# HP Pavilion Gaming Notebook

## Maintenance and Service Guide

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**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 of Windows. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows functionality. See http://www.microsoft.com for details.

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For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

## Safety warning notice

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

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# 1 Product description

| Category | Description |
|---|---|
| **Product name** | HP Pavilion Gaming Notebook |
| **Processors** | **6th generation, Intel Core i7 processor, Dual Core (Skylake-H)** (6-MB L3 cache, 30 W)<br>6700HQ, 2.6 GHz, SC turbo up to 3.5 GHz<br>**6th generation, Intel Core i5 processors, Dual Core (Skylake-H)** (6-MB L3 cache, 30 W)<br>6300HQ, 2.3 GHz, SC turbo up to 3.2 GHz<br>**6th generation, Intel Core i3 processors, Dual Core (Skylake-U)** (3-MB L3 cache, 15 W)<br>6200U, 2.3-GHz, turbo up to 2.8-GHz processor<br>6100U, 2.3-GHz processor |
| **Chipset** | Intel HM170 (Intel Skylake H 2-chip series)<br>Integrated SoC (Intel Skylake U 1-chip series) |
| **Graphics** | **Internal graphics:**<br>Intel HD Graphics 530 (Skylake-H)<br>Intel HD Graphics 520 (Skylake-U) |
| | **Switchable discrete graphics:**<br>NVIDIA N16P-GT (GeForce 950M) with up to 4096 MB of dedicated video memory (256Mx16 DDR3 900MHz x 8 PCs, 1GHz bridge to 900MHz) (Skylake-H)<br>NVIDIA N16S-GT (GeForce 940M) with up to 2048 MB of dedicated video memory (256Mx16 DDR3 900MHz x 4 PCs, 1GHz bridge to 900MHz) (Skylake-U)<br>Support HD Decode, DX12, and HDMI |
| **Panel** | **39.6-cm** (15.6-in), high-definition (HD), white light-emitting diode (WLED), SVA, BrightView (1366×768) display, flat 3.8 mm, eDP; typical brightness: 220 nits<br>**39.6-cm** (15.6-in), HD, WLED, SVA, BrightView, (1366×768), slim 3.2 mm, TOP (Touch On Panel); typical brightness: 220 nits<br>**39.6-cm** (15.6-in), FHD, LED, UWVA, AntiGlare, (1920×1080), IPS, slim 3.2 mm; typical brightness: 220 nits<br>**39.6-cm** (15.6-in), FHD, WLED, SVA, AntiGlare,45%cg, slim 3.2 mm; typical brightness: 220 nits<br>Touch screen with flush glass, multi-touch enabled<br>Supports LVDS (co-layout with eDP1.2) |

| Category | Description |
|---|---|
| **Memory** | **Two SODIMM slots - NON customer accessible / upgradeable**<br>DDR3L-1600 Dual Channel Support<br>Supports up to 16 GB of system RAM in the following configurations:<br>• 16384-MB total system memory (8192×2)<br>• 12288-MB total system memory (8192×1) + (4096×1)<br>• 8192-MB total system memory (8192×1) or (4096×2)<br>• 6144-MB total system memory (4096×1) + (2048×1)<br>• 4096-MB total system memory (4096×1) or (2048×2) |
| **Hard drives** | Supports **6.35-cm** (2.5-in) SATA hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses<br>7 mm/9.5 mm share the same bracket<br>Accelerometer / HDD protection support<br>**Single HDD configurations:**<br>• 2-TB, 5400-rpm, 9.5-mm<br>• 1-TB, 5400-rpm, 9.5-mm<br>• 500-GB, 5400-rpm, 9.5-mm or 7.0-mm<br>**Hybrid HDD configurations:**<br>• 1-TB, 5400-rpm, 9.5-mm SSHD w/8GB NAND<br>• 500-GB, 5400-rpm, 7.0-mm SSHD w/8GB NAND<br>**M.2 SATA-3 (NGFF):**<br>• SSD, 256GB, 2280, M.2, SATA-3, TLC<br>• SSD, 128GB, 2280, M.2, SATA-3, TLC<br>• SSD, 128GB, 2280, M.2, SATA-3, Value DRAM-less |
| **Optical drive** | Fixed, serial ATA, 9.5-mm tray load<br>Blu-ray Disc R/RW with SuperMulti (models with discrete graphics only)<br>DVD+/-RW Double-Layer SuperMulti<br>Supports zero power optical drive<br>Supports M-disc |

| Category | Description |
|---|---|
| **Audio/video** | HP TrueVision HD: HD camera (fixed, no tilt with activity LED, 1280×720 by 30 frames per second)<br><br>Intel RealSense 3D camera - activity LED, USB 3.0; Intel RealSense 3D camera - activity LED, USB 3.0; 4x depth resolution, 480x640; 85° diagnal field of view<br><br>Dual array digital microphone with appropriate software - beam forming, echo cancellation, noise suppression<br><br>Dual speakers<br><br>B&O Audio<br><br>Enable HP Noise Cancellation<br><br>Support Voice Recognition |
| **Sensors** | Accelerometer |
| **Ethernet** | Integrated 10/100 network interface card (NIC) |
| **Wireless** | **Integrated Wireless options with single antenna (M.2/PCIe):**<br><br>• Broadcom BCM43142 802.11 b/g/n 1x1 Wi-Fi + BT4.0 M.2 Combo Adapter<br><br>• Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter<br><br>• Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter<br><br>**Integrated Wireless options with dual antennas (M.2/PCIe):**<br><br>• Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + BT 4.0 Combo Adapter<br><br>Intel WiDi support<br><br>Compatible with Miracast-certified devices |
| **Internal card expansion** | One M.2 slot for WLAN |
| **External media card** | **HP Multi-Format Digital Media Card Reader**<br><br>Support SD/SDHC/SDXC<br><br>Push-Push Insertion/Removal<br><br>SIM slot (populated with WWAN; tool-less user-accessible) |
| **Ports** | HDMI version 1.4 supporting 1920 ×1080 @ 60Hz<br><br>Hot Plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video<br><br>RJ-45 (Ethernet, includes link and activity lights)<br><br>USB 3.0 (1 on left side, 1 on right side)<br><br>USB 2.0 (1 on left side)<br><br>AC Smart Pin adapter plug<br><br>Headphone jack<br><br>Microphone jack<br><br>AC Smart Pin adapter plug |

| Category | Description |
|---|---|
| **Keyboard/ pointing devices** | Full size standard textured island-style keyboard with numeric keypad (white and silver)<br>Full size standard three coat paint island-style backlit keyboard with numeric keypad (silver)<br>ClickPad with multi-touch gestures, 2-finger scrolling, and pinch-zoom enabled<br>Taps enabled by default<br>Support Modern Trackpad Gestures |
| **Power requirements** | **Battery:**<br>4-cell, 48-Whr, 3.2Ah, li-ion battery (Skylake-H)<br>4-cell, 41-Whr, 2.8Ah, li-ion battery (Skylake-U)<br>**AC adapters:**<br>AC Adapter 90-W Smart nPFC, 3 pin, RC 4.5mm connector (Skylake-H)<br>AC Adapter 65-W EM Smart nPFC, 3 pin, RC 4.5mm connector<br>AC Adapter 65-W EM Smart nPFC, 3 pin, RC 4.5mm connector (India/China only)<br>AC Adapter 45-W Smart nPFC, 3 pin, RC 4.5mm connector (Skylake-U)<br>1 meter power cord |
| **Security** | Kensington Security Lock<br>Trusted Platform Module (fTPM) 2.0 |
| **Operating system** | **Preinstalled:**<br>• Windows 10 Professional<br>• Windows 10 Home High End ML<br>• Windows 10 Home High End EM/SL<br>• FreeDOS 2.0 |
| **Serviceability** | **End-user replaceable parts:**<br>• AC adapter<br>• Battery<br>• Optical drive |

# 2 External component identification

## Display

| Component | | Description |
|---|---|---|
| **(1)** | Internal display switch | Turns off the display and initiates Sleep if the display is closed while the power is on.<br><br>**NOTE:** The internal display switch is not visible from the outside of the computer. |
| **(2)** | Internal microphones (2) | Record sound. |

| Component | | Description |
|---|---|---|
| **(3)** | Webcam<br><br>– or –<br><br>3D camera (select products only) | Records video and captures photographs. Some products allow you to video conference and chat online using streaming video.<br><br>To use a webcam:<br><br>▲ Type `camera` in the taskbar search box, and then select **Camera**.<br><br>A 3D camera enables you to scan or capture 3D images or video. 3D apps for gaming, video chat, security, and immersive collaboration are available to maximize your 3D camera experience.<br><br>• To see what you can do with your 3D camera, type `Intel RealSense Apps` in the taskbar search box or click the icon on the desktop, to go to the **Intel® RealSense™ Showcase** to view and download 3D apps.<br><br>• To practice using your 3D camera, type `Intel RealSense Training` in the taskbar search box, or click the icon on the desktop, to launch an introductory tutorial. |
| **(4)** | Webcam light | On: The webcam is in use. |
| **(5)** | WLAN antennas* | Send and receive wireless signals to communicate with wireless local area networks (WLANs). |

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

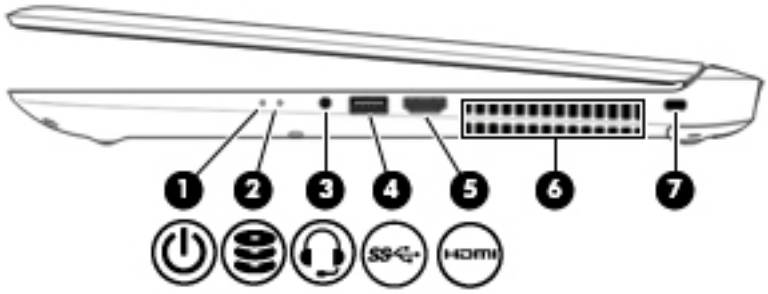
1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.

   – or –

   Click the question mark icon in the taskbar.

2. Select **My PC**, select the **Specifications** tab, and then select **User Guides**.

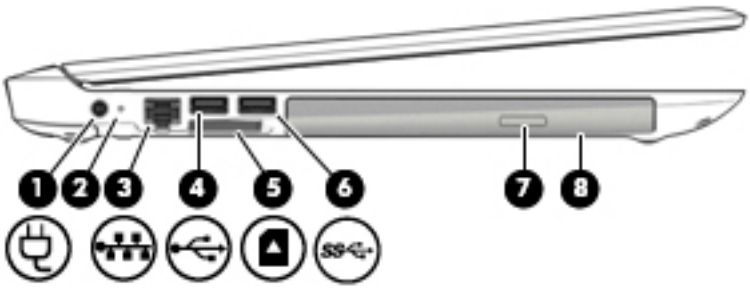
# Right side




| Component | | | Description |
|---|---|---|---|
| **(1)** | | Power light | • On: The computer is on.<br>• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.<br>• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power. |
| **(2)** | | Hard drive light | • Blinking white: The hard drive is being accessed.<br>• Amber: HP 3D DriveGuard has temporarily parked the hard drive. |
| **(3)** | | 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 microphone-only devices.<br>**WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*.<br>To access this guide:<br>1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.<br>– or –<br>Click the question mark icon in the taskbar.<br>2. Select **My PC**, select the **Specifications** tab, and then select **User Guides**.<br>**NOTE:** When a device is connected to the jack, the computer speakers are disabled. |
| **(4)** | | USB 3.0 port | Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. |
| **(5)** | | 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. |

| | | | |
|---|---|---|---|
| **(6)** | | Vent | Enables airflow to cool internal components.<br><br>**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. |
| **(7)** | | Security cable slot | Attaches an optional security cable to the computer.<br><br>**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

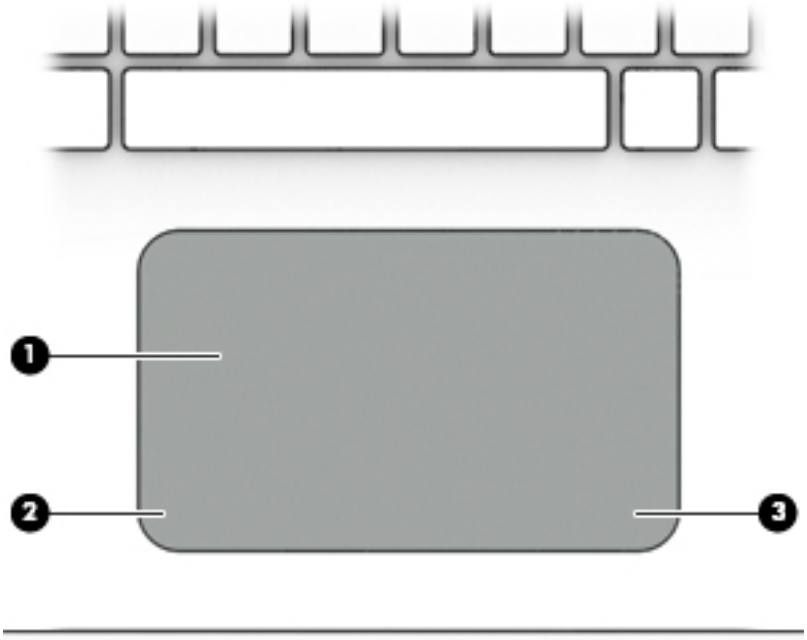



| Component | | Description |
|---|---|---|
| (1) | Power connector | Connects an AC adapter. |
| (2) | AC adapter and battery light | • White: The AC adapter is connected and the battery is fully charged.<br>• Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.<br>• Amber: The AC adapter is connected and the battery is charging.<br>• Off: The battery is not charging. |
| (3) | RJ-45 (network) jack/status lights | Connects a network cable.<br>• White: The network is connected.<br>• Amber: Activity is occurring on the network. |
| (4) | USB 2.0 port | Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. |
| (5) | Memory card reader | Reads optional memory cards that enable you to store, manage, share, or access information.<br>To insert a card:<br>1. Hold the card label-side up, with connectors facing the computer.<br>2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.<br>To remove a card:<br>▲ Press in on the card, and then remove it from the memory card reader. |
| (6) | USB 3.0 port | Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. |

| Component | | Description |
|---|---|---|
| **(7)** | Optical drive eject button | Releases the disc tray. |
| **(8)** | Optical drive | Depending on your computer, reads an optical disc or reads and writes to an optical disc.<br><br>**NOTE:** For disc compatibility information, type `help` in the taskbar search box, select **Help and Support**, and then type `disc compatibility` in the search box. |

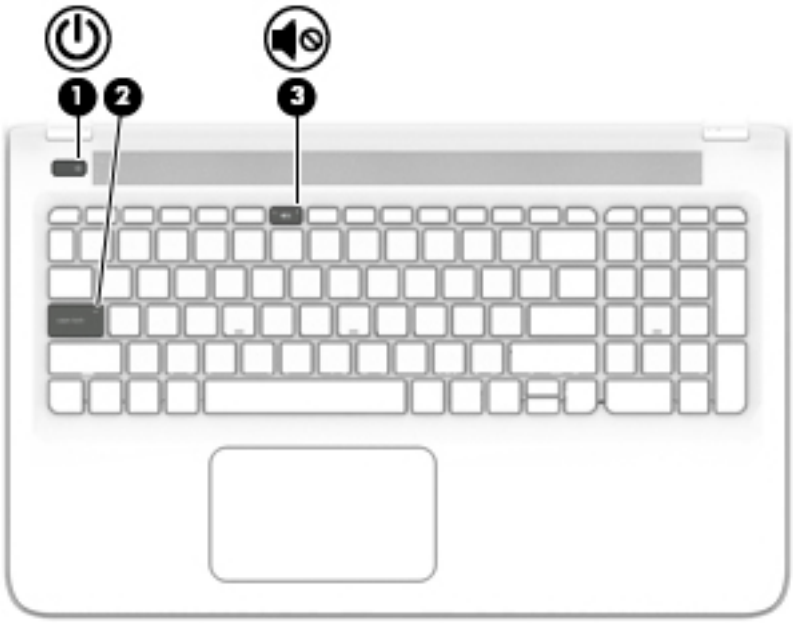
# Top

## TouchPad



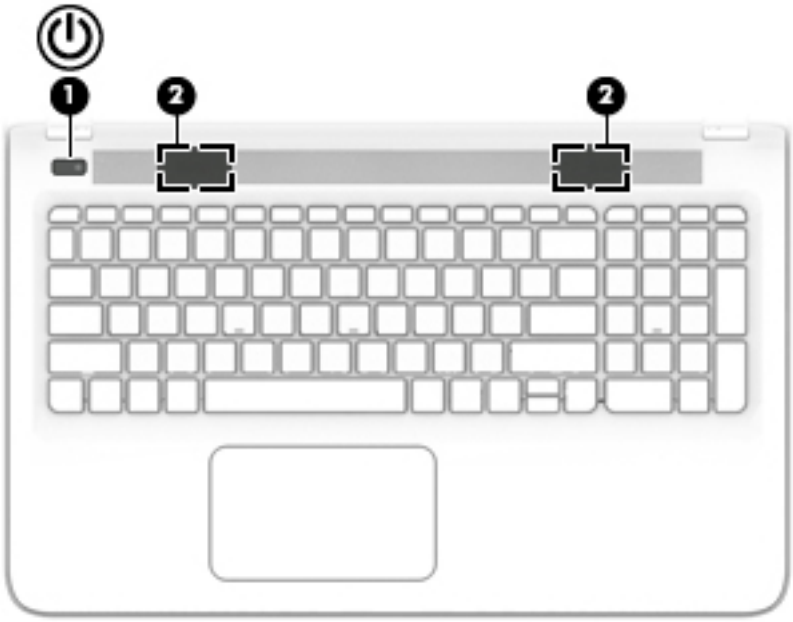

| Component | | Description |
|---|---|---|
| **(1)** | TouchPad zone | Reads your finger gestures to move the pointer or activate items on the screen. |
| **(2)** | Left TouchPad button | Functions like the left button on an external mouse. |
| **(3)** | Right TouchPad button | Functions like the right button on an external mouse. |

# Lights



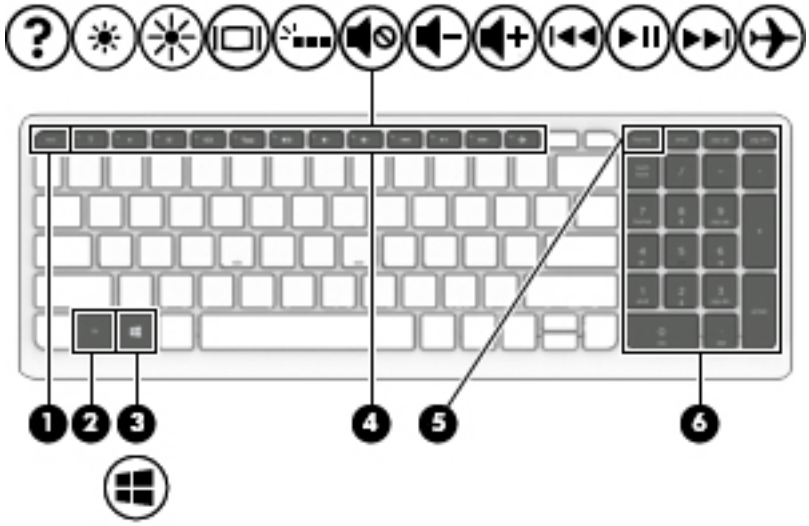

| Component | | Description |
|---|---|---|
| **(1)** | Power light | • On: The computer is on.<br>• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.<br>• Off: The computer is off or in Hibernation. Hibernation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

## Buttons and speakers



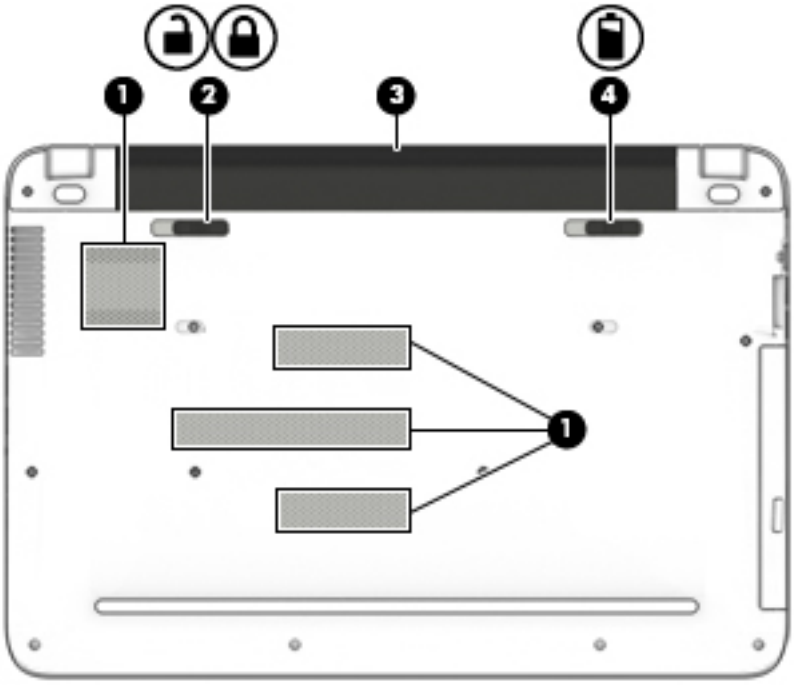

| Component | | Description |
|---|---|---|
| **(1)** | Power button | • When the computer is off, press the button to turn on the computer.<br>• When the computer is on, press the button briefly to initiate Sleep.<br>• When the computer is in the Sleep state, press the button briefly to exit Sleep.<br>• When the computer is in Hibernation, press the button briefly to exit Hibernation.<br>**CAUTION:** Pressing and holding down the power button results in the loss of unsaved information.<br>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.<br>To learn more about your power settings, see your power options.<br>▲ Type `power` in the taskbar search box, and then select **Power and sleep settings**.<br>– or –<br>Right-click the **Start** button, and then select **Power Options**. |
| **(2)** | Speakers (2) | Produce sound. |

# Keys




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

# Bottom




| Component | | | Description |
|---|---|---|---|
| **(1)** | | Vents (4) | Enable airflow to cool internal components.<br><br>**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. |
| **(2)** | | Battery lock | Locks the battery in the battery bay. |
| **(3)** | | Battery bay | Holds the battery. |
| **(4)** | | Battery release latch | Releases the battery. |

# Labels

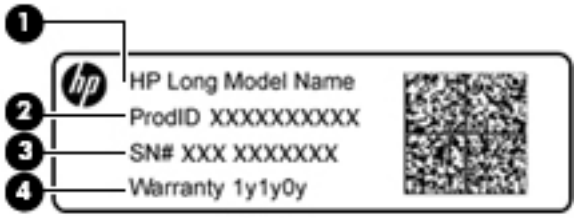
The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

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

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

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

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




| Component | |
|---|---|
| (1) | Model name (select products only) |
| (2) | Product number |

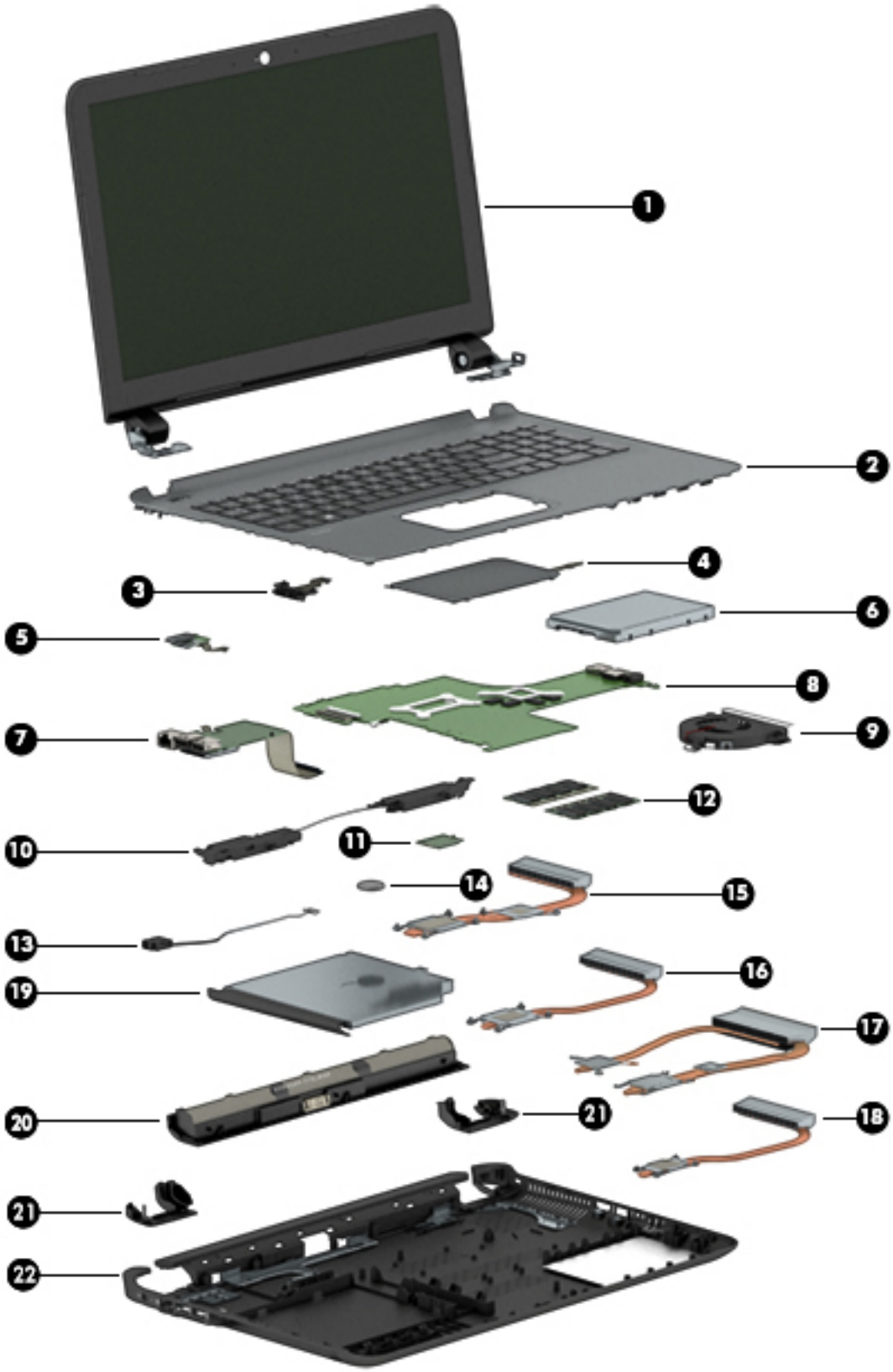
| Component | |
|---|---|
| **(3)** | Serial number |
| **(4)** | Warranty period |

- 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, select your country or region, and then follow the on-screen instructions.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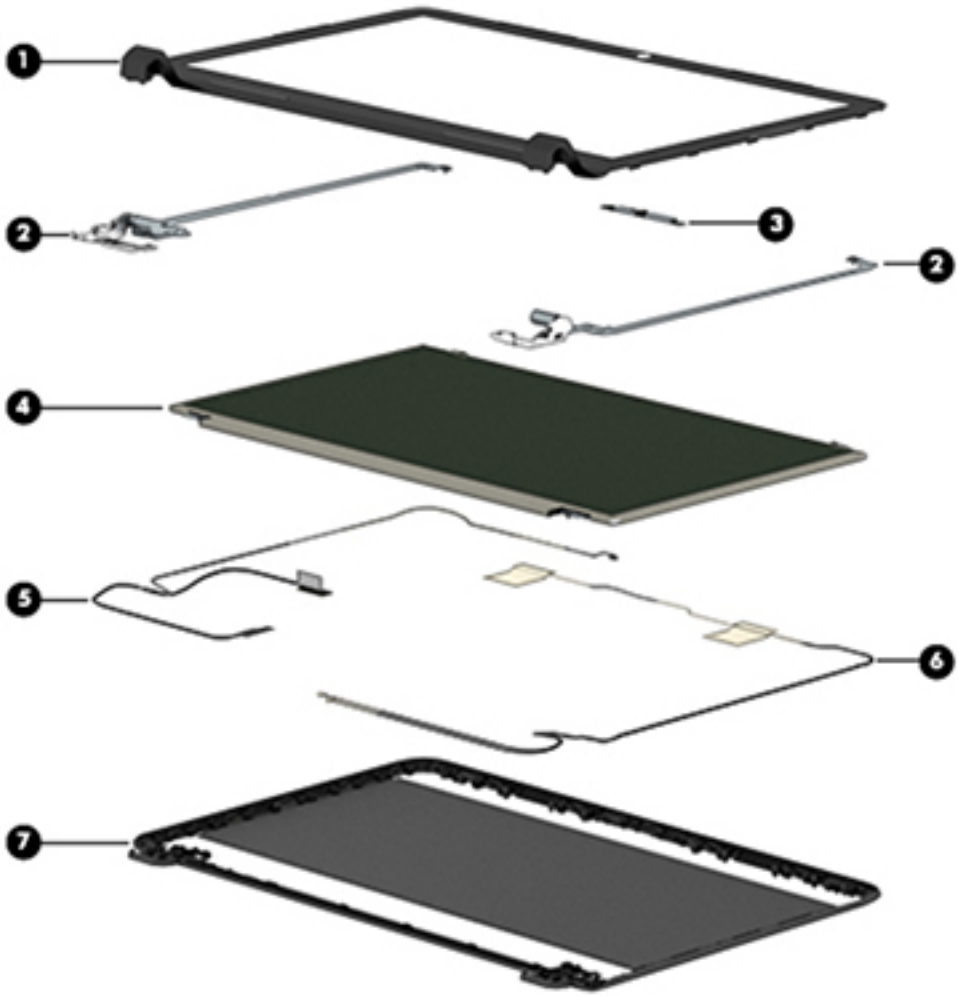
| Item | Component | Spare part number |
|---|---|---|
| **(1)** | **Display assembly** (39.6-cm [15.6-in] HD, touch screen)<br><br>**NOTE:** Touch displays are spared both as entire hinge-ups and at the subcomponent level.<br><br>Non-touch displays are only spared at the subcomponent level.<br><br>**NOTE:** For display assembly spare part information, see Display assembly subcomponents, non-touch models on page 21 and Display assembly subcomponents, touch models on page 23. | not spared |
| **(2)** | **Top cover/keyboard** (includes touchpad)<br><br>**NOTE:** For a detailed list of keyboard country codes, see Bottom cover on page 38. | |
| | Silver models with a backlight | 832805-xxx |
| | Silver models without a backlight | 841944-xxx |
| | White models without a backlight | 840292-xxx |
| **(3)** | **Optical Drive Cable Kit** | 811199-001 |
| **(4)** | **Touchpad**<br><br>**NOTE:** The touchpad cable is available using spare part number 833145-001. | 833142-001 |
| **(5)** | **Power button board**<br><br>**NOTE:** The power button board cable is available using spare part number 833143-001. | 833140-001 |
| **(6)** | **Hard drive** (does not include bracket):<br><br>**NOTE:** The hard drive bracket and connector are available using spare part number 832846-001. | |
| | 2-TB, 5400-rpm, 2.5-inch | 801808-005 |
| | 1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD | 731999-005 |
| | 1-TB, 5400-rpm, 2.5-inch | 778192-005 |
| | 500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD | 732000-005 |
| | 500-GB, 5400-rpm, 2.5 inch | 778188-005 |
| | **M.2 solid-state drive** (not illustrated) | |
| | 256 GB, TLC | 838954-001 |
| | 128 GB, TLC | 832793-001 |
| | 128 GB, value | 832794-001 |
| **(7)** | **USB board**<br><br>**NOTE:** The USB board cable is available using spare part number 833144-001. | 833141-001 |
| **(8)** | **System board** (includes replacement thermal materials):<br><br>All system boards use the following part numbers:<br><br>xxxxxx-001: Non-Windows operating systems<br><br>xxxxxx-601: Windows 10 operating system | |
| | Intel Core i7-6700H processor and 4 GB of dedicated video memory | 832848-xx1 |
| | Intel Core i7-6700H processor and 4 GB of dedicated video memory for use in models with a 3D camera | 832849-xx1 |

| Item | Component | Spare part number |
|---|---|---|
| | Intel Core i5-6300H processor and 4 GB of dedicated video memory | 832847-xx1 |
| | Intel Core i5-6300U processor and 4 GB of dedicated video memory for use in models with a 3D camera | 843077-xx1 |
| | Intel Core i5-6200U processor and 2 GB of dedicated video memory | 841932-xx1 |
| | Intel Core i7-6700H processor and UMA video memory | 840295-xx1 |
| | Intel Core i3-6100U processor and UMA video memory | 841931-xx1 |
| **(9)** | **Fan** | 833139-001 |
| **(10)** | **Speakers** (includes left and right speakers and cable) | 833149-001 |
| **(11)** | **WLAN module:** | |
| | Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter | 792609-005 |
| | Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter | 792610-005 |
| | Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + BT 4.0 Combo Adapter | 806723-005 |
| **(12)** | **Memory module** (DDR3L-1600): | |
| | 8-GB | 693374-005 |
| | 4 GB | 691740-005 |
| **(13)** | **Power connector cable** | 806746-001 |
| **(14)** | **RTC battery** | 811080-001 |
| | **Heat sink assembly** (includes replacement thermal materials): | |
| **(15)** | For use in models with Skylake-H processors with discrete graphics | 833452-001 |
| **(16)** | For use in models with Skylake-H processors with UMA graphics | 841234-001 |
| **(17)** | For use in models with Skylake-U processors with discrete graphics | 841659-001 |
| **(18)** | For use in models with Skylake-U processors with UMA graphics | 841235-001 |
| **(19)** | **DVD+/-RW Double-Layer SuperMulti Drive** | |
| | For use in black models | 832852-001 |
| | For use in white models | 840294-001 |
| | For use in silver models | 841946-001 |
| | **Blu-ray Disc R/RW with SuperMulti Drive** | |
| | For use in black models | 832804-001 |
| | For use in white models | 840293-001 |
| **(20)** | **Battery** | |
| | 4-cell, 48-Whr, 3.2-Ah Li-ion | 800050-001 |
| | 4-cell, 41-Whr, 2.8-Ah Li-ion | 800049-001 |
| **(21)** | **Base enclosure hinge caps** (left and right) | 833146-001 |
| **(22)** | **Bottom cover** | |
| | For use in black models | 833125-001 |

| Item | Component | Spare part number |
|---|---|---|
| | For use in silver models | 841943-001 |
| | For use in white models | 840291-001 |

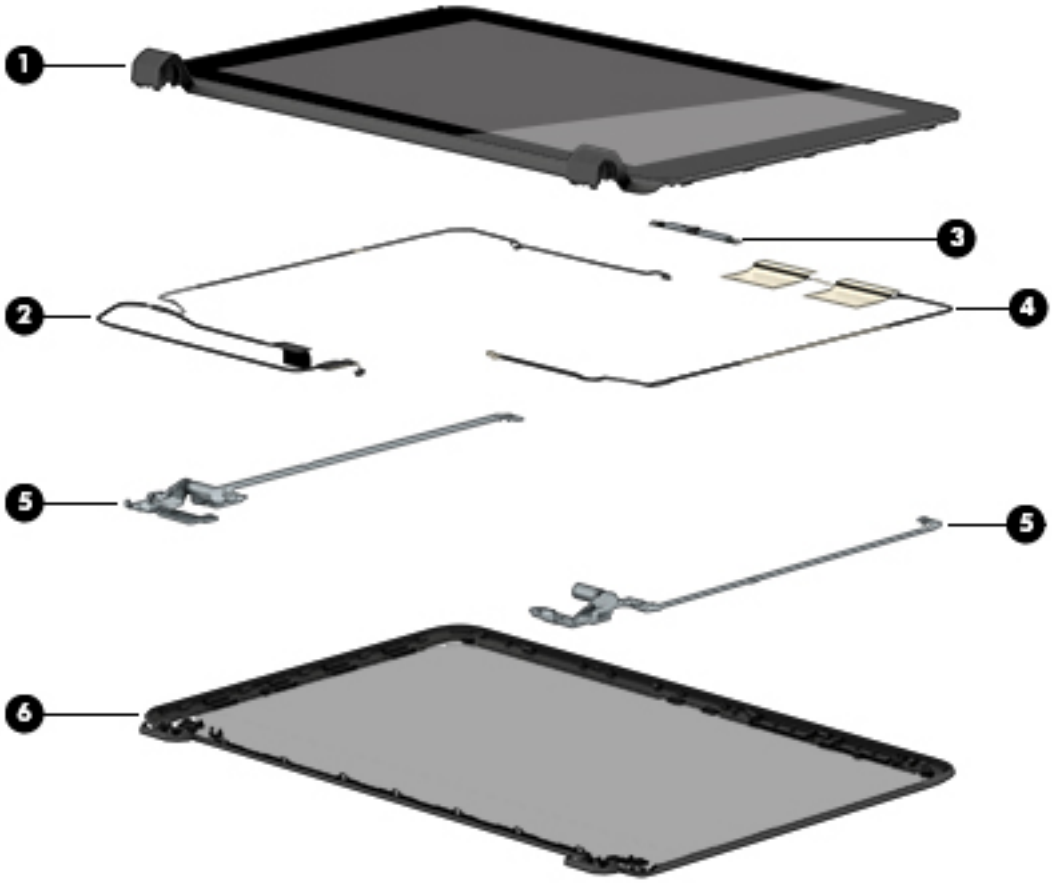
# Display assembly subcomponents, non-touch models




| Item | Component | Spare part number |
|---|---|---|
| (1) | **Display bezel** (includes Mylar screw covers) | |
| | For use with models with a standard webcam | 833126-001 |
| | For use with models with a 3D camera | 840477-001 |
| (2) | **Hinges** (left and right, includes Mylar screw covers) | 809030-001 |
| (3) | **Webcam module** | |
| | Standard camera | 833127-001 |
| | 3D camera | 833128-001 |

| Item | Component | Spare part number |
|---|---|---|
| **(4)** | **Raw display panel** (39.6-cm [15.6-in]; includes Mylar screw covers) | |
| | BrightView, HD, flat | 833129-001 |
| | AntiGlare, FHD, slim | 839853-001 |
| | AntiGlare, FHD, UWVA | 833131-001 |
| | TOP (Touch On Panel) | 833130-001 |
| **(5)** | **Display cable** (includes Mylar screw covers) | |
| | For use in HD, SVA displays | 833133-001 |
| | For use in FHD, SVA, 3DC displays | 833134-001 |
| | For use in TOP (Touch On Panel) displays | 833134-001 |
| **(6)** | **Antennas** (includes wireless antenna cables and transceivers; includes Mylar screw covers) | 833120-001 |
| **(7)** | **Display enclosure**(includes Mylar screw covers): | |
| | White models | 840290-001 |
| | Silver models | 841942-001 |
| | Black models | 843213-001 |
| | Black TOP (touch on panel) models: | 833122-001 |

# Display assembly subcomponents, touch models




| Item | Component | Spare part number |
|---|---|---|
| (1) | **Display bezel and panel** | 833132-001 |
| (2) | **Display cable** (includes Mylar screw covers) | 833135-001 |
| | **Webcam module** | |
| | 3D camera | 833128-001 |
| (3) | Standard camera (not illustrated) | 833127-001 |
| | **Microphone board** (for use on models with a 3D camera; not illustrated) | 833148-001 |
| (4) | **Antennas** (includes wireless antenna cables and transceivers) | 833121-001 |
| (5) | **Hinges** (left and right) | 813345-001 |
| (6) | **Display enclosure**: | 833124-001 |

# Miscellaneous parts

| Component | Spare part number |
|---|---|
| **HP Smart AC adapter:** | |
| AC adapter, 90-W, non-PFC, 4.5 mm | 710413-001 |
| AC adapter, 65-W, non-PFC, 4.5 mm, S-3P | 710412-001 |
| AC adapter, 65-W, non-PFC, 4.5 mm, Smart | 714657-001 |
| AC adapter, 45-W, non-PFC, 4.5 mm, Smart | 741727-001 |
| **Power cord** (3-pin, black, 1.0-m): | |
| For use in Australia | 755530-011 |
| For use in Denmark | 755530-081 |
| For use in Europe, the Middle East, and Africa | 755530-021 |
| For use in India | 755530-D61 |
| For use in Israel | 755530-BB1 |
| For use in Japan | 755530-291 |
| For use in North America | 755530-001 |
| For use in the People's Republic of China | 755530-AA1 |
| For use in South Africa | 755530-AR1 |
| For use in South Korea | 755530-AD1 |
| For use in Switzerland | 755530-111 |
| For use in Taiwan | 755530-AB1 |
| For use in Thailand | 755530-201 |
| For use in the United Kingdom and Singapore | 755530-031 |
| **Screw Kit** | 833147-001 |
| **HDMI to VGA adapter** | 701943-001 |

# Mass storage devices

| Component | Spare part number |
|---|---|
| **Hard drive** (does not include bracket): | |
| 2-TB, 5400-rpm, 2.5-inch | 801808-005 |
| 1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD | 731999-005 |
| 1-TB, 5400-rpm, 2.5-in | 778192-005 |
| 500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD | 732000-005 |
| 500-GB, 5400-rpm, 2.5 inch | 778188-005 |
| **Hard drive hardware kit** | 832846-001 |
| Side brackets (left and right) | |
| Connector | |
| **M.2 solid-state drive** | |
| 256 GB, TLC | 838954-001 |
| 128 GB, TLC | 832793-001 |
| 128 GB, value | 832794-001 |
| **DVD+/-RW Double-Layer SuperMulti Drive** | |
| For use in black models | 832852-001 |
| For use in silver models | 841946-001 |
| For use in white models | 840294-001 |
| **Blu-ray Disc R/RW with SuperMulti Drive** | |
| For use in black models | 832804-001 |
| For use in white models | 840293-001 |

# 4 Removal and replacement procedures preliminary requirements

## Tools required

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

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

## Service considerations

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

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

### Plastic parts

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

### Cables and connectors

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

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

## Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

# Grounding guidelines

## Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

| Typical electrostatic voltage levels | | | |
|---|---|---|---|
| | Relative humidity | | |
| **Event** | **10%** | **40%** | **55%** |
| Walking across carpet | 35,000 V | 15,000 V | 7,500 V |
| Walking across vinyl floor | 12,000 V | 5,000 V | 3,000 V |
| Motions of bench worker | 6,000 V | 800 V | 400 V |
| Removing DIPS from plastic tube | 2,000 V | 700 V | 400 V |
| Removing DIPS from vinyl tray | 11,500 V | 4,000 V | 2,000 V |
| Removing DIPS from Styrofoam | 14,500 V | 5,000 V | 3,500 V |
| Removing bubble pack from PCB | 26,500 V | 20,000 V | 7,000 V |
| Packing PCBs in foam-lined box | 21,000 V | 11,000 V | 5,000 V |

## 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 non-conductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

### Workstation guidelines

Follow these grounding workstation guidelines:

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

### Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape
- Antistatic smocks, aprons, and sleeve protectors
- Conductive bins and other assembly or soldering aids

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

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

| Material | Use | Voltage protection level |
|---|---|---|
| Antistatic plastics | Bags | 1,500 V |
| Carbon-loaded plastic | Floor mats | 7,500 V |
| Metallized laminate | Floor mats | 5,000 V |

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

**CAUTION:** 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.

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

## Component replacement procedures

**NOTE:** Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

**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.

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

There are as many as 3 screws that must be removed, replaced, or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

## Battery

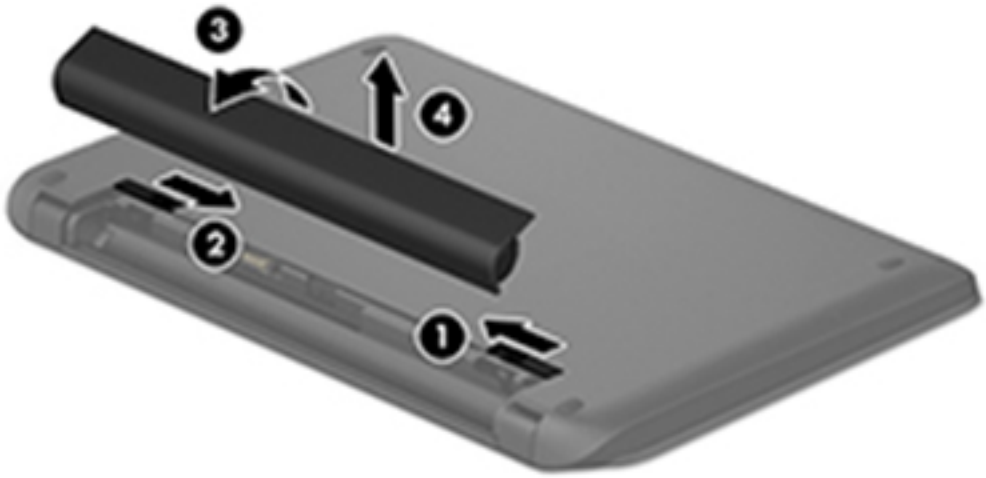
| Description | Spare part number |
|---|---|
| 4-cell, 48-Whr, 3.2-Ah Li-ion battery | 800050-001 |
| 4-cell, 41-Whr, 2.8-Ah Li-ion battery | 800049-001 |

Before disassembling the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

To remove the battery:

1. Position the computer upside down on a flat surface.
2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.
3. Rotate the battery upward **(3)**, and then remove the battery from the computer **(4)**.



# Optical drive

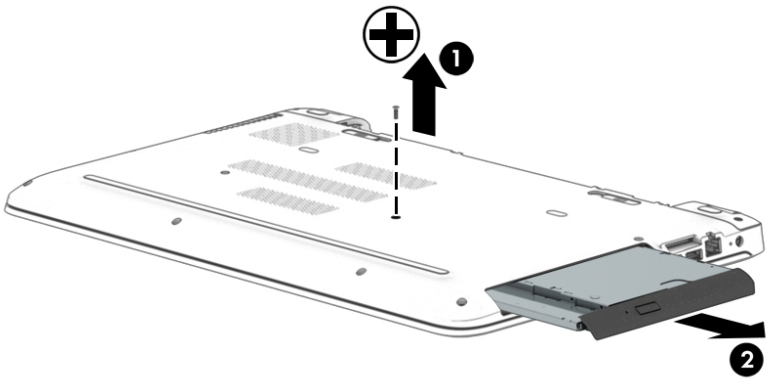
| Description | Spare part number |
|---|---|
| **DVD+/-RW Double-Layer SuperMulti Drive** | |
| For use in black models | 832852-001 |
| For use in silver models | 841946-001 |
| For use in white models | 840294-001 |
| **Blu-ray Disc R/RW with SuperMulti Drive** | |
| For use in black models | 832804-001 |
| For use in white models | 840293-001 |

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).

To remove the optical drive:

1. Remove the Phillips PM2.5×7.0 screw **(1)** that secures the optical drive to the computer.
2. Remove the optical drive **(2)** by sliding it out of the optical drive bay.




Reverse this procedure to reassemble and install the optical drive.

# 6 Removal and replacement procedures for Authorized Service Provider 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.

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

## 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.

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

There are as many as 58 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

## Bottom cover

| Description | Spare part number |
|---|---|
| **Bottom cover hinge caps** | 833146-001 |
| **Bottom cover** | |
| For use in black models | 833125-001 |
| For use in silver models | 841943-001 |
| For use in white models | 840291-001 |
| **Top cover/keyboard** (includes touchpad)<br><br>**NOTE:** In this section, the first table provides the main spare part number for the keyboards. The second table provides the country codes. | |
| Silver models with a backlight | 832805-xxx |
| Silver models without a backlight | 841944-xxx |
| White models without a backlight | 840292-xxx |

| For use in country or region | Spare part number | For use in country or region | Spare part number | For use in country or region | Spare part number |
|---|---|---|---|---|---|
| Belgium | -A41 | Israel | -BB1 | Slovenia | -BA1 |
| Bulgaria | -261 | Italy | -061 | South Korea | -AD1 |
| Canada | -DB1 | Japan | -291 | Spain | -071 |
| Czech Republic and Slovakia | -FL1 | Latin America | -161 | Switzerland | -BG1 |
| Denmark, Finland, and Norway | -DH1 | The Netherlands | -B31 | Taiwan | -AB1 |
| France | -051 | Northern Africa | -FP1 | Thailand | -281 |
| Germany | -041 | Portugal | -131 | Turkey | -141 |
| Greece | -151 | Romania | -271 | United Kingdom | -031 |
| Hungary | -211 | Russia | -251 | United States | -001 |
| India | -002 | Saudi Arabia | -171 | | |

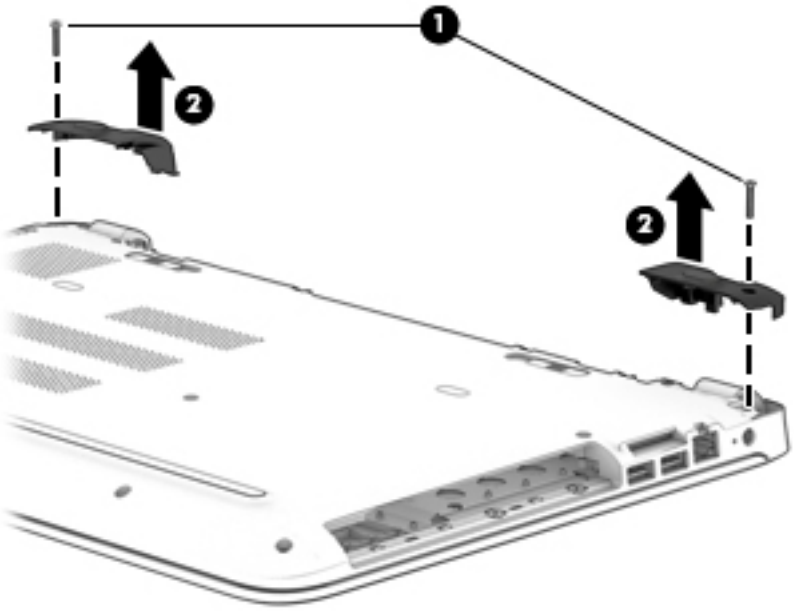
Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

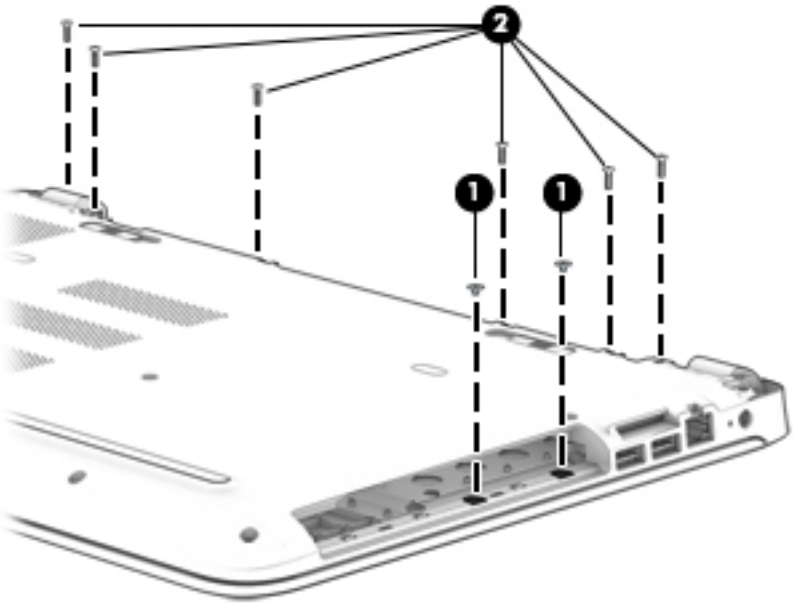
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).

To remove the bottom cover:

1. Position the computer upside down with the front toward you.
2. Remove the two Phillips PM2.5×12.0 screws **(1)** that secure the hinge covers to the computer, and then lift the covers off the computer **(2)**.




3. Remove the two Phillips PM2.0×2.0 screws from the optical drive bay **(1)**.
4. Remove the six Phillips PM2.5×6.5 screws from near the battery bay **(2)**.



5. Position the computer upside down.

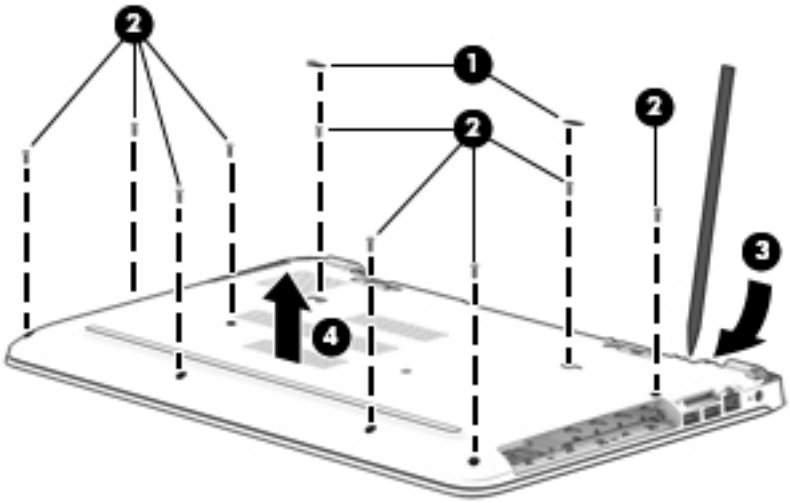
⚠ **CAUTION:** To avoid the hard drive falling out of the computer and getting damaged, be sure the computer is upside-down when removing the bottom cover.

6. Remove the two screw covers **(1)** and nine Phillips PM2.5×6.5 screws **(2)** that secure the top cover to the computer.

7. Use a non-marking tool **(3)** to disengage the bottom cover from the computer. You will have work around the seams on all sides of the computer.

⚠ **CAUTION:** To avoid damaging the cover, do not pry the cover near the optical drive bay.

8. Remove the bottom cover **(4)**.




Reverse this procedure to install the bottom cover.

## Hard drive

**NOTE:** The hard drive spare part kit does not include the hard drive bracket.

| Description | Spare part number |
|---|---|
| 2-TB, 5400-rpm, 2.5-inch | 801808-005 |
| 1-TB, 5400-rpm, 2.5-inch, hybrid 8 GB SSD | 731999-005 |
| 1-TB, 5400-rpm, 2.5-in | 778192-005 |
| 500-GB, 5400-rpm, 7 mm, hybrid 8 GB SSD | 732000-005 |
| 500-GB, 5400-rpm, 2.5 inch | 778188-005 |
| Hard Drive Hardware Kit (brackets and connector) | 832846-001 |

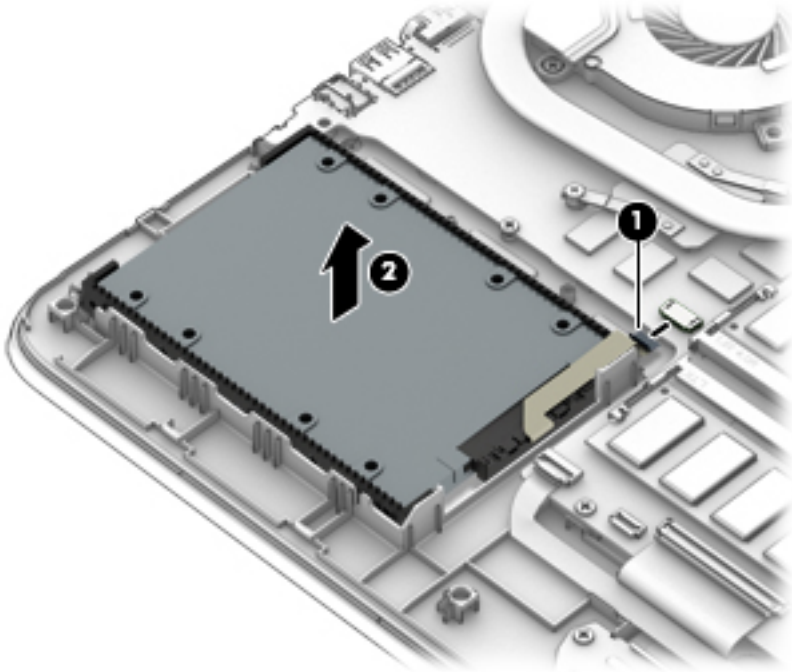
Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove the hard drive:

1. Disconnect the hard drive cable from the system board **(1)**.

2. Lift the hard drive from the computer **(2)**.




3. To disassemble the hard drive, pull the brackets away from each side of the hard drive **(1)**.
4. Disconnect the hard drive connector and cable from the hard drive **(2)**.

Reverse this procedure to reassemble and install the hard drive.

## WLAN module

| Description | Spare part number |
|---|---|
| Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter | 792609-005 |
| Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter | 792610-005 |
| Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + BT 4.0 Combo Adapter | 806723-005 |

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

Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

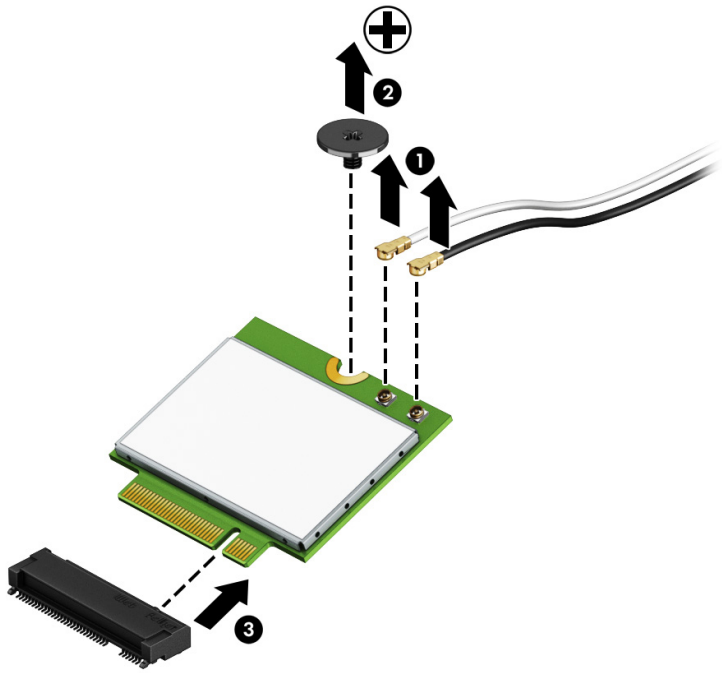
To remove the WLAN module:

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

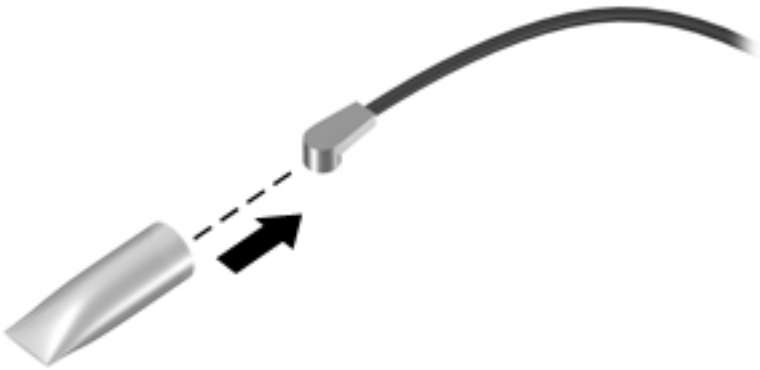
**NOTE:** The #1 WLAN antenna cable is connected to the WLAN module Main terminal. The #2 WLAN antenna cable is connected to the WLAN module Aux terminal.

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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




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



Reverse this procedure to install the WLAN module.

## Solid-state drive (M.2)

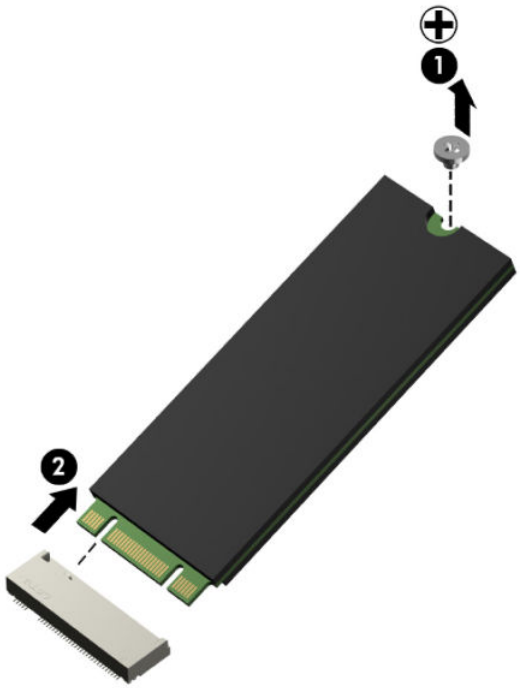
| Description | Spare part number |
|---|---|
| 256 GB, TLC | 838954-001 |
| 128 GB, TLC | 832793-001 |
| 128 GB, value | 832794-001 |

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×3.5 screw **(1)** that secures the solid-state drive to the system board.
2. Remove the solid-state drive **(2)** by pulling the drive away from the slot at an angle.




Reverse this procedure to install the solid-state drive.

## RTC battery

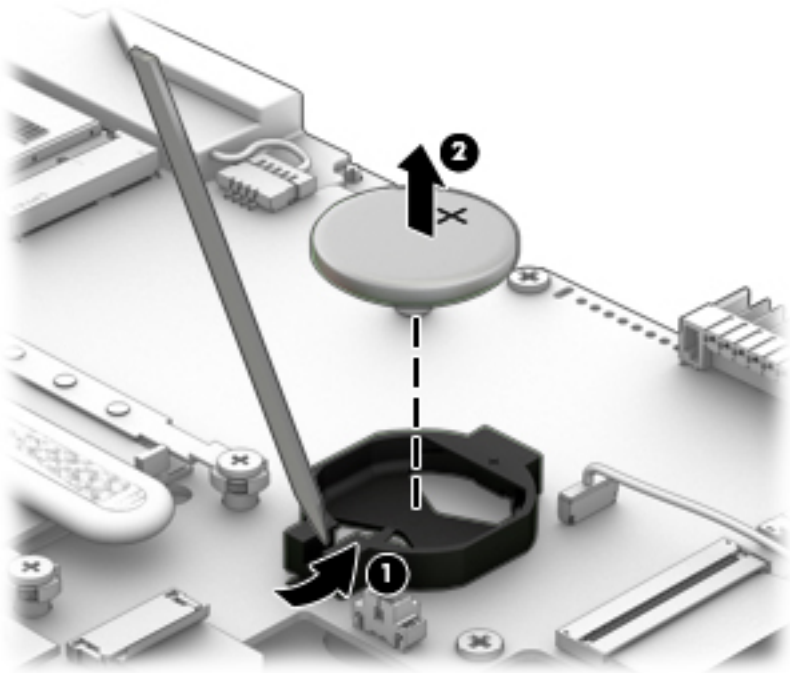
| Description | Spare part number |
|---|---|
| RTC battery | 811080-001 |

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove the RTC battery:

- Using a thin tool or screwdriver, disengage the battery from the socket **(1)**, and then remove the battery **(2)**.




Reverse this procedure to install the RTC battery.

## Memory module

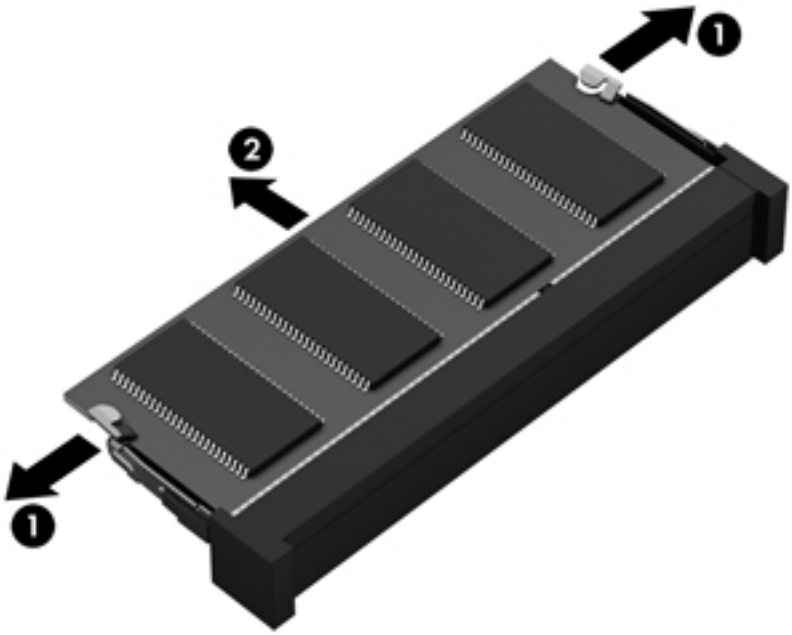
| Description | Spare part number |
|---|---|
| 8-GB (DDR3L-1600) | 693374-005 |
| 4-GB (DDR3L-1600) | 691740-005 |

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove a memory module:

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




Reverse this procedure to install a memory module.

## Fan

| Description | Spare part number |
|---|---|
| Fan | 833139-001 |

**NOTE:** To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

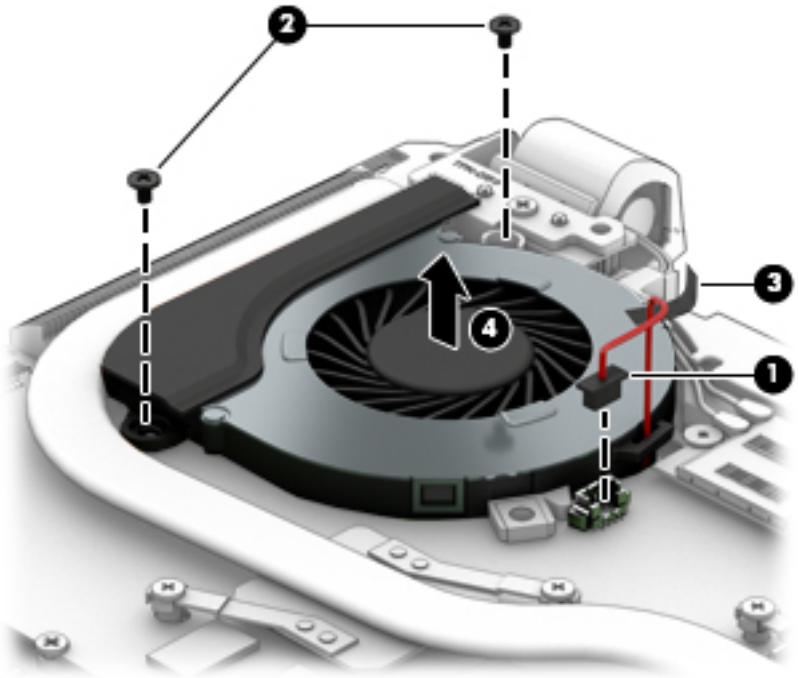
Before removing the fan/heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove the fan:

1. Position the computer upright and open it.
2. Disconnect the fan cable **(1)** from the system board.
3. Remove the two Phillips PM3.0×3.0 screws **(2)** that secure the fan to the computer.
4. Lift the Mylar tape that secures the fan to the speaker **(3)**.

5. Remove the fan from the computer **(4)**.




Reverse this procedure to install the fan.

## Heat sink assembly

**NOTE:** The heat sink assembly spare part kits include replacement thermal materials.

| Description | Spare part number |
|---|---|
| Heat sink for use in models with Skylake-H processors with discrete graphics | 833452-001 |
| Heat sink for use in models with Skylake-H processors with UMA graphics | 841234-001 |
| Heat sink for use in models with Skylake-U processors with discrete graphics | 841659-001 |
| Heat sink for use in models with Skylake-U processors with UMA graphics | 841235-001 |

**NOTE:** To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

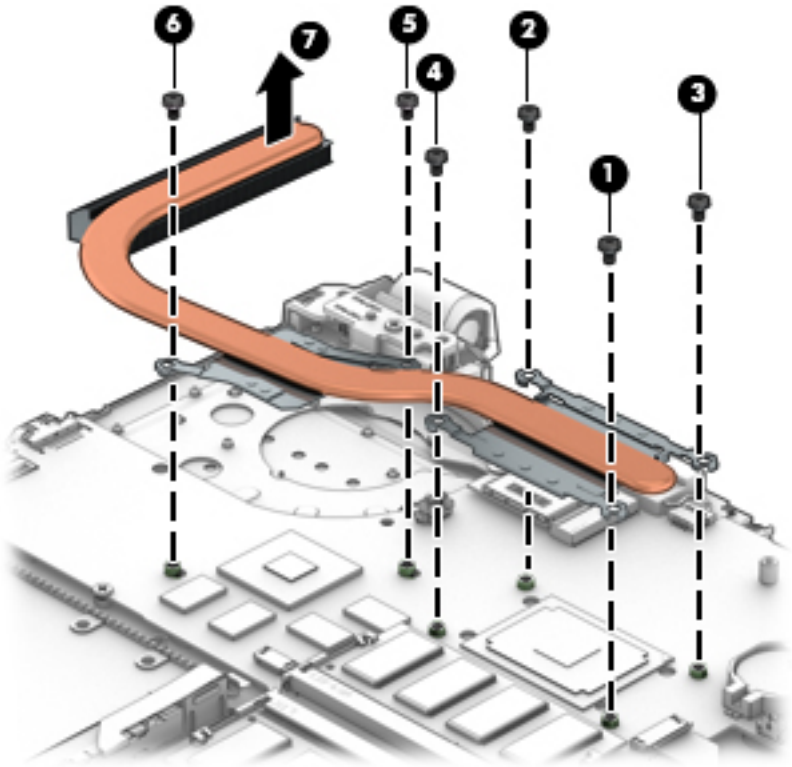
Before removing the heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

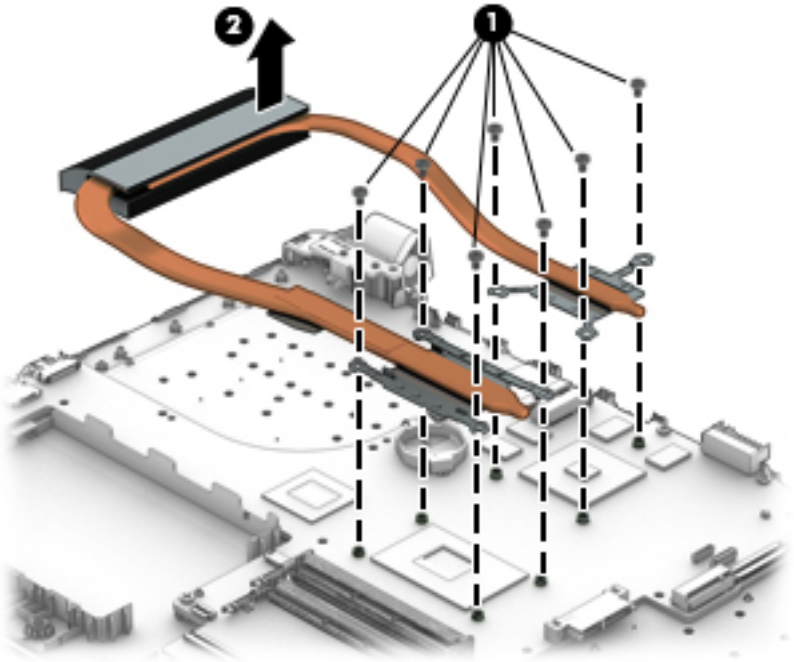
To remove the heat sink assembly:

1. Position the system board upside down.
2. If you have a model with discrete graphics and a non-Skylake processor, in the order indicated, remove the four Phillips PM2.0×3.0 screws **(1)** – **(4)** and the two Phillips PM2.5×4.0 screws **(5)** – **(6)** that secure the heat sink to the system board.
3. Remove the heat sink **(7)** from the system board.



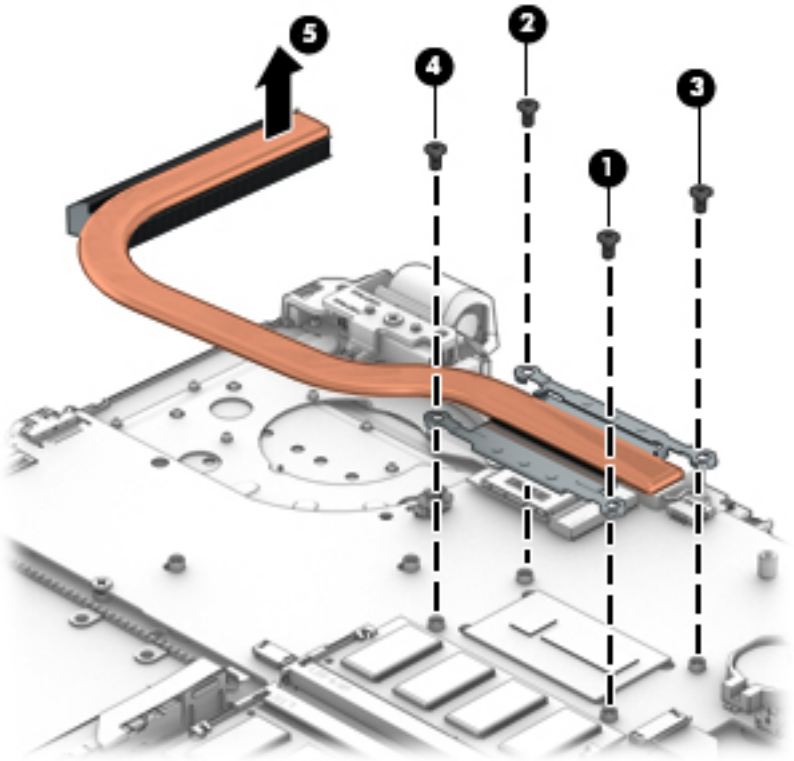

4. If you have a model with discrete graphics and a Skylake processor, in the order indicated, remove the seven Phillips PM2.0×3.0 screws **(1)** that secure the heat sink to the system board.

5. Remove the heat sink **(2)** from the system board.



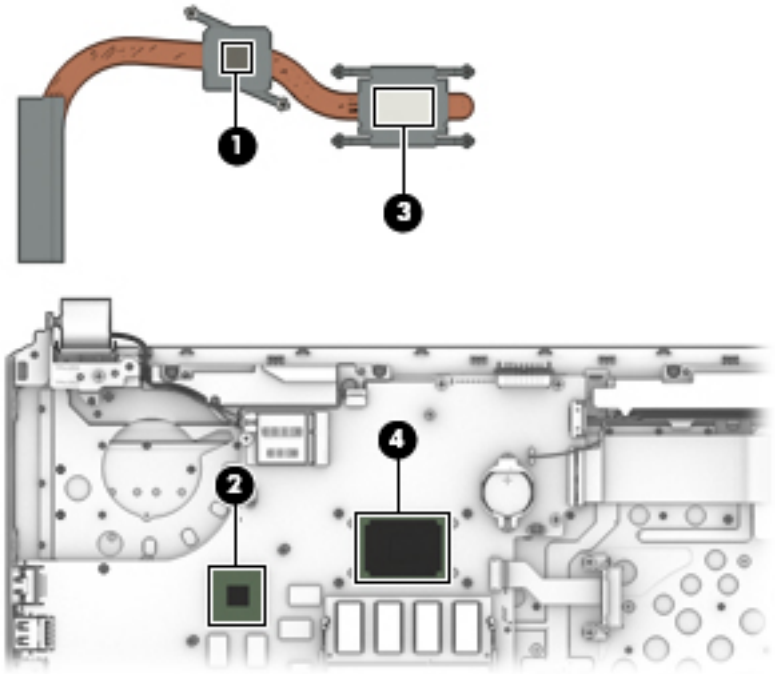

6. If you have a model with UMA graphics, in the order indicated, remove the four Phillips PM2.0×3.0 screws **(1)** – **(4)** that secure the heat sink to the system board.

7. Remove the heat sink **(5)** from the system board.

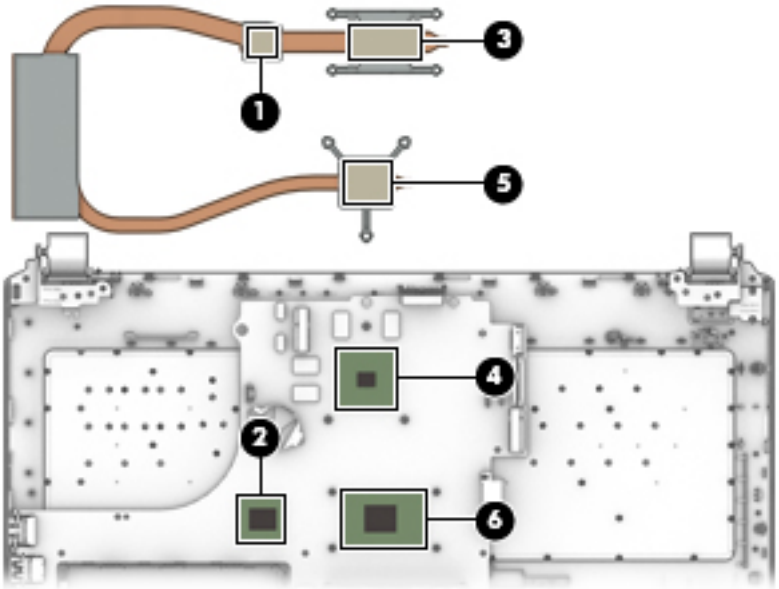


**NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Thermal paste is used on various system board and the heat sink sections that services them.

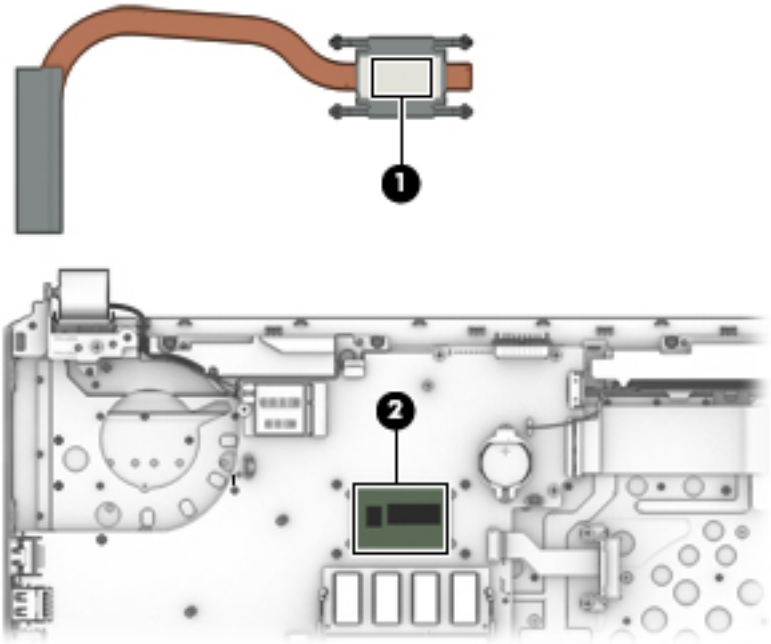
- **Discrete graphics and a non-Skylake processor:**




- **Discrete graphics and an Intel Skylake processor:**




- **UMA graphics**.




Reverse this procedure to reassemble and install the heat sink assembly.

## USB board

| Description | Spare part number |
|---|---|
| USB board | 833141-001 |
| **NOTE:** The USB board cable is available using spare part number 833144-001. | |

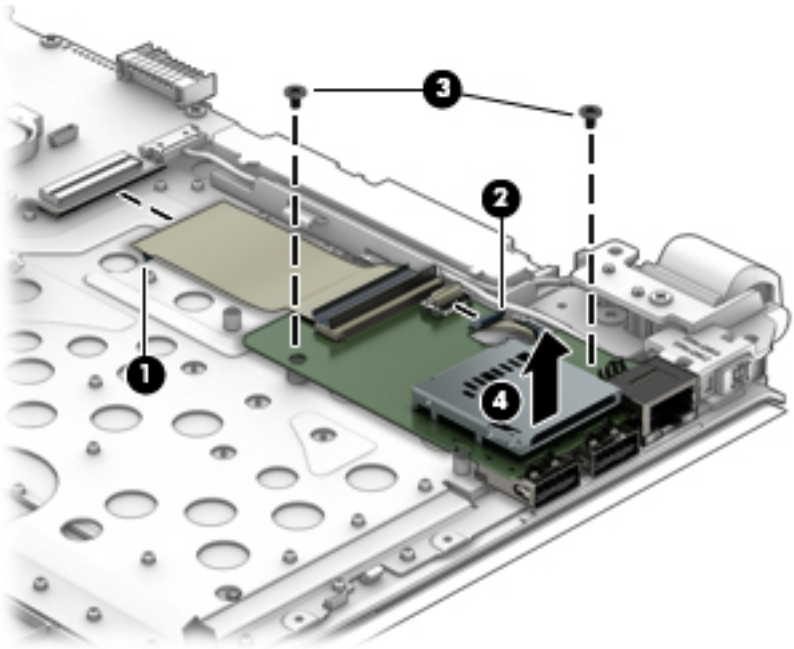
Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove the USB board:

1. Position the computer upright.
2. Disconnect the larger cable from the system board **(1)**.
3. Disconnect the smaller cable from the USB board that routes to the power button board **(2)**
4. Remove the two Phillips PM2.5×3.0 screws **(3)** that secure the USB board to the computer.

5. Remove the USB board **(4)**.




Reverse this procedure to install the USB board.

## Optical drive connector

| Description | Spare part number |
|---|---|
| Optical drive connector | 811199-001 |

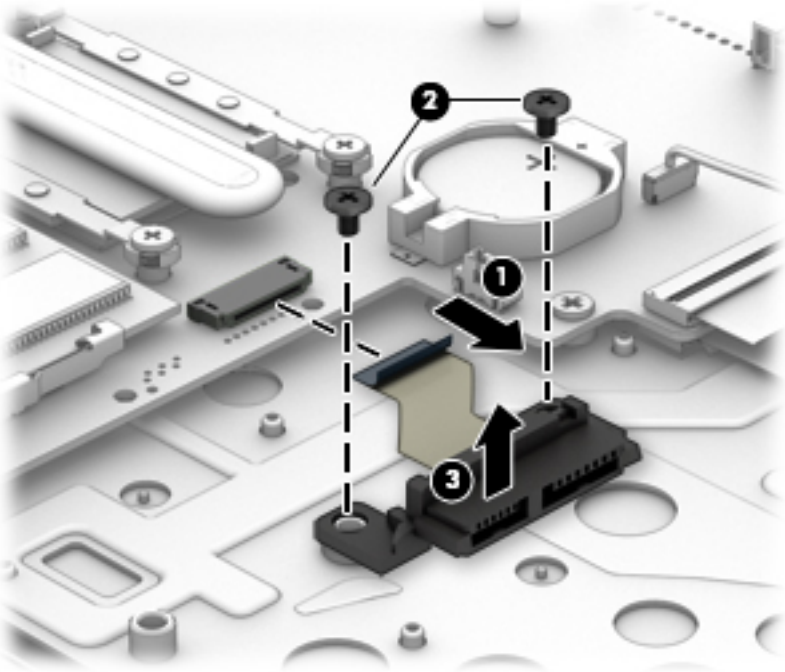
Before removing the optical drive connector, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

To remove the optical drive connector:

1. Position the computer upright.
2. Disconnect the optical drive connector cable from the system board **(1)**.
3. Remove the two Phillips PM2.5×3.0 screws **(2)** that secure the optical drive connector to the computer.

4. Remove the optical drive connector and cable **(3)**.




Reverse this procedure to install the optical drive connector.

## System board

**NOTE:** The system board spare part kit includes replacement thermal materials.

| Description | Spare part number |
|---|---|
| **System board** (includes replacement thermal materials): | |
| All system boards use the following part numbers: | |
| xxxxxx-001: Non-Windows operating systems | |
| xxxxxx-601: Windows 10 operating system | |
| Intel Core i7-6700H processor and 4 GB of dedicated video memory | 832848-xx1 |
| Intel Core i7-6700H processor and 4 GB of dedicated video memory for use in models with a 3D camera | 832849-xx1 |
| Intel Core i5-6300H processor and 4 GB of dedicated video memory | 832847-xx1 |
| Intel Core i5-6300U processor and 4 GB of dedicated video memory for use in models with a 3D camera | 843077-xx1 |
| Intel Core i5-6200U processor and 2 GB of dedicated video memory | 841932-xx1 |
| Intel Core i7-6700H processor and UMA video memory | 840295-xx1 |
| Intel Core i3-6100U processor and UMA video memory | 841931-xx1 |

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).

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

- Memory modules (see Memory module on page 47)
- WLAN module (see WLAN module on page 43)
- Heat sink assembly (see Heat sink assembly on page 49)
- Fan (see Fan on page 48)

To remove the system board:

1. Position the computer upright, and then disconnect the following cables from the system board:

   **(1)**: Speaker cable

   **(2)**: Display cable

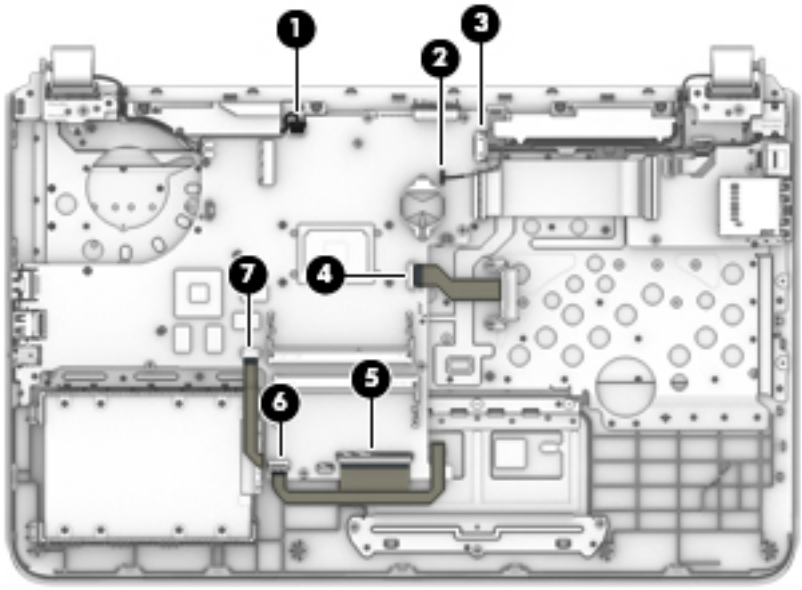
   **(3)**: Power connector cable

   **(4)**: Optical drive cable

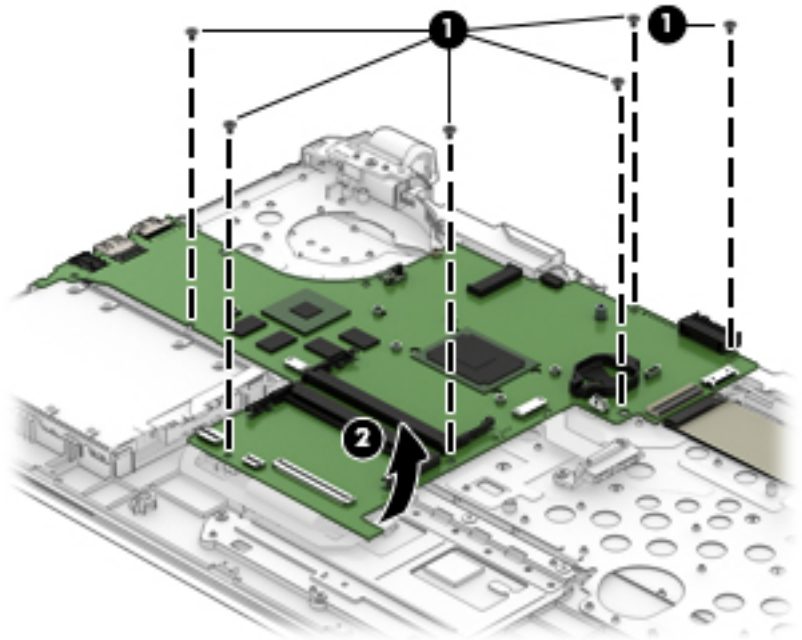
   **(5)**: Keyboard cable

   **(6)**: Touchpad cable

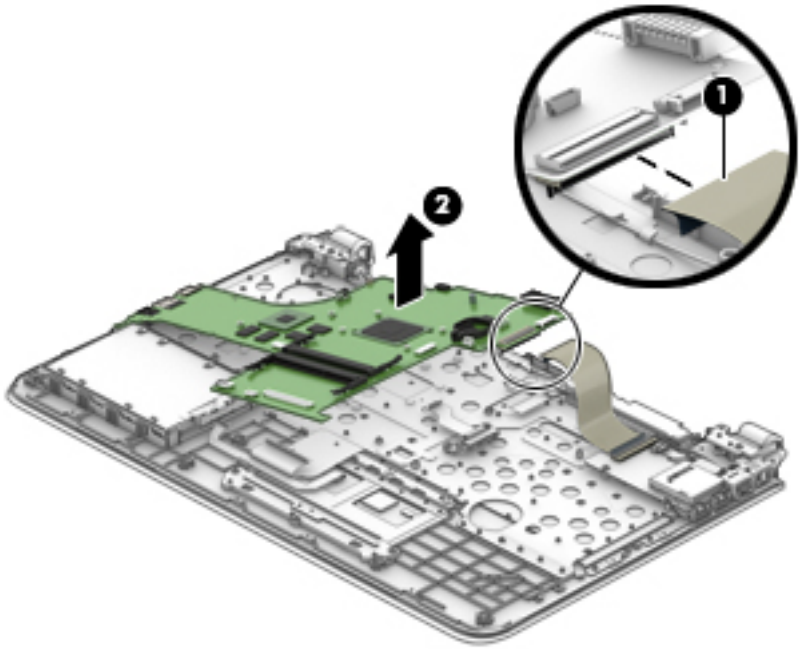
   **(7)**: Hard drive cable




2. Remove the six Phillips PM2.0×3.0 screws **(1)** that secure the system board to the computer.
3. Lift the right side of the system board, and then lift the right side of the system board up to gain access to the USB board cable and connector underneath **(2)**.



4. Disconnect the USB board cable from the connector under the system board **(1)**, and the remove the system board from the computer **(2)**.




Reverse this procedure to install the system board.

## Speakers

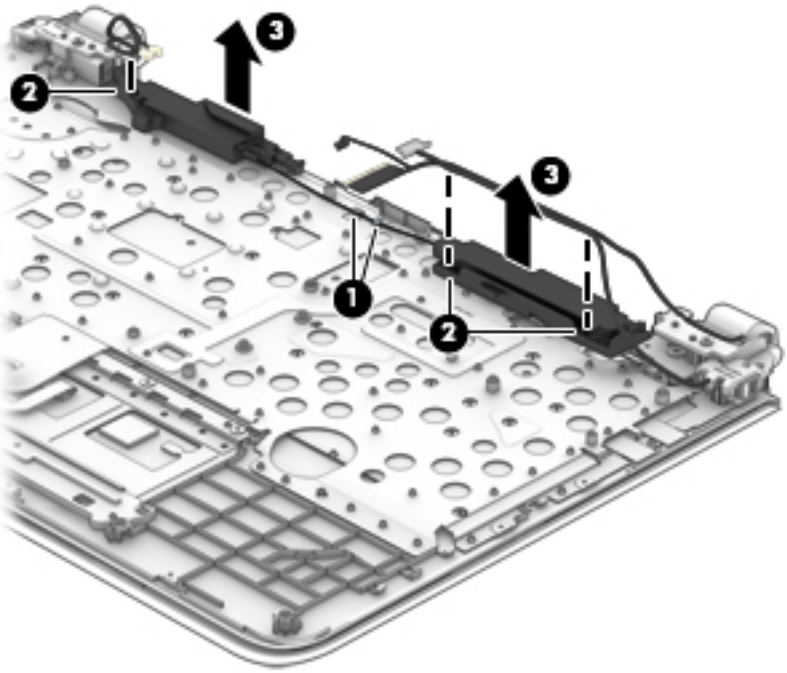
| Description | Spare part number |
|---|---|
| Speakers (includes left and right speakers and cable) | 833149-001 |

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the speakers:

1. Remove the speaker wire from the clips between the speakers **(1)**.
2. Remove the display cable from the channel at the top of the left speaker **(2)**.
3. Remove the speakers from the computer **(3)**.




Reverse this procedure to install the speakers.

## Power button board

| Description | Spare part number |
|---|---|
| Power button board | 833140-001 |
| **NOTE:** The power button board cable is available using spare part number 833143-001. | |

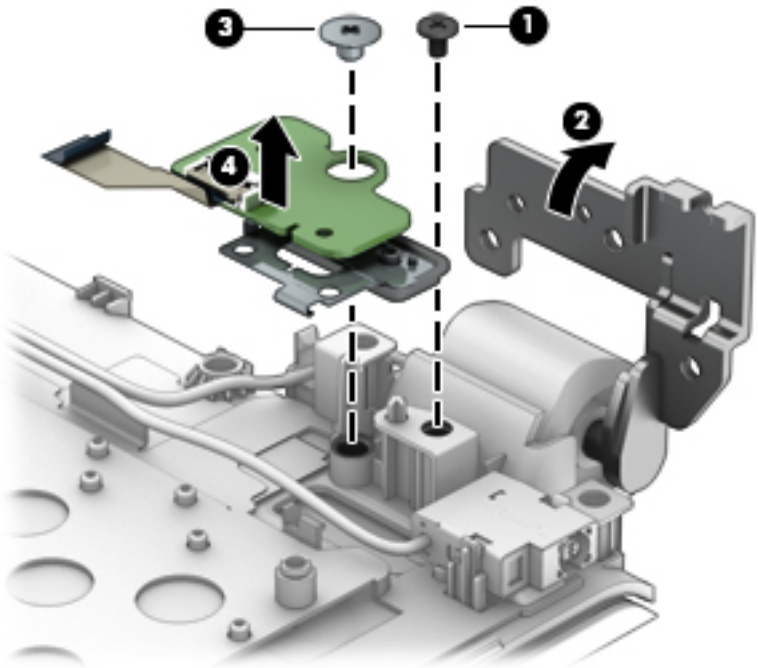
Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the power button board:

1. Remove the Phillips PM2.5×5.0 screw **(1)** from the left hinge.
2. Rotate the left hinge upward.
3. Remove the Phillips PM2.0×2.5 screw **(3)** that secures the power button board to the computer.

4. Remove the power button board from the computer **(4)**.




Reverse this procedure to install the power button board and cable.

## Power connector cable

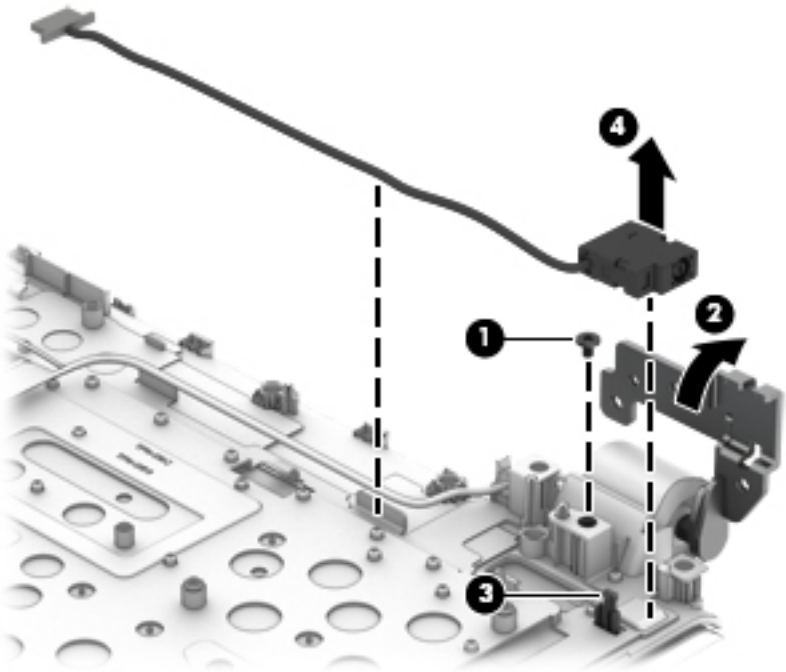
| Description | Spare part number |
|---|---|
| Power connector cable | 806746-001 |

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the power connector cable:

1. Remove the Phillips PM2.5×3.0 screw **(1)** from the left hinge that sits above the power connector.
2. Rotate the hinge upward **(2)**.
3. Pull the tab away from the connector **(3)**, and then remove the power connector and cable **(4)** from the computer.




Reverse this procedure to install the power connector cable.

## TouchPad

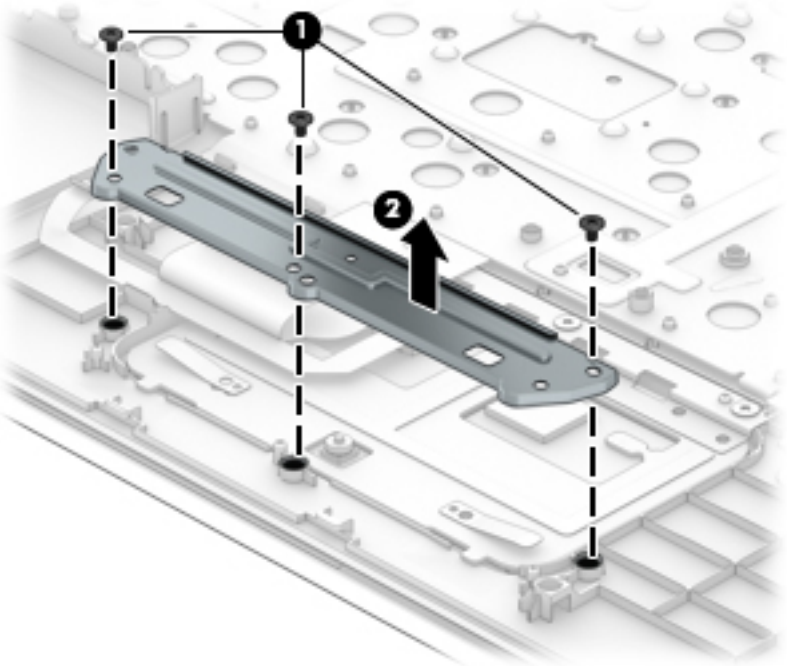
| Description | Spare part number |
|---|---|
| TouchPad | 833142-001 |
| **NOTE:** The touchpad cable is available using spare part number 833145-001. | |

Before removing the TouchPad, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the TouchPad:

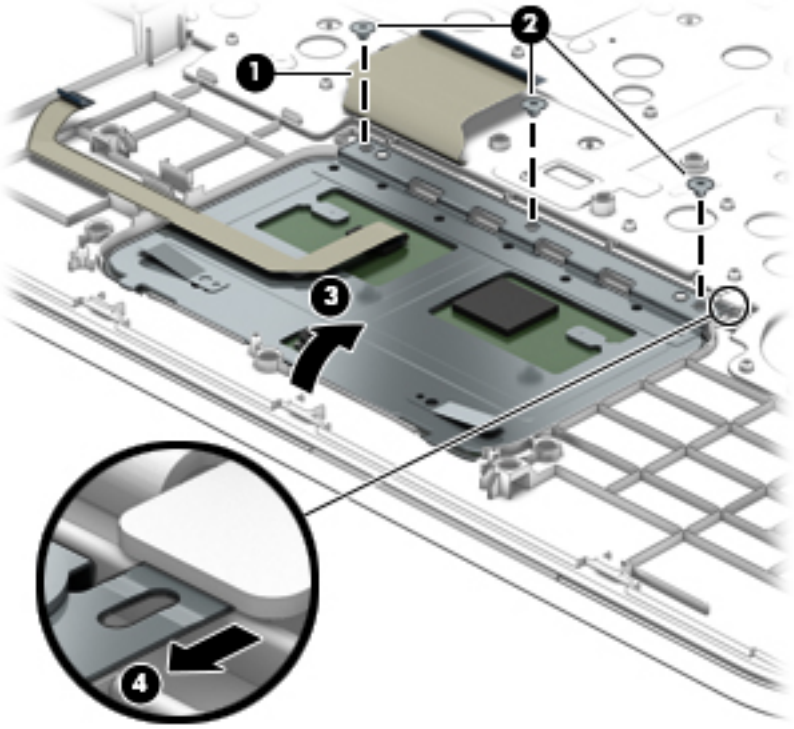
1. Remove the three Phillips PM2.5×3.0 screws **(1)** that secure the TouchPad bracket to the computer.
2. Remove the bracket **(2)**.




3. Lift the keyboard cable **(1)** to gain access to the TouchPad screws.

4. Remove the three broadhead Phillips PM2.0×2.0 screws **(2)** that secure the TouchPad to the computer.
5. Lift the bottom of touchpad up, and then pull it away from computer.**(3)**.

**NOTE:** When installing the TouchPad, note that the metal protrusion that extents from the touchpad is installed UNDER the keyboard shield **(4)**.




Reverse this procedure to install the touchpad.

## Display assembly, non-touch

| Description | Spare part number |
|---|---|
| Raw display panel (BrightView, HD, flat) | 833129-001 |
| Raw display panel (AntiGlare, FHD, slim) | 839853-001 |
| Raw display panel (AntiGlare, FHD, UWVA, non-touch) | 809999-001 |
| Raw display panel (TOP (Touch On Panel)) | 833130-001 |
| Antennas (include Mylar screw covers) | 833120-001 |
| Display bezel for use in models with a standard webcam | 833126-001 |
| Display bezel for use in models with a 3D camera | 840477-001 |
| Display cable for use in HD, SVA displays (includes Mylar screw covers) | 833133-001 |
| Display cable for use in FHD, SVA displays with a 3D camera (includes Mylar screw covers) | 840454-001 |
| For use in TOP (Touch On Panel) displays | 833134-001 |
| Display enclosure for use in black models TOP (touch on panel) models (includes Mylar screw covers) | 833122-001 |
| Display enclosure for use in white models (includes Mylar screw covers) | 840290-001 |
| Display enclosure for use in silver models (includes Mylar screw covers) | 841942-001 |
| Display enclosure for use in black models (includes Mylar screw covers) | 843213-001 |
| Hinges (left and right) (include Mylar screw covers) | 809030-001 |
| Standard camera module | 833127-001 |
| 3D camera module | 833128-001 |

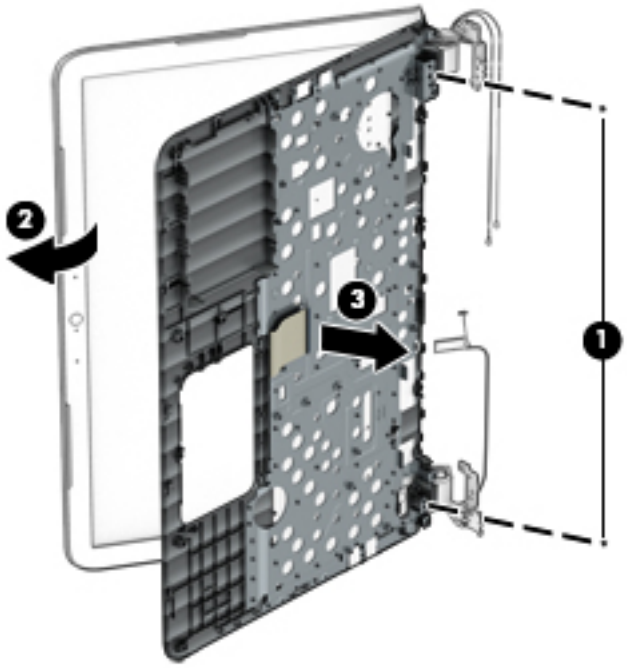
Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).
6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the display assembly:

1. Position the computer on its side, partially open.
2. Remove the two Phillips PM2.5×5.0 screws **(1)** that secure the display assembly to the computer.
3. Open the display to rotate the hinges upward to an angle **(2)**.

4. Separate the display assembly from the computer **(3)**.




If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display bezel:

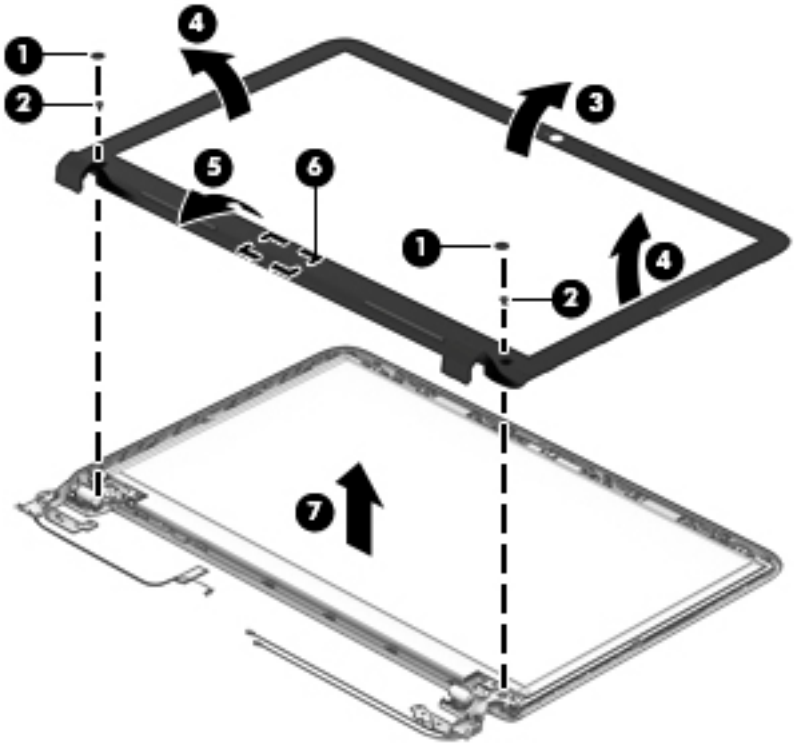
   a. Remove the two screw covers **(1)** and the two Phillips PM2.0×3.0 screws **(2)** that secure the display assembly to the computer.

   b. Flex the inside of the top edge **(3)**, the left and right edges **(4)**, and the bottom edge **(5)** of the display bezel until the bezel disengages from the display enclosure.

   c. Disengage the double-sided tape located in the middle, bottom of the bezel (under the logo) **(6)**.

**d.** Remove the display bezel **(7)**.

The display bezel is available using spare part number 833126-001 for models with a standard webcam and 840477-001 for models with a 3D camera.




2. To remove the webcam/microphone module:

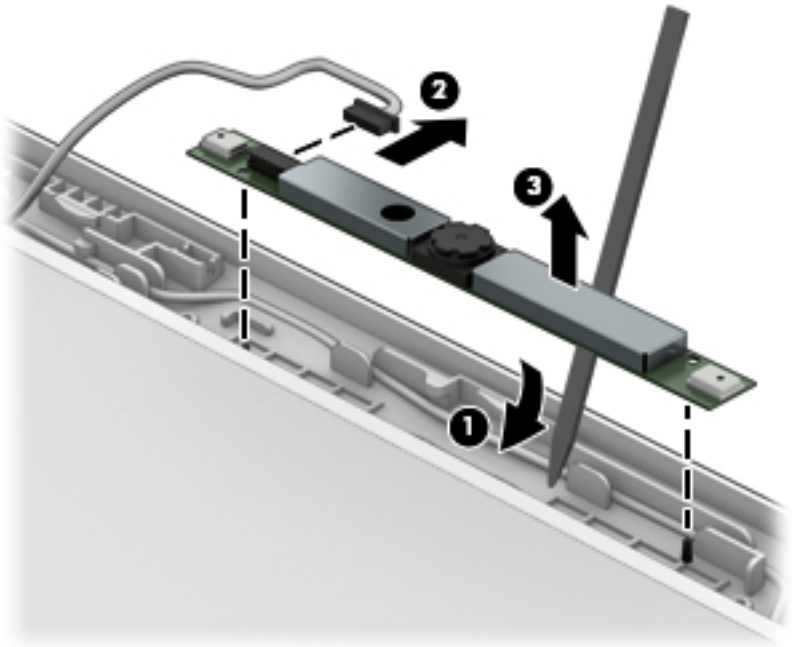
   **a.** Position the display assembly with the top edge toward you.

   **b.** Use a tool to pry the webcam and disengage the adhesive that secures it to the display **(1)**.

   **c.** Disconnect the cable **(2)** from the module.

**d.** Remove the webcam module from the display **(3)**.

The webcam is available using spare part number 833128-001 for a 3D camera, 833127-001 for a standard webcam, and 833148-001 for a microphone module.




3. To remove the display panel:

**a.** Remove the four Phillips PM2.0×3.0 screws that secure the display panel to the enclosure **(1)**.

**b.** Lift the top of the panel **(2)**.

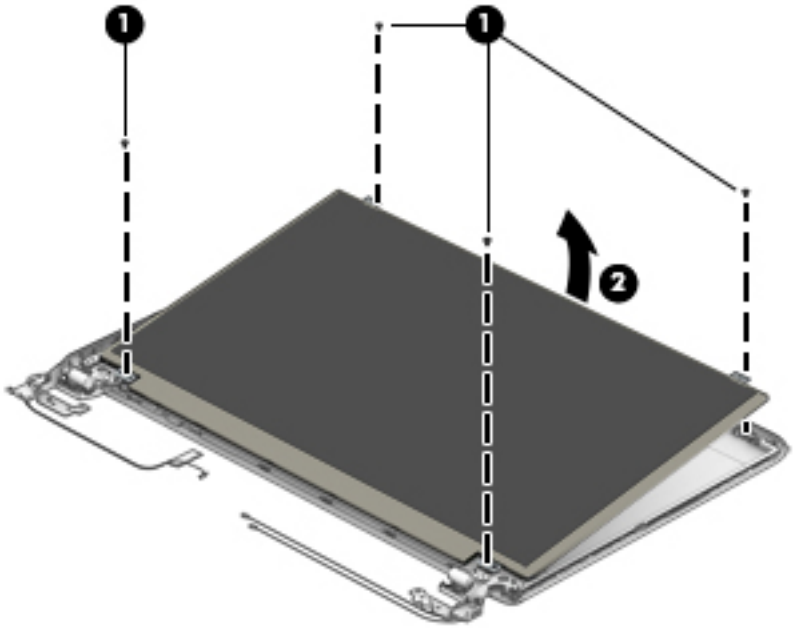
Raw display panels are available using the following spare part numbers:

833129-001: BrightView HD panels

839853-001: AntiGlare FHD panels

833130-001: TOP (Touch On Panel)

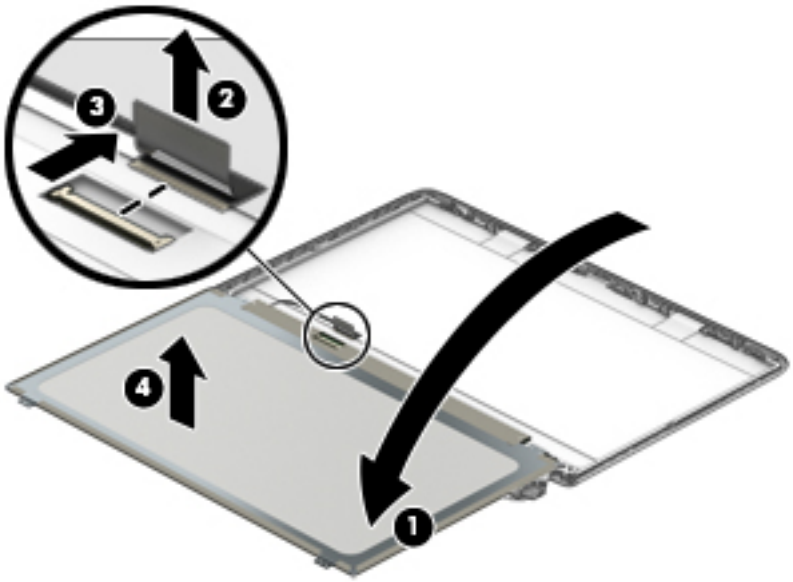
833131-001: AntiGlare, FHD, UWVA panels




**c.** Rotate the display panel until it is upside-down next to the display enclosure **(1)**.

**d.** On the back of the display panel, release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the cable **(3)**.

e. Remove the display panel from the enclosure **(4)**.

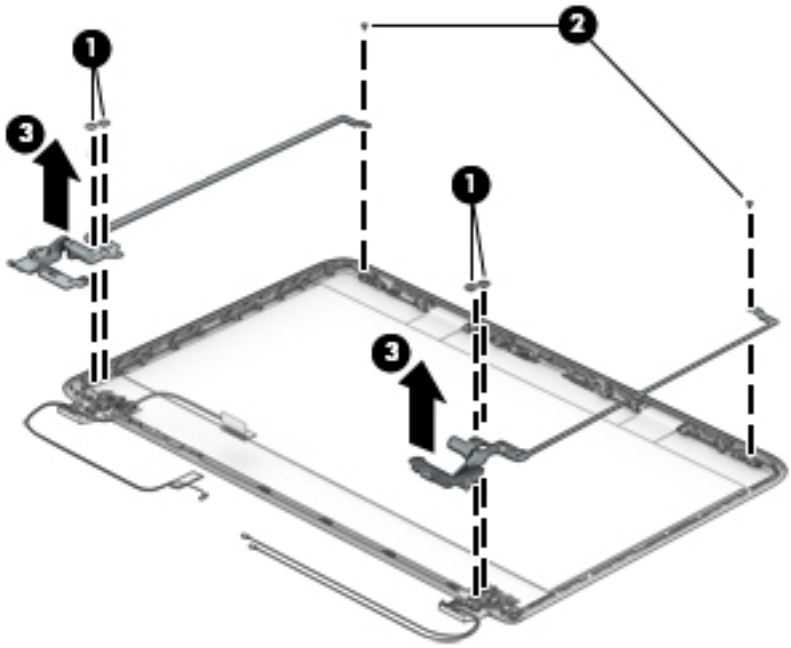



4. To remove the display hinges:

   a. Remove the four Phillips PM2.0×3.0 screws **(1)** from the bottom of the hinges, and the two Phillips PM2.0×3.0 screws **(2)** from the top of the hinges that secure the display hinges to the display enclosure.

   b. Remove the display hinges **(3)**.

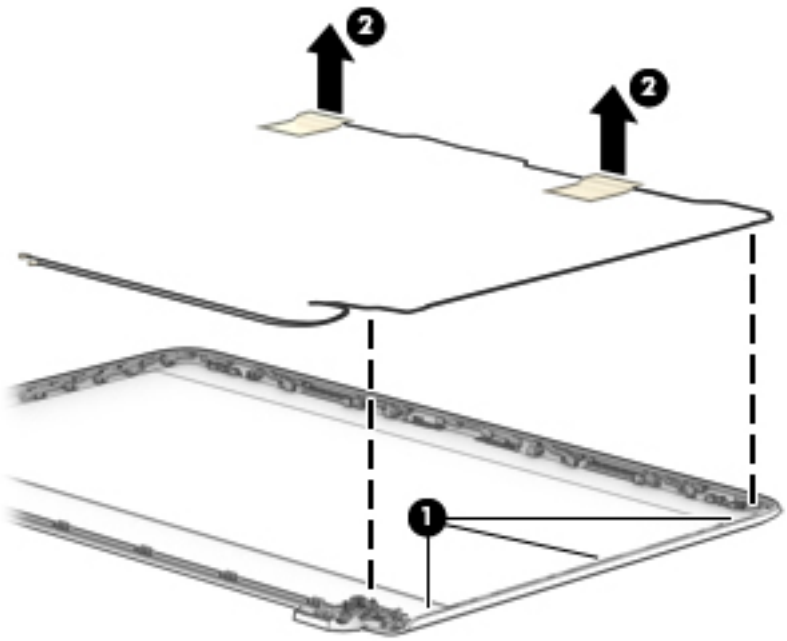
      Display hinges are available using spare part number 809030-001.



5. To remove the wireless antenna cables and transceivers, release the wireless antenna cables from the clips **(1)** built into the display enclosure, peel the transceivers from the enclosure, and then remove the antenna cables and transceivers **(2)**.

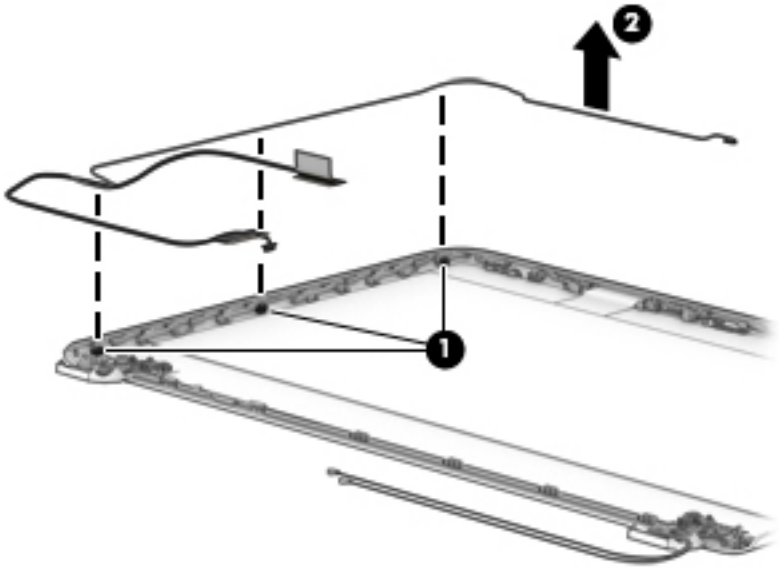
   Antennas for non-touch models are available using spare part number 833120-001.

**NOTE:** Number of antennas and transceivers may vary.



6. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(1)**, and then remove the cable from the display enclosure **(2)**.

   The display cable is available using spare part number 833133-001 for SVA, HD displays, 840454-001 for use in FHD, SVA, displays with a 3D camera, and 833134-001 for TOP (Touch On Panel) displays.




7. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

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

   840290-001: White models, non-touch

   841942-001: Silver models, non-touch

   843213-001: Black models, non-touch

   833122-001: Black TOP models

Reverse this procedure to reassemble and install the display assembly.

## Display assembly, touch

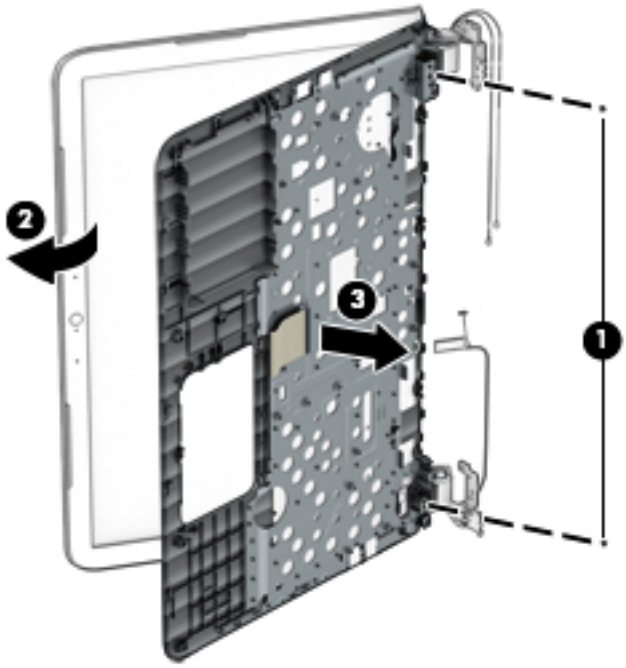
Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 34).
5. Remove the optical drive (see Optical drive on page 35).

6. Remove the bottom cover (see Bottom cover on page 38).
7. Remove the system board (see System board on page 56).

To remove the display assembly:

1. Position the computer on its side, partially open.
2. Remove the two Phillips PM2.5×5.0 screws **(1)** that secure the display assembly to the computer.
3. Open the display to rotate the hinges upward to an angle **(2)**.
4. Separate the display assembly from the computer **(3)**.

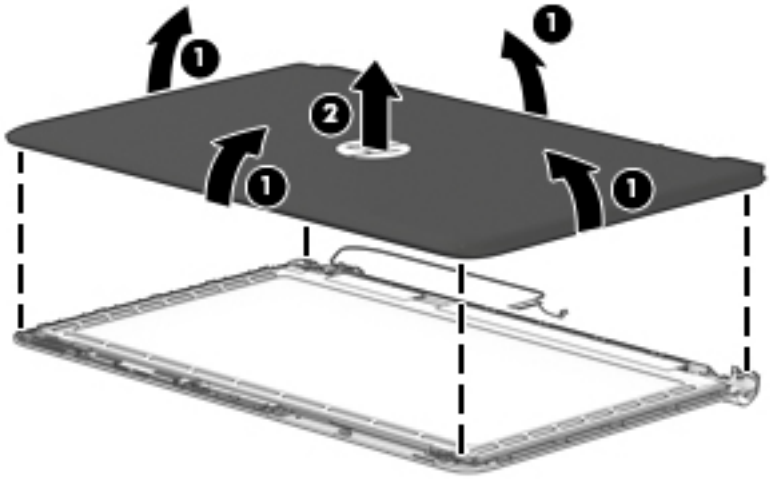



If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display cover:
   a. Pry up on each side of the display to disengage the cover **(1)**.

**b.** Remove the display cover **(2)**.

The display enclosure is available using spare part number 833124-001.



2. To remove the webcam/microphone module:

**a.** Position the display assembly with the top edge toward you.

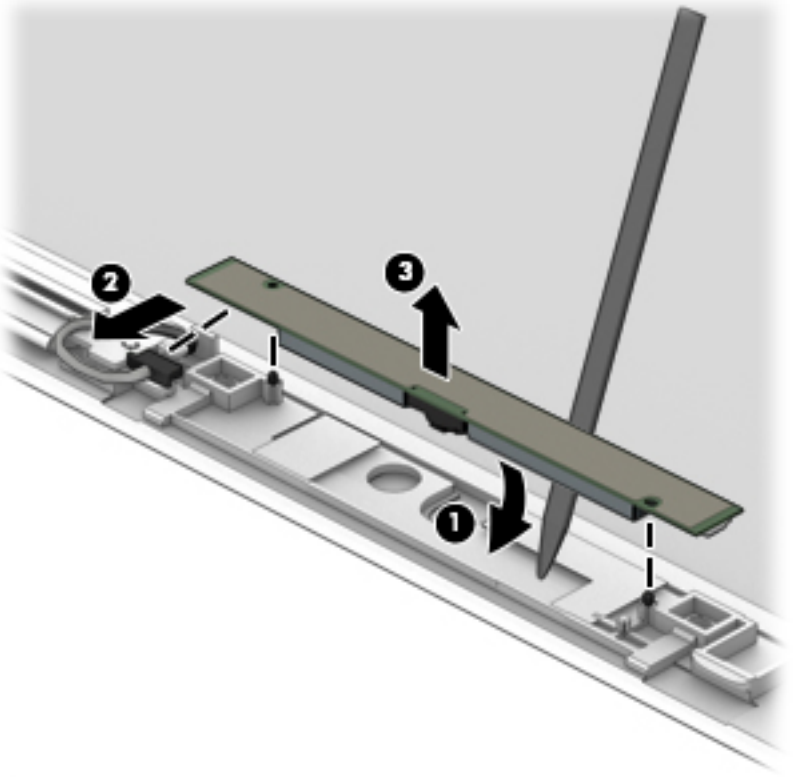
**b.** Use a tool to pry the webcam and disengage the adhesive that secures it to the display **(1)**.

**c.** Disconnect the cable **(2)** from the module.

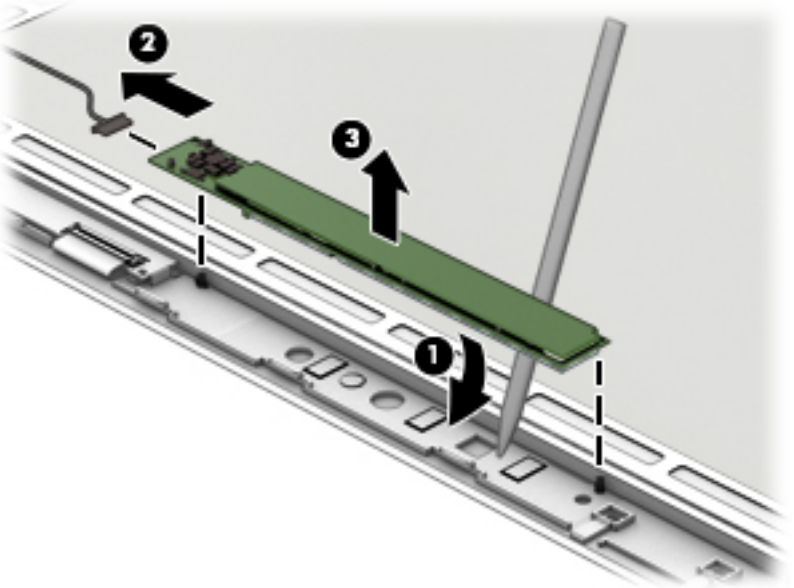
**d.** Remove the webcam/microphone module from the display **(3)**.

The webcam for touch displays is available using spare part number 833128-001 for a 3D camera, 833127-001 for a standard webcam/microphone module.

**Standard webcam**




**3D webcam**




3. If you need to remove the separate microphone module on models with 3D webcams:

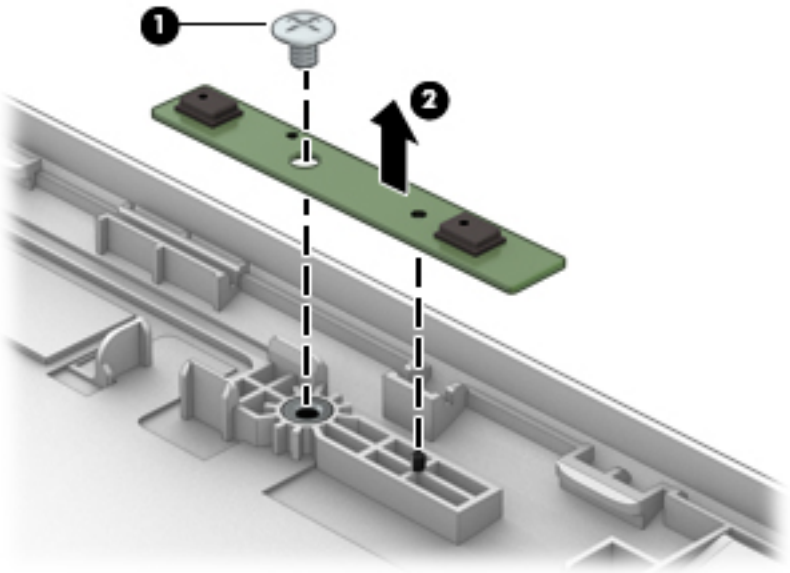
a. Position the display assembly with the top edge toward you.

b. Remove the Phillips PM2.0×2.0 screw **(1)** that secures the module to the display.

c. Remove the module from the display **(2)**.

The microphone module is available using spare part number 833148-001.

**Non-3D webcam**



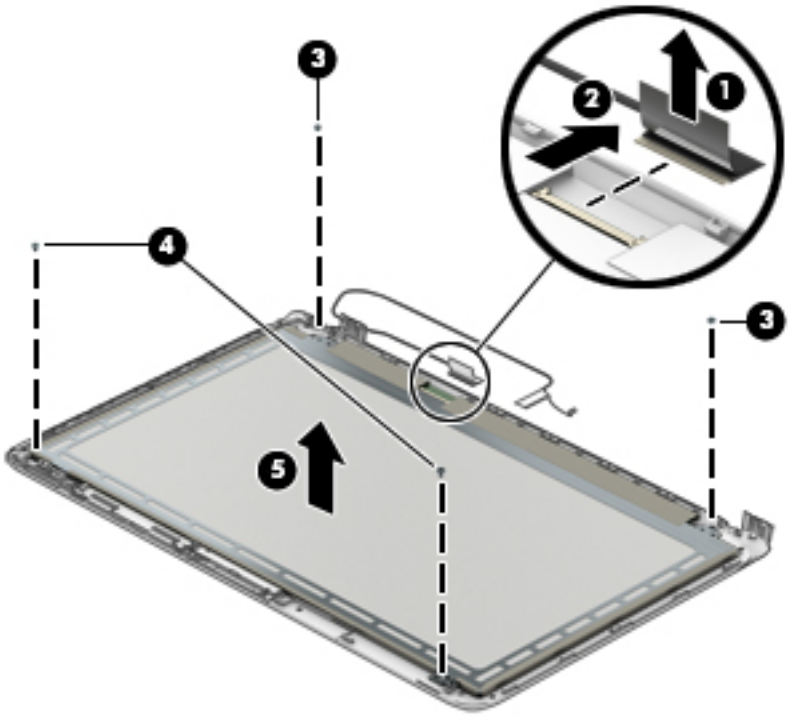

4. To remove the display panel:

a. Lift the tape that secures the display cable to the connector on the back of the panel **(1)**, and then disconnect the display cable **(2)**.

b. Remove the two Phillips PM2.0×1.5 screws **(3)** that secure the display panel to the bottom of the enclosure.

c. Remove the two Phillips PM2.0×2.0 screws **(4)** that secure the display panel to the top of the enclosure.

**d.** Lift the top of the panel **(5)**.

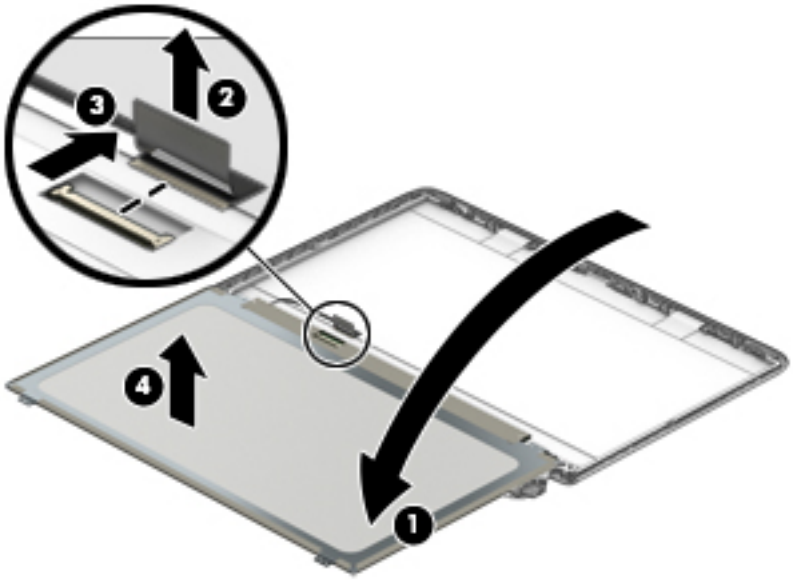



**e.** Rotate the display panel until it is upside-down next to the display enclosure **(1)**.

**f.** On the back of the display panel, release the adhesive strip **(2)** that secures the display panel cable to the display panel, and then disconnect the cable **(3)**.

**g.** Remove the display panel from the enclosure **(4)**.

The display panel is available using spare part number 833132-001.

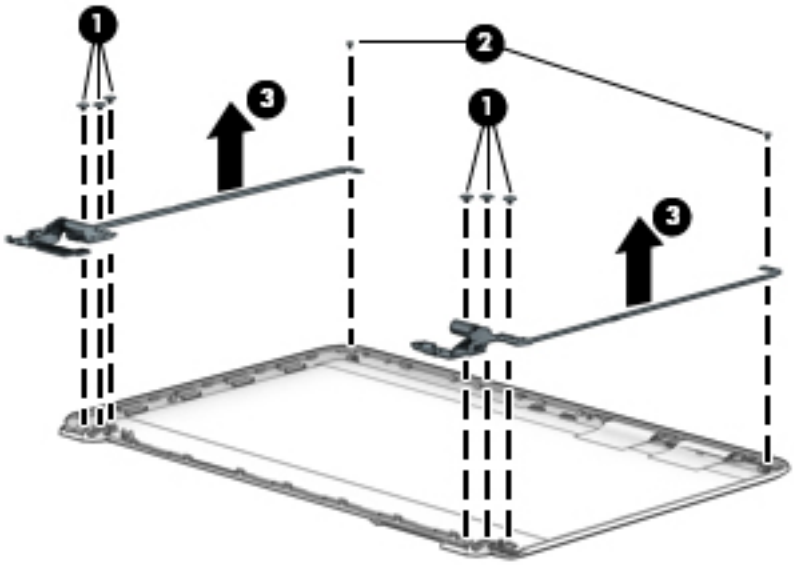



**5.** To remove the display hinges:

**a.** Remove the six Phillips PM2.5×2.0 screws **(1)** from the bottom of the hinges, and the two Phillips PM2.0×2.5 screws **(2)** from the top of the hinges that secure the display hinges to the display enclosure.

**b.** Remove the display hinges **(3)**.

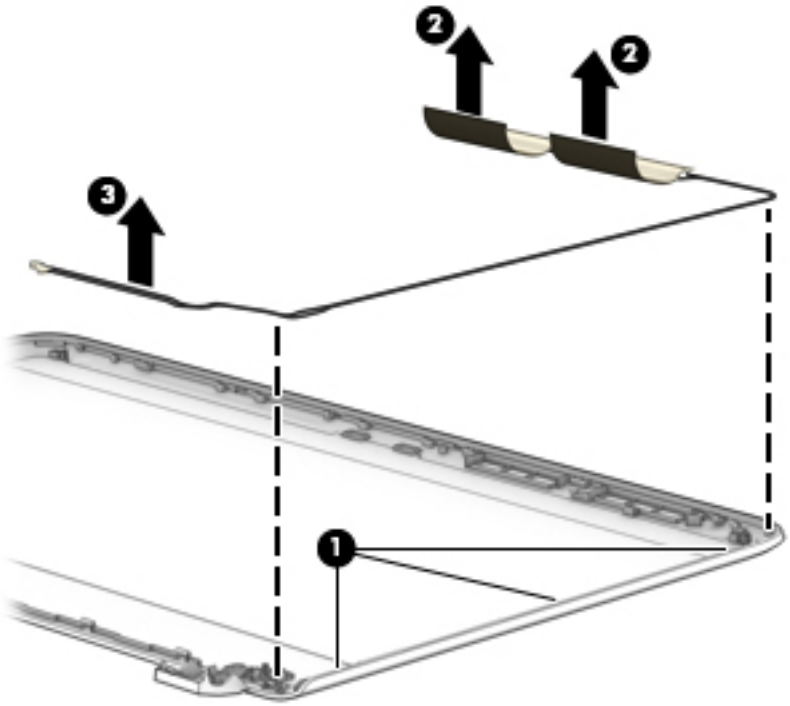
The display hinges are available using spare part number 813345-001.



6. To remove the wireless antenna cables and transceivers, release the wireless antenna cables from the clips **(1)** built into the display enclosure, peel the transceivers from the enclosure **(2)**, and then remove the antenna cables and transceivers **(3)**.

   The antennas are available using spare part number 833121-001.

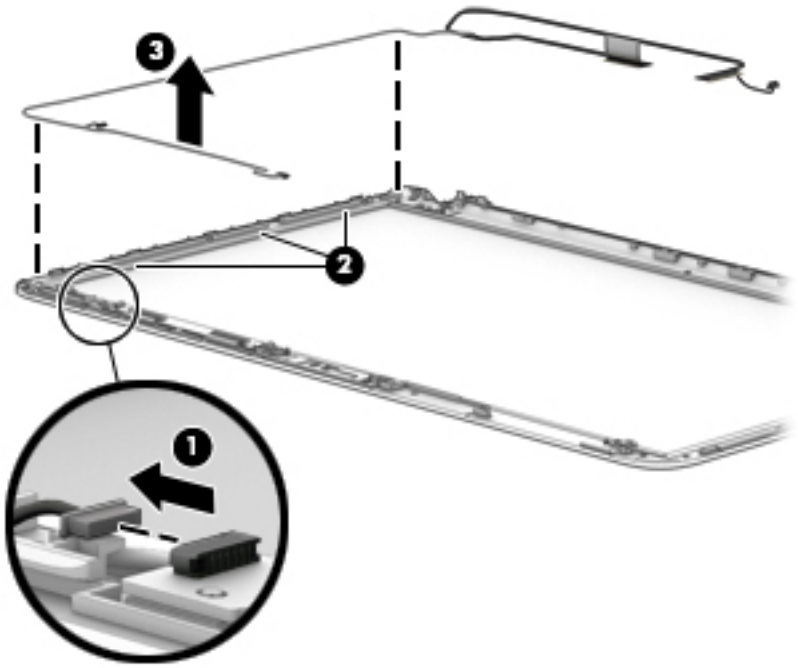
**NOTE:** Number of antennas and transceivers may vary.




7. Disconnect the cable from the touch control board **(1)**.

8. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(2)**, and then remove the cable from the display enclosure **(3)**.

   The display cable is available using spare part number 833134-001 for TOP (Touch On Panel) displays and 833135-001 for touch displays.




9. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

Reverse this procedure to reassemble and install the display assembly.

# 7 Using Setup Utility (BIOS) in Windows 10

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

**NOTE:** To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook. The on-screen keyboard, which displays in tablet mode, cannot access Setup Utility.

## Starting Setup Utility (BIOS)

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

**NOTE:** To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook. The on-screen keyboard, which displays in tablet mode, cannot access Setup Utility.

- Computers or tablets with keyboards:

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

- Tablets without keyboards:

  1. Turn on or restart the tablet, and then quickly hold down the volume down button.

     - or -

     Turn on or restart the tablet, and then quickly hold down the Windows button.

  2. Tap **f10**.

## Updating Setup Utility (BIOS)

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

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

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

## Determining the BIOS version

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

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*):

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

   – or –

   Click the question mark icon in the taskbar.

2. Select **My PC**, and then select **Specifications**.

– or –

▲ Use Setup Utility (BIOS).

To use Setup Utility (BIOS):

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 83).
2. Select **Main**, select System Information, and then make note of the BIOS version.
3. Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see Downloading a BIOS update on page 84.

## Downloading a BIOS update

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

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

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

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

   – or –

   Click the question mark icon in the taskbar.

2. Click **Updates**, and then click **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or

other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

**b.** Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

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

**NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

# Synchronizing a tablet and keyboard (select products only)

For a tablet with a detachable keyboard, when you attach the tablet to the keyboard and restart the computer, Setup Utility (BIOS) checks to see if the Embedded Controller firmware on the keyboard needs to be synchronized. If so, synchronization begins. If the synchronization is interrupted, a notification screen displays for 10 seconds before the tablet restarts and attempts to synchronize again.

**NOTE:** The Embedded Controller firmware will synchronize ONLY if the tablet or keyboard battery is more than 50% charged, or if your tablet is connected to AC power.

# 8 Backing up, restoring, and recovering in Windows 10

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

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

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

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

– or –

Click the question mark icon in the taskbar.

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

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

## Creating recovery media and backups

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

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select products only) on page 88. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 89.
- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Recovering using HP Recovery Manager on page 89.

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

## Creating HP Recovery media (select products only)

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

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

  You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 89.

- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

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

To create HP Recovery media:

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

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

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 89.

# Using Windows tools

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

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

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

▲ Select the **Start** button, and then select the **Get started** app.

# Restore and recovery

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

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

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

  ▲ Select the **Start** button, and then select the **Get started** app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.

  ▲ Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 89. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 88.

- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 89.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select products only) on page 91.

## Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 88.

## What you need to know before you get started

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

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

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 88.
- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 88.
- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

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

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

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

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

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

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

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

To start HP Recovery Manager from the HP Recovery partition:

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

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

   - or-

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

   For tablets without keyboards:

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

- or -

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

2. Select **Troubleshoot** from the boot options menu.
3. Select **Recovery Manager**, and then follow the on-screen instructions.

## Using HP Recovery media to recover

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

1. If possible, back up all personal files.
2. Insert the HP Recovery media, and then restart the computer.

**NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 91.

3. Follow the on-screen instructions.

## Changing the computer boot order

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

To change the boot order:

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

1. Insert the HP Recovery media.
2. Access BIOS:

   For computers or tablets with keyboards attached:

   ▲ Turn on or restart the computer or tablet, quickly press esc, and then press f9 for boot options.

   For tablets without keyboards:

   ▲ Turn on or restart the tablet, and then quickly hold down the volume down button; then select **f9**.

   - or -

   Turn on or restart the tablet, and then quickly hold down the Windows button; then select **f9**.
3. Select the optical drive or USB flash drive from which you want to boot.
4. Follow the on-screen instructions.

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

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

**IMPORTANT:** After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 88.

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

Follow these steps to remove the HP Recovery partition:

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

# 9 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

**NOTE:** To start BIOS on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached to your tablet. The on-screen keyboard, which displays in tablet mode, cannot access BIOS.

To start HP PC Hardware Diagnostics UEFI:

1. Start BIOS:
   - Computers or tablets with keyboards:
     - ▲ Turn on or restart the computer, quickly press esc.
   - Tablets without keyboards:
     - ▲ Turn on or restart the tablet, and then quickly hold down the volume down button.

       - or -

       Turn on or restart the tablet, and then quickly hold down the Windows button.
2. Press or tap f2.

   The BIOS searches three places for the diagnostic tools, in the following order:

   a. Connected USB drive

   **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 94.

   b. Hard drive

   c. BIOS
3. When the diagnostic tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions. On a tablet, press the volume down button to stop a diagnostic test.

**NOTE:** If you need to stop a diagnostic test on computers or tablets with a keyboard, press esc.

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

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

**Download the latest UEFI version:**

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.
2. In the HP PC Hardware Diagnostics section, click the **Download** link, and then select **Run**.

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

1. Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.
2. Click **Drivers & Downloads**.
3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.
4. Select your computer, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

# 10 Specifications

## Computer specifications

| | Metric | U.S. |
|---|---|---|
| **Dimensions** (touch models) | | |
| Depth | **261.1 mm** | 10.28 in |
| Width | **384.5 mm** | 15.14 in |
| Height (rear) | **25.15 mm** | 0.99 in |
| **Weight** | | |
| Touch | **2.499 kg** | 5.51 lb |
| Non-touch | **2.299 kg** | 5.07 lb |
| **Input power** | | |
| Operating voltage and current | 19.5 V dc @ 3.33 A – 65 W | |
| | 19.5 V dc @ 2.31 A – 45 W | |
| **Temperature** | | |
| Operating | **5°C to 35°C** | 41°F to 95°F |
| Nonoperating | **-20°C to 60°C** | -4°F to 140°F |
| **Relative humidity** (noncondensing) | | |
| Operating | 10% to 90% | |
| Nonoperating | 5% to 95% | |
| **Maximum altitude** (unpressurized) | | |
| Operating | **-15 m to 3,048 m** | -50 ft to 10,000 ft |
| Nonoperating | **-15 m to 12,192 m** | -50 ft to 40,000 ft |

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

# 39.6-cm (15.6-in) display specifications

| | Metric | U.S. |
|---|---|---|
| Active diagonal size | 39.6-cm | 15.6-in |
| Thickness | 3.8 mm or 3.2 mm | 0.150 inch or 0.126 inch |
| Resolution | 1920x1080 (FHD)<br>1366x768 (HD) | |
| Surface treatment | AntiGlare or BrightView | |
| Contrast ratio | 300:1 (typical) | |
| Brightness | 220 nits (typical) | |
| Viewing angle | SVA | |
| Backlight | WLED | |
| Companion standard | eDP | |

# Hard drive specifications

| | 2-TB* | 1-TB* | 750-GB* | 500-GB* |
|---|---|---|---|---|
| **Dimensions** | | | | |
| Height | 9.5 mm | 9.5 mm | 9.5 mm | 7.0 mm or 9.5 mm |
| Length | 100.4 mm | 100.4 mm | 100.4 mm | 100.6 mm |
| Width | 69.9 mm | 69.9 mm | 69.9 mm | 70.1 mm |
| Weight | 115.0 g | 115.0 g | 115.0 g | 92.0 g |
| **Interface type** | SATA | SATA | SATA | SATA |
| **Transfer rate** | | | | |
| Synchronous (maximum) | 300 MB/sec | 300 MB/sec | 300 MB/sec | 300 MB/sec |
| Security | ATA security | ATA security | ATA security | ATA security |
| **Seek times** (typical read, including setting) | | | | |
| Single track | 1.4 ms | 1.4 ms | 1.5 ms | 3 ms |
| Average (read/write) | 10 ms | 10 ms | 11 ms | 13 ms |
| Maximum | 12 ms | 12 ms | 14 ms | 24 ms |
| **Logical blocks** | 3,877,842,922 | 1,938,921,461 | 1,465,149,168 | 1,048,576,000 |
| **Disk rotational speed** | 5400 rpm | 5400 rpm | 5400 rpm | 5400 rpm |
| **Operating temperature** | **0°C** to **60°C** (32°F to 140°F) | | | |
| *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. | | | | |

# Blu-ray ROM DVD±RW SuperMulti DL Drive

| **Applicable disc** | **Read:** | **Write:** | |
|---|---|---|---|
| | CD-DA, CD+(E)G, CD-MIDI, CDTEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD +RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW | CD-R and CD-RW DVD+R, DVD+R(9), DVD +RW, DVD-R, DVD-R(9),DVD-RW, DVD-RAM | |
| **Access time** | **CD** | **DVD** | **HD** |
| Random | 170 ms | 170 ms | 230 ms |
| **Cache buffer** | 8 MB | | |
| **Data transfer rate** | | | |
| 24X CD-ROM | 3,600 KB/sec | | |
| 8X DVD | 10,800 KB/sec | | |
| 24X CD-R | 3,600 KB/sec | | |
| 16X CD-RW | 2,400 KB/sec | | |
| 8X DVD+R | 10,800 KB/sec | | |
| 4X DVD+RW | 5,400 KB/sec | | |
| 8X DVD-R | 10,800 KB/sec | | |
| 4X DVD-RW | 5,400 KB/sec | | |
| 2.4X DVD+R(9) | 2,700 KB/sec | | |
| 5X DVD-RAM | 6,750 KB/sec | | |
| 1X BD-ROM | 4,500 KB/sec | | |
| 1X BD-R read | 4,500 KB/sec | | |
| 1X BD-RE read | 4,500 KB/sec | | |
| **Transfer mode** | Multiword DMA Mode | | |

# DVD±RW SuperMulti DL Drive specifications

| **Applicable disc** | **Read:**<br><br>CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM | **Write:**<br><br>CD-R and CD-RW<br><br>DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM |
|---|---|---|
| **Center hole diameter** | 1.5 cm (0.59 in) | |
| **Disc diameter** | | |
| Standard disc | 12 cm (4.72 in) | |
| Mini disc | 8 cm (3.15 in) | |
| **Disc thickness** | 1.2 mm (0.047 in) | |
| **Track pitch** | 0.74 µm | |
| **Access time** | **CD** | **DVD** |
| Random | < 175 ms | < 230 ms |
| Full stroke | < 285 ms | < 335 ms |
| **Audio output level** | Line-out, 0.7 Vrms | |
| **Cache buffer** | 2 MB | |
| **Data transfer rate** | | |
| 24X CD-ROM | 3,600 KB/sec | |
| 8X DVD-ROM | 10,800 KB/sec | |
| 24X CD-R | 3,600 KB/sec | |
| 16X CD-RW | 2,400 KB/sec | |
| 8X DVD+R | 10,800 KB/sec | |
| 4X DVD+RW | 5,400 KB/sec | |
| 8X DVD-R | 10,800 KB/sec | |
| 4X DVD-RW | 5,400 KB/sec | |
| 2.4X DVD+R(9) | 2,700 KB/sec | |
| 5X DVD-RAM | 6,750 KB/sec | |
| **Transfer mode** | Multiword DMA Mode | |
| **Startup time** | < 15 seconds | |
| **Stop time** | < 6 seconds | |

# 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 volts ac, or from 220 to 240 volts ac.

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

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

## Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 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

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

| Country/region | Accredited agency | Applicable note number |
|---|---|---|
| The United States | UL | 2 |

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75mm$^2$ conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75mm$^2$ or 1.25mm$^2$ conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75mm$^2$ conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3X0.75mm$^2$ 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.
6. The flexible cord must be Type HVCTF 3X1.25mm$^2$ conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 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 3X0.75/1.00mm$^2$ conductor size, with plug BS 1363/A with BSI or ASTA marks.

# 12 Recycling

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

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

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