



## Maintenance and Service Guide

HP Chromebook 11A G8 Education Edition  
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## Product notice

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

Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. Go to <http://www.microsoft.com> for details.

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


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

## Safety warning notice

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 **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 applicable safety standards.

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# 1 Product description

Table 1-1 Product description

Category	Description
Product Name	HP Chromebook™ 11A G8 Education Edition
Processor	AMD® A6-9220C 1.8 GHz (turbo up to 2.7 GHz) dual core processor (1.0 MB L2 cache, 1800 MHz FSB, 6 W), R5-720 unified memory architecture (UMA) graphics subsystem  AMD A4-9120C 1.6 GHz (turbo up to 2.4 GHz) dual core processor (1.0 MB L2 cache, 1800 MHz FSB, 6 W), R4-600 unified memory architecture (UMA) graphics subsystem
Chipset	R5-720 unified memory architecture (UMA) graphics subsystem on computer models equipped with an AMD A6-9220C processor  R4-600 UMA graphics subsystem on computer models equipped with an AMD A4-9120C processor
Graphics	AMD integrated with soldered-on-circuit (SoC) processor
Panel	<ul style="list-style-type: none"><li>• 11.6 inch, touchscreen, high-definition (HD) (1366×768), antiglare, white light emitting diode (WLED), UWVA, liquid crystal display (LCD), 50% CG, eDP 1.2 without PSR, display panel; typical brightness: 220 nits</li><li>• 11.6 inch, nontouchscreen, HD (1366×768), antiglare, WLED, UWVA, LCD, 50% CG, display panel; typical brightness: 220 nits</li><li>• 11.6 inch, nontouchscreen, HD (1366×768), antiglare, WLED, SVA, LCD, 45% CG, display panel; typical brightness: 220 nits</li></ul>
Memory	Support for the following:  DDR4-3200, 1.2 V, nonupgradeable, onboard system memory in 16 GB and 8 GB configurations  DDR4-2666, 1.2 V, nonupgradeable, onboard system memory in 16 GB and 8 GB configurations
Storage	<b>Embedded Multimedia Controller (eMMC):</b> Supports M0-276 MMC v 5.0 in 64/32/16/8 GB configurations
Audio and video	Fixed (no tilt), 720p HD WKCD camera integrated into display assembly  Single microphone with appropriate echo-cancellation, noise-suppression software  Dual speakers
Wireless	Integrated wireless local area network (WLAN) with two built-in antennas  Support for the Qualcomm QCA6174A-5 ac 2×2 + Bluetooth® 4.2 M.2 2230 PCI-e WorldWide (WW) WLAN module
Keyboard/pointing devices	Island-style, spill-resistant, textured standard notebook keyboard in chalkboard gray finish  Island-style, spill-resistant, textured standard notebook keyboard in dark sage green  Touchpad
Power requirements	Supports a 2 cell, 47.36 Whr, 6.15 Ahr, Li-ion battery  Supports a 45 W, AC adapter (non-PFC, standard USB Type-C, straight connector)  Supports 1.8 and 1.0 meter C5 conventional power cords

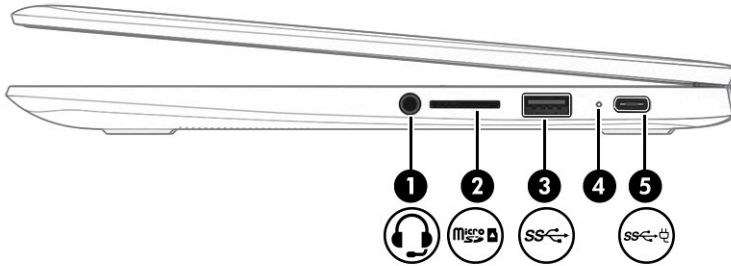
Table 1-1 Product description (continued)

Category	Description
Operating system	<b>Preinstalled:</b> Google® Chrome OS 64
Serviceability	<b>End user replaceable parts:</b> AC adapter




# 2 Components

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


## Right side



**Table 2-1** Right-side components and their descriptions

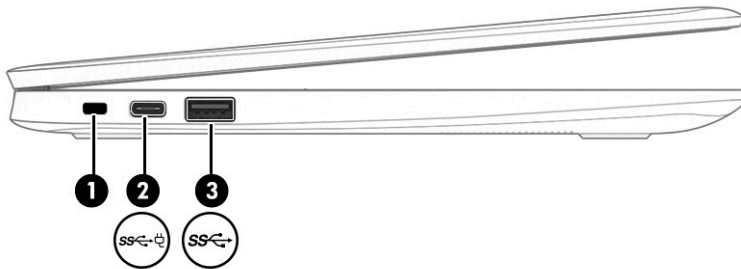
Component	Description
<p>(1)  Audio-out (headphone)/Audio-in (microphone) combo jack</p>	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p><b>WARNING!</b> To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p><b>NOTE:</b> When a device is connected to the jack, the computer speakers are disabled.</p>
<p>(2)  microSD™ memory card reader</p>	<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"> <li>1. Hold the card label-side up, with connectors facing the computer.</li> <li>2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.</li> </ol> <p>To remove a card:</p> <ul style="list-style-type: none"> <li>▲ Press in on the card, and then remove it from the memory card reader.</li> </ul>
<p>(3)  USB SuperSpeed port</p>	<p>Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p>
<p>(4) AC adapter and battery light</p>	<ul style="list-style-type: none"> <li>• White: The AC adapter is connected and the battery is fully charged.</li> <li>• Amber: The AC adapter is connected and the battery is charging.</li> </ul>

**Table 2-1** Right-side components and their descriptions (continued)



Component	Description
<p>(5)</p>  <p>USB Type-C power connector and SuperSpeed port</p>	<ul style="list-style-type: none"> <li>• Blinking amber: The battery has an error.</li> <li>• Off: The battery is not charging.</li> </ul> <hr/> <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><b>NOTE:</b> Cables, adapters, or both (purchased separately) may be required.</p>



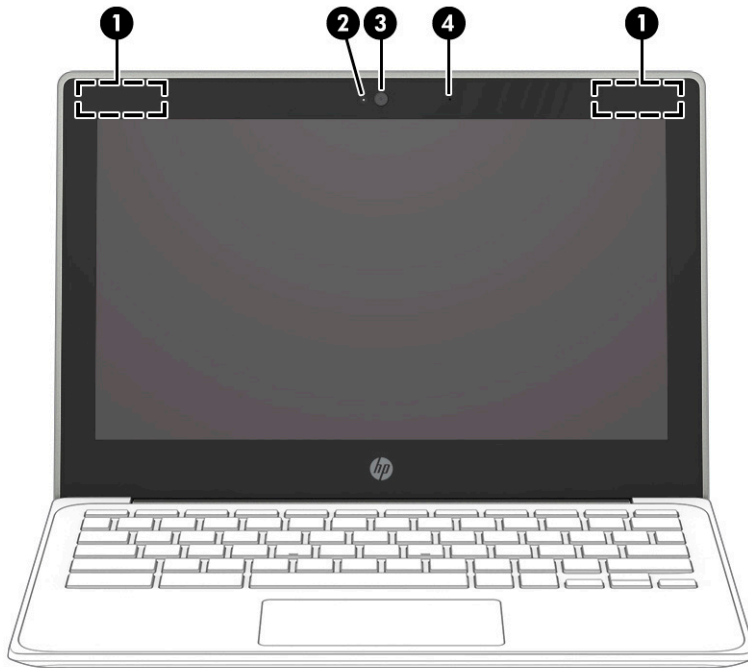
## Left side



**Table 2-2** Left-side components and their descriptions

Component	Description
(1)	<p>Nano security cable slot</p> <p>Attaches an optional security cable to the computer.</p> <p><b>NOTE:</b> The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>
(2)	<p>            USB Type-C Power Connector and SuperSpeed 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><b>NOTE:</b> Cables, adapters, or both (purchased separately) may be required.</p>
(3)	<p>            USB SuperSpeed port         </p> <p>Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer.</p>

# Display



**Table 2-3** Display components and their descriptions

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

\*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>, type HP Documentation in the taskbar search box, and then select HP Documentation.

# Keyboard area

## Touchpad



**Table 2-4** Touchpad component and its description

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

## Bottom



**Table 2-5** Bottom component and its description

Component	Description
Speaker vents	Enable airflow to cool internal components. <b>NOTE:</b> The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

# Labels

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

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

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

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

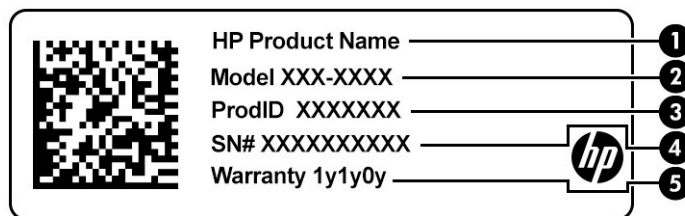


Table 2-6 Service label components

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

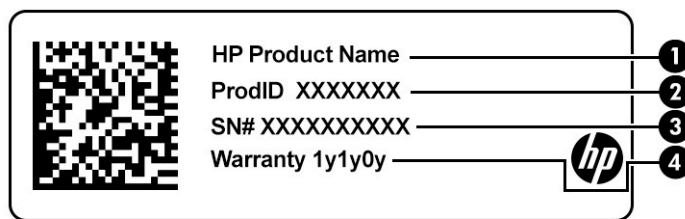


Table 2-7 Service label components


Component
(1) HP product name
(2) Product ID

**Table 2-7** Service label components (continued)

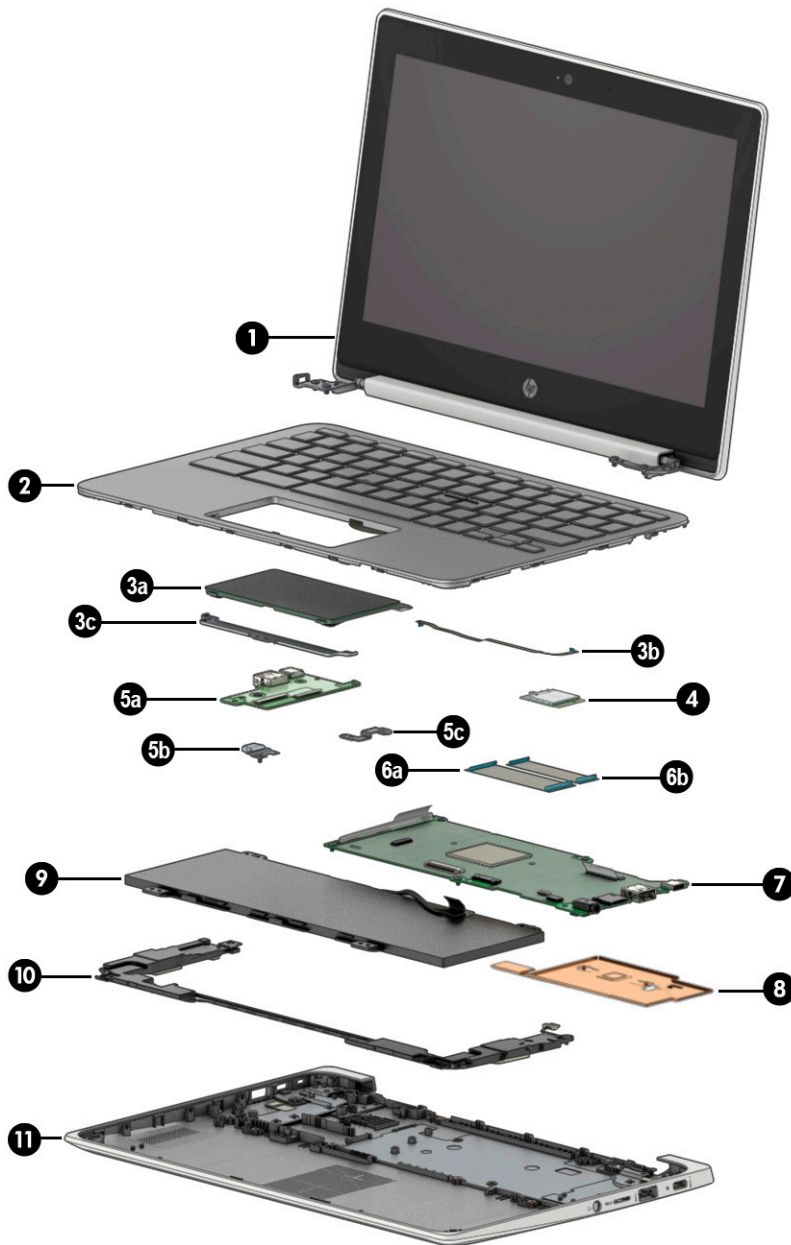
Component	
(3)	Serial number
(4)	Warranty period

- 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

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

## Computer major components



**Table 3-1 Major component spare part information**

Item	Component	Spare part number
(1)	<b>Display assembly:</b> The display assembly is available as spare parts at the subcomponent level only. For more display assembly spare part information, see <a href="#">Display components on page 15</a> .	
(2)	<b>Keyboard/top cover</b> in chalkboard gray finish (includes keyboard cable):	
	For use in Belgium	L92832-A41
	For use in Brazil	L92832-201
	For use in Canada	L92832-DB1
	For use in the Czech Republic and Slovakia	L92832-FL1
	For use in Denmark, Finland, and Norway	L92832-DH1
	For use in France	L92832-051
	For use in Germany	L92832-041
	For use in Israel	L92832-BB1
	For use in Italy	L92832-061
	For use in Latin America	L92832-161
	For use in the Netherlands	L92832-B31
	For use in North Africa	L92832-DB1
	For use in Portugal	L92832-131
	For use in Romania	L92832-271
	For use in Russia	L92832-251
	For use in Saudi Arabia	L92832-171
	For use in South Korea	L92832-AD1
	For use in Spain	L92832-071
	For use in Switzerland	L92832-BG1
	For use in Taiwan	L92832-AB1
	For use in Thailand	L92832-281
	For use in Turkey	L92832-141
	For use in the United Kingdom	L92832-031
	For use in the United States	L92832-001
	<b>Keyboard/top cover</b> in dark sage gray finish (includes keyboard cable):	
	For use in Belgium	L92833-A41
	For use in Brazil	L92833-261
	For use in Canada	L92833-DB1
	For use in the Czech Republic and Slovakia	L92833-FL1
	For use in Denmark, Finland, and Norway	L92833-DH1
	For use in France	L92833-051



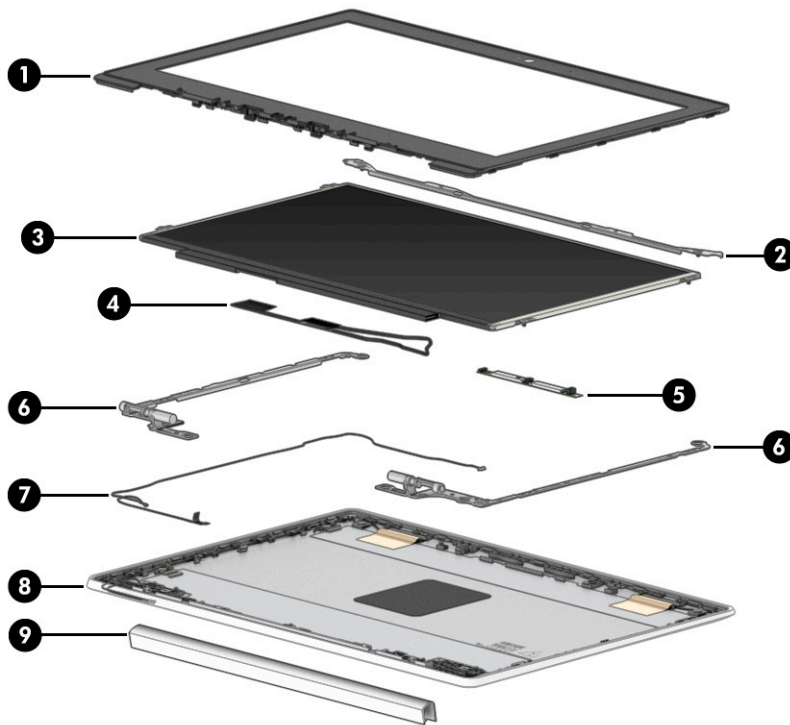
**Table 3-1 Major component spare part information (continued)**

Item	Component	Spare part number
	For use in Germany	L92833-041
	For use in Israel	L92833-BB1
	For use in Italy	L92833-061
	For use in Latin America	L92833-161
	For use in the Netherlands	L92833-B31
	For use in North Africa	L92833-DB1
	For use in Portugal	L92833-131
	For use in Romania	L92833-271
	For use in Russia	L92833-251
	For use in Saudi Arabia	L92833-171
	For use in South Korea	L92833-AD1
	For use in Spain	L92833-071
	For use in Switzerland	L92833-BG1
	For use in Taiwan	L92833-AB1
	For use in Thailand	L92833-281
	For use in Turkey	L92833-141
	For use in the United Kingdom	L92833-031
	For use in the United States	L92833-001
<b>(3a)</b>	<b>Touchpad:</b>	
	In chalkboard gray finish	L99224-001
	In dark sage gray finish	L92823-001
<b>(3b)</b>	<b>Touchpad cable</b> (included in the Cable Kit, spare part number L93821-001)	
<b>(3c)</b>	<b>Touchpad bracket</b>	L89791-001
<b>(4)</b>	<b>Qualcomm QCA6174A-5 ac 2x2 + Bluetooth® 4.2 M.2 2230 PCI-e WW WLAN module</b>	L54709-001
<b>(5a)</b>	<b>Connector board</b> (includes audio jack and USB port)	L92816-001
<b>(5b)</b>	<b>Left-side I/O bracket</b>	L89793-001
<b>(5c)</b>	<b>Right-side I/O bracket</b>	L89793-001
<b>(6a)</b>	<b>Connector board high-speed cable</b> (included in the Cable Kit, spare part number L93821-001)	
<b>(6b)</b>	<b>Connector board low-speed cable</b> (included in the Cable Kit, spare part number L93821-001)	
<b>(7)</b>	<b>System board</b> (includes processor, heat sink, replacement thermal material, and a UMA graphics subsystem. Replacement thermal pads are also available in the Thermal Pad Kit, spare part number L93823-001.):	
	Equipped with an AMD A6-9220C processor, 4 GB of system memory, 64 GB of eMMC system storage, and the Google Chrome OS 64 operating system	M08407-001
	Equipped with an AMD A6-9220C processor, 8 GB of system memory, 32 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92815-001

**Table 3-1 Major component spare part information (continued)**

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	Equipped with an AMD A6-9220C processor, 4 GB of system memory, 16 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92814-001
	Equipped with an AMD A4-9120C processor, 4 GB of system memory, 32 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92813-001
	Equipped with an AMD A4-9120C processor, 4 GB of system memory, 16 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92812-001
<b>(8)</b>	<b>Heat sink</b> (includes replacement thermal pads. Replacement thermal pads are also available in the Thermal Pad Kit, spare part number L93823-001.)	L92817-001
<b>(9)</b>	<b>Battery</b> (2 cell, 47.36 WHr, 6.15 AHr, Li-ion; includes cable)	L75783-005
	<b>Battery bracket</b> (not illustrated)	L98587-001
	<b>Battery tape</b> (not illustrated)	L14905-001
<b>(10)</b>	<b>Speakers</b> (include left and right speakers, cables, and 2 rubber isolators)	L89788-001
<b>(11)</b>	<b>Bottom cover:</b>	
	In chalkboard gray finish	L92818-001
	In dark sage gray finish	L92822-001

# Display components



**Table 3-2** Display component spare part information

Item	Component	Spare part number
(1)	Display bezel	L89773-001
(2)	Display bracket	L89774-001
(3)	<b>Display panel:</b>	
	11.6 in, HD, antiglare, LED, UWVA, touchscreen display panel	L92828-001
	11.6 in, HD, antiglare, LED, UWVA, nontouchscreen display panel	L92827-001
	11.6 in, HD, antiglare, LED, SVA, nontouchscreen display panel	92826-001
(4)	<b>Display panel cable:</b>	
	For use only on computers equipped with a touchscreen display assembly	L89776-001
	For use only on computers equipped with a nontouchscreen display assembly	L89775-001
(5)	<b>Webcam module</b> (includes double-sided adhesive)	L92824-001
(6)	<b>Display hinges</b> (2)	L89768-001
(7)	<b>Webcam module cable</b> (included in the Cable Kit, spare part number L93821-001)	
(8)	<b>Display back cover</b> (includes the wireless antenna cables and transceivers):	
	In chalkboard gray finish	L89771-001
	In dark sage gray finish	L89772-001
	<b>Wireless Antenna Kit</b> (not illustrated, includes left and right antenna cables and transceivers)	L93822-001
(9)	<b>Display hinge cover:</b>	

**Table 3-2** Display component spare part information (continued)

<b>Item</b>	<b>Component</b>	<b>Spare part number</b>
	In chalkboard gray finish	L89769-001
	In dark sage gray finish	L89770-001

# Miscellaneous parts

**Table 3-3** Miscellaneous spare part information

Component	Spare part number
<b>45 W, AC Adapter (non-PFC, USB Type-C, 1.8 m, 3 pin)</b>	L43407-001
<b>Cable Kit</b> (includes adapter cable, connector board high-speed cable, connector board low-speed cable, touchpad cable, and webcam module cable)	L93821-001
<b>Power cord</b> (C5, 1.8 m, conventional with sticker):	
For use in Argentina	L19357-002
For use in Australia	L19358-002
For use in Brazil	L19359-002
For use in Europe	L19361-002
For use in India	L19363-002
For use in Israel	L19362-002
For use in Italy	L19364-002
For use in North America	L19367-002
For use in South Africa	L19369-002
For use in South Korea	L19366-002
For use in Switzerland	L19370-002
For use in Taiwan	L19372-002
For use in the United Kingdom	L19373-002
<b>Power cord</b> (C5, 1.0 m, conventional with sticker):	
For use in Argentina	L19357-001
For use in Australia	L19358-001
For use in Brazil	L19359-001
For use in Denmark	L19360-001
For use in Europe	L19361-001
For use in India	L19363-001
For use in Israel	L19362-001
For use in Italy	L19364-001
For use in North America	L19367-001
For use in South Africa	L19369-001
For use in South Korea	L19366-001
For use in Switzerland	L19370-001
For use in Taiwan	L19372-001
For use in Thailand	L19371-001

**Table 3-3** Miscellaneous spare part information (continued)

<b>Component</b>	<b>Spare part number</b>
For use in the United Kingdom	L19373-001
<b>Power cord</b> (C5, black)	213349-001
<b>Rubber Kit</b> (includes touchpad bracket bumper)	L89786-001
<b>Screw Kit</b>	L92825-001

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# 4 Removal and replacement procedures preliminary requirements

## Tools required


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

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Case utility tool or similar thin plastic tool

## Service considerations

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


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

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## Plastic parts


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 **IMPORTANT:** Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic.

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## Cables and connectors

---

 **IMPORTANT:** 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.

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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



**IMPORTANT:** 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 2.54 cm (1 in.) 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.”

## 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 might have occurred.

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



**IMPORTANT:** 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.



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



**Table 4-1** Typical electrostatic voltage levels

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 polystyrene foam	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.

## 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 polystyrene foam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

## Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of  $1\text{ M}\Omega \pm 10\%$  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  $1\text{ M}\Omega \pm 10\%$  resistance between the operator and ground. To be effective, the conductive must be worn in contact with the skin.

HP recommends the following grounding equipment 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  $1\text{ M}\Omega \pm 10\%$  resistance
- Static-dissipative tables or floor mats with hard ties to the ground
- Field service kits
- Static awareness labels
- Material-handling packages
- Nonconductive plastic bags, tubes, or boxes
- Metal tote boxes
- Electrostatic voltage levels and protective materials


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

**Table 4-2** Shielding protection provided by antistatic bags and floor mats

<b>Material</b>	<b>Use</b>	<b>Voltage protection level</b>
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

 **IMPORTANT:** 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 about supported parts for the computer, go to <http://partsurfer.hp.com>, select the country or region, and then follow the on-screen instructions.

## Component replacement procedures

There are as many as 53 screws that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

### Keyboard/top cover

**Table 5-1** Keyboard/top cover spare part information

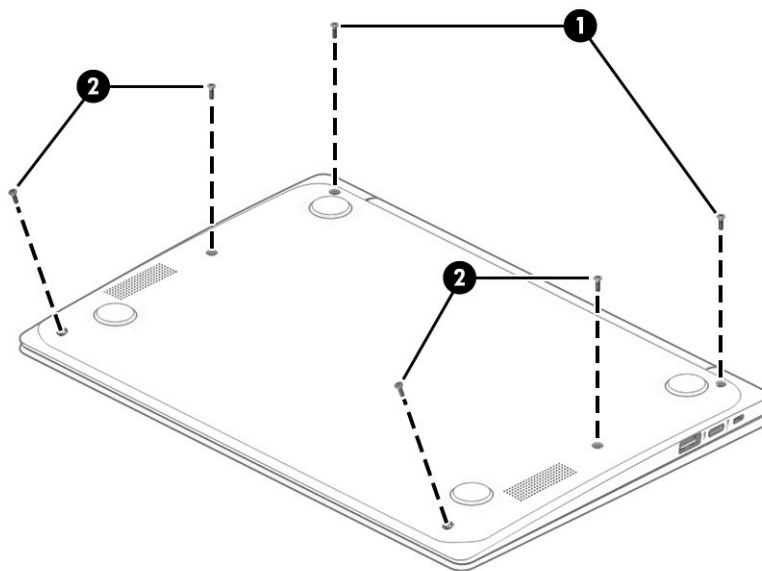
For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Keyboard/top cover in chalkboard gray finish (includes keyboard cable):					
For use in Belgium	L92832-A41	For use in Italy	L92832-061	For use in South Korea	L92832-AD1
For use in Brazil	L92832-201	For use in Latin America	L92832-161	For use in Spain	L92832-071
For use in Canada	L92832-DB1	For use in the Netherlands	L92832-B31	For use in Switzerland	L92832-BG1
For use in the Czech Republic and Slovakia	L92832-FL1	For use in North Africa	L92832-DB1	For use in Taiwan	L92832-AB1
For use in Denmark, Finland, and Norway	L92832-DH1	For use in Portugal	L92832-131	For use in Thailand	L92832-281
For use in France	L92832-051	For use in Romania	L92832-271	For use in Turkey	L92832-141
For use in Germany	L92832-041	For use in Russia	L92832-251	For use in the United Kingdom	L92832-031
For use in Israel	L92832-BB1	For use in Saudi Arabia	L92832-171	For use in the United States	L92832-001
Keyboard/top cover in dark sage green finish (includes keyboard cable):					
For use in Belgium	L92833-A41	For use in Italy	L92833-061	For use in South Korea	L92833-AD1
For use in Brazil	L92833-201	For use in Latin America	L92833-161	For use in Spain	L92833-071
For use in Canada	L92833-DB1	For use in the Netherlands	L92833-B31	For use in Switzerland	L92833-BG1

**Table 5-1** Keyboard/top cover spare part information (continued)

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
For use in the Czech Republic and Slovakia	L92833-FL1	For use in North Africa	L92833-DB1	For use in Taiwan	L92833-AB1
For use in Denmark, Finland, and Norway	L92833-DH1	For use in Portugal	L92833-131	For use in Thailand	L92833-281
For use in France	L92833-051	For use in Romania	L92833-271	For use in Turkey	L92833-141
For use in Germany	L92833-041	For use in Russia	L92833-251	For use in the United Kingdom	L92833-031
For use in Israel	L92833-BB1	For use in Saudi Arabia	L92833-171	For use in the United States	L92833-001

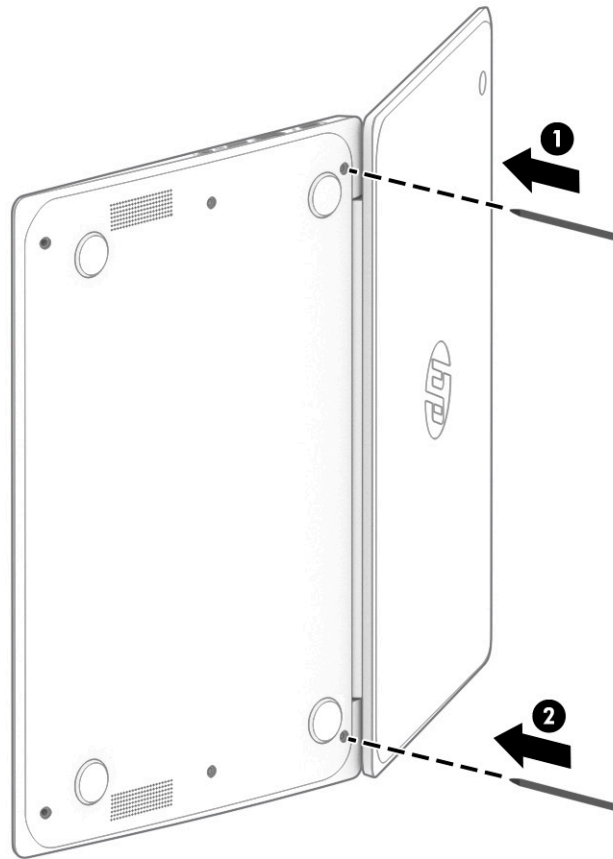
Remove the keyboard/top cover:

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. Close the computer and position it upside down.
5. Remove the two Phillips M2.5×8.7 screws **(1)** the four Phillips M2.5×7.2 screws **(2)** that secure the keyboard/top cover to the bottom cover.



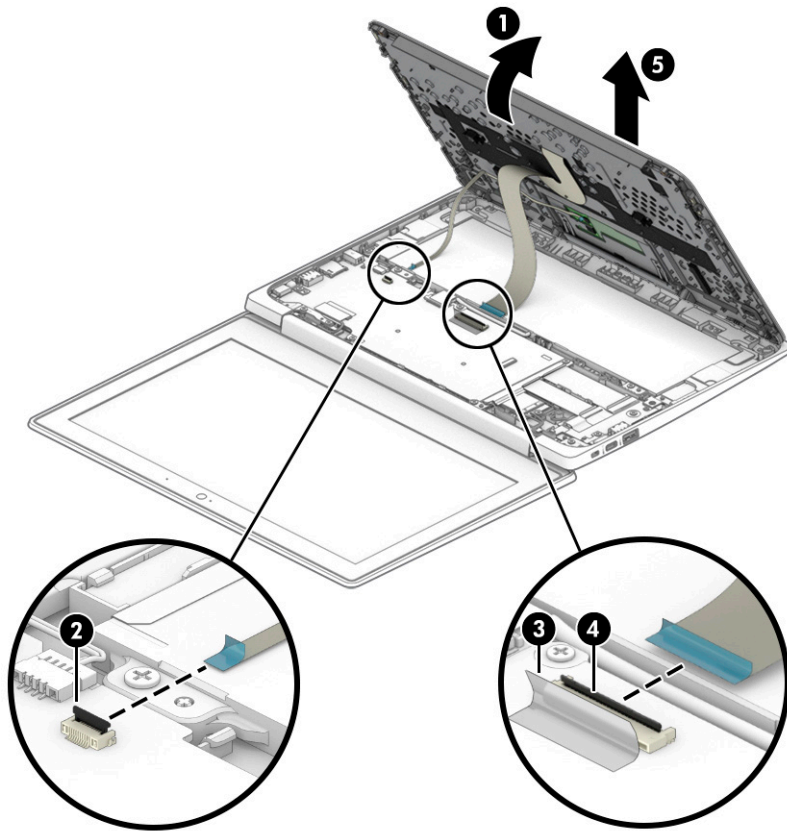
6. Open the computer and rest it on its left side.

7. Use a thin plastic tool **(1)** to separate the rear edge of the keyboard/top cover **(2)** from the bottom cover.




8. Position the computer right side up with the rear toward you.
9. Open the computer as far as it will open.
10. Lift the rear edge of the keyboard/top cover **(1)** as far as the keyboard cable and touchpad cable allow.
11. Release the zero insertion force (ZIF) connector **(2)** to which the touchpad board cable is connected, and then disconnect the touchpad cable from the system board.
12. Release the shielding **(3)** that covers the keyboard cable ZIF connector.
13. Release the ZIF connector **(4)** to which the keyboard cable is connected, and then disconnect the keyboard cable from the system board.

14. Remove the keyboard/top cover (5).



Reverse this procedure to install the keyboard/top cover.

## Touchpad cable

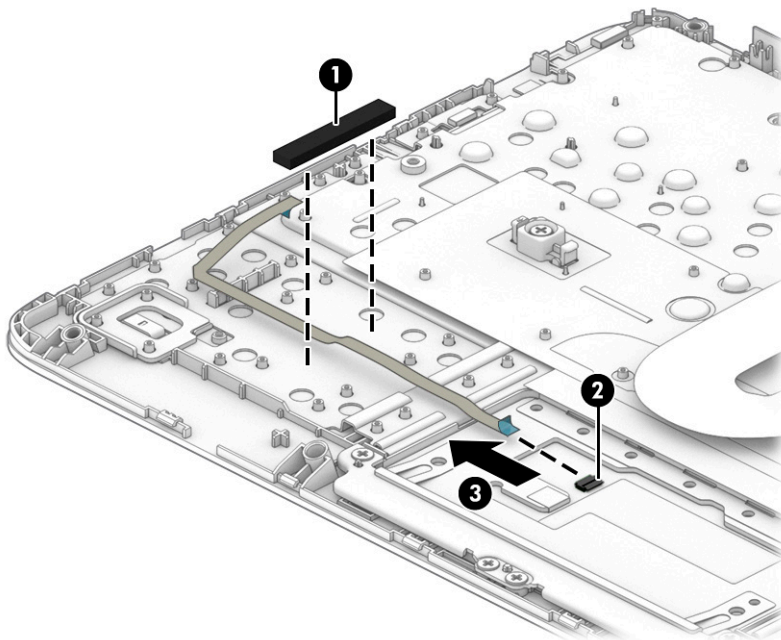
 **NOTE:** The touchpad cable is included in the Cable Kit, spare part number L93821-001.

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 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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).

Remove the touchpad cable:

1. Turn the keyboard/top cover upside down with the front toward you.
2. Remove the pad (1) that secures the touchpad cable to the keyboard/top cover.
3. Release the ZIF connector (2) to which the touchpad cable is connected, and then disconnect the touchpad cable from the touchpad.
4. Remove the touchpad cable (3).



Reverse this procedure to install the touchpad cable.



# Touchpad

Table 5-2 Touchpad spare part information

Description	Spare part number
In chalkboard gray finish	L99224-001
In dark sage gray finish	L92823-001

Before removing the touchpad, follow these steps:

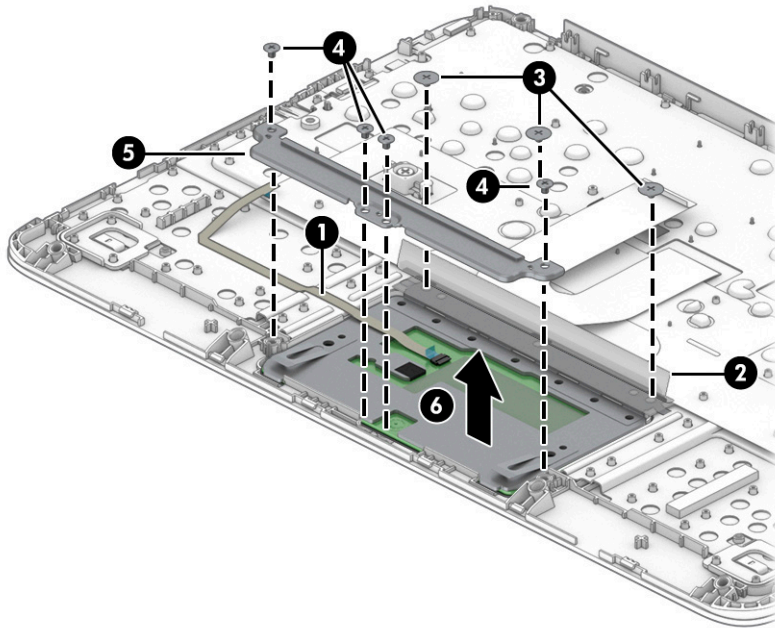
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the touchpad:

1. Turn the keyboard/top cover upside down with the front toward you.
2. Remove the pad **(1)** that secures the touchpad cable to the keyboard/top cover.
3. Release the shielding **(2)** that covers the touchpad screws.
4. Remove the three Phillips M2.0×2.2 broad head screws **(3)** that secure the touchpad to the keyboard/top cover.
5. Remove the four Phillips M2.0×2.9 screws **(4)** that secure the touchpad and touchpad bracket to the keyboard/top cover.
6. Remove the touchpad bracket **(5)**.

The touchpad bracket is available using spare part number L89791-001.

7. Remove the touchpad (6) and cable.



Reverse this procedure to install the touchpad.

# Speakers

**Table 5-3 Speaker spare part information**

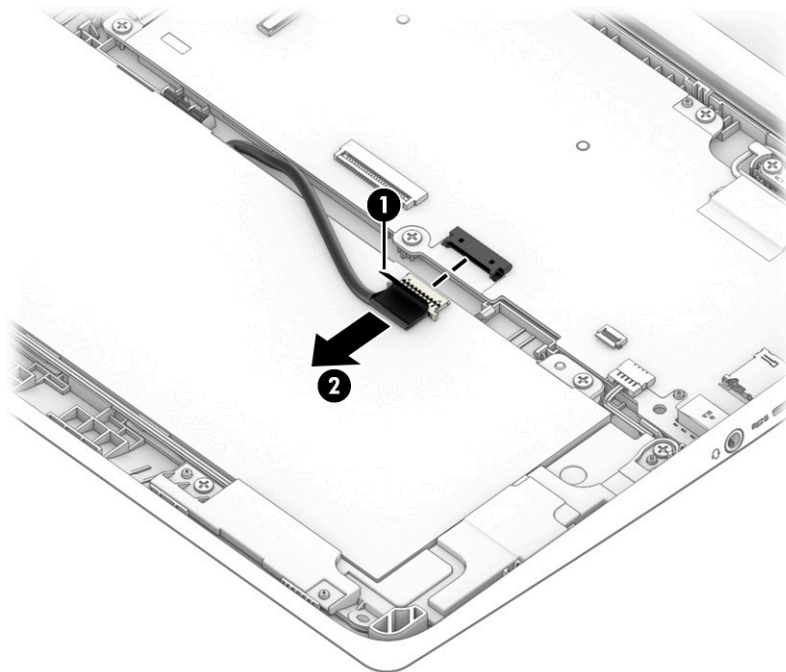
Description	Spare part number
Speakers (include left and right speakers, cables, and 2 rubber isolators)	L89788-001

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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).

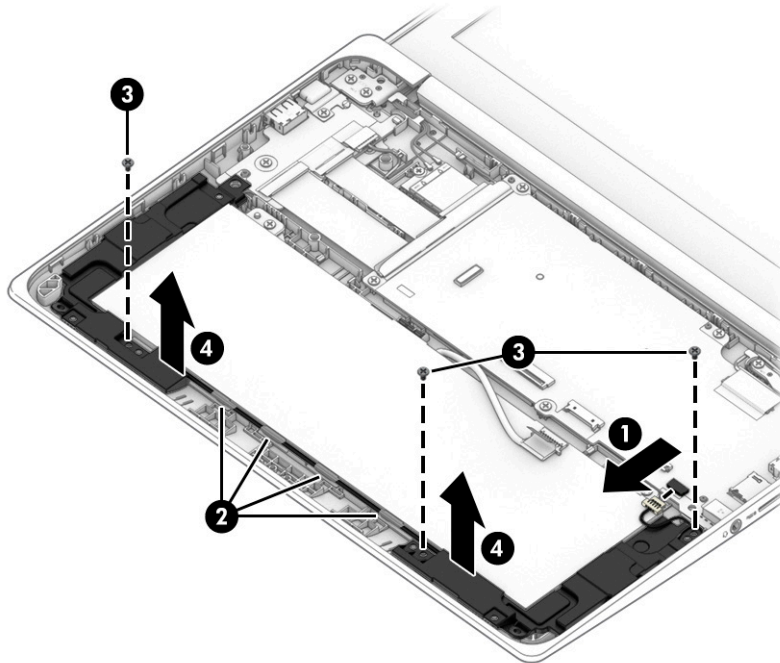
Remove the speakers:

1. Release the shielding (1) that covers the battery cable and connector.
2. Disconnect the battery cable (2) from the system board.



3. Disconnect the speaker cable (1) from the system board.
4. Release the speaker cable from the routing clips (2) and channel built into the battery.
5. Remove the three Phillips M2.0×4.2 screws (3) that secure the speakers to the bottom cover.

6. Remove the speakers (4).



Reverse this procedure to install the speakers.

## Battery

**Table 5-4** Battery spare part information

Description	Spare part number
Battery (2 cell, 47.36 WHr, 6.15 AHR, Li-ion; includes cable)	L75783-005
Battery bracket	L98587-001
Battery tape	L14905-001

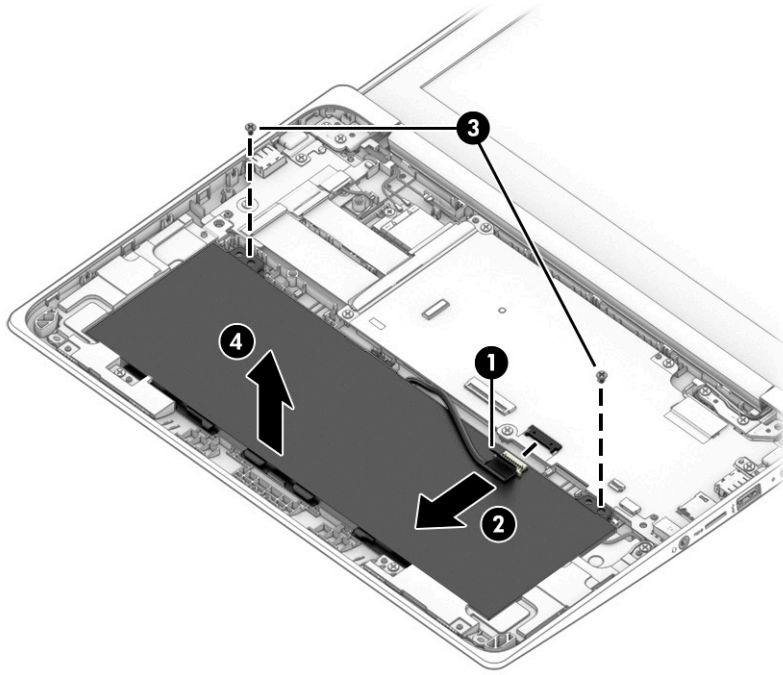
Before removing the battery, follow these steps:

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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Remove the speakers (see [Speakers on page 31](#)).

Remove the battery:

1. Release the shielding (1) that covers the battery cable and connector.
2. Disconnect the battery cable (2) from the system board.
3. Remove the two Phillips M2.0×4.2 screws (3) that secure the battery to the bottom cover.

4. Remove the battery (4).



Reverse this procedure to install the battery.

## WLAN module

Table 5-5 WLAN module spare part information

Description	Spare part number
Qualcomm QCA6174A-5 ac 2×2 + Bluetooth® 4.2 M.2 2230 PCI-e WW WLAN module	L54709-001



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

Before removing the WLAN module, follow these steps:

1. 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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 32](#)).

Remove the WLAN module:

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

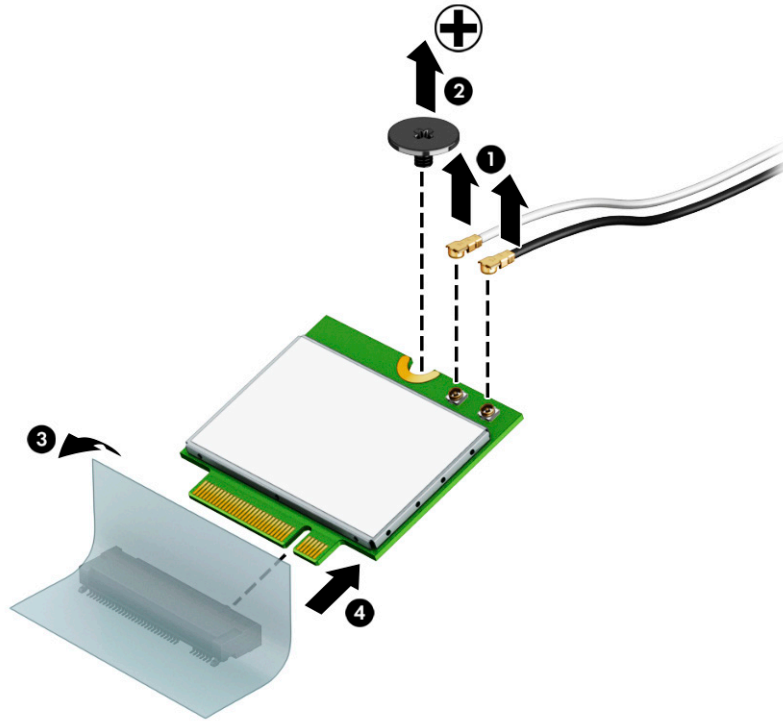


**NOTE:** The #1/white WLAN antenna cable connects to the WLAN module **#1/Main** terminal. The #2/ black WLAN antenna cable connects to the WLAN module **#2/Aux** terminal.

2. Remove the Phillips M2.0×2.9 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)
3. Release the shielding **(3)** that secures the WLAN module to the slot.


4. Remove the WLAN module (4) by pulling the module away from the slot at an angle.

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



Reverse this procedure to install the WLAN module.

## Connector board cables

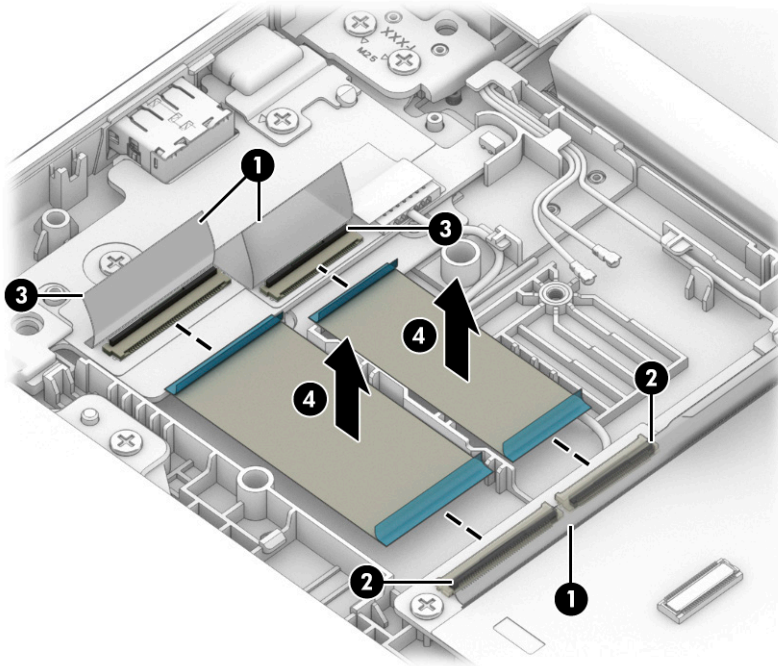
 **NOTE:** The connector board cables are included in the Cable Kit, spare part number L93821-001.

Before removing the connector board cables, 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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 32](#)).

Remove the connector board cables:

1. Release the shielding (1) that covers the connector board cable ZIF connectors.
2. Release the ZIF connectors (2) to which the connector board cables are connected, and then disconnect the connector board cables from the system board.
3. Release the ZIF connectors (3) to which the connector board cables are connected, and then disconnect the connector board cables from the connector board.
4. Remove the connector board cables (4).



Reverse this procedure to install the connector board cables.



## Connector board

Table 5-6 Connector board spare part information

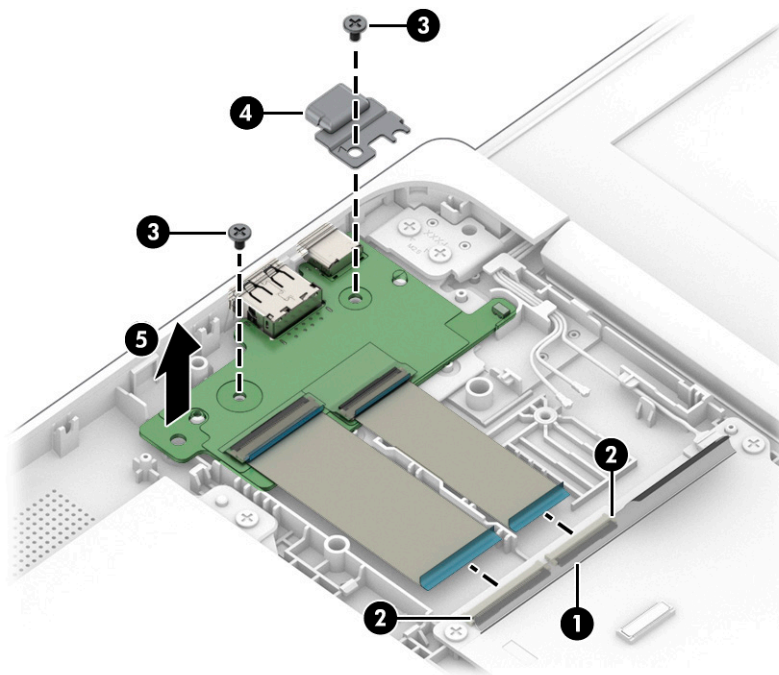
Description	Spare part number
Connector board (includes audio jack and USB port and rubber bumper)	L92816-001

Before removing the connector 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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 32](#)).

Remove the connector board:

1. Release the shielding (1) that covers the connector board cable ZIF connectors on the system board.
  2. Release the ZIF connectors (2) to which the connector board cables are connected, and then disconnect the connector board cables from the system board.
  3. Remove the two Phillips M2.0×4.2 screws (3) that secure the connector board to the bottom cover.
  4. Remove the left-side I/O bracket (4).
- The left-side I/O bracket is available using spare part number L89793-001.
5. Remove the connector board (5) and cables.



Reverse this procedure to install the connector board.

## System board



**NOTE:** The system board spare part kit includes the processor, heat sink, and replacement thermal material.

**Table 5-7** System board spare part information

Description	Spare part number
Equipped with an AMD A6-9220C processor, 4 GB of system memory, 64 GB of eMMC system storage, and the Google Chrome OS 64 operating system	M08407-001
Equipped with an AMD A6-9220C processor, 8 GB of system memory, 32 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92815-001
Equipped with an AMD A6-9220C processor, 4 GB of system memory, 16 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92814-001
Equipped with an AMD A4-9120C processor, 4 GB of system memory, 32 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92813-001
Equipped with an AMD A4-9120C processor, 4 GB of system memory, 16 GB of eMMC system storage, and the Google Chrome OS 64 operating system	L92812-001

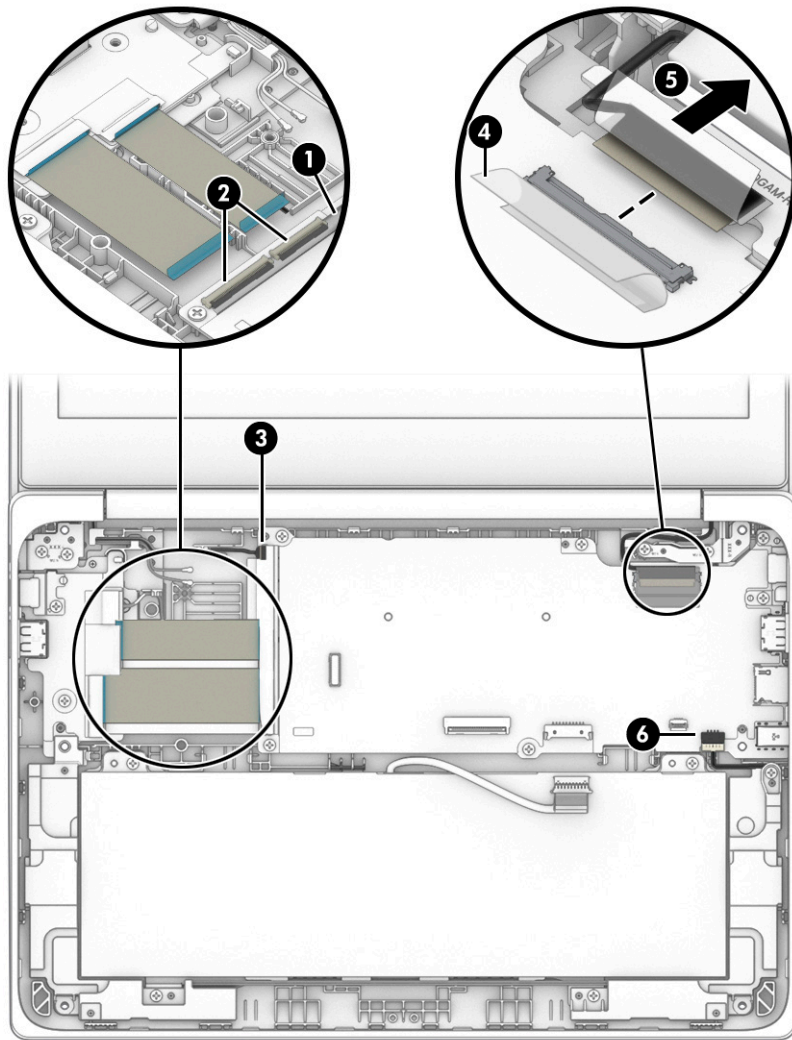
Before removing the system board, follow these steps:

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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 32](#)).
6. Remove the WLAN module (see [WLAN module on page 34](#)).

Remove the system board:

1. Release the shielding **(1)** that covers the connector board cable ZIF connectors on the system board.
2. Release the ZIF connectors **(2)** to which the connector board cables are connected, and then disconnect the connector board cables from the system board.
3. Disconnect the webcam module cable **(3)** from the system board.
4. Release the shielding **(4)** that covers the display panel cable connector.
5. Disconnect the display panel cable **(5)** from the system board.

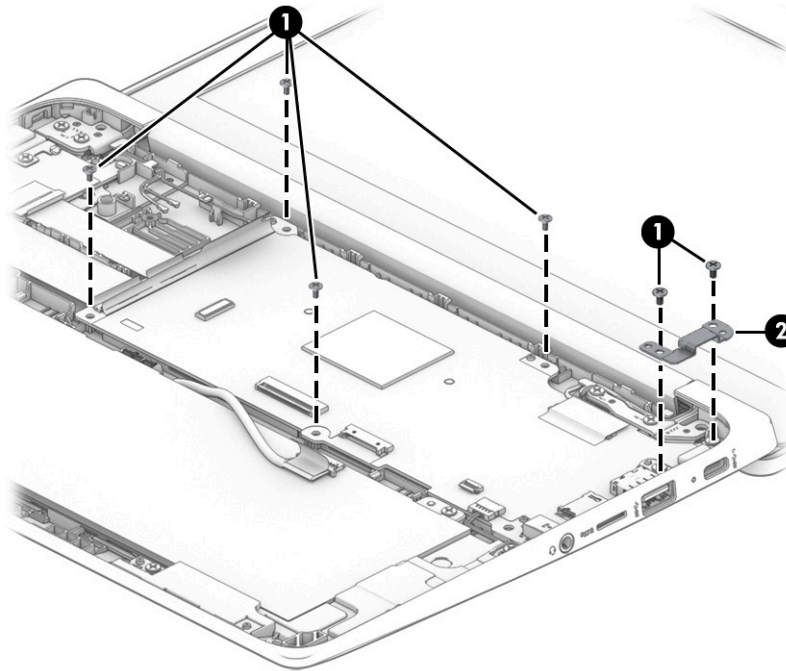
6. Disconnect the speaker cable (6) from the system board.



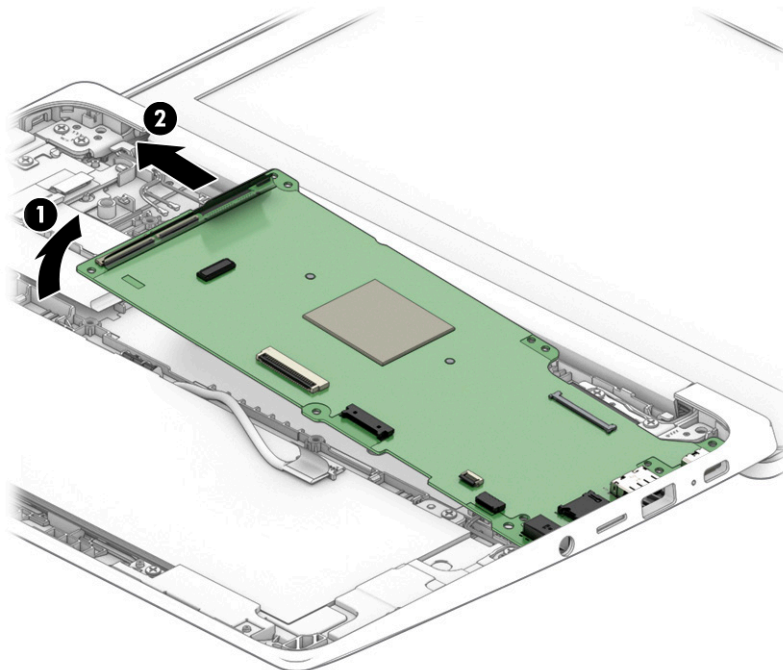
7. Remove the six Phillips M2.0×4.2 screws (1) that secure the system board to the bottom cover.

8. Remove the right-side I/O bracket (2).

The I/O bracket is available using spare part number L89793-001.



9. Lift the left side the system board (1) until it rests at an angle.
10. Remove the system board (2) by sliding it up and to the left at an angle.



Reverse this procedure to install the system board.

## Heat sink

Table 5-8 Heat sink spare part information

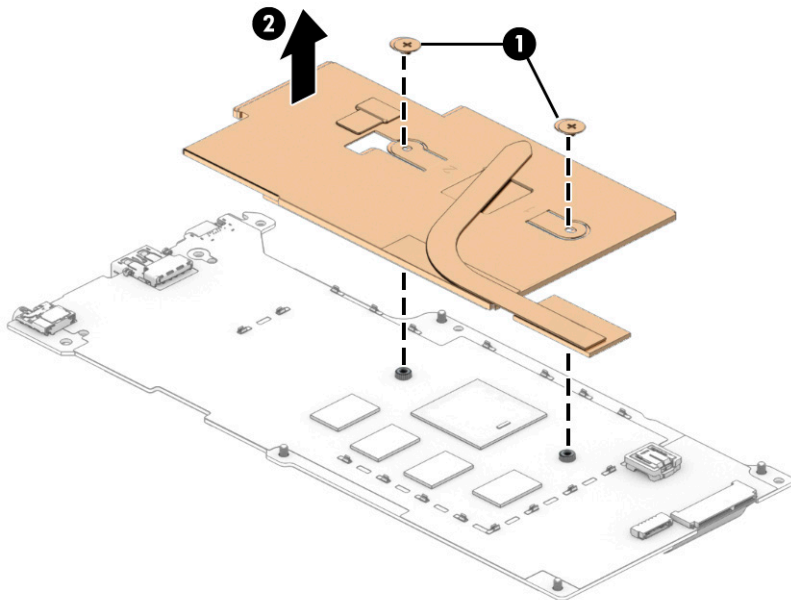
Description	Spare part number
Heat sink (includes replacement thermal pads. Replacement thermal pads are also available in the Thermal Pad Kit, spare part number L93823-001.)	L92817-001

Before removing the heat sink, follow these steps:

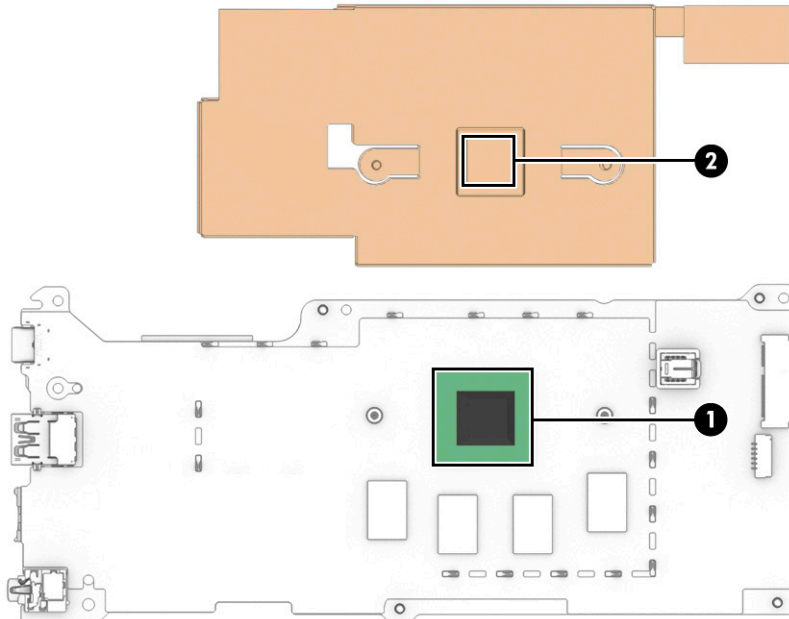
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery cable from the system board (see [Battery on page 32](#)).
6. Remove the WLAN module (see [WLAN module on page 34](#)).
7. Remove the system board (see [System board on page 39](#)).

Remove the heat sink:

1. Remove the two Phillips M2.0×2.0 broad head screws (1) that secure the heat sink to the system board.
2. Remove the heat sink (2).



Each time the heat sink is removed, thoroughly clean the thermal material from the processor component (1) and the surface of the heat sink (2). Replacement thermal material is included with the heat sink and system board spare part kits and in the Thermal Pad Kit, spare part number L93823-001.



Reverse this procedure to install the heat sink.

## Display assembly

 **NOTE:** The display assembly is available as spare parts at the subcomponent level only. See the removal section for each component for information.

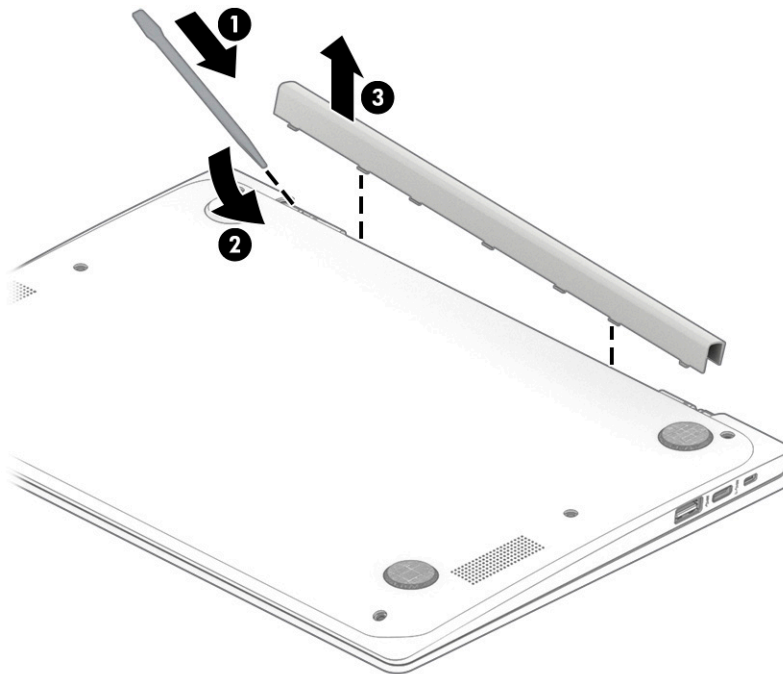
Before removing the display assembly, follow these steps:

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 keyboard/top cover (see [Keyboard/top cover on page 24](#)).
5. Disconnect the battery from the system board (see [Battery on page 32](#)).

Remove the display assembly:

1. Remove the display hinge cover by following these steps:
  - a. Close the computer.
  - b. Turn the computer upside down with the front toward you.
  - c. Use a case utility tool (1) or similar thin, plastic tool to separate the left (2) and right edges of the hinge cover from the display assembly.
  - d. Remove the hinge cover (3).

The hinge cover is available using spare part numbers L89769-001 (in chalkboard gray finish) and L89770-001 (in dark sage gray finish).

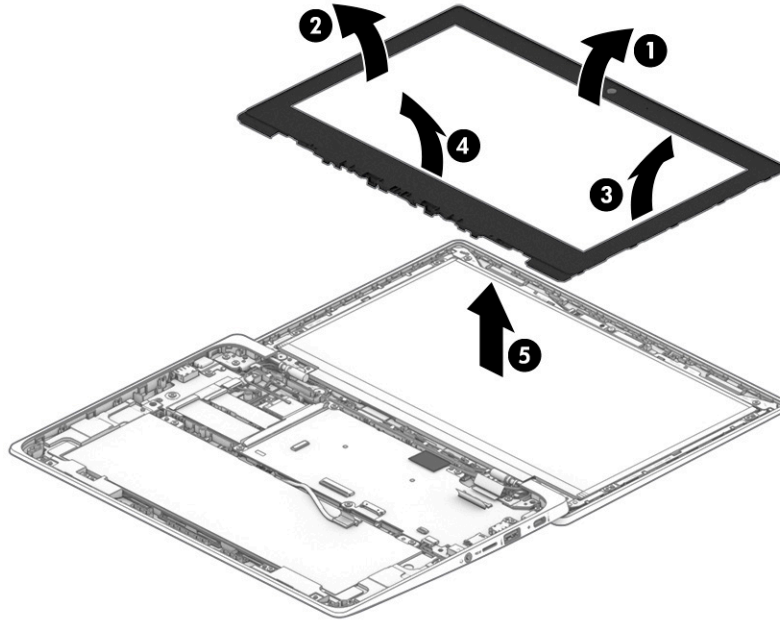


2. Remove the display bezel by following these steps:



- a. Turn the computer right side up with the rear toward you.
- b. Open the computer as far as it will open.
- c. Release the top edge of the display bezel **(1)** from the display assembly.
- d. Release the left and right edges of the display bezel **(2)** from the display assembly.
- e. Release the bottom edge of the display bezel **(3)** from the display assembly.
- f. Remove the display bezel **(4)**.

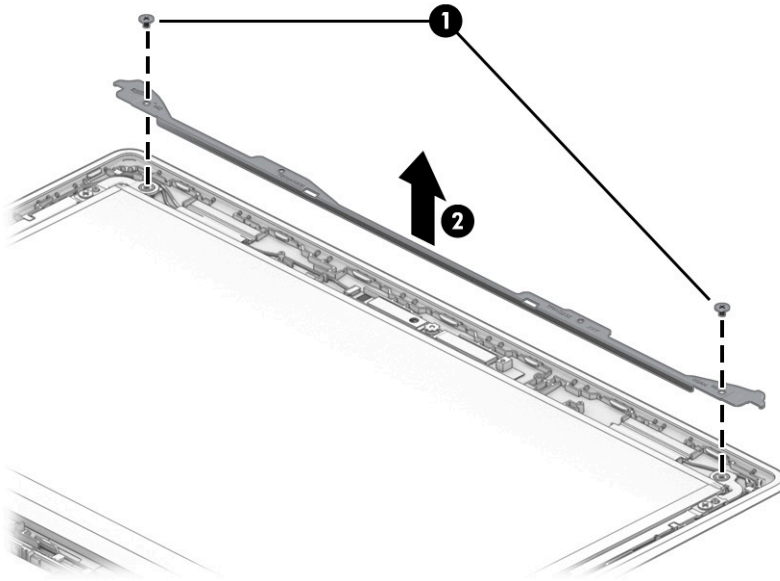
The display bezel is available using spare part number L89773-001.



3. Remove the display bracket by following these steps:
  - a. Remove the two Phillips M2.0×2.9 screws **(1)** that secure the display bracket to the display back cover.

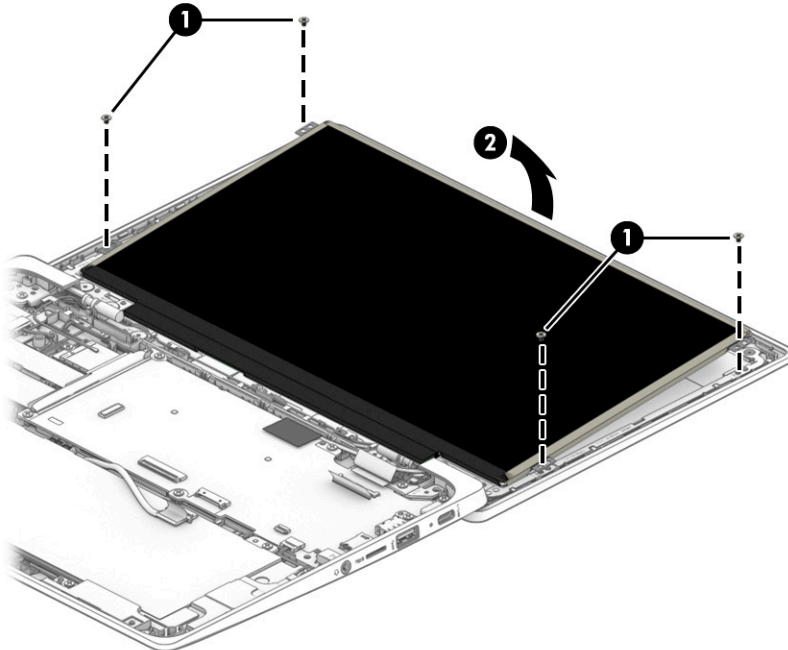
- b. Remove the display bracket (2).

The display bracket is available using spare part number L89774-001.



4. Remove the display panel by following these steps:

- a. Remove the four Phillips M2.0×2.9 screws (1) that secure the display panel to the display back cover.  
b. Swing the top edge (2) of the display panel up and forward until it rests upside down on the computer.

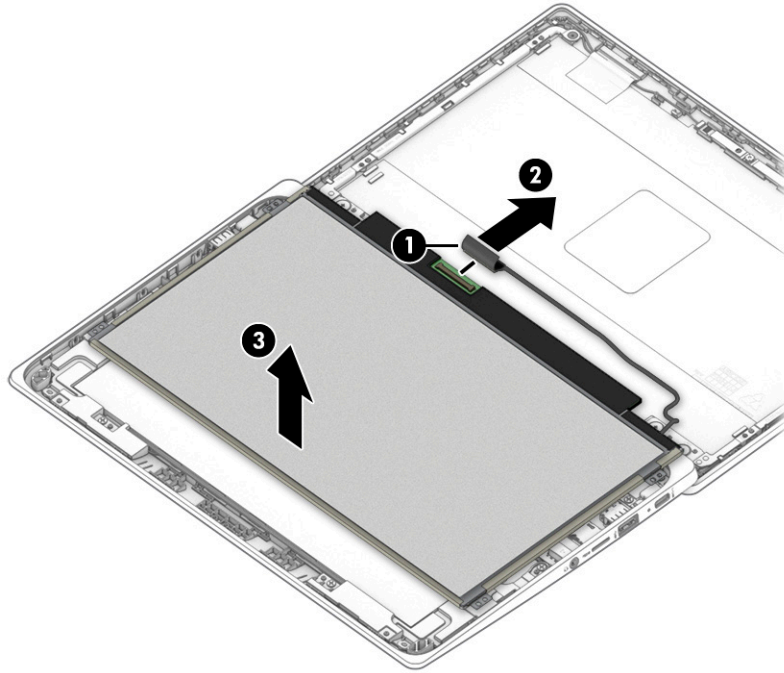


- c. Release the adhesive support strip (1) that secures the display panel cable connector to the display panel.  
d. Disconnect the display panel cable (2) from the display panel.

- e. Remove the display panel (3).

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

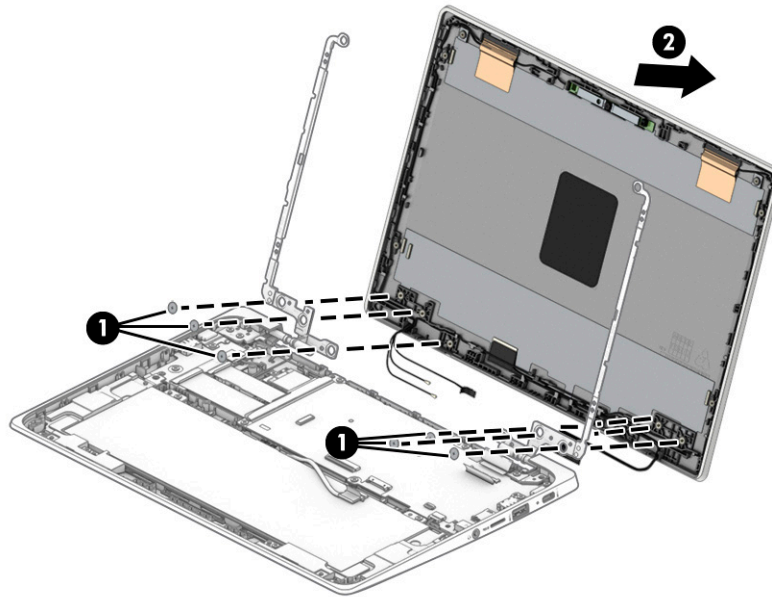
- L92828-001 – 11.6 in, HD, antiglare, LED, UWVA, touchscreen display panel
- L92827-001 – 11.6 in, HD, antiglare, LED, UWVA, nontouchscreen display panel
- L92826-001 – 11.6 in, HD, antiglare, LED, SVA, nontouchscreen display panel



5. Remove the display back cover by following these steps:
- a. Remove the six Phillips M2.5×3.0 broad head screws (1) that secure the display back cover to the display hinges.

- b. Remove the display back cover (2).

The display back cover is available using spare part numbers L89771-001 (in chalkboard gray finish) and L89772-001 (in dark sage gray finish).

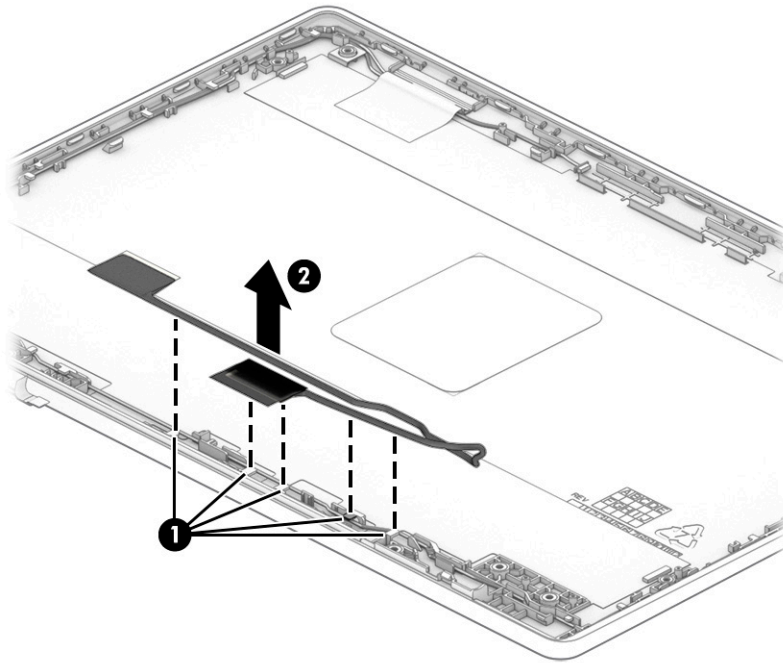


- 6. Remove the display panel cable by following these steps:

- a. Release the display panel cable from the retention clips (1) and routing channel built into the bottom edge of the display back cover.

- b. Remove the display panel cable (2).

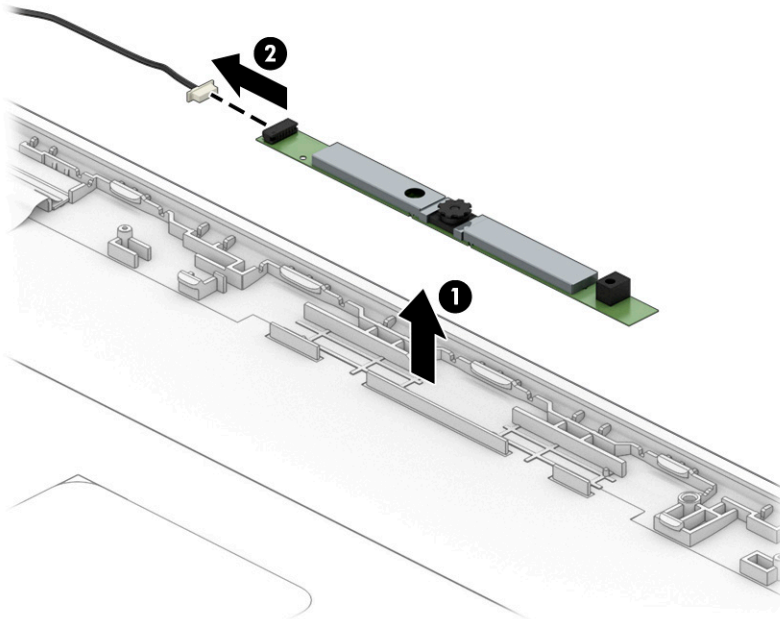
The display panel cable is available using spare part numbers L89776-001 (for use only on computers equipped with a touchscreen display assembly) and L89775-001 (for use only on computers equipped with a nontouchscreen display assembly).



7. Remove the webcam module by following these steps:

- a. Detach the webcam module (1) from the display back cover. (The webcam module is attached to the display back cover with double-sided adhesive.)

- b. Release the ZIF connector (2) to which the webcam module cable is connected, and then disconnect the webcam module cable from the webcam module.



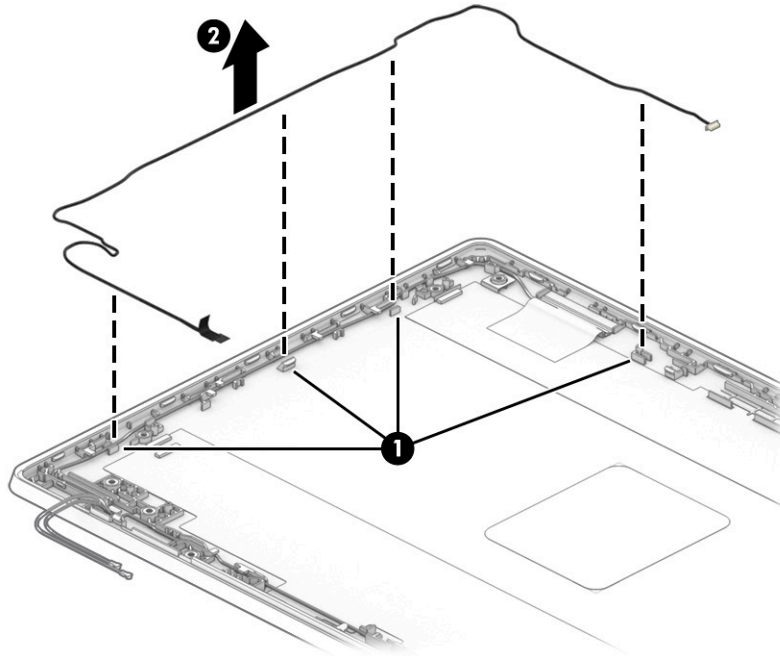
- c. Remove the webcam module.

The webcam module is available using spare part number L92824-001.

8. Remove the webcam module cable by following these steps:
- a. Release the webcam module cable from the retaining clips (1) built into the left hinge area of the display back cover.

- b. Remove the webcam module cable (2).

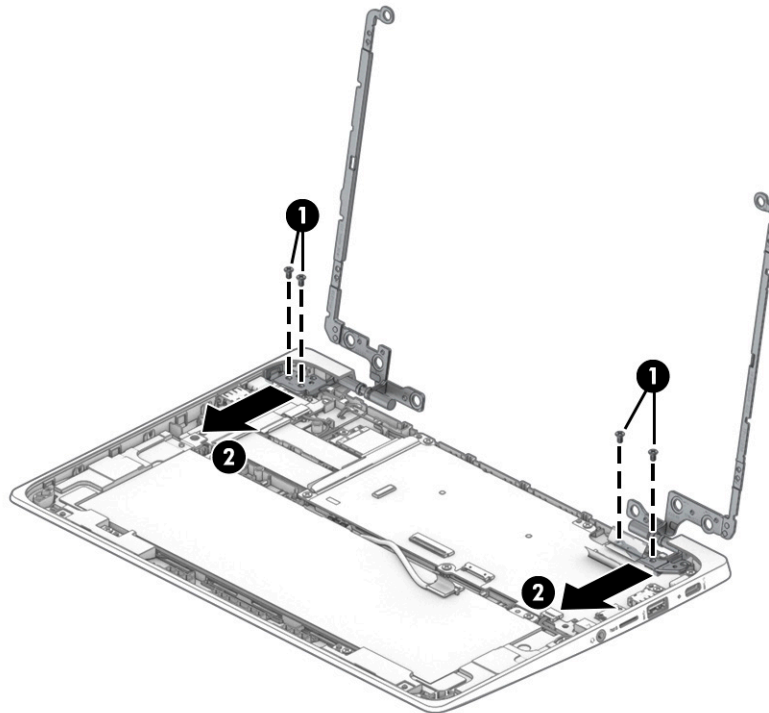
The webcam module cable is included in the Cable Kit, spare part number L93821-001.



- 9. Remove the display hinges by following these steps:

- a. Remove the four Phillips M2.5×4.7 screws that secure the display hinges to the bottom cover.
- b. Slide the hinges (2) forward and remove them.

The display hinges are available using spare part number L89768-001.



Reverse this procedure to reassemble and install the display assembly.




---

## 6 Backing up, restoring, and recovering

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

- **Backing up your personal information**—You can use Windows tools to back up your personal information (see [Using Windows tools on page 53](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 53](#)).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 53](#)).
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see [Using Windows tools on page 53](#)).

---

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


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

---

### Backing up information and creating recovery media

#### Using Windows tools

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

---

You can use Windows tools to back up personal information and create system restore points and recovery media.

---


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

---

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

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

---

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

---

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

You can use the HP Cloud Recovery Download Tool to create HP Recovery media on a bootable USB flash drive.

To download the tool:

- ▲ Go to the Microsoft Store and search for HP Cloud Recovery.

For details, go to <http://www.hp.com/support>, search for HP Cloud Recovery, and then select "HP PCs – Using the Cloud Recovery Tool (Windows 10, 7)."



---

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

---

## Restoring and recovery

### Restoring, resetting, and refreshing using Windows tools

Windows offers several options for restoring, resetting, and refreshing the computer. For details, see [Using Windows tools on page 53](#).

### Recovering using HP Recovery media

HP Recovery media is used to recover the original operating system and software programs that were installed at the factory. On select products, it can be created on a bootable USB flash drive using the HP Cloud Recovery Download Tool. For details, see [Using the HP Cloud Recovery Download Tool to create recovery media \(select products only\) on page 53](#).



---

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

---

To recover your system:

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

### Changing the computer boot order

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

To change the boot order:



---

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

---

1. Insert the HP Recovery media.
2. Access the system **Startup** menu.

For computers or tablets with keyboards attached:

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

For tablets without keyboards:

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

– or –

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

3. Select the optical drive or USB flash drive from which you want to boot, and then follow the on-screen instructions.

## Using HP Sure Recover (select products only)

Select computer models are configured with HP Sure Recover, a PC OS recovery solution built into the hardware and firmware. HP Sure Recover can fully restore the HP OS image without installed recovery software.

Using HP Sure Recover, an administrator or user can restore the system and install:

- Latest version of the operating system
- Platform-specific device drivers
- Software applications, in the case of a custom image

To access the latest documentation for HP Sure Recover, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

---

# 7 Using HP PC Hardware Diagnostics

## Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 56](#).

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

1. To access HP PC Hardware Diagnostics Windows from HP Help and Support:
  - a. Select the **Start** button, and then select **HP Help and Support**.
  - b. Select **HP PC Hardware Diagnostics Windows**.

– or –

To access HP PC Hardware Diagnostics Windows from HP Support Assistant:

- a. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
- or –
- a. Select the question mark icon in the taskbar.
  - b. Select **Troubleshooting and fixes**.
  - c. Select **Diagnostics**, and then select **HP PC Hardware Diagnostics Windows**.
2. When the tool opens, select the type of diagnostic test you want to run, and then follow the on-screen instructions.



**NOTE:** If you need to stop a diagnostic test at any time, select **Cancel**.

---

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

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

## Downloading HP PC Hardware Diagnostics Windows

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

## Downloading the latest HP PC Hardware Diagnostics Windows version


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

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics Windows**, and then select a location on your computer or a USB flash drive.

The tool is downloaded to the selected location.

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

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

---

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

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, and then enter the product name or number in the search box that is displayed.
3. In the **Diagnostics** section, select **Download**, and then follow the on-screen instructions to select the specific Windows diagnostics version to be downloaded to your computer or USB flash drive.

The tool is downloaded to the selected location.


## Installing HP PC Hardware Diagnostics Windows

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

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

## Using HP PC Hardware Diagnostics UEFI

---

 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 58](#).

---

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

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


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

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

– or –

Contact support, and provide the Failure ID code.

---

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

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

---

## Starting HP PC Hardware Diagnostics UEFI

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

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

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

- a. Connected USB flash drive

 **NOTE:** To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 58](#).

---


- b. Hard drive
- c. BIOS

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

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

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

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

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


---

## Downloading the latest HP PC Hardware Diagnostics UEFI version

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

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download HP Diagnostics UEFI**, and then select **Run**.

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

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

---

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

1. Go to <http://www.hp.com/support>.
2. Enter the product name or number, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the specific UEFI Diagnostics version for your computer.

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

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

### Downloading Remote HP PC Hardware Diagnostics UEFI

---

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

---


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

To download the latest Remote HP PC Hardware Diagnostics UEFI version, follow these steps:

1. Go to <http://www.hp.com/go/techcenter/pcdiags>. The HP PC Diagnostics home page is displayed.
2. Select **Download Remote Diagnostics**, and then select **Run**.

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

---

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

---

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

1. Go to <http://www.hp.com/support>.
2. Select **Get software and drivers**, select your type of product, enter the product name or number in the search box that is displayed, select your computer, and then select your operating system.
3. In the **Diagnostics** section, follow the on-screen instructions to select and download the **Remote UEFI** version for the product.

## Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.

- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

To customize Remote HP PC Hardware Diagnostics UEFI settings, follow these steps:

1. Turn on or restart the computer, and when the HP logo appears, press **f10** to enter Computer Setup.
2. Select **Advanced**, and then select **Settings**.
3. Make your customization selections.
4. Select **Main**, and then **Save Changes and Exit** to save your settings.

Your changes take effect when the computer restarts.



# 8 Specifications

## Computer specifications

The power information in this section may be helpful if you plan to travel internationally with the computer.

The computer operates on DC power, which can be supplied by an AC or a DC power source. The AC power source must be rated at 100 V–240 V, 50 Hz–60 Hz. Although the computer can be powered from a standalone DC power source, it should be powered only with an AC adapter or a DC power source that is supplied and approved by HP for use with this computer.

The computer can operate on DC power within the following specifications. Operating voltage and current varies by platform. The voltage and current for your computer is located on the regulatory label.

**Table 8-1 Computer specifications**

	Metric	U.S.
<b>Dimensions:</b>		
Width	29.5 cm	11.6 in
Depth	20.5 cm	8.1 in
Height	1.9 cm	0.7 in
<b>Weight</b>	1.3 kg	2.9 lbs
<b>Input power</b>	<b>Rating</b>	
Operating voltage and current	5 V dc @ 2 A / 12 V dc @ 3 A / 15 V dc @ 3 A – 45 W USB-C	
	5 V dc @ 3 A / 9 V dc @ 3 A / 12 V dc @ 3.75 A / 15 V dc @ 3 A – 45 W USB-C	
	5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 3.75 A / 12 V dc @ 3.75 A / 15 V dc @ 3 A / 20 V dc @ 2.25 A – 45 W USB-C	
	5 V dc @ 3 A / 9 V dc @ 3 A / 12 V dc @ 5 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A – 65 W USB-C	
	5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 5 A / 12 V dc @ 5 A / 15 V dc @ 4.33 A / 20 V dc @ 3.25 A – 65 W USB-C	
	5 V dc @ 3 A / 9 V dc @ 3 A / 10 V dc @ 5 A / 12 V dc @ 5 A / 15 V dc @ 5 A / 20 V dc @ 4.5 A – 90 W USB-C	
	19.5 V dc @ 2.31 A – 45 W	
	19.5 V dc @ 3.33 A – 65 W	
	19.5 V dc @ 4.62 A – 90 W	
	19.5 V dc @ 6.15 A – 120 W	
	19.5 V dc @ 6.9 A – 135 W	
	19.5 V dc @ 7.70 A – 150 W	
	19.5 V dc @ 10.3 A – 200 W	
19.5 V dc @ 11.8 A – 230 W		
19.5 V dc @ 16.92 A – 330 W		

**Table 8-1** Computer specifications (continued)

	Metric	U.S.
<b>Temperature</b>		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
<b>Relative humidity</b> (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
<b>Maximum altitude</b> (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
<b>NOTE:</b> Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

---

# 9 Backing up, resetting, and recovering

## Backing up

You can back up your data to an optional USB flash drive or SD memory card or through Google Drive™. For detailed information about creating a backup, go to <http://www.support.google.com>.

## Resetting

A factory reset erases all the information on your computer hard drive, including all the files in the Downloads folder. Before you reset, be sure to back up your files to an optional USB flash drive, to an SD memory card, or through Google Drive. The factory reset won't delete any of your files on Google Drive or an external storage device.

---

 **IMPORTANT:** Resetting permanently erases everything on your computer hard drive, including your downloaded files. If possible, back up your files before you reset your computer.

---


You might want to reset your computer in the following circumstances:

- You see the message "Reset this Chrome device."
- You are having problems with your user profile or settings.
- You restarted your computer, and it still doesn't work properly.
- You want to change the owner of your computer.

To reset your computer:

1. Under the **Settings** menu, click **Advanced**.
2. In the **Powerwash** section, click **Powerwash**.
3. Click **Restart**, and then sign in with your Google Account.

---

 **NOTE:** The account you sign in with after you reset your computer will be recognized as the owner account.


---


4. Follow the on-screen instructions to reset your computer.
5. After you complete the reset, you can set up your computer and check to see whether the problem is fixed.

## Recovering

When your Chrome OS™ (operating system) isn't working properly, you can perform a recovery. A recovery reinstalls the operating system and software programs and restores the original factory settings. Locally saved files and saved networks are deleted for all accounts. Your Google Accounts and any data synced to your Google Drive are not affected by a system recovery.

---

 **IMPORTANT:** Recovery permanently erases everything on your computer hard drive, including your downloaded files. If possible, back up your files before you recover your computer.

 **NOTE:** For more information about performing a system recovery on your computer, go to <http://www.support.google.com>.

---

Before beginning the recovery process, you need the following:

- A USB flash drive or SD memory card with a capacity of 4 GB or greater. Because all data is erased from this storage device when the recovery media is created, back up any files from the device before you begin.
- A computer with Internet access. You must also have administrative rights to the computer.
- Computer AC adapter. The computer must be plugged into AC power during recovery.
- Your computer displaying the “Chrome OS is missing or damaged” screen displaying on your computer. If this message is not already displayed:
  - Turn on the computer, press and hold the **esc+f3** keys, and then press the power button. The computer restarts, and the screen shows the “Chrome OS is missing or damaged” screen.

## Installing the Chromebook Recovery Utility

The Chromebook Recovery Utility is an app that recovers the original operating system and software programs that were installed at the factory. This utility can be installed from the Chrome Web Store on any computer.

To install the Chromebook Recovery Utility:

- ▲ Open the Chrome Web Store, search for `chrome recovery`, click **Chromebook Recovery Utility** from the Apps list, and follow the on-screen instructions.


## Creating recovery media

Use recovery media to recover the original operating system and software programs that were installed at the factory.

To create recovery media:

1. Turn on a computer that has Internet access.
- 
2. Click the **Launcher** icon, and then click **All Apps**.
  3. In the Apps window, click **Recovery**, and then click **Get started**.
  4. Follow the on-screen instructions to create the recovery media.

---

 **NOTE:** All data and partitions on your recovery media will be deleted. Do not remove the USB flash drive or SD memory card until the process is complete.


---


## Recovering the Chrome operating system

To recover the Chrome operating system on your computer using the recovery media that you created:

1. Disconnect any external devices connected to your computer, plug in the power cord, and then turn on the computer.
2. To enter recovery mode, press and hold **esc+f3**, and then press the power button. When the “Chrome OS is missing or damaged” screen is displayed, insert the recovery media into your computer. The recovery process begins immediately.
3. Wait while Chrome verifies the integrity of the recovery media.

---

 **NOTE:** If you need to cancel the recovery during the verification process, press and hold the power button until the computer turns off. Do not disrupt the system recovery process after the verification step is complete.

 **NOTE:** If an error message is displayed, you might need to run the Chrome Recovery Utility again or use a different USB flash drive or SD memory card.

---

4. When the “System Recovery is complete” message is displayed, remove the recovery media.  
The computer restarts with Chrome OS reinstalled.

## Setting up your computer after a reset or recovery

After a reset or recovery is complete, perform the initial setup process. For details about setting up the computer, go to <http://www.support.google.com>.

## Erase and reformat the recovery media

During the process of creating recovery media, the USB flash drive or SD memory card is formatted as a recovery tool. After you recover your computer, you must erase the recovery media if you want to reuse your USB flash drive or SD memory card to store other files. Use the steps in this section to erase the recovery media using the Chromebook Recovery Utility.

1. Click the **Launcher** icon, and then click **All Apps**.
2. In the apps window, click **Recovery**.
3. Click the **Settings** icon, and then click **Erase recovery media**.
4. Select the USB flash drive or SD memory card that you inserted, click **Continue**, and then click **Erase now**.
5. After the recovery media is erased, click **Done** to close the Chromebook Recovery Utility, and then remove the USB flash drive or SD memory card.

The media is ready to be formatted using a formatting tool provided by your operating system.


# 10 Statement of memory volatility

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

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

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

---

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

---

## Current BIOS steps

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

- a. Turn on or restart the computer, and then quickly press **esc**.

---

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

---

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

The computer will reboot.

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

---

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

---

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

The computer will reboot.

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

---

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

---

- f. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.


- g. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then uncheck the checkbox for **DriveLock password on restart**. Select **OK** to proceed.

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

The computer will reboot.

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

---

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

---

- j. Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.
- k. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint reader, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.
- l. Remove all power and system batteries for at least 24 hours.

2. Complete one of the following:

- Remove and retain the storage drive.

– or –

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

– or –

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

---

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

---

- a. Turn on or restart the computer, and then quickly press **esc**.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Utilities**.
- d. Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.


– or –

- Clear the contents of the drive using the following Disk Sanitizer commands steps:

---

 **IMPORTANT:** If you clear data using Disk Sanitizer, it cannot be recovered.

---

 **NOTE:** The amount of time it takes for Disk Sanitizer to run can take several hours. Plug the computer into an AC outlet before starting.

---

- a. Turn on or restart the computer, and then quickly press **esc**.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Utilities**.
- d. Under **Utilities**, select **Disk Sanitizer**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

# Nonvolatile memory usage

**Table 10-1** Troubleshooting steps for nonvolatile memory usage

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	8 MB	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start.  For more information, see <a href="#">Using HP Sure Start (select models only) on page 71</a> .	Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.	This memory is protected by the HP Sure Start Embedded Controller.
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using Computer Setup (BIOS), or by changing the Microsoft® Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KB (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility must be used to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 bytes per memory module, 128 bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MB	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.	<b>NOTE:</b> Writing data to this ROM in an inappropriate manner can render the computer non-functional.  A utility must be used for writing data to this memory and is available on the HP website; go to <a href="http://www.hp.com/support">http://www.hp.com/support</a> . Select <b>Find your</b>




**Table 10-1** Troubleshooting steps for nonvolatile memory usage (continued)

Nonvolatile memory type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
Intel Management Engine Firmware (present only in select Elite or Z models. For more information, go to <a href="http://www.hp.com/support">http://www.hp.com/support</a> . Select <b>Find your product</b> , and then follow the on-screen instructions.)	1.5 MB or 7 MB	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third-party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The third-party data store contents can be populated by a remote management console or local applications that have been registered by an administrator to have access to the space.	<b>product</b> , and then follow the on-screen instructions.  The Intel chipset is configured to enforce hardware protection to block all direct read/write access to this area. An Intel utility must be used for updating the firmware. Only firmware updates digitally signed by Intel can be applied using this utility.
Bluetooth flash (select products only)	2 Mb	No	Yes	Stores Bluetooth configuration and firmware.	Bluetooth flash is programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility must be used for writing data to this memory and is made available through newer versions of the driver whenever the flash requires an upgrade.
802.11 WLAN EEPROM	4 Kb to 8 Kb	No	Yes	Stores configuration and calibration data.	802.11 WLAN EEPROM is programmed at the factory. Tools for writing data to this memory are not made public.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Webcam (select products only)	64 Kb	No	Yes	Stores webcam configuration and firmware.	Webcam memory is programmed using a utility from the device manufacturer that can be run from Windows.	A utility must be used for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader (select products only)	512 KB flash	Yes	Yes	Stores fingerprint templates.	Fingerprint reader memory is programmed by user enrollment in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

## Questions and answers

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

---

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

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

---

- a. Turn on or restart the computer, and then quickly press `esc`.
- b. Select **Main**, and then select **Apply Factory Defaults and Exit**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

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

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

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

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

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

## 3. Where does the UEFI BIOS reside?

The UEFI BIOS resides on a flash memory chip. A utility must be used to write to the chip.

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

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

## 5. What is meant by "Restore the nonvolatile memory found in Intel-based system boards"?

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

## 6. How can the BIOS security be reset to factory defaults and data erased?

---

 **IMPORTANT:** Resetting will result in the loss of information.

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

---

- a. Turn on or restart the computer, and then quickly press **esc**.
  - b. Select **Main**, and then select **Reset Security to Factory Defaults**.
  - c. Follow the on-screen instructions.
  - d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.
7. **How can the Custom Secure Boot Keys be reset?**

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

- a. Turn on or restart the computer, and then quickly press **esc**.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

## Using HP Sure Start (select models only)

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

To access the latest documentation on HP Sure Start, go to <http://www.hp.com/support>. Select **Find your product**, and then follow the on-screen instructions.

---

# 11 Power cord set requirements

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

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

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

## Requirements for all countries

The following requirements are applicable to all countries and regions:

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

## Requirements for specific countries and regions

**Table 11-1** Power cord requirements

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 mm<sup>2</sup> conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

**Table 11-1 Power cord requirements (continued)**

Country/region	Accredited agency	Applicable note number
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, 0.75 mm <sup>2</sup> or 1.25 mm <sup>2</sup> 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, 0.75 mm <sup>2</sup> 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 3-conductor, 0.75 mm <sup>2</sup> 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 3-conductor, 1.25 mm <sup>2</sup> 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-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 mm <sup>2</sup> or 1.00 mm <sup>2</sup> conductor size, with plug BS 1363/A with BSI or ASTA marks.	

---

## 12 Recycling

When a nonrechargeable 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 website at <http://www.hp.com/recycle>.

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