. Remove the board from the computer (3).

Reverse this procedure to install the hard drive connector board.
USB/card reader board

Table 6-9  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>USB/card reader board</td>
<td>L20448-001</td>
</tr>
<tr>
<td>USB/card reader board cable</td>
<td>L20452-001</td>
</tr>
</tbody>
</table>

Before removing the USB/card reader board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).

Remove the USB/card reader board:

1. Disconnect the cable from the ZIF connector on the USB board (1).
2. Remove the Phillips M2.0 × 3.0 screw (2), and then remove the board from the computer (3).

Reverse this procedure to replace the USB/card reader board.
TouchPad button board

Table 6-10  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TouchPad button board</td>
<td>not spared</td>
</tr>
<tr>
<td>TouchPad button board cable</td>
<td>L20451-001</td>
</tr>
</tbody>
</table>

Before removing the TouchPad button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the TouchPad button board:

1. Disconnect the system board cable from the ZIF connector on the TouchPad button board (1).
2. Disconnect the TouchPad cable from the ZIF connector on the TouchPad button board (2).
3. Remove the two Phillips M2.0 × 3.0 screws (3) that secure the board to the computer.
4. Remove the TouchPad button board from the computer (4).

Reverse this procedure to install the TouchPad button board.
TouchPad module

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>TouchPad module</td>
<td>L20449-001</td>
</tr>
<tr>
<td>TouchPad module cable</td>
<td>L20450-001</td>
</tr>
</tbody>
</table>

Before removing the TouchPad module, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

To remove the TouchPad module:

1. Disconnect the TouchPad cable from the ZIF connector on the TouchPad (1) and the TouchPad button board cable from the ZIF connector on the system board (2).

2. Peel the tape off the TouchPad (1).
3. Starting in the corner, use a plastic, non-marking tool to pry up the TouchPad module to disengage the adhesive that secures it to the top cover (2).
4. Working around each edge, pry the TouchPad module loose, and then remove it from the computer (3).

**NOTE:** The TouchPad module may be very tight and difficult to remove.

Reverse this procedure to install the TouchPad module.
Fan

Table 6-12  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fan</td>
<td>L20474-001</td>
</tr>
</tbody>
</table>

Before removing the fan, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).

Remove the fan:

1. Disconnect the fan cable from the system board (1).
2. Remove the Phillips M2.5 × 6.0 screw (2) that secures the fan to the computer.
3. Lift the fan from the computer (3).

Reverse this procedure to install the fan.
**Heat sink assembly**

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heat sink for use in models with AMD Ryzen processors and integrated UMA graphics</td>
<td>L20483-001</td>
</tr>
<tr>
<td>Heat sink for use in models with AMD A6/A9 processors and integrated UMA graphics</td>
<td>L20491-001</td>
</tr>
<tr>
<td>Heat plate for use in fanless models with AMD E2-9000e processors</td>
<td>L20494-001</td>
</tr>
</tbody>
</table>

Before removing the heat sink, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

To remove the heat sink assembly from products with integrated UMA graphics:

1. In the order indicated on the heat sink assembly, remove the four Phillips M2.0 × 3.0 screws (1) that secure the heat sink to the computer.
2. Lift the heat sink assembly from the computer (2).
3. Thoroughly clean the thermal material from the surface of the heat sink (1) and its associated system board component (2) each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

To remove the heat sink assembly from products with discrete graphics:

1. In the order indicated on the heat sink assembly, remove the six Phillips M2.0 × 3.0 screws (1) that secure the heat sink to the computer.

2. Lift the heat sink assembly from the computer (2).
3. Thoroughly clean the thermal material from the surfaces of the heat sink (1)(3) and associated system board components (2)(4) each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

To remove the heat plate from fanless models:

1. In the order indicated on the heat plate, remove the five Phillips M2.0 × 3.0 screws (1) that secure the heat plate to the computer.

2. Lift the heat plate from the computer (2).
3. Thoroughly clean the thermal material from the surface of the heat plate (1) and associated system board component (2) each time the heat plate is removed. Replacement thermal material is included with the heat plate and system board spare part kits.

Reverse this procedure to install the heat plate or heat sink assembly.
Display assembly

Full hinge-up displays are not spared. Displays are spared only at the subcomponent level.

Before removing the display panel, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).

Remove the display assembly:

1. Lift the tape from the display connector on the system board (1).
2. Disconnect the cable from the connector (2).
3. Remove the cable from the clip (3).
4. Remove the four Phillips M2.5 × 6.0 screws (1) from the display hinges.
5. Remove the Phillips broad head M2.0 × 2.0 screw (2) from the right display hinge.
6. Rotate the hinges upward (3).
7. Separate the display from the computer (4).

Remove the display assembly subcomponents:

1. To remove the hinge cover, pull upward near the hinge to disengage it from the display enclosure (1), and then remove the hinge cover from the display enclosure (2).

Hinge covers are available using the following spare part numbers:

- L49990-001: Asteroid silver
- L49991-001: Dark ash silver

When replacing the hinge cover, make sure the hinges rotate downward as far as they can go. Align the cover, and then start from above and rotate the cover downward onto the hinges. Make sure the clips snap into place along the bottom of the display cover.
2. If it is necessary to replace the display bezel:
   a. Remove the two Phillips M2.0 × 3.0 screws (1), flex the top (2) of the bezel, the inside edges of the left and right sides (3), and then the bottom (4) of the bezel until it disengages from the display enclosure.
   b. Remove the bezel (5).

   The display bezel is available using spare part number L20421-001.

3. If it is necessary to replace the camera/microphone module:
   a. Detach the module (1) from the display back cover. (The module is attached with double-sided adhesive.)
b. Disconnect the cable (2) from the camera/microphone module.

The HD camera module is available using spare part number L20447-001. The VGA camera module is available using spare part number L20446-001.

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

**IMPORTANT:** HD panels are secured to the display enclosure with screws. FHD panels are secured with tape.

a. **HD panels:**

Remove the four Phillips M2.0 × 3.0 screws that secure the panel to the display enclosure.
**FHD panels:**

b. Pull the tape out from behind the left and right sides of the panel.

![NOTE:](image) You have to pull on the tape multiple times before it is completely removed.

Display panel stretchable adhesive tape is available using spare part number L29080-001.

c. **HD and FHD panels:**

Swing the top edge of the display panel forward and position it upside down next to the display enclosure (1).

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

e. Disconnect the display panel cable (3) from the display panel.

f. Remove the display panel.

Raw display panels are available using the following spare part numbers:

L50021-001: HD
If it is necessary to replace the display hinges:

a. Remove the three Phillips M2.5 × 2.5 screws (1) from each hinge.

b. Remove the display hinges (2).

The display hinges are available using spare part number L20420-001.

If it is necessary to replace the display panel cable:

a. Release the cable from the retention clips and routing channel built into the bottom edge and side of the display enclosure (1).
b. Remove the display panel cable (2).

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

L20443-001: HD, non-touch display
L23064-001: FHD, non-touch display

7. If it is necessary to replace the wireless antenna cables and transceivers:
   a. Remove the antennas from the top of the display enclosure (1).
   b. Release the wireless antenna cables from the retention clips and routing channel built into the sides of the display enclosure (2).

Antennas are available using the following spare part numbers:

L20445-001: Single antenna models
L23060-001: Single antenna, narrow bezel models
L20444-001: Dual antenna models
L23059-001: Dual antenna, narrow bezel models
Use the following image to determine proper cable routing in the display of the antenna cable (1) and display cable (2).

The display rear cover is available using the following spare part numbers:
L49986-001: Asteroid silver
L49987-001: Dark ash silver
Reverse these procedures to reassemble and install the display assembly components.
When reassembling an FHD display assembly, be sure to install the following parts into the display enclosure from the Display Miscellaneous Kit, spare part number L23065-001 and display panel stretchable adhesive tape, spare part number L29080-001.

(1): Four positioning corner pieces
(2): Two gaskets
(3): Display panel stretchable adhesive tape
Component replacement procedures
System board

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

All system boards use the following part numbers:
xxxxxx-001: Non-Windows operating systems
xxxxxx-601: Windows operating system

Table 6-14 Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMD Ryzen 3-2200U processor</td>
<td>L50003-xx1</td>
</tr>
<tr>
<td>AMD A9-9425 processor</td>
<td>L50004-xx1</td>
</tr>
<tr>
<td>AMD A6-9225 processor</td>
<td>L50005-xx1</td>
</tr>
<tr>
<td>AMD A4-9125 processor</td>
<td>L54792-xx1</td>
</tr>
<tr>
<td>AMD E2-9000e processor</td>
<td>L50006-xx1</td>
</tr>
</tbody>
</table>

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).

2. Remove the following components:
   a. Optical drive (see Optical drive on page 28)
   b. Bottom cover (see Bottom cover on page 31)
   c. Battery (see Battery on page 33)
   d. Display (see Display assembly on page 53)

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

- WLAN module (see WLAN module on page 42)
- Memory modules (see Memory on page 35)
- Heat sink (see Heat sink assembly on page 49)

Remove the system board:

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

1. Disconnect the following cables from the system board:
   (1): Keyboard backlight cable
   (2): Hard drive connector cable
   (3): Speaker cable
   (4): USB/card reader board cable
   (5): Keyboard cable
   (6): TouchPad button board cable
2. Remove the two Phillips M2.0 × 3.0 screws that secure the system board to the computer (1).
3. Lift the left side of the system board, and then remove the system board from the computer (2).

Reverse this procedure to install the system board.
**Speakers**

<table>
<thead>
<tr>
<th>Table 6-15</th>
<th>Spare part description and number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Description</td>
<td>Spare part number</td>
</tr>
<tr>
<td>Speaker Kit</td>
<td>L20453-001</td>
</tr>
</tbody>
</table>

Before removing the speakers, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).
5. Remove the display (see Display assembly on page 53).

Remove the speakers:

1. Remove the speaker cable from the clips built into the computer (1).
2. Remove the speakers from the computer (2).

Reverse this procedure to install the speakers.
Power connector cable (DC-in)

Table 6-16  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power connector cable</td>
<td>L20475-001</td>
</tr>
</tbody>
</table>

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly (Preparation for disassembly on page 27).
2. Remove the optical drive (see Optical drive on page 28).
3. Remove the bottom cover (see Bottom cover on page 31).
4. Remove the battery (see Battery on page 33).
5. Remove the system board (see System board on page 62).
6. Remove the display (see Display assembly on page 53).

Remove the power connector cable:

1. Remove the cable from the clips built into the computer (1).
2. Remove the power connector cable from the computer (2).

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 6-17  Spare part description and number

<table>
<thead>
<tr>
<th>Description</th>
<th>Spare part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Keyboard, jet black</td>
<td>L50000-xx1</td>
</tr>
<tr>
<td>Keyboard, no backlight, silver</td>
<td>L50001-xx1</td>
</tr>
</tbody>
</table>

Table 6-18  Spare part country codes

<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>Hungary</td>
<td>-211</td>
<td>Slovenia</td>
<td>-BA1</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>-261</td>
<td>India</td>
<td>-D61</td>
<td>South Korea</td>
<td>-AD1</td>
</tr>
<tr>
<td>Chile</td>
<td>-161</td>
<td>Israel</td>
<td>-BB1</td>
<td>Spain</td>
<td>-071</td>
</tr>
<tr>
<td>Czech Republic/Slovakia</td>
<td>-FL1</td>
<td>Italy</td>
<td>-061</td>
<td>Switzerland</td>
<td>-BG1</td>
</tr>
<tr>
<td>Denmark, Finland, and Norway</td>
<td>-DH1</td>
<td>Japan</td>
<td>-291</td>
<td>Taiwan</td>
<td>-AB1</td>
</tr>
<tr>
<td>French Canada</td>
<td>-DB1</td>
<td>The Netherlands</td>
<td>-B31</td>
<td>Thailand</td>
<td>-281</td>
</tr>
<tr>
<td>France</td>
<td>-051</td>
<td>Portugal</td>
<td>-131</td>
<td>Turkey</td>
<td>-141</td>
</tr>
<tr>
<td>Germany</td>
<td>-041</td>
<td>Russia</td>
<td>-251</td>
<td>United Kingdom</td>
<td>-031</td>
</tr>
<tr>
<td>Greece</td>
<td>-151</td>
<td>Saudi Arabia</td>
<td>-171</td>
<td>United States</td>
<td>-001</td>
</tr>
</tbody>
</table>
Using Computer Setup

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

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

Starting Computer Setup

▲ Turn on or restart the computer, and when the HP logo appears, press f10 to enter Computer Setup.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to select the item.
- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.
- To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

- To exit Computer Setup menus without saving your changes, select Main, select Ignore Changes and Exit, and then select Yes.

  **NOTE:** If you are using arrow keys to highlight your choice, you must then press enter.

- To save your changes and exit Computer Setup menus, select Main, select Save Changes and Exit, and then select Yes.

  **NOTE:** If you are using arrow keys to highlight your choice, you must then press enter.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

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

2. Select Main, select Apply Factory Defaults and Exit, and then select Yes.

  **NOTE:** If you are using arrow keys to highlight your choice, you must then press enter.
NOTE: On select products, the selections may display Restore Defaults instead of Apply Factory Defaults and Exit.

Your changes go into effect when the computer restarts.

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

Updating the BIOS

Updated versions of the BIOS may be available on the HP 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 Computer Setup (BIOS), first determine the BIOS version on your computer.

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

2. Select Main, and then select System Information.
3. To exit Computer Setup menus without saving your changes, select Main, select Ignore Changes and Exit, and then select Yes.

NOTE: If you are using arrow keys to highlight your choice, you must then press enter.

To check for later BIOS versions, see Downloading a BIOS update on page 68.

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 on 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.

1. Type support in the taskbar search box, and then select the HP Support Assistant app.
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. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

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

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

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

1. 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.

### Changing the boot order using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Access the Boot Device Options menu:
   - Turn on or restart the computer, and when the HP logo appears, press **f9** to enter the Boot Device Options menu.

2. Select a boot device, press **enter**, and then follow the on-screen instructions.

### TPM BIOS settings (select products only)

**IMPORTANT:** Before enabling Trusted Platform Module (TPM) functionality on this system, you must ensure that your intended use of TPM complies with relevant local laws, regulations and policies, and approvals or licenses must be obtained if applicable. For any compliance issues arising from your operation/usage of TPM which violates the above mentioned requirement, you shall bear all the liabilities wholly and solely. HP will not be responsible for any related liabilities.

TPM provides additional security for your computer. You can modify the TPM settings in Computer Setup (BIOS).

**NOTE:** If you change the TPM setting to Hidden, TPM is not visible in the operating system.

To access TPM settings in Computer Setup:

1. Start Computer Setup. See **Starting Computer Setup on page 67**.
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.
Using HP Sure Start (select products only)

Select computer models are configured with HP Sure Start, a technology that monitors the computer’s BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start automatically restores the BIOS to its previously safe state, without user intervention.

HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to [http://www.hp.com/support](http://www.hp.com/support). Select **Find your product**, and then follow the on-screen instructions.
Using HP PC Hardware Diagnostics

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 71.

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.

When HP PC Hardware Diagnostics Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. The screen displays one of the following options:

- A Failure ID link is displayed. Select the link and follow the on-screen instructions.
- A Quick Response (QR) code is displayed. With a mobile device, scan the code and then follow the on-screen instructions.
- Instructions for calling support are displayed. Follow those instructions.

**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. Select **Download HP Diagnostics Windows**, 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 **Diagnostics** section, select **Download**, and then follow the on-screen instructions to select the specific Windows diagnostics version to be downloaded to your computer or 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 [Download HP PC Hardware Diagnostics UEFI to a USB flash drive on page 73](#).

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 Windows detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in solving the problem:

▲ Select **Get Support**, and then use a mobile device to scan the QR code that displays on the next screen. The HP Customer Support - Service Center page displays, with your Failure ID and product number automatically filled in. Follow the on-screen instructions.

– or –

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:
   a. 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 73.
   
   b. Hard drive
   
   c. BIOS

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. Select Download HP Diagnostics UEFI, 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 about 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. 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.
9  Backing up, restoring, and recovering

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

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see Using Windows tools on page 76).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 76).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 76).
- **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 76).

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

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

### Backing up information and creating recovery media

#### 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.

**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.

#### Using the HP Cloud Recovery Download Tool to create recovery media (select products only)

You can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive, as follows:

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

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 76.

Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 76.

To recover your system:

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

Changing the computer boot order

If your computer does not restart using the HP Recovery media, 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 or tablet, 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.
# 10 Specifications

## Computer specifications

### Table 10-1 Computer specifications

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Length</td>
<td>246.0 mm</td>
<td>10.72 in</td>
</tr>
<tr>
<td>Width</td>
<td>376.0 mm</td>
<td>16.33 in</td>
</tr>
<tr>
<td>Height</td>
<td>22.5 mm</td>
<td>0.97 in</td>
</tr>
<tr>
<td><strong>Weight</strong> (lowest configuration)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SSD, Ryzen processors, UMA graphics</td>
<td>1829.5 g</td>
<td>4.03 lbs</td>
</tr>
<tr>
<td>SSD, A9/A6/A4 processors, UMA graphics</td>
<td>1771.5 g</td>
<td>3.91 lbs</td>
</tr>
<tr>
<td>SSD, Ryzen/A9/A6/A4 processors, discrete graphics</td>
<td>1855.5 g</td>
<td>4.09 lbs</td>
</tr>
<tr>
<td>HDD and ODD, Ryzen processors, UMA graphics</td>
<td>2062.7 g</td>
<td>4.55 lbs</td>
</tr>
<tr>
<td>HDD and ODD, A9/A6/A4 processors, UMA graphics</td>
<td>2004.7 g</td>
<td>4.42 lbs</td>
</tr>
<tr>
<td>HDD and ODD, Ryzen/A9/A6/A4 processors, discrete graphics</td>
<td>2088.7 g</td>
<td>4.60 lbs</td>
</tr>
<tr>
<td><strong>Input power</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating voltage</td>
<td>19.0 V dc @ 4.74 A – 90 W or 18.5 V dc @ 3.5 A – 65 W</td>
<td></td>
</tr>
<tr>
<td>Operating current</td>
<td>4.74 A or 3.5 A</td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating (not writing to optical disc)</td>
<td>0°C to 35°C</td>
<td>32°F to 95°F</td>
</tr>
<tr>
<td>Operating (writing to optical disc)</td>
<td>5°C to 35°C</td>
<td>41°F to 95°F</td>
</tr>
<tr>
<td>Nonoperating</td>
<td>-20°C to 60°C</td>
<td>-4°F to 140°F</td>
</tr>
<tr>
<td><strong>Relative humidity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating</td>
<td>10% to 90%</td>
<td></td>
</tr>
<tr>
<td>Nonoperating</td>
<td>5% to 95%</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:** Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.
### 39.6-cm (15.6-in) display specifications

**Table 10-2 Display specifications**

<table>
<thead>
<tr>
<th>Metric</th>
<th>U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Active diagonal size</strong></td>
<td>39.6-cm, 15.6-in</td>
</tr>
<tr>
<td><strong>Resolution</strong></td>
<td>FHD: 1920 × 1080</td>
</tr>
<tr>
<td></td>
<td>HD: 1366 × 768</td>
</tr>
<tr>
<td><strong>Surface treatment</strong></td>
<td>Anti-glare, BrightView</td>
</tr>
<tr>
<td><strong>Brightness</strong></td>
<td>220 nits</td>
</tr>
<tr>
<td></td>
<td>200 nits (BrightView, HD, Touch-on Panel)</td>
</tr>
<tr>
<td><strong>Viewing angle</strong></td>
<td>SVA, UWVA (FHD, anti glare panel)</td>
</tr>
<tr>
<td><strong>Backlight</strong></td>
<td>WLED</td>
</tr>
<tr>
<td><strong>Aspect ratio</strong></td>
<td>16:10 ultra wide</td>
</tr>
<tr>
<td><strong>Display panel interface</strong></td>
<td>eDP</td>
</tr>
<tr>
<td><strong>Width</strong></td>
<td>Slim-flat, 3.2 mm</td>
</tr>
</tbody>
</table>

### M.2 SATA solid-state drive specifications

**Table 10-3 Solid-state drive specifications**

<table>
<thead>
<tr>
<th></th>
<th>128-GB*</th>
<th>256-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Height</strong></td>
<td>1.35 mm</td>
<td>1.35 mm</td>
</tr>
<tr>
<td><strong>Weight</strong></td>
<td>&lt; 10 g</td>
<td>&lt; 10 g</td>
</tr>
<tr>
<td><strong>Form factor</strong></td>
<td>M.2 2280-D2-B-M</td>
<td>M.2 2280-D2-B-M</td>
</tr>
<tr>
<td><strong>Transfer rate</strong></td>
<td>up to 540 MB/sec</td>
<td>up to 540 MB/sec</td>
</tr>
<tr>
<td><strong>Interface type</strong></td>
<td>SATA-3</td>
<td>SATA-3</td>
</tr>
<tr>
<td><strong>Ready time, maximum (to not busy)</strong></td>
<td>1.0 ms</td>
<td>&lt; 1.0 ms</td>
</tr>
<tr>
<td><strong>Access times, logical</strong></td>
<td>0.1 ms</td>
<td>0.1 ms</td>
</tr>
<tr>
<td><strong>Total logical sectors</strong></td>
<td>234,441,648</td>
<td>468,883,296</td>
</tr>
<tr>
<td><strong>Operating temperature</strong></td>
<td>0°C to 70°C (32°F to 158°F)</td>
<td></td>
</tr>
</tbody>
</table>

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

**NOTE:** Certain restrictions and exclusions apply. Contact technical support for details.
# M.2 PCIe solid-state drive specifications

## Table 10-4 Solid-state drive specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>256-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>1 mm</td>
</tr>
<tr>
<td>Length</td>
<td>50.8 mm</td>
</tr>
<tr>
<td>Width</td>
<td>28.9 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt; 10 g</td>
</tr>
</tbody>
</table>

| Interface type      | ATA-7                 |

<table>
<thead>
<tr>
<th>Transfer rate</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sequential Read</td>
<td>Up to 2150 MB/s</td>
</tr>
<tr>
<td>Random Read</td>
<td>Up to 300,000 IOPs</td>
</tr>
<tr>
<td>Sequential Write</td>
<td>Up to 1260 MB/s</td>
</tr>
<tr>
<td>Random Write</td>
<td>Up to 100,000 IOPs</td>
</tr>
</tbody>
</table>

| Ready time, Maximum (to not busy) | 1.0 s |

<table>
<thead>
<tr>
<th>Access times</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Logical</td>
<td>0.1 ms</td>
</tr>
</tbody>
</table>

| Total logical sectors | 500,118,192 |

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating</td>
<td>0° to 70°C (32°F to 158°F)</td>
</tr>
<tr>
<td>Non-operating</td>
<td>-40° to 80°C (-40°F to 176°F)</td>
</tr>
</tbody>
</table>

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

**NOTE:** Certain restrictions and exclusions apply. Contact technical support for details.
# Hard drive specifications

## Table 10-5 Hard drive specifications

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>2-TB*</th>
<th>1-TB*</th>
<th>500-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Height</td>
<td>7.2 mm or 9.5 mm</td>
<td>7.2 mm or 9.5 mm</td>
<td>7.0 mm</td>
</tr>
<tr>
<td>Length</td>
<td>100.4 mm</td>
<td>100.4 mm</td>
<td>100.6 mm</td>
</tr>
<tr>
<td>Width</td>
<td>69.9 mm</td>
<td>69.9 mm</td>
<td>70.1 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>130.0 g</td>
<td>107.0 g</td>
<td>92.0 g</td>
</tr>
<tr>
<td>Interface type</td>
<td>SATA</td>
<td>SATA</td>
<td>SATA</td>
</tr>
</tbody>
</table>

### Transfer rate

<table>
<thead>
<tr>
<th></th>
<th>2-TB*</th>
<th>1-TB*</th>
<th>500-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synchronous (maximum)</td>
<td>300 MB/sec</td>
<td>300 MB/sec</td>
<td>300 MB/sec</td>
</tr>
<tr>
<td>Security</td>
<td>ATA security</td>
<td>ATA security</td>
<td>ATA security</td>
</tr>
</tbody>
</table>

### Seek times (typical read, including setting)

<table>
<thead>
<tr>
<th></th>
<th>2-TB*</th>
<th>1-TB*</th>
<th>500-GB*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single track</td>
<td>2.0 ms</td>
<td>2.0 ms</td>
<td>3 ms</td>
</tr>
<tr>
<td>Average (read/write)</td>
<td>12 ms</td>
<td>12 ms</td>
<td>13 ms</td>
</tr>
<tr>
<td>Maximum</td>
<td>22 ms</td>
<td>22 ms</td>
<td>24 ms</td>
</tr>
</tbody>
</table>

### Logical blocks

<table>
<thead>
<tr>
<th></th>
<th>3,907,029,168</th>
<th>1,953,525,168</th>
<th>1,048,576,000</th>
</tr>
</thead>
</table>

### Disk rotational speed

<table>
<thead>
<tr>
<th></th>
<th>5400 rpm</th>
<th>5400 rpm</th>
<th>5400 rpm</th>
</tr>
</thead>
</table>

### Operating temperature

<table>
<thead>
<tr>
<th></th>
<th>0°C to 60°C (32°F to 140°F)</th>
</tr>
</thead>
</table>

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

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

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (3.3 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.
### Requirements for specific countries and regions

**Table 11-1  Power cord requirements for specific countries and regions**

<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>IRAM</td>
<td>1</td>
</tr>
<tr>
<td>Australia</td>
<td>SAA</td>
<td>1</td>
</tr>
<tr>
<td>Austria</td>
<td>OVE</td>
<td>1</td>
</tr>
<tr>
<td>Belgium</td>
<td>CEBEC</td>
<td>1</td>
</tr>
<tr>
<td>Brazil</td>
<td>ABNT</td>
<td>1</td>
</tr>
<tr>
<td>Canada</td>
<td>CSA</td>
<td>2</td>
</tr>
<tr>
<td>Chile</td>
<td>IMQ</td>
<td>1</td>
</tr>
<tr>
<td>Denmark</td>
<td>DEMKO</td>
<td>1</td>
</tr>
<tr>
<td>Finland</td>
<td>FIMKO</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>UTE</td>
<td>1</td>
</tr>
<tr>
<td>Germany</td>
<td>VDE</td>
<td>1</td>
</tr>
<tr>
<td>India</td>
<td>BIS</td>
<td>1</td>
</tr>
<tr>
<td>Israel</td>
<td>SII</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>IMQ</td>
<td>1</td>
</tr>
<tr>
<td>Japan</td>
<td>JIS</td>
<td>3</td>
</tr>
<tr>
<td>The Netherlands</td>
<td>KEMA</td>
<td>1</td>
</tr>
<tr>
<td>New Zealand</td>
<td>SANZ</td>
<td>1</td>
</tr>
<tr>
<td>Norway</td>
<td>NEMKO</td>
<td>1</td>
</tr>
<tr>
<td>The People's Republic of China</td>
<td>CCC</td>
<td>4</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>SASO</td>
<td>7</td>
</tr>
<tr>
<td>Singapore</td>
<td>PSB</td>
<td>1</td>
</tr>
<tr>
<td>South Africa</td>
<td>SABS</td>
<td>1</td>
</tr>
<tr>
<td>South Korea</td>
<td>KTL</td>
<td>5</td>
</tr>
<tr>
<td>Sweden</td>
<td>SEMKO</td>
<td>1</td>
</tr>
<tr>
<td>Switzerland</td>
<td>SEV</td>
<td>1</td>
</tr>
<tr>
<td>Taiwan</td>
<td>BSMI</td>
<td>6</td>
</tr>
<tr>
<td>Thailand</td>
<td>TISI</td>
<td>1</td>
</tr>
<tr>
<td>The United Kingdom</td>
<td>ASTA</td>
<td>1</td>
</tr>
<tr>
<td>The United States</td>
<td>UL</td>
<td>2</td>
</tr>
</tbody>
</table>

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
<table>
<thead>
<tr>
<th>Country/region</th>
<th>Accredited agency</th>
<th>Applicable note number</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td>The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.</td>
<td></td>
</tr>
</tbody>
</table>
12  Statement of memory volatility

The purpose of this chapter is to provide general information regarding nonvolatile memory in HP Business computers. This chapter also provides general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.

HP Business computer products that use Intel®-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP, assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.

Following system shutdown and removal of all power sources from an HP Business computer system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. Use the steps below to remove personal data from the computer, including the nonvolatile memory found in Intel-based and AMD-based system boards.

NOTE: If your tablet has a keyboard base, connect to the keyboard base before beginning steps in this chapter.

Current BIOS steps

1.  Follow steps (a) through (l) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.

   a.  Turn on or restart the computer, and then press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

      NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

   b.  Select Main, select Apply Factory Defaults and Exit, and then select Yes to load defaults.

      The computer will reboot.

   c.  During the reboot, press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

      NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

   d.  Select the Security menu, select Restore Security Settings to Factory Defaults, and then select Yes to restore security level defaults.

      The computer will reboot.

   e.  During the reboot, press esc while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

      NOTE: If the system has a BIOS administrator password, enter the password at the prompt.

   f.  If an asset or ownership tag is set, select the Security menu and scroll down to the Utilities menu. Select System IDs, and then select Asset Tracking Number. Clear the tag, and then make the selection to return to the prior menu.
If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then uncheck the checkbox for **DriveLock password on restart**. Select **OK** to proceed.

Select the **Main** menu, and then select **Reset BIOS Security to factory default**. Click **Yes** at the warning message.

The computer will reboot.

During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

**NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.

Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.

Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint sensor, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.

Remove all power and system batteries for at least 24 hours.

**2.** Complete one of the following:

- Remove and retain the storage drive.

- or –

- Clear the drive contents by using a third party utility designed to erase data from an SSD.

- or –

- Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:

**IMPORTANT:** If you clear data using Secure Erase, it cannot be recovered.

- Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

- Select the **Security** menu and scroll down to the **Utilities** menu.

- Select **Hard Drive Utilities**.

- Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.
## Nonvolatile memory usage

**Table 12-1 Nonvolatile memory usage**

<table>
<thead>
<tr>
<th>Nonvolatile Memory Type</th>
<th>Amount (Size)</th>
<th>Does this memory store customer data?</th>
<th>Does this memory retain data when power is removed?</th>
<th>What is the purpose of this memory?</th>
<th>How is data input into this memory?</th>
<th>How is this memory write-protected?</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP Sure Start flash (select models only)</td>
<td>8 MBytes</td>
<td>No</td>
<td>Yes</td>
<td>Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start. For more information, see <a href="#">Using HP Sure Start (select models only) on page 90</a>.</td>
<td>Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.</td>
<td>This memory is protected by the HP Sure Start Embedded Controller.</td>
</tr>
<tr>
<td>Real Time Clock (RTC) battery backed-up CMOS configuration memory</td>
<td>256 Bytes</td>
<td>No</td>
<td>Yes</td>
<td>Stores system date and time and noncritical data.</td>
<td>RTC battery backed-up CMOS is programmed using the Computer Setup (BIOS), or changing the Microsoft® Windows date &amp; time.</td>
<td>This memory is not write-protected.</td>
</tr>
<tr>
<td>Controller (NIC) EEPROM</td>
<td>64 KBytes (not customer accessible)</td>
<td>No</td>
<td>Yes</td>
<td>Stores NIC configuration and NIC firmware.</td>
<td>NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.</td>
<td>A utility is required to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.</td>
</tr>
<tr>
<td>DIMM Serial Presence Detect (SPD) configuration data</td>
<td>256 Bytes per memory module, 128 Bytes programmable (not customer accessible)</td>
<td>No</td>
<td>Yes</td>
<td>Stores memory module information.</td>
<td>DIMM SPD is programmed by the memory vendor.</td>
<td>Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.</td>
</tr>
<tr>
<td>System BIOS</td>
<td>9 MBytes</td>
<td>Yes</td>
<td>Yes</td>
<td>Stores system BIOS code and computer configuration data.</td>
<td>System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.</td>
<td>NOTE: Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility is required for writing data to this memory and is available on the HP website; go to <a href="http://www.hp.com/">http://www.hp.com/</a></td>
</tr>
<tr>
<td>Nonvolatile Memory Type</td>
<td>Amount (Size)</td>
<td>Does this memory store customer data?</td>
<td>Does this memory retain data when power is removed?</td>
<td>What is the purpose of this memory?</td>
<td>How is data input into this memory?</td>
<td>How is this memory write-protected?</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------</td>
<td>---------------------------------------------------</td>
<td>-----------------------------------</td>
<td>----------------------------------</td>
<td>-------------------------------------</td>
</tr>
<tr>
<td>Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to <a href="http://www.hp.com/support">http://www.hp.com/support</a>. Select Find your product, and then follow the on-screen instructions.)</td>
<td>1.5 MBytes or 7 MBytes</td>
<td>Yes</td>
<td>Yes</td>
<td>Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.</td>
<td>Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third party data store contents can be populated by a remote management console or local applications that have been registered by an administrator to have access to the space.</td>
<td>Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.</td>
</tr>
<tr>
<td>Bluetooth flash (select products only)</td>
<td>2 Mbit</td>
<td>No</td>
<td>Yes</td>
<td>Stores Bluetooth configuration and firmware.</td>
<td>Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.</td>
<td>A utility is required for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.</td>
</tr>
<tr>
<td>802.11 WLAN EEPROM</td>
<td>4 Kbit to 8 Kbit</td>
<td>No</td>
<td>Yes</td>
<td>Stores configuration and calibration data.</td>
<td>802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.</td>
<td>A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.</td>
</tr>
<tr>
<td>Camera (select products only)</td>
<td>64 Kbit</td>
<td>No</td>
<td>Yes</td>
<td>Stores camera configuration and firmware.</td>
<td>Camera memory is programmed using a utility from the device manufacturer that can be run from Windows.</td>
<td>A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.</td>
</tr>
<tr>
<td>Fingerprint sensor (select products only)</td>
<td>512 KByte flash</td>
<td>Yes</td>
<td>Yes</td>
<td>Stores fingerprint templates.</td>
<td>Fingerprint sensor memory is programmed by user enrollment in HP ProtectTools Security Manager.</td>
<td>Only a digitally signed application can make the call to write to the flash.</td>
</tr>
</tbody>
</table>
Questions and answers

1. **How can the BIOS settings be restored (returned to factory settings)?**

   **IMPORTANT:** Restore defaults does not securely erase any data on your hard drive. See question and answer 6 for steps to securely erase data.

   Restore defaults does not reset the Custom Secure Boot keys. See question and answer 7 for information about resetting the keys.

   a. Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
   
   b. Select Main, and then select **Apply Factory Defaults and Exit**.
   
   c. Follow the on-screen instructions.
   
   d. Select Main, select **Save Changes and Exit**, and then follow the on-screen instructions.

2. **What is a UEFI BIOS, and how is it different from a legacy BIOS?**

   The Unified Extensible Firmware Interface (UEFI) BIOS is an industry-standard software interface between the platform firmware and an operating system (OS). It is a replacement for the older BIOS architecture, but supports much of the legacy BIOS functionality.

   Like the legacy BIOS, the UEFI BIOS provides an interface to display the system information and configuration settings and to change the configuration of your computer before an OS is loaded. BIOS provides a secure run-time environment that supports a Graphic User Interface (GUI). In this environment, you can use either a pointing device (Touchscreen, TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make menu and configuration selections. The UEFI BIOS also contains basic system diagnostics.

   The UEFI BIOS provides functionality beyond that of the legacy BIOS. In addition, the UEFI BIOS works to initialize the computer’s hardware before loading and executing the OS; the run-time environment allows the loading and execution of software programs from storage devices to provide more functionality, such as advanced hardware diagnostics (with the ability to display more detailed system information) and advanced firmware management and recovery software.

   HP has provided options in Computer Setup (BIOS) to allow you to run in legacy BIOS, if required by the operating system. Examples of this requirement would be if you upgrade or downgrade the OS.

3. **Where does the UEFI BIOS reside?**

   The UEFI BIOS resides on a flash memory chip. A utility is required to write to the chip.

4. **What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?**

   The DIMM SPD memory contains information about the memory module, such as size, serial number, data width, speed/timing, voltage, and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a computer. Third-party tools do exist that can write to the EEPROM when the memory module is not installed in a computer. Various third-party tools are available to read SPD memory.

5. **What is meant by “Restore the nonvolatile memory found in Intel-based system boards”?**

   This message relates to clearing the Real Time Clock (RTC) CMOS memory that contains computer configuration data.

6. **How can the BIOS security be reset to factory defaults and data erased?**
**IMPORTANT:** Resetting will result in the loss of information.

These steps will not reset Custom Secure Boot Keys. See question and answer 7 for information about resetting the keys.

a. Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

b. Select Main, and then select Reset Security to Factory Defaults.

c. Follow the on-screen instructions.

d. Select Main, select Save Changes and Exit, and then follow the on-screen instructions.

7. **How can the Custom Secure Boot Keys be reset?**

Secure Boot is a feature to ensure that only authenticated code can start on a platform. If you enabled Secure Boot and created Custom Secure Boot Keys, simply disabling Secure Boot will not clear the keys. You must also select to clear the Custom Secure Boot Keys. Use the same Secure Boot access procedure you used to create the Custom Secure Boot Keys, but make the selection to clear or delete all Secure Boot Keys.

a. Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

b. Select the Security menu, select Secure Boot Configuration, and then follow the on-screen instructions.

c. At the Secure Boot Configuration window, select Secure Boot, select Clear Secure Boot Keys, and then follow the on-screen instructions to continue.

**Using HP Sure Start (select models only)**

Select computer models are configured with HP Sure Start, a technology that continuously monitors your computer’s BIOS for attacks or corruption. If the BIOS becomes corrupted or is attacked, HP Sure Start restores the BIOS to its previously safe state, without user intervention. Those select computer models ship with HP Sure Start configured and enabled. HP Sure Start is configured and already enabled so that most users can use the HP Sure Start default configuration. The default configuration can be customized by advanced users.

To access the latest documentation on HP Sure Start, go to [http://www.hp.com/support](http://www.hp.com/support). Select Find your product, and then follow the on-screen instructions.
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](http://www.hp.com/recycle).
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