



Maintenance and Service Guide

HP Chromebook

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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.

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

Software terms

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

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

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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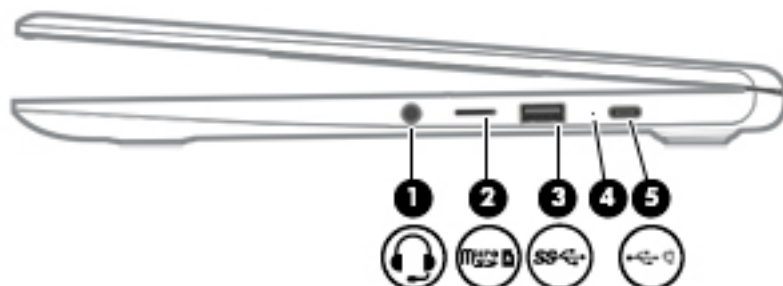
1 Product description



| Category | Description |
|------------------------|--|
| Product Name | HP Chromebook Models: 14-db0xxx, 14z-db000 |
| Processors | APU AMD processor A4-9120 2C 2.2/2.5G BGA 1 MB L2 R3 2133 MHz 15 W FT4 Notebook APU AMD® processor A6-9220 2C 2.9/2.5G BGA 1–MB L2 R4 2133 MHz 15 W FT4 Notebook |
| Chipset | Integrated with soldered-on-circuit (SoC) |
| Graphics | Internal graphics: AMD Radeon R5 |
| Panel | <ul style="list-style-type: none"> 14-inch, FHD Anti-Glare (1920Hamm1080) WLED UWVA 45 220 nits, eDP, FlushGlass 14-inch FHD Anti-Glare (1920 × 1080) WLED UWVA 45 eDP slim 220 nits, eDP, non-touch only 14-inch FHD (1920 × 1080) BrightView WLED UWVA 45 220 eDP slim Touch on Panel 14-inch FHD (1920 × 1080) BrightView WLED UWVA 45 220 eDP slim Touch on Panel 14-inch HD (1366 × 768) Anti-Glare WLED SVA 220 eDP slim (Nantucket) 220nits, eDP, non-touch only 14-inch HD (1366 × 768) BrightView WLED SVA 45 220 nits, eDP slim Touch on Panel |
| Memory | On-board system memory, non-customer-accessible/non-upgradable 4 GB 2666 DDR4 1.2v IC 8 Gb x 16 x 4 pcs |
| eMMC | 4 GB MMCv5.0 4 GB TS 32GeMMC 4 GB 64GeMMC, 4 GB TS 64GeMMC |
| Audio and video | Audio Bang & Olufsen Bang & Olufsen Audio Control Support for quad speakers Camera:Support HP Wide Vision FHD infrared camera with indicator light, 2 infrared lights, USB 2.0, FHD Hybrid BSI sensor, f2.0, wide dynamic range (WDR), 88° WFOV, 1080p by 30 frames per second Microphones: Dual array digital microphones with appropriate beam-forming, echo-cancellation, noise-suppression software Support for Watchdog function Support for voice recognition |
| Wireless | Qualcomm Atheros QCA6174A-5 ac 2 × 2 + Bluetooth® 4.2 M.2 2230 PCI-e WW with 2 Antennas |
| Ports | <ul style="list-style-type: none"> Audio-out (headphone)/audio-in (microphone) combo jack |


| Category | Description |
|---------------------------------------|---|
| | <ul style="list-style-type: none"> • USB Type-A 3.1 Gen 1 port (1 port) with support for HP Sleep and Charge |
| | <ul style="list-style-type: none"> • USB Type-A 3.1 Gen 1 port (1 port) with support for HP Sleep and Charge |
| | <ul style="list-style-type: none"> • USB Type-C port 3.1 Gen 2 (2 ports) with Thunderbolt™ Gen 3 technology supporting the following functions: |
| | <ul style="list-style-type: none"> • Power delivery |
| | <ul style="list-style-type: none"> • Data transfer |
| Keyboard/ pointing devices | <ul style="list-style-type: none"> • DisplayPort 1.2 |
| | <ul style="list-style-type: none"> • Full-size, backlit, island-style keyboard in snow white island, ink blue island, and chalkboard grey island finishes TouchPad requirements: |
| | <ul style="list-style-type: none"> • ClickPad with image sensor |
| | <ul style="list-style-type: none"> • MultiTouch gestures enabled |
| | <ul style="list-style-type: none"> • Support TrackPad gestures |
| Power requirements | <ul style="list-style-type: none"> • Taps enabled as default |
| | Support for a 2-cell, 47-Whr, Li-ion battery |
| | Support for 45-W AC adapter (non-PFC, RC, USB-C, 3-pin) |
| Security | Support for C5 Conventional 1.0m power cord sticker |
| | Nano security lock |
| Operating system | Chrome64 2C18 |
| Serviceability | End user replaceable parts: |
| | AC adapter |

2 External component identification

Right side





| Component | Description |
|--|---|
| (1)  Audio-out (headphone)/Audio-in (microphone) combo jack | <p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>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 <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p> |
| (2) MicroSD memory card reader | <p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p> <ol style="list-style-type: none">1. Hold the card label-side up, with connectors facing the computer.2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. <p>To remove a card:</p> <ul style="list-style-type: none">▲ Press in on the card, and then remove it from the memory card reader. |
| (3)  USB SuperSpeed port | <p>Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p> |
| (4) AC adapter and battery light | <ul style="list-style-type: none">• White: The AC adapter is connected and the battery is fully charged.• Amber: The AC adapter is connected and the battery is charging.• Blinking amber: The batter has an error. |

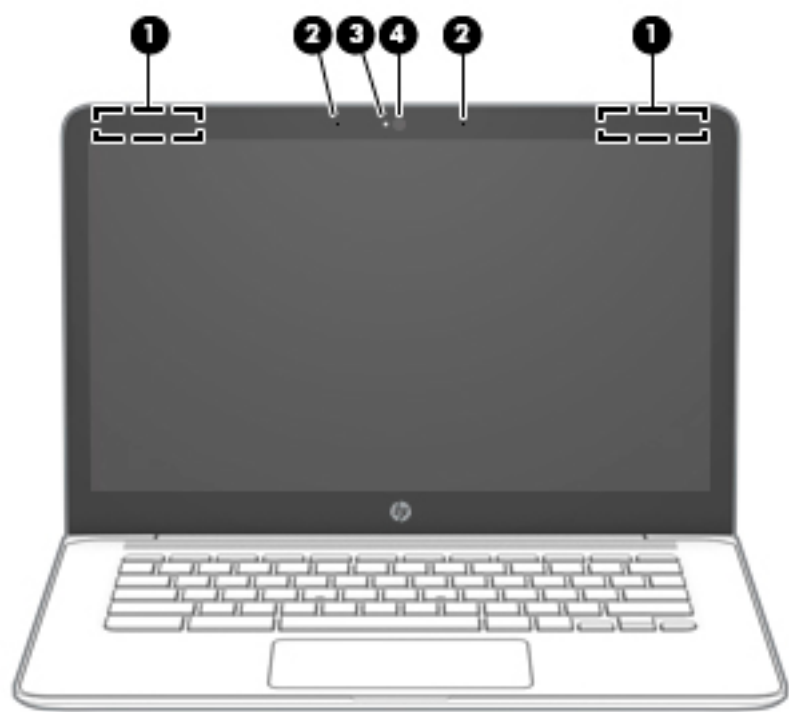
| Component | Description |
|---|---|
| | <ul style="list-style-type: none"> Off: The battery is not charging. |
| <p>(5)</p>  <p>USB Type-C power connector and port</p> | <p>Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery.</p> <p>– and –</p> <p>Connects a USB device that has a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.</p> <p>– and –</p> <p>Connects a display device that has a USB Type-C connector, providing DisplayPort output.</p> <p>NOTE: Cables and/or adapters (purchased separately) may be required.</p> |

Left side



| Component | | Description |
|-----------|--|--|
| (1) | Security cable slot | Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. |
| (2) |  USB Type-C port with HP Sleep and Charge | Connects a USB device that has a Type-C connector, provides data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. NOTE: Cables and/or adapters (purchased separately) may be required. |
| (3) |  USB SuperSpeed port | Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer. |

Display



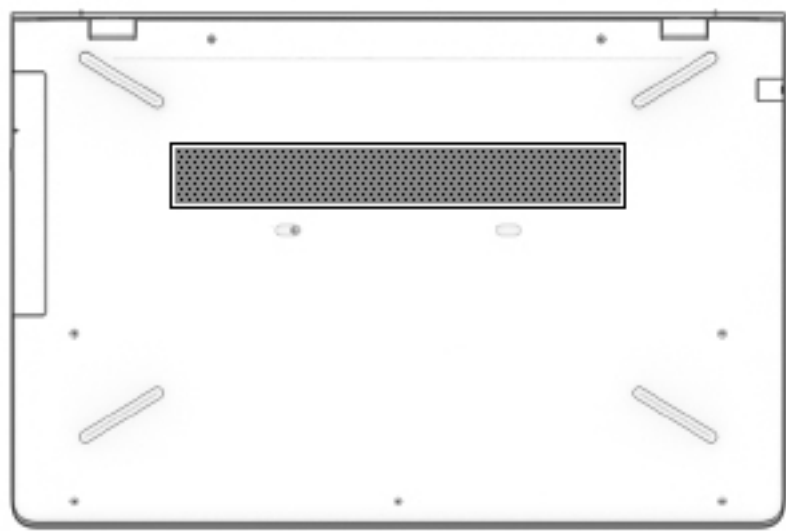
| Component | | Description |
|-----------|--------------------------|---|
| (1) | WLAN antennas* | Send and receive wireless signals to communicate with wireless local area networks (WLANs). |
| (2) | Internal microphones (2) | Record sound. |
| (3) | Camera light | On: The camera is in use. |
| (4) | Camera | Allows you to video chat, record video, and record still images. |

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

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

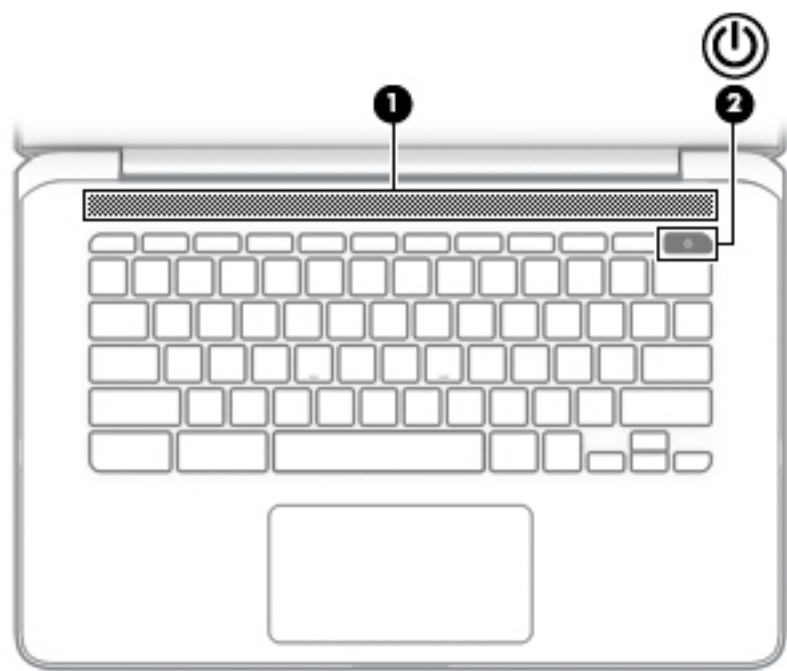
To access this guide, go to <http://www.hp.com/support>, and follow the instructions to find your product. Then select **User Guides**.



Bottom



| Components | Description |
|------------|--|
| Vent | Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |

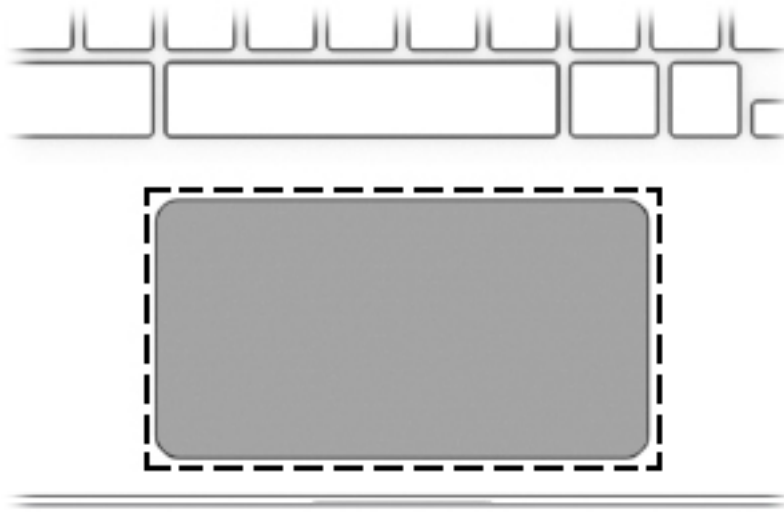
Speakers



| Component | | Description |
|-----------|--|--|
| (1) | Speaker | Produces sound. |
| (2) |  Power button | <ul style="list-style-type: none">When the computer is off, press the button to turn on the computer.When the computer is on, press the button briefly to initiate Sleep.When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only).When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, see your power options.</p> <p>▲ Right-click the Power meter icon  and then select Power Options.</p> |

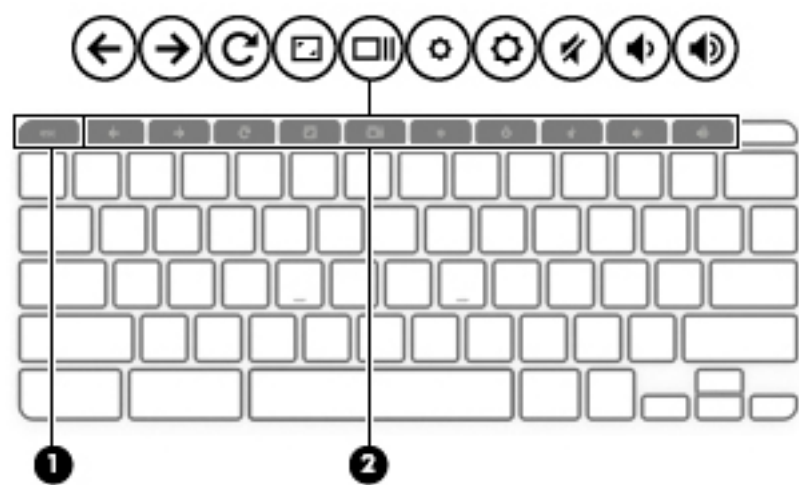
Keyboard area

TouchPad



| Component | Description |
|---------------|---|
| TouchPad zone | Reads your finger gestures to move the pointer or activate items on the screen. |

Special keys













| Component | | Description |
|-----------|-------------|---|
| (1) | esc key | Activates certain computer functions when pressed in combination with other keys, such as tab or shift. |
| (2) | Action keys | Execute frequently used system functions. |

Action keys

An action key performs the function indicated by the icon on the key. To determine which keys are on your product, see [Special keys on page 10](#).

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

For more information on action keys and keyboard shortcuts, go to <https://support.google.com/chromebook/answer/183101>. Select your language at the bottom of the page.

| Icon | Key | Description |
|---|-----------------|--|
|  | Back | Displays the previous page in your browser history. |
|  | Forward | Displays the next page in your browser history. |
|  | Reload | Reloads your current page. |
|  | Full screen | Opens your page in full-screen mode. |
|  | Display apps | Displays open apps. NOTE: Pressing this button in conjunction with ctrl takes a screenshot. |
|  | Brightness down | Decreases the screen brightness incrementally as long as you hold down the key. |
|  | Brightness up | Increases the screen brightness incrementally as long as you hold down the key. |
|  | Mute | Mutes speaker sound. |
|  | Volume down | Decreases speaker volume incrementally as long as you hold down the key. |
|  | Volume up | Increases speaker volume incrementally as long as you hold down the key. |

Labels

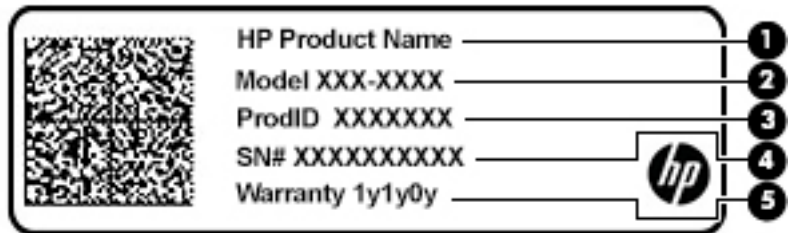
The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer. Labels may be in paper form or imprinted on the product.



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

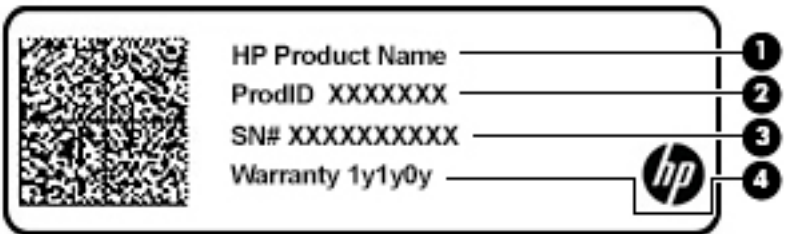
- Service label—Provides important information to identify your computer. When contacting support, you may be asked for the serial number, the product number, or the model number. Locate this information before you contact support.

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



Component

- (1) HP product name
- (2) Model number
- (3) Product ID
- (4) Serial number
- (5) Warranty period



Component

- (1) HP product name
- (2) Product ID
- (3) Serial number
- (4) Warranty period

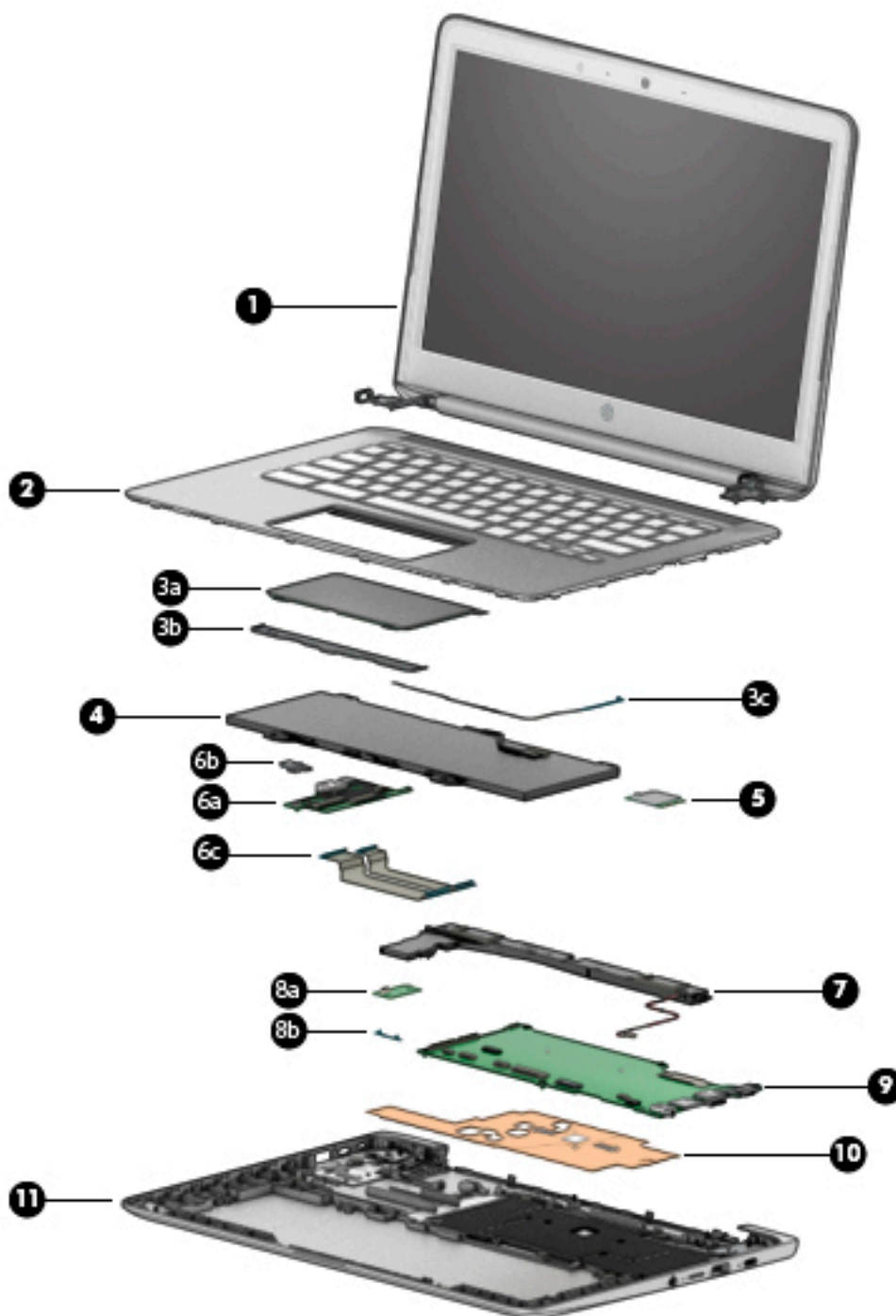
- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

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.



| Item | Component | Spare part number |
|------|------------------------|-------------------|
| (1) | Display | |
| | 14 AG FHD UWVA fSNW FG | L46548-001 |
| | 14 AG FHD UWVA | L46549-001 |
| | 14 BV FHD UWVA TOP | L46550-001 |
| | 14 AG HD SVA fSNW FG | L46551-001 |

| Item | Component | Spare part number |
|------------|---|-------------------|
| | 14 AG HD SVA | L46552-001 |
| | 14 BV HD SVA TOP | L46553-001 |
| (2) | Top cover with keyboard | |
| | For use on computer models with chalk board grey finish for Belgium | L46581-A41 |
| | For use on computer models with chalk board grey finish for Belgium with backlight | L46582-A41 |
| | For use on computer models with ink blue finish for Belgium | L46583-A41 |
| | For use on computer models with ink blue finish for Belgium with backlight | L46584-A41 |
| | For use on computer models with snow white finish for Belgium | L46585-A41 |
| | For use on computer models with snow white finish for Belgium with backlight | L46586-A41 |
| | For use on computer models with chalk board grey finish for France | L46581-051 |
| | For use on computer models with chalk board grey finish for France with backlight | L46582-051S |
| | For use on computer models with ink blue finish for France | L46583-051 |
| | For use on computer models with ink blue finish for France with backlight | L46584-051 |
| | For use on computer models with snow white finish for France | L46585-051 |
| | For use on computer models with snow white finish for France with backlight | L46586-051 |
| | For use on computer models with ink blue finish for International | L46581-B31 |
| | For use on computer models with ink blue finish for International with backlight | L46582-B31 |
| | For use on computer models with ink blue finish for International | L46583-B31 |
| | For use on computer models with ink blue finish for International with backlight | L46584-B31 |
| | For use on computer models with snow white finish for International | L46585-B31 |
| | For use on computer models with snow white finish for International with backlight | L46586-B31 |
| | For use on computer models with chalk board grey finish for Nordic | L46581-DH1 |
| | For use on computer models with chalk board grey finish for Nordic with backlight | L46582-DH1 |
| | For use on computer models with ink blue finish for Nordic | L46583-DH1 |
| | For use on computer models with ink blue finish for Nordic with backlight | L46584-DH1 |
| | For use on computer models with snow white finish for Nordic | L46585-DH1 |
| | For use on computer models with snow white finish for Nordic with backlight | L46586-DH1 |
| | For use on computer models with chalk board gray finish for the United Kingdom | L46581-031 |
| | For use on computer models with chalk board gray finish for the United Kingdom with backlight | L46582-031 |
| | For use on computer models with ink blue finish for the United Kingdom | L46583-031 |
| | For use on computer models with ink blue finish for the United Kingdom with backlight | L46584-031 |
| | For use on computer models with snow white finish for the United Kingdom | L46585-031 |
| | For use on computer models with snow white finish for the United Kingdom with backlight | L46586-031 |
| | For use on computer models with chalk board gray finish for the United States | L46581-001 |

| Item | Component | Spare part number |
|-------------|---|-------------------|
| | For use on computer models with chalk board finish for the United States with backlight | L46582-001 |
| | For use on computer models with snow white finish for the United States | L46585-001 |
| | For use on computer models with snow white finish for the United States with backlight | L46586-001 |
| | For use on computer models with ink blue finish for the United States | L46583-001 |
| | For use on computer models with ink blue finish for the United States | L46584-001 |
| (3a) | TouchPad | |
| | TouchPad in chalk board gray finish | L46559-001 |
| | TouchPad in ink blue finish | L46734-001 |
| | TouchPad in snow white finish | L46735-001 |
| (3b) | TouchPad bracket | L14359-001 |
| (3c) | TouchPad cable | L14330-001 |
| (4) | Battery | L42583-005 |
| (5) | WLAN | L54597-001 |
| (6a) | USB board | L46557-001 |
| (6b) | USB bracket | L14359-001 |
| | USB cable | L14330-001 |
| (7) | Speaker kit | L14353-001 |
| (8a) | Infrared sensor board | L46558-001 |
| (8b) | Infrared sensor cable | L14330-001 |
| (9) | System board (includes processor) | |
| | Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32 G of eMMC memory, and the Chrome operating system. | L46545-001 |
| | Equipped with an AMD A4-9220C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32 G of eMMC memory, and the Chrome operating system. | L46546-001 |
| | Equipped with an AMD A4-9220C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 64 G of eMMC memory, and the Chrome operating system. | L46547-001 |
| | Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 64 G of eMMC memory, and the Chrome operating system. | L51318-001 |
| | Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32 G of eMMC memory, and the Chrome operating system. | L51319-001 |
| | Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 64 G of eMMC memory, and the Chrome operating system. | L51320-001 |
| | Equipped with an AMD A4-9220C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32 G of eMMC memory, and the Chrome operating system. | L51321-001 |

| Item | Component | Spare part number |
|------|---|-------------------|
| (10) | Fan/heatsink | L46576-001 |
| (11) | Bottom cover | |
| | Bottom cover in chalk board gray finish | L46561-001 |
| | Bottom cover in Ink blue finish | L46561-001 |
| | Bottom cover in snow white finish | L46562-001 |

Miscellaneous parts

| Component | Spare part number |
|--|-------------------|
| AC adapter | |
| 45 W ADPTR nPFC USB-PD 3PIN | 934739-850 |
| Power cords | |
| 1.0 m STK Conv for use in Denmark | L19360-001 |
| 1.0 m STK Conv for use in Europe | L19361-001 |
| 1.0 m STK Conv for use in North America | L19367-001 |
| 1.0 m STK Conv for use in United Kingdom | L19373-001 |

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


Cables and connectors



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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

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 $\pm 10\%$ 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 |

Electrostatic discharge damage

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

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

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

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


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

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

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

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

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

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

| Typical electrostatic voltage levels | | | |
|--------------------------------------|-------------------|----------|---------|
| Event | Relative humidity | | |
| | 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 nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.


5 Removal and replacement procedures

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

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

CAUTION: This computer does not have user-replaceable parts. Only HP authorized service providers should perform the removal and replacement procedures described here. Accessing the internal part could damage the computer or void the warranty.

Component replacement procedures

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer.

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

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

Bottom cover

| Description | Spare part number |
|----------------------------|-------------------|
| Bottom cover | |
| In chalk board gray finish | L46560-001 |
| In ink blue finish | L46561-001 |
| In snow white finish | L46562-001 |

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.

Remove the bottom cover:

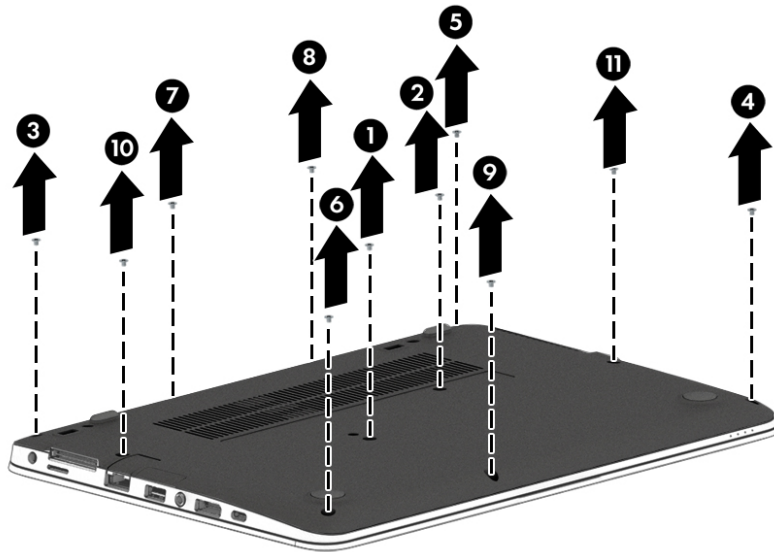
1. Remove the computer rear rubber feet **(1)**.

The rubber feet are included in the Rubber Kit, spare part number L01856-001.

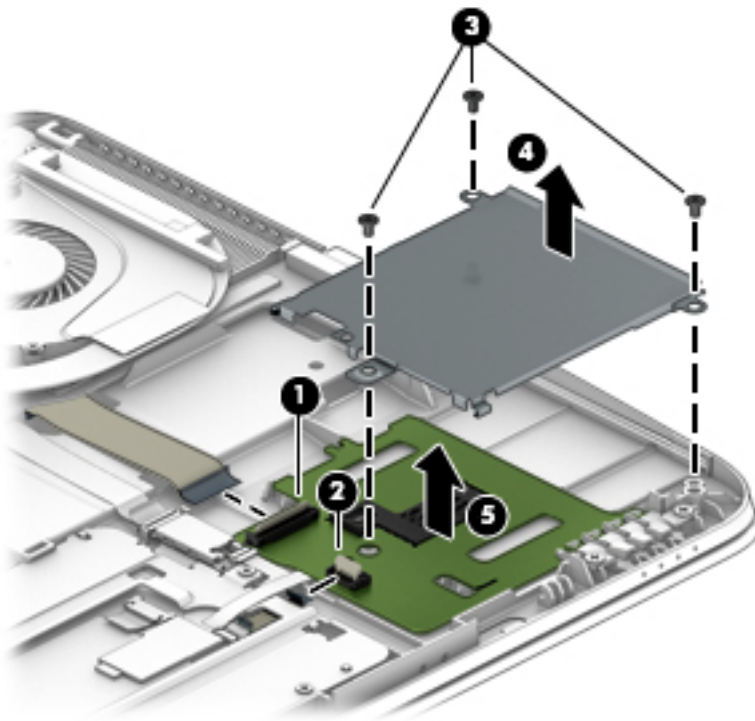
2. Remove the following screws that secure the bottom cover to the computer:

(2) Four Phillips M2.5 × 6.7 screws under the rubber feet

(3) Three Phillips M2.0 × 5.7 screws on the front edge



3. Insert a case utility tool **(1)** or similar thin, plastic tool into the hinge areas of the bottom cover.
4. Lift up on the rear edge of the bottom cover **(2)** until it separates from the keyboard/top cover.
5. Remove the bottom cover **(3)**.



Reverse this procedure to install the bottom cover.

Battery

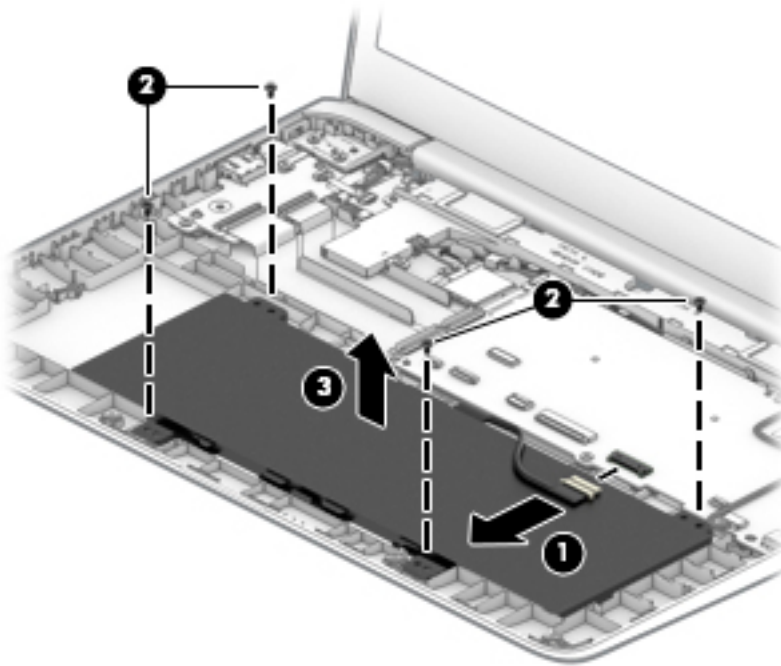
| Description | Spare part number |
|--|-------------------|
| 2-cell, 47 Whr, 6.17 Ahr, Li-ion battery | L42583-005 |

Before removing the battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).

Remove the battery:

1. Remove the four Phillips M2.0 × 5.7 screws (1) that secure the battery to the keyboard/top cover.
2. Remove the battery (2).



Reverse this procedure to install the battery.


Memory module



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

Update BIOS before adding memory modules

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

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

To update BIOS:

1. Navigate to www.hp.com.
2. Click **Support & Drivers**, and then click **Drivers & Software**.
3. In the **Enter a product name/number** box, type the computer model information, and then click **Search**.
4. Click the link for the computer model.
5. Select the operating system, and then click **Next**.
6. Under **Step 2: Select a Download**, click the **BIOS** link.
7. Click the link for the most recent BIOS.
8. Click the **Download** button, and then follow the on-screen instructions.

Before removing the memory module, follow these steps:

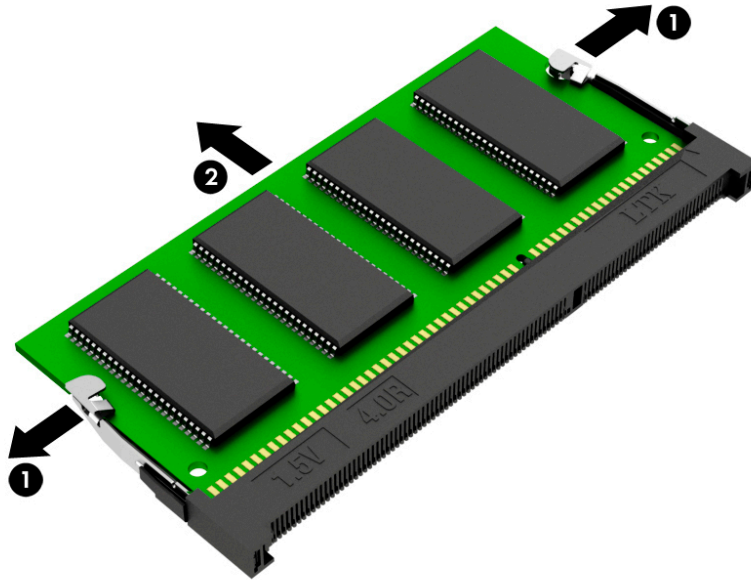
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the memory module:

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

2. Remove the memory module **(2)** by pulling the module away from the slot at an angle.

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



Reverse this procedure to install a memory module.

TouchPad cable

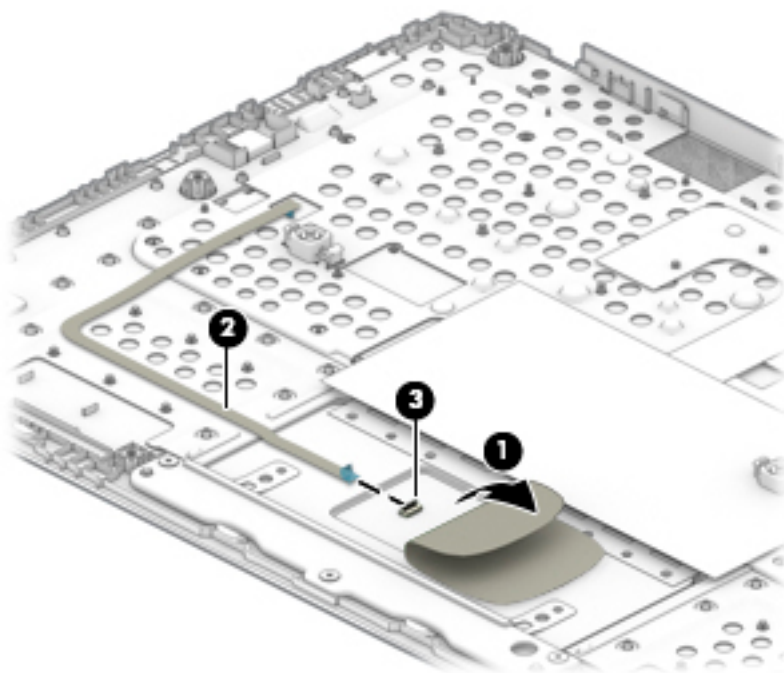
| Description | Spare part number |
|----------------|-------------------|
| TouchPad cable | L14330-001 |

Before removing the TouchPad 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 the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Remove the bottom cover (see [Bottom cover on page 22](#)).
4. Remove the battery (see [Battery on page 24](#)).

Remove the TouchPad cable:

1. Release the ZIF connector **(1)** to which TouchPad cable is connected, and then disconnect the TouchPad cable from the system board.
2. Release the ZIF connector **(2)** to which TouchPad cable is connected, and then disconnect the TouchPad cable from the TouchPad.
3. Remove the TouchPad cable **(3)**.



4. Remove the TouchPad cable.

Reverse this procedure to install the TouchPad cable.

TouchPad



NOTE: The TouchPad spare part kit does not include the TouchPad bracket or TouchPad cable. The TouchPad bracket is available using spare part number 926879-001. The TouchPad cable is available using spare part number L01851-001.

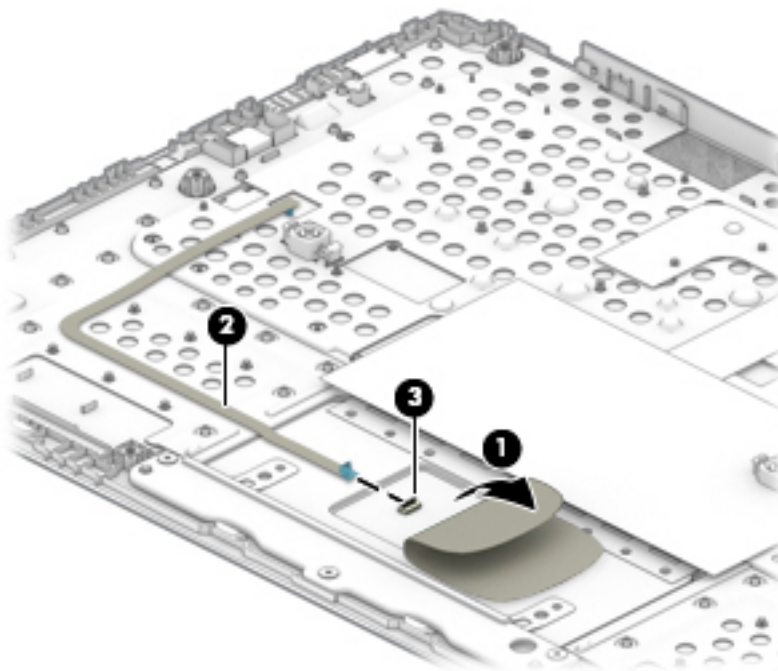
| Description | Spare part number |
|----------------------------|-------------------|
| TouchPad | |
| In chalk board gray finish | L46559-001 |
| In ink blue finish | L46734-001 |
| In snow white finish | L46735-001 |

Before removing the TouchPad, follow these steps:

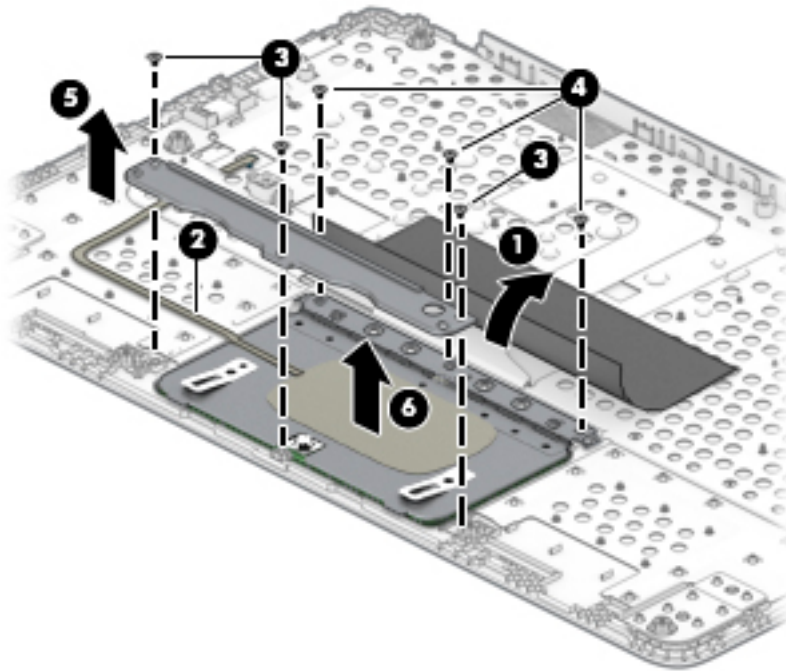
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 24](#)).

Remove the TouchPad:

1. Release the ZIF connector **(1)** to which TouchPad cable is connected, and then disconnect the TouchPad cable from the system board.
2. Release the shielding **(2)** and tape **(3)** that cover the TouchPad.



3. Remove the three Phillips M2.0 × 3.0 screws **(1)** that secure the TouchPad bracket to the keyboard/top cover.
4. Remove the TouchPad bracket **(2)**.
5. Remove the three Phillips M2.0 × 2.4 broad head screws **(3)** that secure the TouchPad to the keyboard/top cover.
6. Remove the TouchPad **(4)**.



Reverse this procedure to install the TouchPad.

System board



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

| Description | Spare part numbers |
|--|--------------------|
| Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32 GB of eMMC memory, and the Chrome operating system. | L51319-001 |
| Equipped with an AMD A4-9120C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 64 GB of eMMC memory, and the Chrome operating system. | L51320-001 |
| Equipped with an AMD A4-9220C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 32-GB of eMMC memory, and the Chrome operating system. | L51321-001 |
| Equipped with an AMD A6-9220C (turbo up to 2.2/2.5 GHz) quad core processor (2133 MHz, 8.0 MB L3 cache, 15 W), a graphics subsystem with UMA video memory, 4 GB of system memory, 64-GB of eMMC memory, and the Chrome operating system. | L51322-001 |

Before removing the system board, follow these steps:

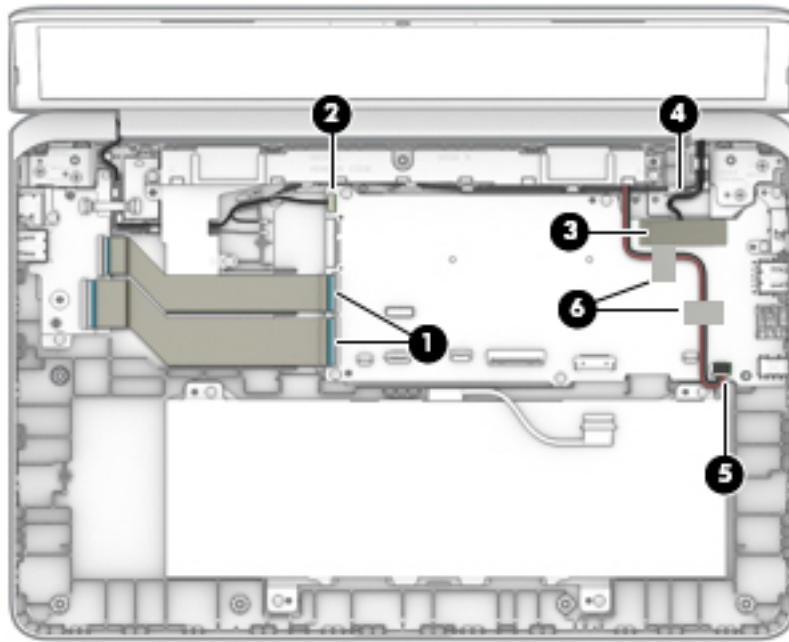
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)), and then remove the following components:
 - ▲ Battery (see [Battery on page 24](#))

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

- Heat sink (see [Heat sink/fan on page 33](#))

Remove the system board:

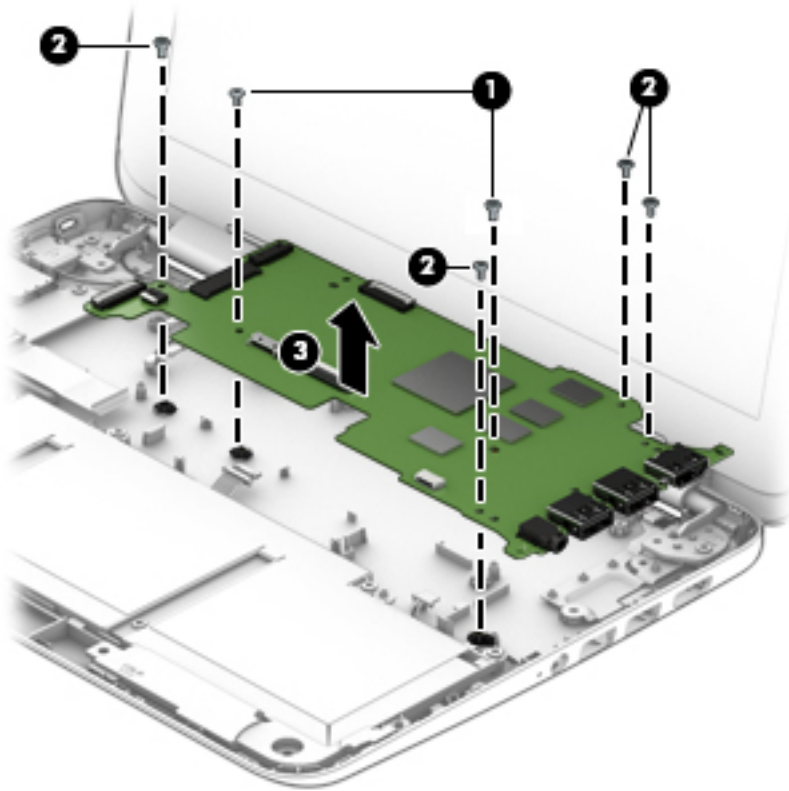
1. Disconnect the following cables:
 - (1) Display panel ZIF connector cable
 - (2) Power connector cable
 - (3) Webcam/microphone module cable
 - (4) Speaker cable
 - (5) Connector board ZIF connector cable
 - (6) Audio jack board ZIF connector cable
 - (7) TouchPad ZIF connector cable
 - (8) Keyboard ZIF connector cable
 - (9) Backlight ZIF connector cable
 - (10) Hard drive ZIF connector cable



2. Remove the following:

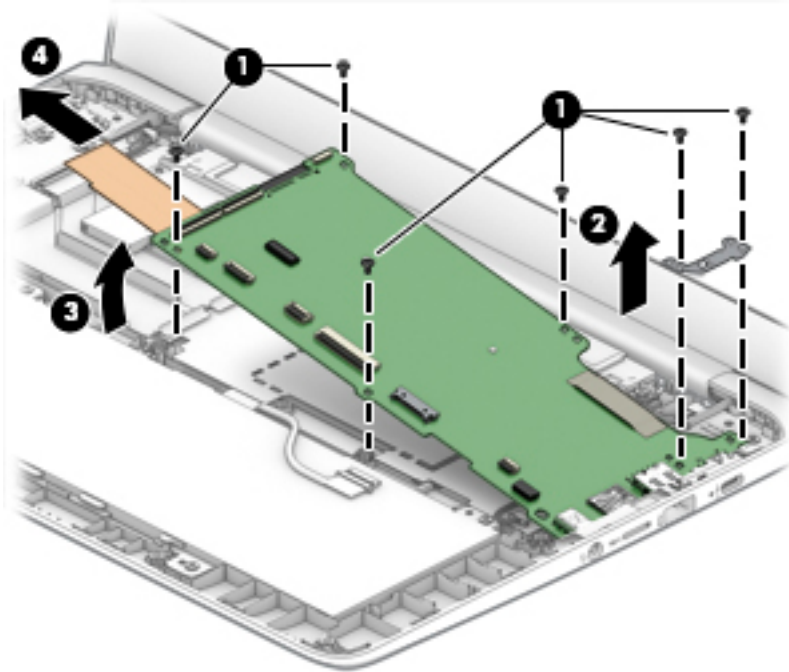
- (1)** Six Phillips M2.0 × 3.0 screws that secure the system board to the keyboard/top cover
- (2)** One Phillips M2.0 × 5.7 screw that secures the system board to the keyboard/top cover
- (3)** USB Type-C bracket

The USB Type-C bracket is available using spare part number L01852-001.




3. Lift the right side of the system board **(1)** until it rests at an angle.

4. Remove the system board (2) by sliding it up and to the right at an angle.



Reverse this procedure to install the system board.

Heat sink/fan

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

| Description | Spare part number |
|---------------|-------------------|
| Fan/heat sink | L46576-001 |

Before removing the heat sink, follow these steps:

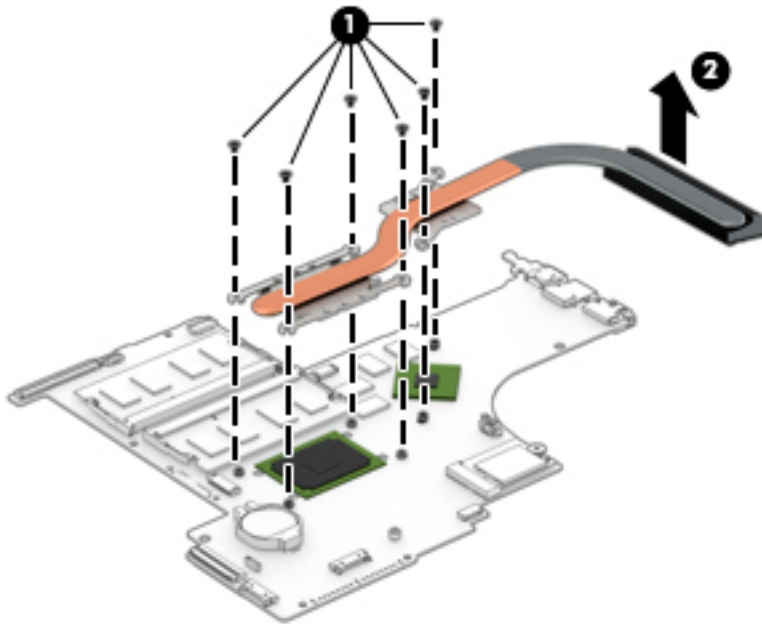
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)), and then remove the following components:
 - a. Battery (see [Battery on page 24](#))
 - b. System board (see [System board on page 30](#))

Remove the heat sink:

 **NOTE:** Steps 1 and 2 apply to computer models equipped with a graphics subsystem with discrete memory.

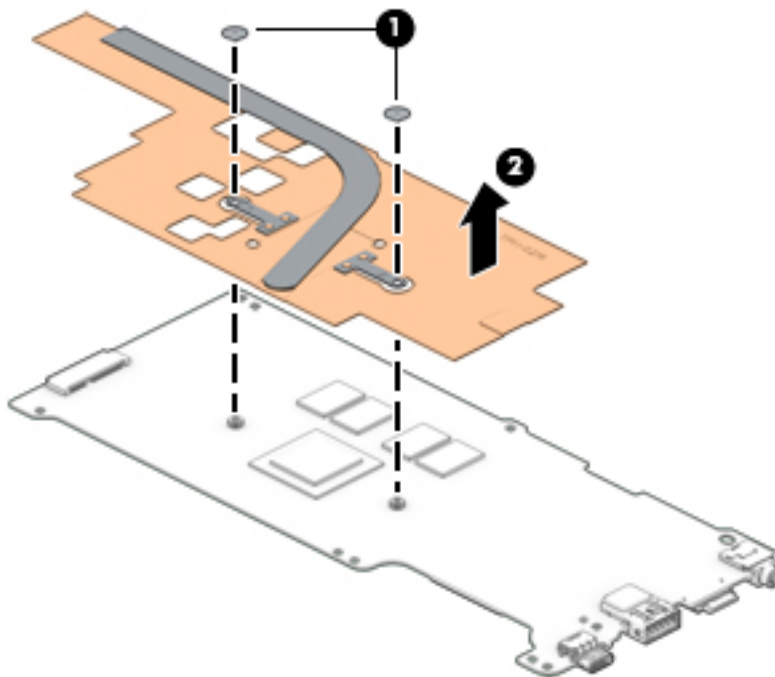
1. Remove the six Phillips M2.0 × 3.0 screws (1) that secure the heat sink to the system board.

2. Remove the heat sink **(2)**.



NOTE: Steps 3 and 4 apply to computer models equipped with a graphics subsystem with UMA memory.

3. Remove the four Phillips M2.0 × 3.0 screws **(1)** that secure the heat sink to the system board.
4. Remove the heat sink **(2)**.



Speakers

| Description | Spare part number |
|---|-------------------|
| Speakers (include left and right speakers and cables) | L14353-001 |

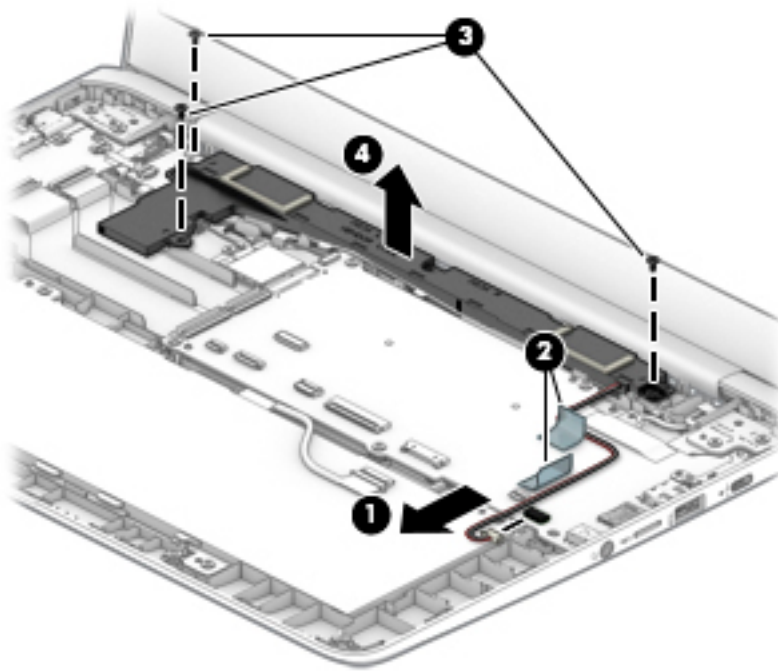
Before removing the speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the bottom cover (see [Bottom cover on page 22](#)), and then remove the following components:
 - a. Battery (see [Battery on page 24](#))
 - b. System board (see [System board on page 30](#))

Remove the speakers:

1. Release the speaker cable from the retention clips **(1)** and routing channel built into the keyboard/top cover.
2. Release the wireless antenna cables from the retention clips **(2)** and routing channel built into the left speaker.
3. Remove the three Phillips M2.5 × 6.7 screws **(3)** that secure the left display hinge to the keyboard/top cover.
4. Swing the left display hinge **(4)** up and back until the left speaker is accessible.
5. Remove the two Phillips M2.0 × 5.7 screws **(5)** that secure the speakers to the keyboard/top cover.

6. Remove the speakers (6).



Reverse this procedure to install the speakers.

6 Specifications

Computer specifications

| | Metric | U.S. |
|---|---|--|
| Dimensions | | |
| Width | 38.56 cm | 15.18 inches |
| Depth | 25.80 cm | 10.15 inches |
| Height (front to back) | 2.26 centimeters | 0.89 inches |
| Weight | 2.09 or 2.29 kg (depending on configuration) | 4.61 lb or 5.05 (depending on configuration) |
| Input power | | |
| Operating voltage and current | 19.5 V dc @ 3.33 A – 65 W | |
| | 19 V dc @ 4.62 A – 90 W | |
| | 19.5 V dc @ 2.31 – 45 W (select models only) | |
| 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. | | |

xx cm (xx-inches) display specifications

| | Metric | U.S. |
|-------------------------|--|--------------|
| Dimensions | | |
| Height | 20.77 cm | 8.17 inches |
| Width | 37.78 cm | 14.87 inches |
| Diagonal | 39.62 cm | 15.60 inches |
| Number of colors | Up to 16.8 million | |
| Contrast ratio | 500:1 (typical) | |
| Brightness | 200 nits | |
| Pixel resolution | | |
| Pitch | 0.252 mm x 0.252 mm | |
| Format | 1366 × 768 | |
| Configuration | RGB vertical stripe | |
| Backlight | LED | |
| Character display | 80 × 25 | |
| Total power consumption | 2.0 W | |
| Viewing angle | ±65° horizontal, ±50° vertical (typical) | |

Hard drive specifications

| | 500 GB* | 750 GB* |
|---|-----------------------------------|-----------------------------------|
| Dimensions | | |
| Height | 9.5 mm | 9.5 mm |
| Width | 70 mm | 70 mm |
| Weight | 107 g max | 102 g max |
| Interface type | SATA | SATA |
| Transfer rate | 300 MB/sec | 300 MB/sec |
| Security | ATA security | ATA security |
| Seek times (typical read, including setting) | | |
| Single track | 1.5 ms | 1.1 ms |
| Average | 12.0 ms | 12.0 ms |
| Maximum | 22.0 ms | 21.0 ms |
| Logical blocks | 976,752,240 | 1,465,149,168 |
| Disk rotational speed | 5400 rpm | 5400 rpm |
| Operating temperature | 0°C to 60°C (0°F to 140°F) | 0°C to 60°C (0°F to 140°F) |

| 500 GB* | 750 GB* |
|---|---------|
| *Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly. | |
| NOTE: Certain restrictions and exclusions apply. Contact support for details. | |

7 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

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

Requirements for specific countries and regions

| 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 | BIS | 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 |
| The United States | UL | 2 |

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
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.

| Country/region | Accredited agency | Applicable note number |
|----------------|-------------------|---|
| | | <p>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, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.</p> <p>4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.</p> <p>5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.</p> <p>6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.</p> <p>7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.</p> |

8 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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