



Maintenance and Service Guide

HP 15 Laptop PC

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Product notice

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

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

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

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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


 **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 components and their descriptions

Category	Description
Product Name	HP 15 Laptop PC Model numbers: 15-dy0xxx, 15t-dy000
Processor	Intel® Core™ i7-8565U (1.8 GHz, turbo up to 4.6 GHz, 2400 MHz FSB, 8 MB L3 cache, quad core, 15 W) Intel Core i5-8265U (1.6 GHz, turbo up to 3.9 GHz, 2400 MHz FSB, 6 MB L3 cache, quad core, 15 W) Intel Core i3-8145U (2.1 GHz, turbo up to 3.9 GHz, 2400 MHz FSB, 4 MB L3 cache, dual core, 15 W) Intel Core i3-8130U (2.26 GHz, 2400 MHz FSB, 4 MB L3 cache, dual core, 15 W) Intel Core i3-7020U (2.3 GHz, 2133 MHz FSB, 3 MB L3 cache, dual core, 15 W) Intel Pentium™ Gold 5405U (2.3 GHz, 2133 MHz FSB, 2 MB L3 cache, dual core, 15 W) Intel Pentium Gold 4417U (2.3 GHz, 2133 MHz FSB, 2 MB L3 cache, dual core, 15 W) Intel Pentium Silver N5000 (1.1 GHz, turbo up to 2.7 GHz, 2400 MHz FSB, 4 MB L3 cache, quad core, 6 W) Intel Celeron™ N4000 (1.1 GHz, turbo up to 2.6 GHz, 2400 MHz FSB, 4 MB L3 cache, dual core, 6 W)
Graphics	Internal graphics Intel UHD Graphics 620 (Intel Core processors) Intel UHD Graphics 610 (Pentium Gold 5405U processor) Intel UHD Graphics 605 (Pentium Silver N5000 processor) Intel UHD Graphics 600 (Celeron N4000 processor) Intel HD Graphics 620 (Intel Core i3-7020U) Intel HD Graphics 610 (Pentium Gold 4417U processor) Supports HD decode, DX12, and HDMI
Display panel	39.6 cm (15.6 in), WLED, slim-flat (3.2 mm), narrow bezel, 45% NTSC High-definition (HD) (1366 × 768), antiglare, SVA, eDP 1.2, 220 nits HD, BrightView, SVA, eDP 1.2, 220 nits HD, BrightView, SVA, eDP, 220 nits, Touch-on Panel (TOP) Full high-definition (FHD) (1920 × 1080), antiglare, SVA, eDP 1.2, 220 nits FHD, antiglare, UWVA, eDP, 250 nits
Memory	Two SODIMM slots, not customer accessible or upgradeable Intel Core and Pentium Gold 5405U and 4417U processors DDR4-2400 dual channel support (DDR4-3200 bridge to 2666, DDR4-2666 downgrade to DDR4-2400) Supports up to 16 GB maximum system memory in the following configurations:

Table 1-1 Product components and their descriptions (continued)

Category	Description
	<ul style="list-style-type: none"> • 16 GB (8 GB × 2) • 12 GB (8 GB × 1 + 4 GB × 1) • 8 GB (8 GB × 1 or 4 GB × 2) • 4 GB (4 GB × 1)
	Pentium Silver N5000 and Celeron N4000 processors
	DDR4-2133 dual-channel support (DDR4-3200 bridge to 2666, DDR4-2666 downgrade to DDR4-2133)
	Supports up to 8 GB maximum system memory in the following configurations:
	<ul style="list-style-type: none"> • 8 GB (8 GB × 1) • 4 GB (4 GB × 1)
Storage	M.2, SATA, solid-state drive
	<ul style="list-style-type: none"> • 512 GB, PCIe, TLC • 512 GB, PCIe, value • 256 GB, PCI, value • 256 GB, PCI, value + 16 GB Optane™ memory module • 128 GB, SATA-3, TLC
Audio	Audio control panel: HP Audio Control Dual speakers
Video	HP TrueVision HD Camera - indicator LED, USB 2.0, HD sensor, f2.0 720p by 30 frames per second Dual-array digital microphone with appropriate software: beam forming, echo cancellation, noise suppression
Wireless networking	Integrated wireless option with dual antennas (M.2/PCIe) <ul style="list-style-type: none"> • Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth® 5.0 (MU-MIMO supported) Integrated wireless option with single antenna (M.2/MIPI/BRI) <ul style="list-style-type: none"> • Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2 (MU-MIMO supported) • Realtek RTL8723DE 802.11bgn 1 × 1 Wi-Fi + Bluetooth 4.2 Turbo Lite WLAN SVTP Support for Wi-Fi CERTIFIED Miracast™ devices
Ports	HP Smart Pin AC adapter Audio-out (headphone)/Audio-in (microphone) combo jack High-definition multimedia interface (HDMI) v.1.4b supporting up to 1920 × 1080 at 60 Hz Hot plug/unplug and autodetect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected) (2) USB 3.1 Type A ports

Table 1-1 Product components and their descriptions (continued)

Category	Description
	(1) USB 3.1 Gen 1 Type-C port (supports data transfer)
Media card reader	Supports microSD™, SDHC™, SDXC™ Push-pull insertion and removal
Internal card expansion	One M.2 slot for WLAN One M.2 slot for solid-state drive
Keyboard/pointing devices	Keyboard, full size, island style, with numeric keypad Textured 2-coat paint, backlit 3-coat paint, backlit 4-coat paint, backlit Touchpad requirements Touchpad with image sensor Multitouch gestures enabled Support for precision touchpad Support for modern trackpad gestures Taps enabled as default
Power requirements	Battery 3 cell, 41 Wh, polymer battery Supports battery life enhancement Supports battery fast charge (45 minutes, 50% charged) Smart AC adapter (PFC, slim barrel, 4.5 mm) 65 W 45 W, right angle Power cord (1 m, conventional) C5
Security	Trusted Platform Module (fTPM) 2.0, firmware based Universal 2nd Factor Authentication Fingerprint reader
Operating system	Preinstalled Windows® 10 Home 64 Windows 10 Home 64 Chinese Market CPPP Windows 10 Home 64 High-End Chinese Market CPPP Windows 10 Home 64 Plus

Table 1-1 Product components and their descriptions (continued)

Category	Description
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Plus Single Language Africa Market PPP
	Windows 10 Home 64 Plus Single Language APAC EM PPP
	Windows 10 Home 64 Plus Single Language India Market PPP
	Windows 10 Home 64 Plus Single Language Indonesia Market PPP
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 Single Language Africa Market PPP
	Windows 10 Home 64 Single Language APAC EM PPP
	Windows 10 Home 64 Single Language India Market PPP
	Windows 10 Home 64 Single Language Indonesia Market PPP
	Windows 10 Home S 64
	Windows 10 Home S 64 Plus
	Windows 10 Pro 64
	FreeDOS 3.0
Serviceability	End-user replaceable part
	AC adapter

2 Getting to know your computer

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

Right side

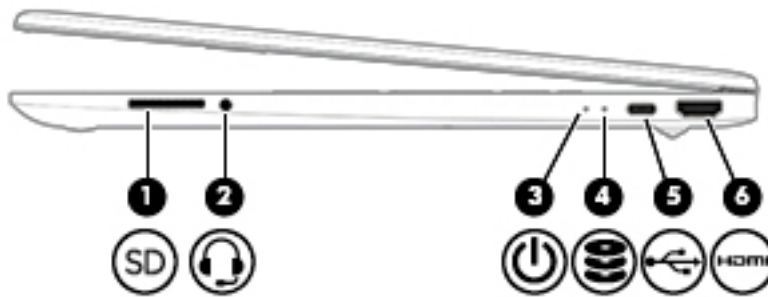


Table 2-1 Right-side components and their descriptions







Component	Description
(1)  Memory card reader	<p>Reads optional memory cards that enable you to store, manage, share, or access information.</p> <p>To insert a card:</p> <ol style="list-style-type: none">1. Hold the card label-side up, with connectors facing the computer.2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. <p>To remove a card:</p> <ul style="list-style-type: none">▲ Pull the card out of the memory card reader.
(2)  Audio-out (headphone)/Audio-in (microphone) combo jack	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none">▲ Select the Start button, select HP Help and Support, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>
(3)  Power light	<ul style="list-style-type: none">● On: The computer is on.



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

Component	Description
(4)  Drive light (select products only)	<ul style="list-style-type: none">• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(5)  USB Type-C port	Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer. NOTE: Cables and/or adapters (purchased separately) may be required.
(6)  HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.

Left side



Table 2-2 Left-side components and their descriptions

Component	Description
(1) 	Power connector Connects an AC adapter.
(2)	AC adapter and battery light <ul style="list-style-type: none">• White: The AC adapter is connected and the battery is fully charged.• Blinking white: The AC adapter is disconnected and the battery has reached a low battery level.• Amber: The AC adapter is connected and the battery is charging.• Off: The battery is not charging.
(3) 	USB SuperSpeed ports (2) Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.

Display

Low blue light mode (select products only)

Your computer display is shipped from the factory in low blue light mode for improved eye comfort and safety. Also, low blue light mode automatically adjusts blue light emissions when you are using the computer at night or for reading.

⚠ WARNING! To reduce the risk of serious injury, read the *Safety & Comfort Guide*. It describes proper workstation setup and proper posture, health, and work habits for computer users. The *Safety & Comfort Guide* also provides important electrical and mechanical safety information. The *Safety & Comfort Guide* is available on the web at <http://www.hp.com/ergo>.

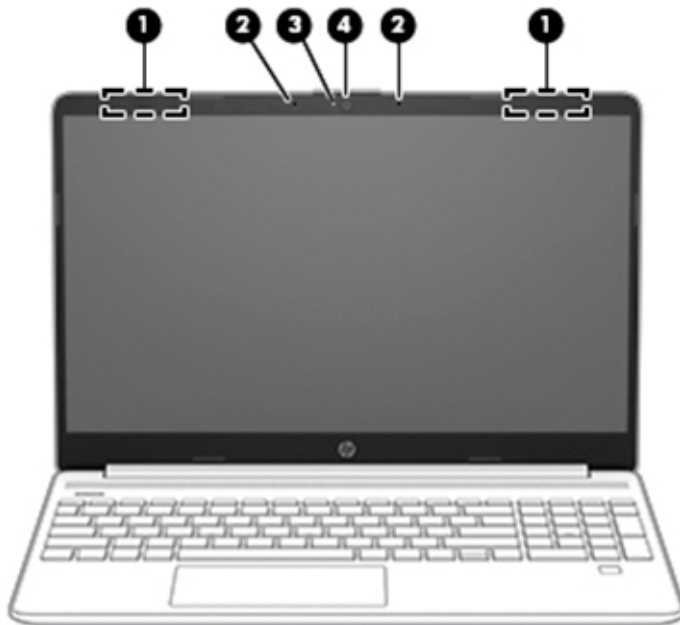


Table 2-3 Display components and their descriptions

Component	Description
(1) WLAN antennas* (select products only)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphones	Record sound.
(3) Camera light	On: The camera is in use.
(4) Camera	Allows you to video chat, record video, and record still images. Some cameras also allow a facial recognition logon to Windows, instead of a password logon. NOTE: Camera functions vary depending on the camera hardware and software installed on your product.

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

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

To access this guide:

- ▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**.

Keyboard area

Touchpad

Touchpad settings

To adjust touchpad settings and gestures, or to turn off the touchpad:

1. Type `touchpad settings` in the taskbar search box, and then press [enter](#).
2. Choose a setting.

To turn on the touchpad:

1. Type `touchpad settings` in the taskbar search box, and then press [enter](#).
2. Using an external mouse, click the **touchpad** button.

– or –

- ▲ Press the [Tab](#) key repeatedly until the pointer rests on the **touchpad** button. Then press the [spacebar](#) to select the button.

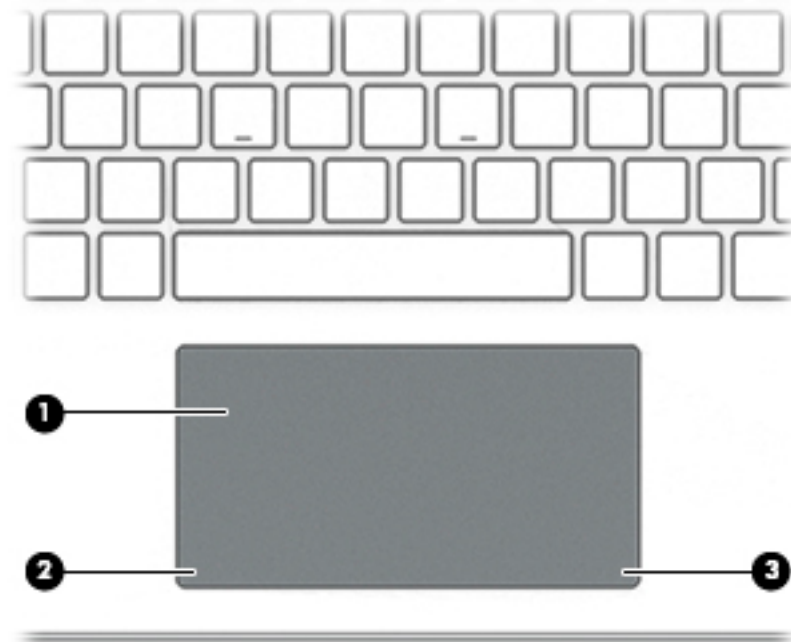


Table 2-4 Touchpad components and their descriptions

Component	Description
(1) Touchpad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2) Left control zone	Textured area that allows you to perform additional gestures.
(3) Right control zone	Textured area that allows you to perform additional gestures.

Lights

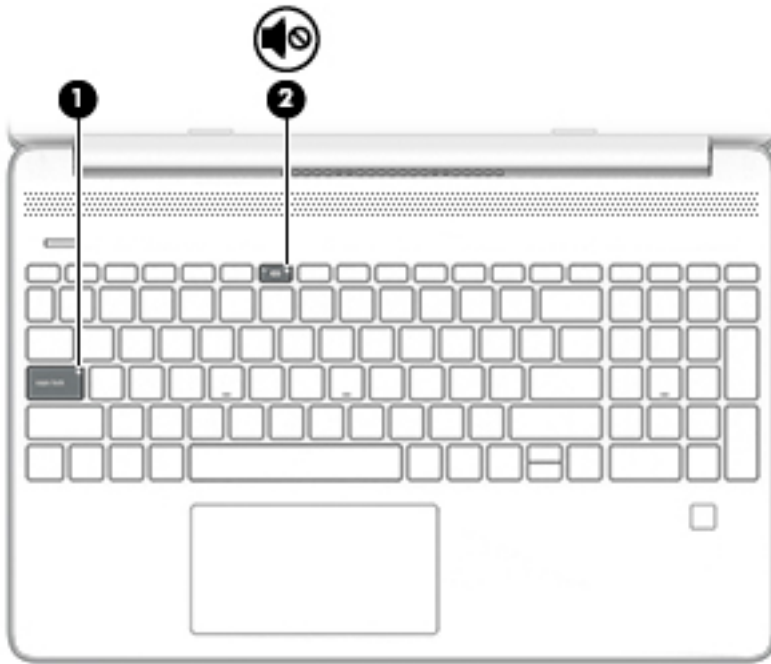



Table 2-5 Lights and their descriptions

Component	Description
(1) Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)  Mute light	<ul style="list-style-type: none">• On: Computer sound is off.• Off: Computer sound is on.

Button, vent, speakers, and fingerprint reader

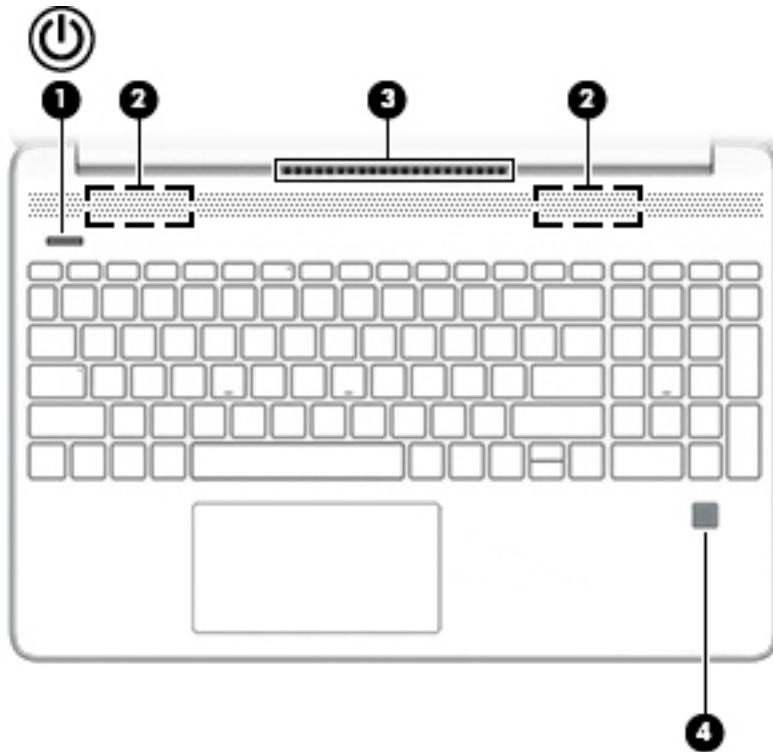


Table 2-6 Button, vent, speakers, and fingerprint reader and their descriptions



Component	Description
<p>(1)  Power button</p>	<ul style="list-style-type: none"> When the computer is off, press the button to turn on the computer. When the computer is on, press the button briefly to initiate Sleep. When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>IMPORTANT: Pressing and holding down the power button results in the loss of unsaved information.</p> <p>If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, see your power options:</p> <ul style="list-style-type: none"> Right-click the Power icon , and then select Power Options.
(2) Speakers (2)	Produce sound.
(3) Vent	<p>Enables airflow to cool internal components.</p> <p>NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.</p>
(4) Fingerprint reader (select products only)	<p>Allows a fingerprint logon to Windows, instead of a password logon.</p> <ul style="list-style-type: none"> Swipe down across the fingerprint reader.

Table 2-6 Button, vent, speakers, and fingerprint reader and their descriptions (continued)

Component	Description
	IMPORTANT: To prevent fingerprint logon issues, make sure when you register your fingerprint that all sides of your finger are registered by the fingerprint reader.

Special keys

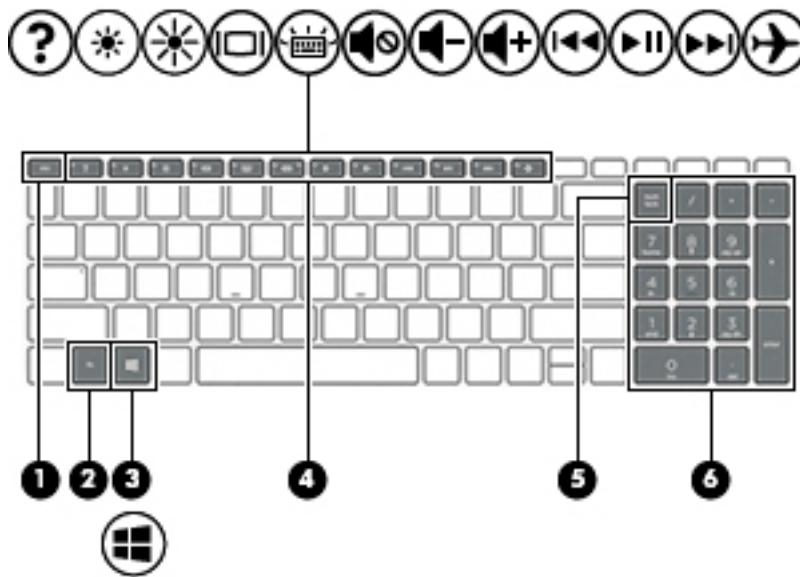



Table 2-7 Special keys and their descriptions

Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes specific functions when pressed in combination with another key.
(3)  Windows key	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(4) Action keys	Execute frequently used system functions.
(5) <code>num lock</code> key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6) Integrated numeric keypad	A separate keypad to the right of the alphabet keyboard. When <code>num lock</code> is pressed, the keypad can be used like an external numeric keypad. NOTE: If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.

Bottom

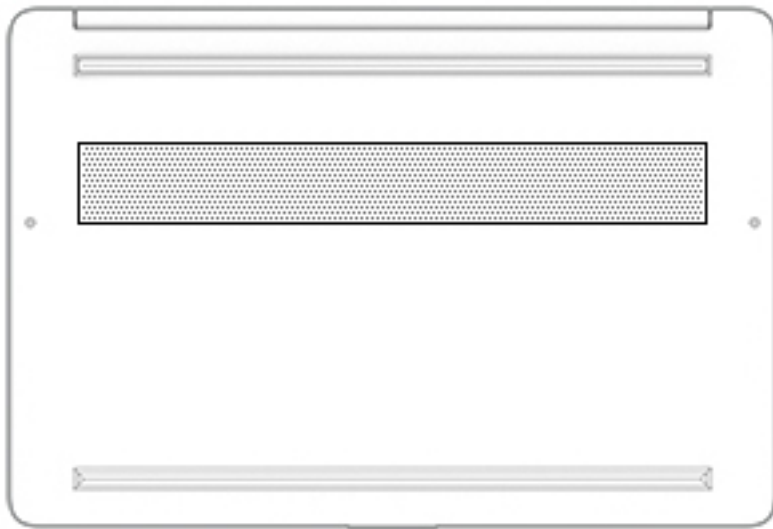


Table 2-8 Bottom components and their descriptions

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

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.

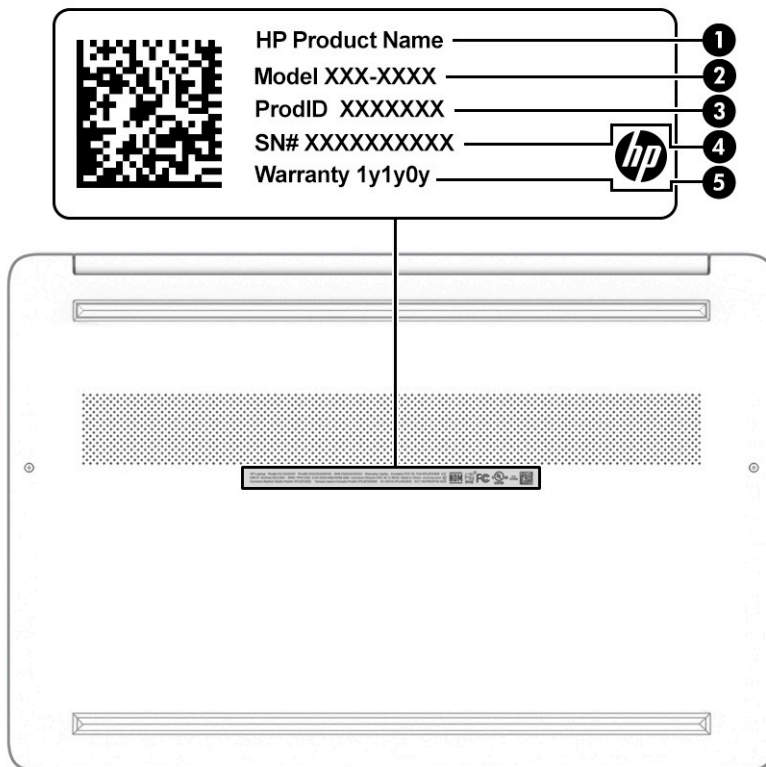


Table 2-9 Service label components


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

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

3 Illustrated parts catalog

Computer major components

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

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Labels on page 14](#) for details.

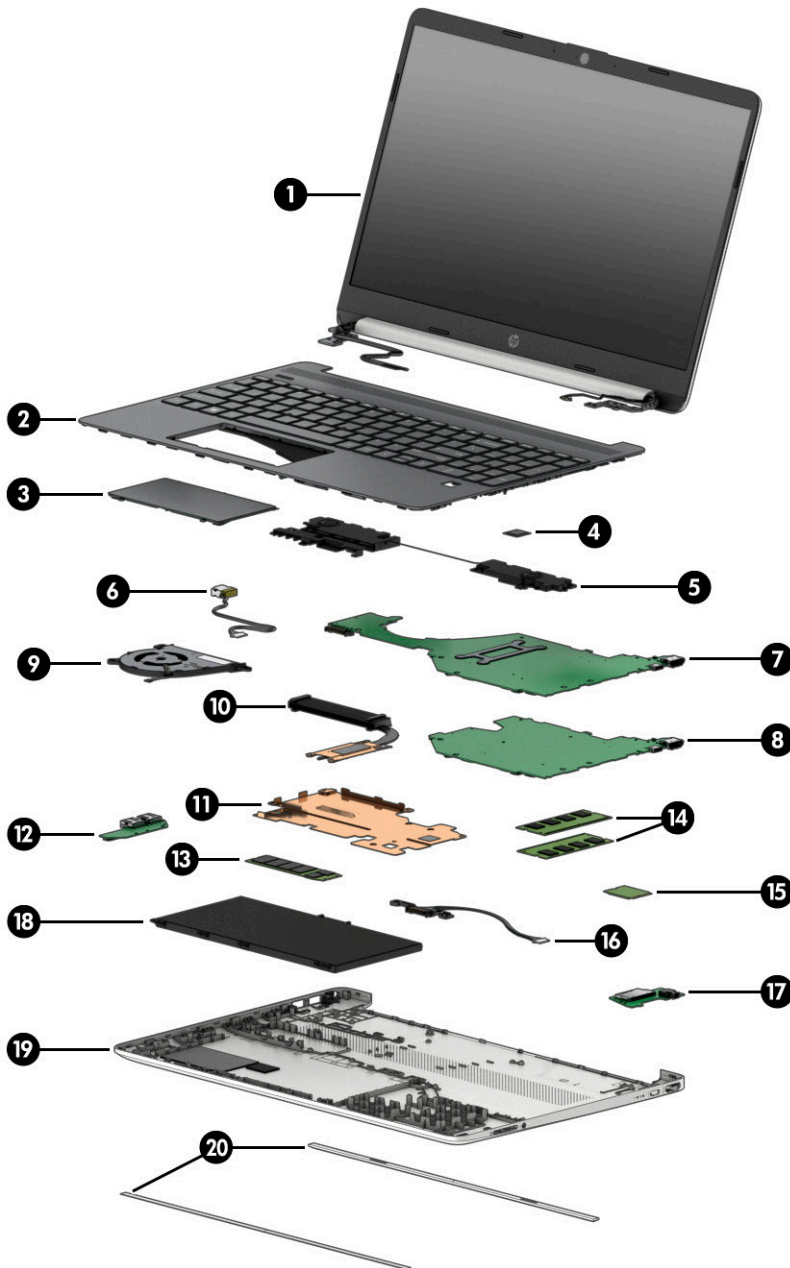


Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	Display assembly NOTE: Display assemblies are offered as spare parts only at a subcomponent level.	
(2)	Keyboard/top cover: For a detailed list of country codes, see Keyboard/top cover on page 61 .	
	Snow white; no backlight	L63574-xx1
	Snow white; backlit	L63575-xx1
	Ash silver; no backlight	L63576-xx1
	Ash silver; backlit	L63577-xx1
	Natural silver; no backlight	L63578-xx1
	Natural silver; backlit	L63579-xx1
(3)	Touchpad: The touchpad cable is available as spare part number L63602-001.	
	Natural silver	L63600-001
	Ash silver	L63599-001
	Snow white	L63601-001
(4)	Fingerprint reader board NOTE: The fingerprint reader board cable is available as spare part number L63596-001.	L63595-001
(5)	Speaker assembly	L63594-001
(6)	Power connector cable: For use in models with an Intel Core or Pentium Gold 4417U or 5405U processor	806746-001
	For use in models with a Pentium N5000 or Celeron N4000 processor	810327-004
	System board (includes processor): All system boards use the following part numbers: xxxxxx-001: Non-Windows operating system xxxxxx-601: Windows 10 operating system	
(7)	Models with a fan:	
	• Intel Core i7-8565U processor	L63560-xx1
	• Intel Core i5-8265U processor	L63559-xx1
	• Intel Core i3-8145U processor	L63558-xx1
	• Intel Core i3-7020U processor	L63557-xx1
	• Intel Pentium 5405U processor	L70056-xx1
	• Intel Pentium 4417U processor	L63561-xx1
(8)	Models without a fan:	
	• Intel Pentium N5000 processor	L63563-xx1

Table 3-1 Computer major components and their descriptions (continued)

Item	Component	Spare part number
	<ul style="list-style-type: none"> Intel Celeron N4000 processor 	L63562-xx1
(9)	Fan (for use only in models with an Intel Core or Pentium Gold 5405U or 4417U processor):	
	For use in models with a backlit keyboard	L63587-001
	For use in models without a backlit keyboard	L63588-001
	Heat sink	
(10)	For use in models with an Intel Core or Pentium Gold 4417U or 5405U processor	L63586-001
(11)	For use in models with a Pentium N5000 or Celeron N4000 processor	spare part not available
(12)	USB board	L63580-001
(13)	Solid-state drive (M.2):	
	512 GB, PCIe, TLC	L63572-001
	512 GB, PCIe, value	L63573-001
	256 GB, PCIe, value	L63571-001
	256 GB, PCIe + 16 GB Optane memory module	L69125-001
	128 GB, SATA-3, TLC	L63570-001
(14)	Memory modules (DDR4-2666):	
	8 GB	937236-855
	4 GB	L10598-855
(15)	WLAN module:	
	Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth 5.0	L44796-005
	Realtek RTL8723DE 802.11bgn 1 × 1 Wi-Fi + Bluetooth 4.2	L21480-005
	Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2	L17365-005
(16)	Battery connector	L63585-001
(17)	Card reader/audio board	L63583-001
	NOTE: The card reader/audio board cable is available as spare part number L63584-001.	
(18)	Battery (3 cell, 41 Wh)	L11119-855
(19)	Bottom cover:	
	Natural silver	L63590-001
	Pale gold	L63591-001
	Snowflake white	L63592-001
(20)	Rubber feet:	
	Silver	L63597-001
	Gold	L63598-001
	Vent cover (interior) (not illustrated)	L68290-001

Display assembly subcomponents

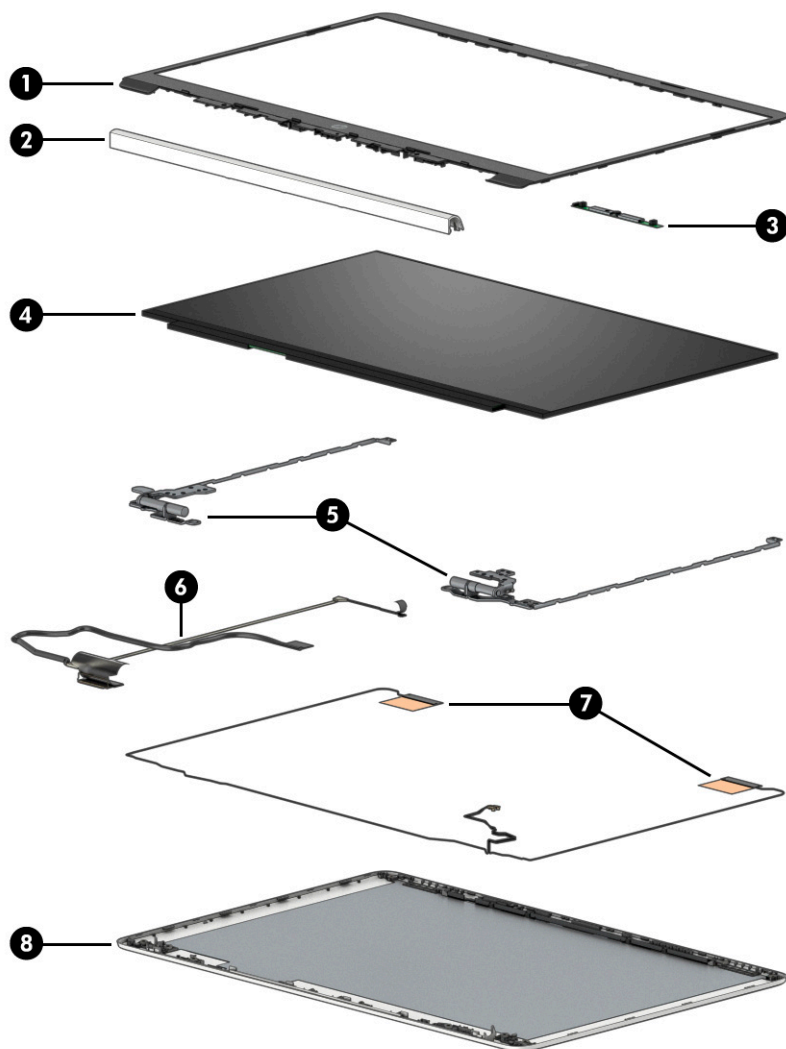


Table 3-2 Display components and their descriptions

Item	Component	Spare part number
(1)	Display bezel	L63608-001
(2)	Hinge cover:	
	Natural silver	L63609-001
	Pale gold	L63610-001
	Snowflake white	L63611-001
(3)	Webcam/microphone module (includes bezel adhesive tape and display panel cover tape)	L63564-001
(4)	Display panel:	
	FHD, antiglare, SVA	L63565-001
	FHD, antiglare, UWVA	L63566-001
	FHD, BrightView, Touch-on Panel (TOP)	L69126-001

Table 3-2 Display components and their descriptions (continued)

Item	Component	Spare part number
	HD, antiglare	L63567-001
	HD, BrightView	L63568-001
	HD, BrightView, Touch-on Panel (TOP)	L63569-001
(5)	Display hinges (left and right; includes bezel and display cover adhesive)	L63612-001
(6)	Display panel cable (includes bezel adhesive tape):	
	For use with touch displays on models with an Intel Core or Pentium Gold 4417U or 5405U processor	L63613-001
	For use with touch displays on models with a Pentium N5000 or Celeron N4000 processor	L63614-001
	For use with non-touch displays on models with an Intel Core or Pentium Gold 4417U or 5405U processor	L63615-001
	For use with non-touch displays on models with a Pentium N5000 or Celeron N4000 processor	L63616-001
(7)	Wireless antennas (includes bezel adhesive tape and display cover tape):	
	Dual antennas	L63607-001
	Single antenna	L63606-001
(8)	Display back cover (includes bezel adhesive tape):	
	Natural silver	L63603-001
	Pale gold	L63604-001
	Snowflake white	L63605-001

Cables

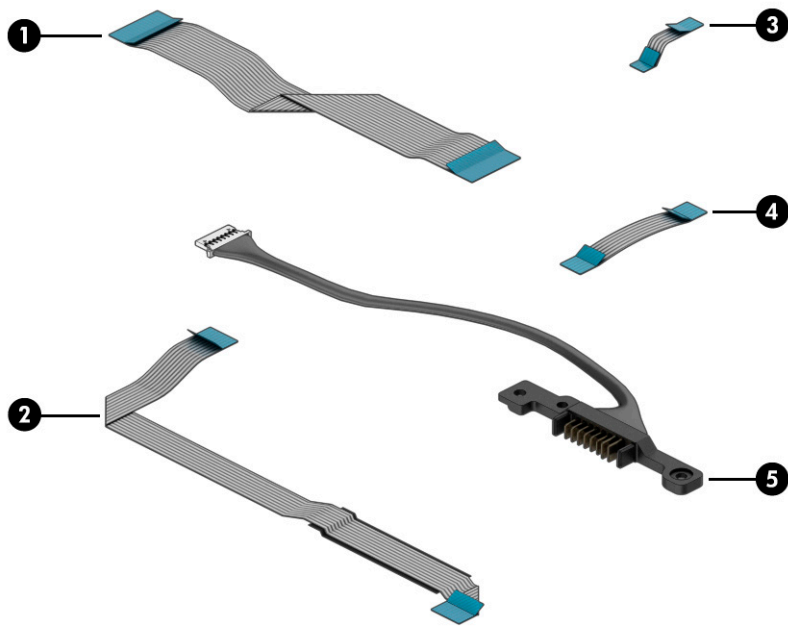


Table 3-3 Cables and their descriptions

Item	Component	Spare part number
(1)	USB cable	L63581-001
(2)	Touchpad cable	L63602-001
(3)	Fingerprint reader board cable	L63596-001
(4)	Card reader/audio board cable	L63584-001
(5)	Battery connector	L63585-001

Miscellaneous parts

Table 3-4 Miscellaneous parts and their descriptions

Component	Spare part number
AC adapter (PFC, slim, 4.5 mm):	
65 W	913691-850
45 W	741727-001
Power cord (C5, 1.0 m):	
For use in Australia	L19358-001
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 North America	L19367-001
For use in the People's Republic of China	L19368-001
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
For use in the United Kingdom	L19373-001
External optical drive	747080-001
HDMI-to-VGA adapter	701943-001
USB-to-RJ-45 adapter	829941-001
Screw Kit	L63617-001

4 Removal and replacement procedures preliminary requirements


Tools required

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

- Non-marking, non-conductive pry tool
- Magnetic Phillips P1 screwdriver
- Tweezers

Service considerations


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

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

Plastic parts

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

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.

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 inch) of shock-proof foam.

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and 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.

Electrostatic discharge information

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

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



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

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

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

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

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

Generating static electricity

Note the following:

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

Table 4-1 Static electricity occurrence based on activity and humidity

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

Electronic components can be packaged together in plastic tubes, trays, or polystyrene foam.



NOTE: As little as 700 V can degrade a product.

Preventing electrostatic damage to equipment

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

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

- Avoid contact with pins, leads, or circuitry.
- Place reusable electrostatic-sensitive parts from assemblies in protective packaging or conductive foam.

Personal grounding methods and equipment

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

- **Wrist straps** are flexible straps with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance in the ground cords. To provide proper ground, a strap must be worn snug against bare skin. The ground cord must be connected and fit snugly into the banana plug connector on the grounding mat or workstation.
- **Heel straps/Toe straps/Boot straps** can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use them on both feet with a maximum of $1\text{ M}\Omega \pm 10\%$ resistance between the operator and ground.

Table 4-2 Static shielding protection levels

Static shielding protection levels	
Method	Voltage
Antistatic plastic	1,500
Carbon-loaded plastic	7,500
Metallized laminate	15,000

Grounding the work area

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

- Cover the work surface with approved static-dissipative material. Provide a wrist strap connected to the work surface and properly grounded tools and equipment.
- Use static-dissipative mats, foot straps, or air ionizers to give added protection.
- Handle electrostatic sensitive components, parts, and assemblies by the case or PCB laminate. Handle them only at static-free work areas.
- Turn off power and input signals before inserting and removing connectors or test equipment.
- Use fixtures made of static-safe materials when fixtures must directly contact dissipative surfaces.
- Keep work area free of nonconductive materials such as ordinary plastic assembly aids and polystyrene foam.
- Use field service tools, such as cutters, screwdrivers, and vacuums, that are conductive.

Recommended materials and equipment

HP recommends the following materials and equipment to prevent static electricity:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of $1\text{ M}\Omega \pm 10\%$ resistance


- Static-dissipative table or floor mats with hard tie to ground
- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing $1\text{ M}\Omega \pm 10\%$ resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

5 Removal and replacement procedures for authorized service provider parts

 **IMPORTANT:** Components described in this chapter should be accessed only 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 your computer, go to <http://partsurfer.hp.com>, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

There are as many as 52 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Preparation for disassembly

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

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

Bottom cover

Table 5-1 Bottom cover descriptions and part numbers

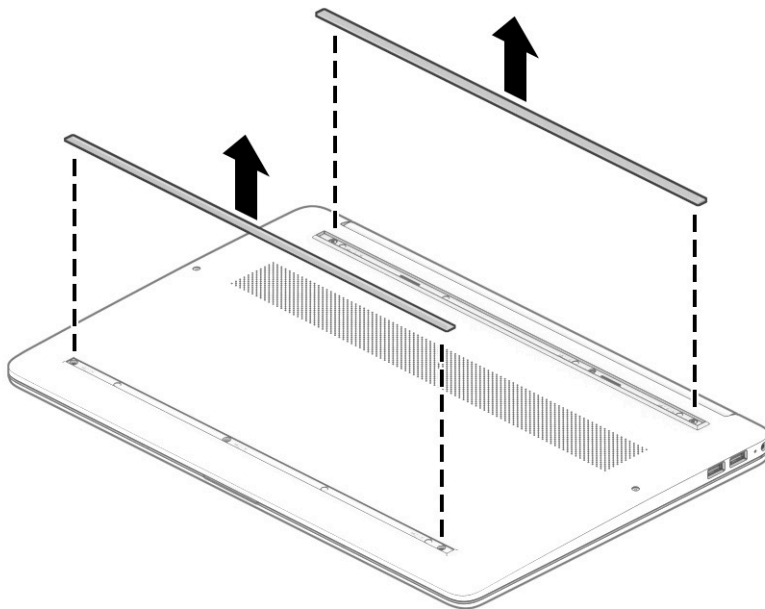
Description	Spare part number
Bottom cover, natural silver	L63590-001
Bottom cover, pale gold	L63591-001
Bottom cover, snowflake white	L63592-001
Rubber feet, gold	L63598-001
Rubber feet, silver	L63597-001

Before removing the bottom cover, follow this step:

- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).

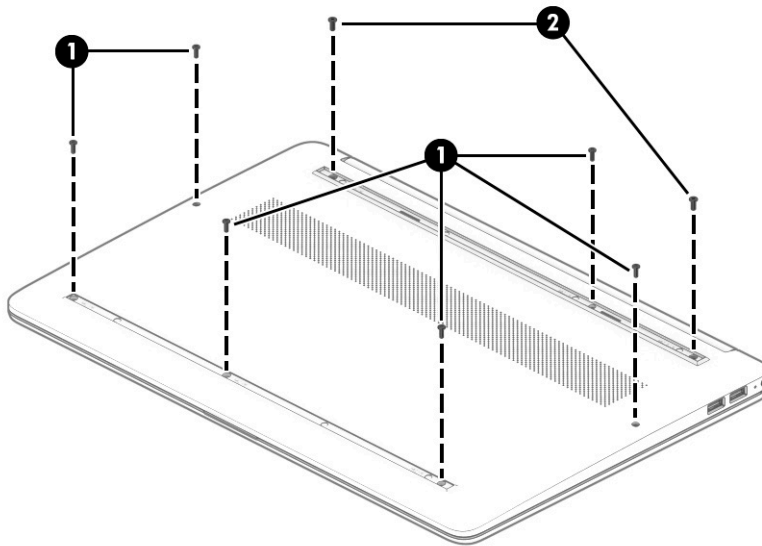
Remove the bottom cover:

1. Peel the two rubber feet off the bottom cover.

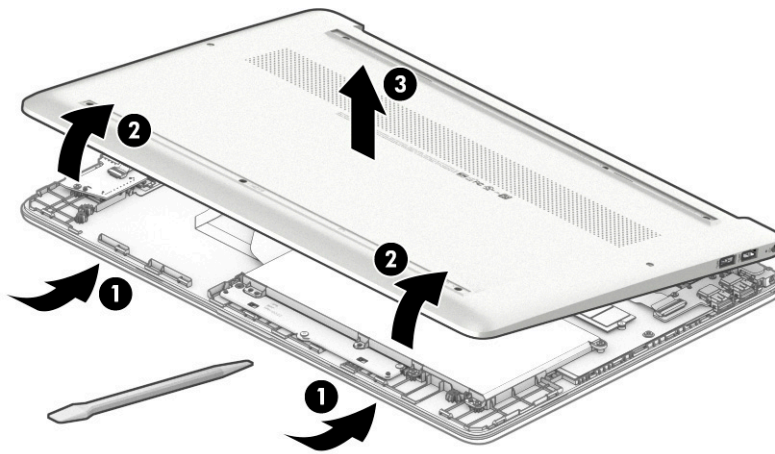


2. Remove the six Phillips M2.0 × 6.0 screws **(1)** from the bottom cover.

3. Remove the two Phillips M2.5 × 6.0 screws **(2)** from the bottom cover.



4. Insert a plastic tool between the bottom cover and the computer chassis **(1)**, and then flex and lift the bottom of the bottom cover **(2)** enough to separate it from the computer.
5. Remove the bottom cover from the computer **(3)**.



Reverse this procedure to install the bottom cover.

Battery

Table 5-2 Battery description and part number

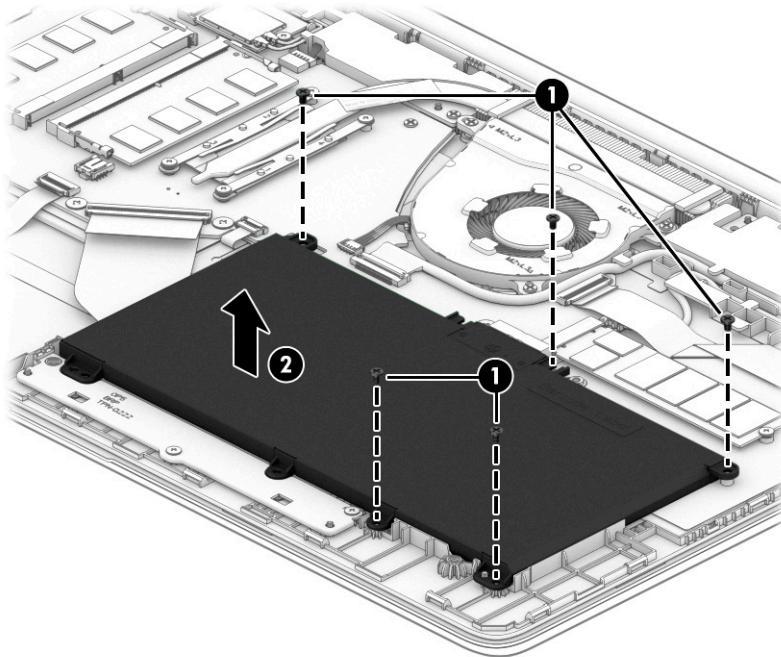
Description	Spare part number
Battery, 3 cell, 41 Wh	L11119-855

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).

Remove the battery:

1. Remove the five Phillips M2.0 × 3.0 screws **(1)** that secure the battery to the computer.
2. Remove the battery from the computer **(2)**.



Reverse this procedure to install the battery.

Memory module

Table 5-3 Memory descriptions and part numbers


Description	Spare part number
Memory module, 8 GB	937236-855
Memory module, 4 GB	L10598-855

Before removing the memory modules, follow these steps:

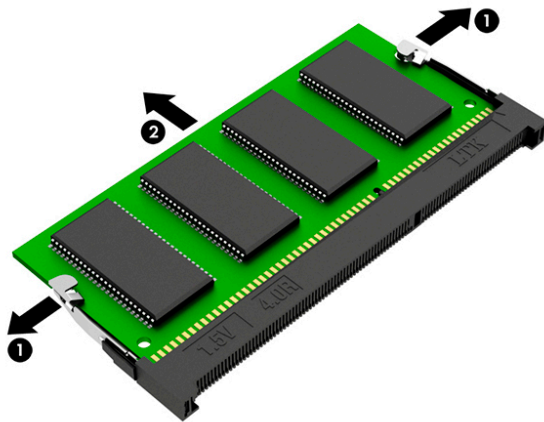
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).


Remove the memory modules:

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

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

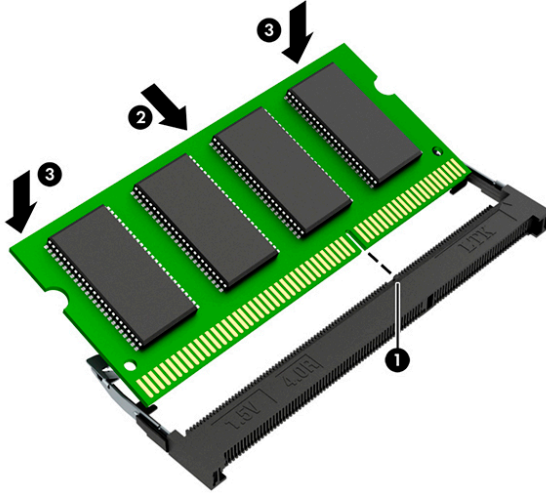
To protect a memory module after removal, place it in an electrostatic-safe container.



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

1. Align the notched edge of the memory module with the tab in the memory module slot **(1)**.
2. Press the module into the slot until seated **(2)**.

3. Gently press down on the module edges until the side retention clips snap into place **(3)**.



Solid-state drive

Table 5-4 Solid-state drive descriptions and part numbers

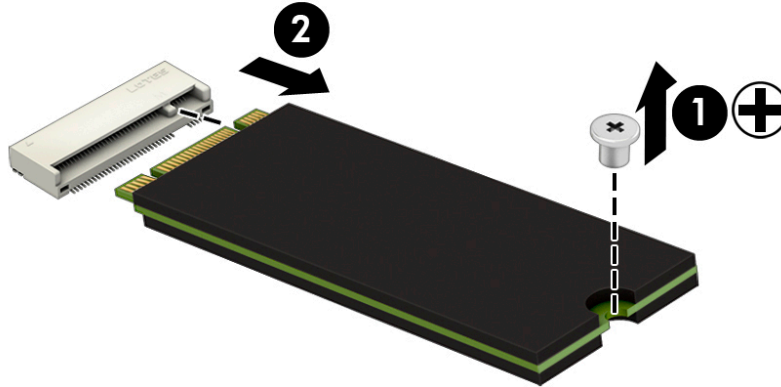
Description	Spare part number
512 GB, PCIe, TLC	L63572-001
512 GB, PCIe, value	L63573-001
256 GB, PCIe, value	L63571-001
256 GB, PCIe + 16 GB Optane memory module	L69125-001
128 GB, SATA-3, TLC	L63570-001

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

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the solid-state drive:

- ▲ Remove the Phillips M2.0 × 2.0 screw **(1)**, and then pull the drive from the socket **(2)**.




Reverse this procedure to install the solid-state drive.

WLAN module

Table 5-5 WLAN module description and part number

Description	Spare part number
Realtek RTL8822CE 802.11ac 2 × 2 Wi-Fi + Bluetooth 5.0	L44796-005
Realtek RTL8723DE 802.11bgn 1 × 1 Wi-Fi + Bluetooth 4.2	L21480-005
Realtek RTL8821CE 802.11ac 1 × 1 Wi-Fi + Bluetooth 4.2	L17365-005


 **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. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the WLAN module:

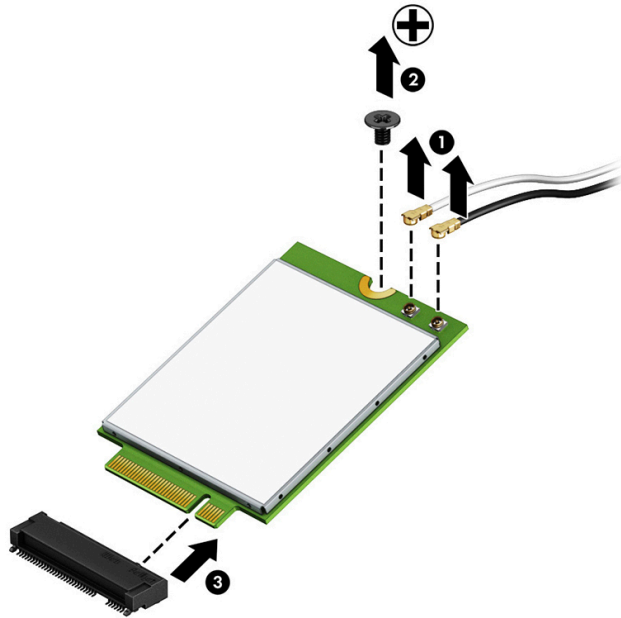
1. Disconnect the WLAN antenna cables (**1**) from the terminals on the WLAN module.

 **NOTE:** Models have either one or two WLAN antennas. On models with two antennas, 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 #1 Aux terminal.

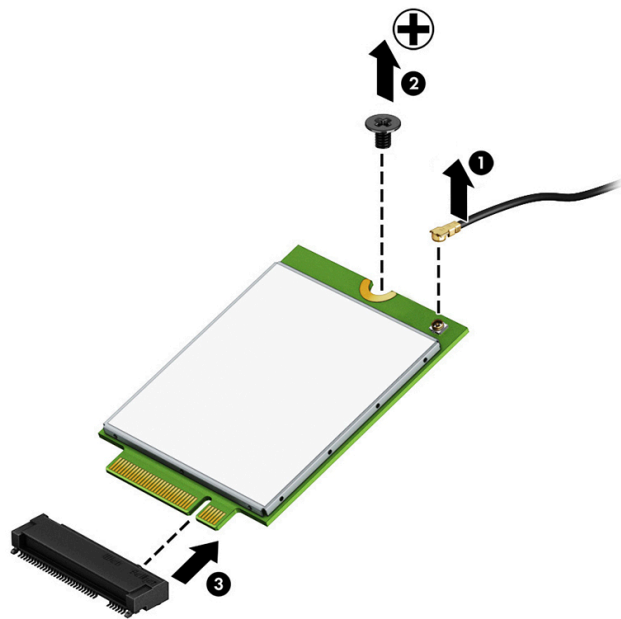
2. Remove the Phillips M2.0 × 2.0 screw (**2**) that secures the WLAN module to the bottom cover. (The WLAN module tilts up.)


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

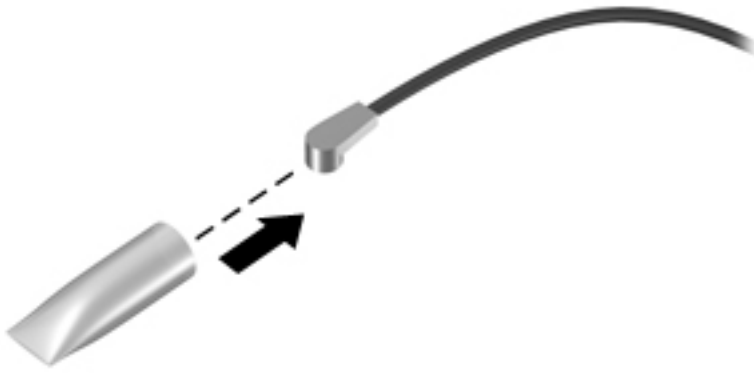
Models with two antennas



Models with one antenna



 **NOTE:** If the WLAN antenna is not connected to the terminal on the WLAN module, a protective sleeve must be installed on the antenna connector, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Card reader/audio board

Table 5-6 Card reader/audio board description and part number

Description	Spare part number
Card reader/audio board	L63583-001

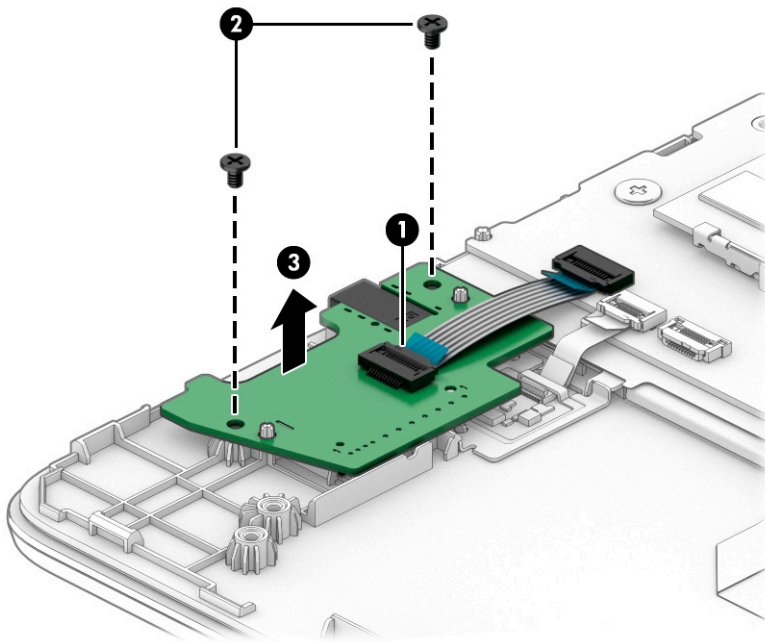
NOTE: The card reader/audio board spare part kit does not include the cable. The cable is available as spare part number L63584-001.

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

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the card reader/audio board:

1. Disconnect the cable from the ZIF connector on the card reader/audio board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)** that secure the board to the computer.
3. Remove the board from the computer **(3)**.



Reverse this procedure to install the card reader/audio board.

USB board

Table 5-7 USB board description and part number

Description	Spare part number
USB board	L63580-001

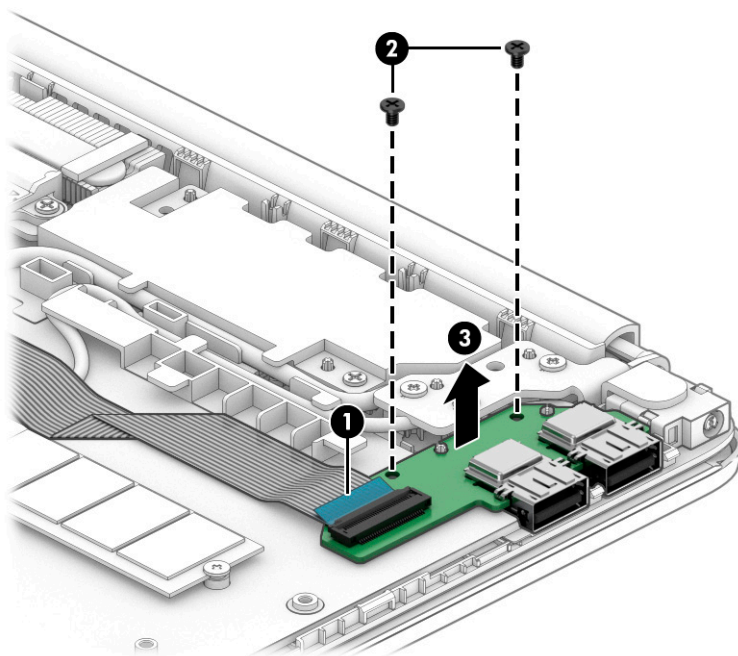
NOTE: The USB board spare part kit does not include the cable. The cable is available as spare part number L63581-001 for models without Pentium N5000 and Celeron N4000 processors and L63582-001 for models with Pentium N5000 and Celeron N4000 processors.

Before removing the USB board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the USB board:

1. Disconnect the cable from the ZIF connector on the USB board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)** that secure the USB board to the computer, and then remove the board **(3)**.



Reverse this procedure to install the USB board.

Touchpad

Table 5-8 Touchpad description and part number

Description	Spare part number
Touchpad, natural silver	L63600-001
Touchpad, ash silver	L63599-001
Touchpad, snow white	L63601-001

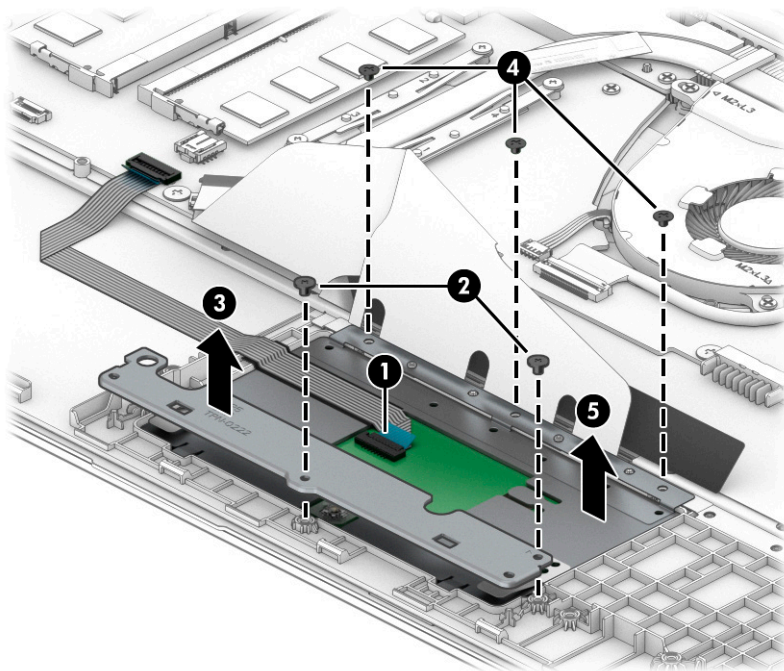
NOTE: The touchpad spare part kit does not include the cable. The cable is available as spare part number L63602-001.

Before removing the touchpad, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the touchpad:

1. Disconnect the cable from the ZIF connector on the touchpad (**1**).
2. Remove the two Phillips M2.0 × 2.5 screws (**2**) that secure the touchpad bracket to the computer, and then remove the bracket (**3**).
3. Remove the three Phillips M2.0 × 2.0 screws (**4**) that secure the touchpad to the computer, and then remove the touchpad (**5**).



Reverse this procedure to install the touchpad.

Fingerprint reader board

Table 5-9 Fingerprint reader board description and part number

Description	Spare part number
Fingerprint reader board	L63595-001

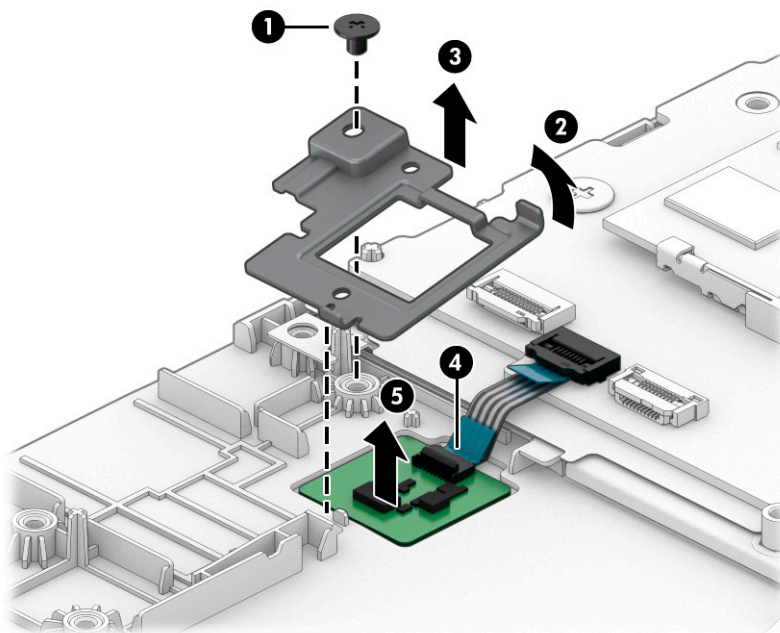
NOTE: The fingerprint reader board spare part kit does not include the cable. The cable is available as spare part number L63596-001.

Before removing the fingerprint reader board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the card reader/audio board (see [Card reader/audio board on page 37](#)).

Remove the fingerprint reader board:

1. Remove the Phillips M2.0 × 2.5 screw **(1)** that secures the fingerprint reader bracket to the computer.
2. Rotate the bracket upward **(2)**, and then remove the bracket from the computer **(3)**.
3. Disconnect the cable from the ZIF connector on the fingerprint reader board **(4)**, and then remove the board from the computer **(5)**.



Reverse this procedure to install the fingerprint reader board.

Fan

Table 5-10 Fan description and part number

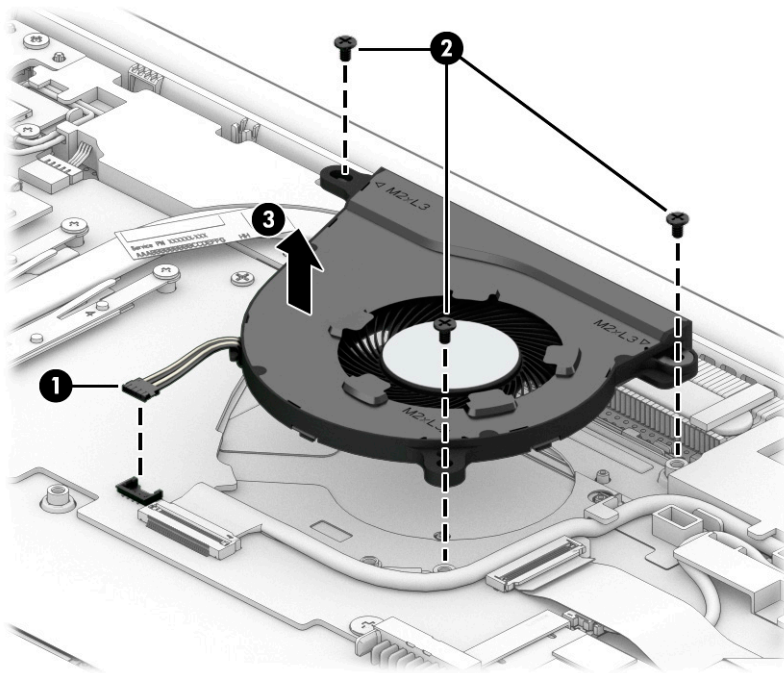
Description	Spare part number
Fan for use only in models with an Intel Core or Pentium Gold 5405U or 4417U processor and a backlit keyboard	L63587-001
Fan for use only in models with an Intel Core or Pentium Gold 5405U or 4417U processor and without a backlit keyboard	L63588-001

Before removing the fan, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the fan:

1. Disconnect the fan cable from the system board **(1)**.
2. Remove the three Phillips M2.0 × 3.0 screws **(2)** that secure the fan to the computer.
3. Remove the fan from the computer **(3)**.




Reverse this procedure to install the fan.

Vent cover and rubber filler (interior) on fanless models

Table 5-11 Vent cover description and part number

Description	Spare part number
Vent cover	L68290-001

Fanless models require that you install a cover on the inside of the computer over the air vent holes.

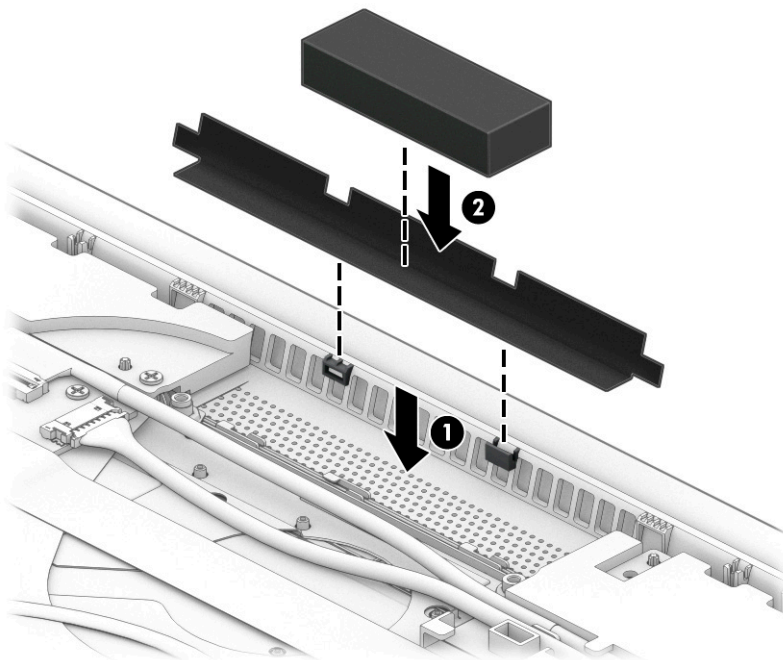
 **IMPORTANT:** Do not install the vent cover in models with a fan. Doing so will cause thermal performance problems.

Before installing the interior vent cover, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Install the interior vent cover and rubber filler piece:

1. Fold the cover along the dotted lines in the middle of the cover.
2. Install the cover of the fan vent, making sure the cover aligns correctly with the hooks along the top of the vent **(1)**.
3. If replacing the top cover, remove the fan vent rubber filler piece from the old top cover and install it in the new top cover **(2)**.



Heat sink (thermal module)

Table 5-12 Heat sink assembly, thermal pad, and thermal grease descriptions and part numbers

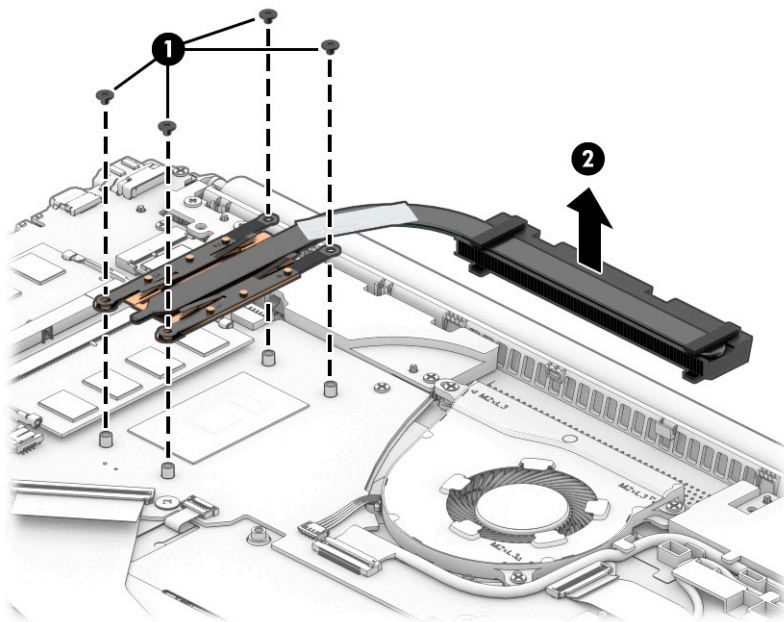
Description	Spare part number
Heat sink for use in models with an Intel Core or Pentium Gold 4417U or 5405U processor	L63586-001

Before removing the heat sink, follow these steps:

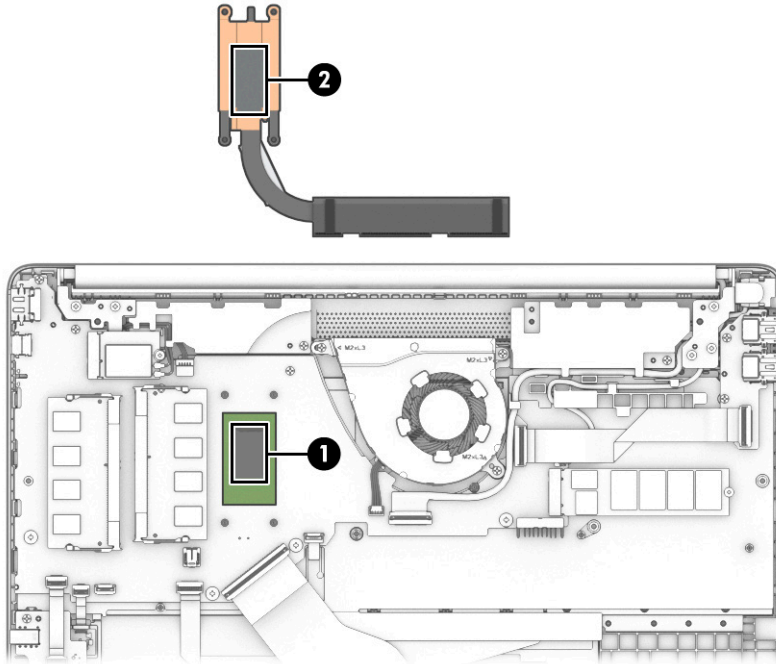
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).

Remove the heat sink:

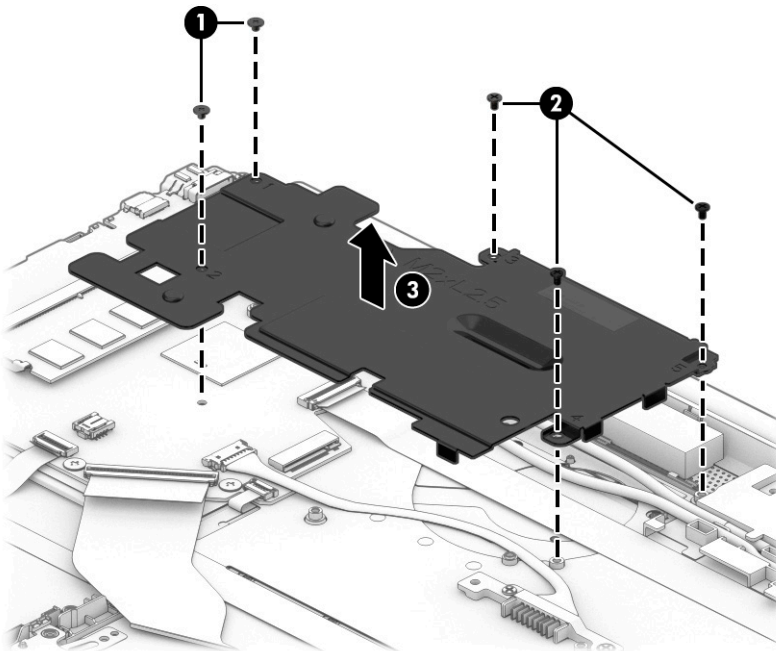
1. **Models with a fan:** Remove the four Phillips M2.0 × 2.0 screws (**1**) in the order indicated on the heat sink.
2. Remove the heat sink (**2**).



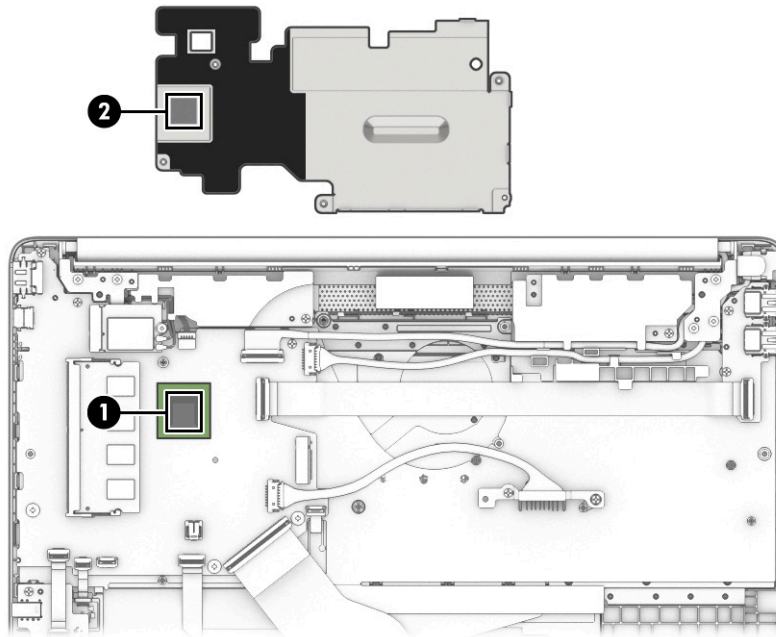
3. Apply thermal grease to the integrated processor on the system board (1) and associated location on the heat sink (2).



4. **Fanless models:** Remove the two black Phillips M2.0 × 2.0 screws (1) and the three silver Phillips M2.0 × 2.5 screws (2) in the order indicated on the heat sink.
5. Remove the heat sink (3).



6. Apply thermal grease to the integrated processor on the system board (1) and associated location on the heat sink (2).



Reverse this procedure to install the heat sink.

Battery connector (fanless products only)

Table 5-13 Battery connector description and part number

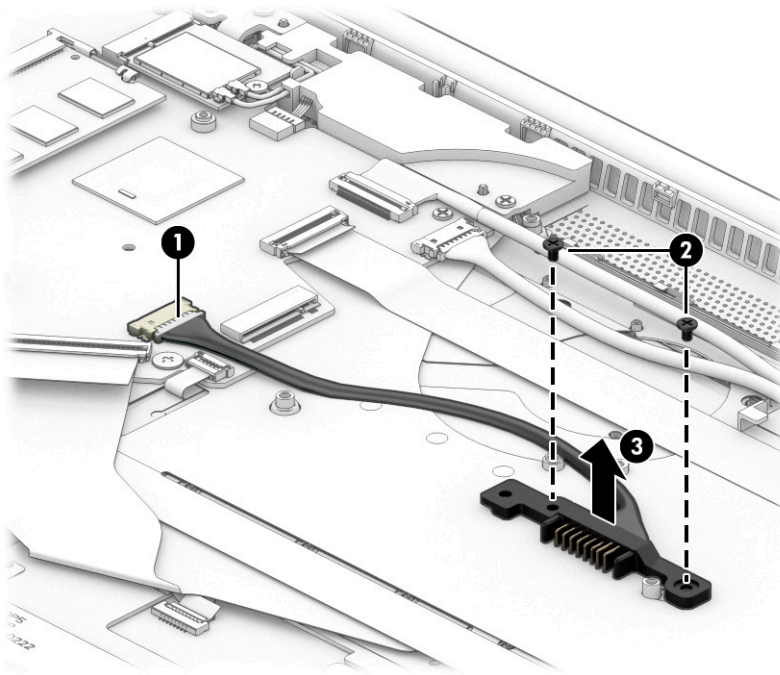
Description	Spare part number
Battery connector	L63585-001

Before removing the battery connector, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 33](#)).
5. Remove the heat sink (see [Heat sink \(thermal module\) on page 43](#)).

Remove the battery connector:

1. Disconnect the battery connector cable from the system board **(1)**.
2. Remove the two Phillips M2.0 × 3.0 screws **(2)** that secure the connector to the computer.
3. Lift the battery connector out of the computer **(3)**.



Reverse this procedure to install the battery connector.

System board

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating system

xxxxxx-601: Windows 10 operating system

Table 5-14 System board descriptions and part numbers

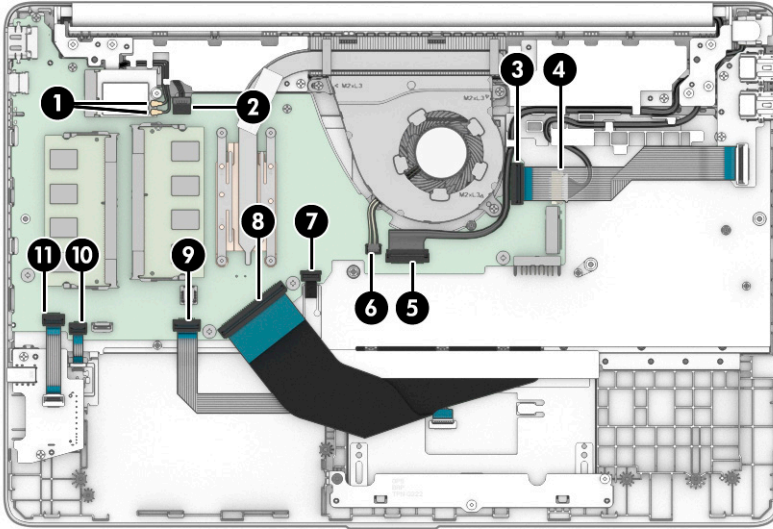
Description	Spare part number
Intel Core i7-8565U processor	L63560-xx1
Intel Core i5-8265U processor	L63559-xx1
Intel Core i3-8145U processor	L63558-xx1
Intel Core i3-7020U processor	L63557-xx1
Intel Pentium 5405U processor	L70056-xx1
Intel Pentium 4417U processor	L63561-xx1
Intel Pentium N5000 processor	L63563-xx1
Intel Celeron N4000 processor	L63562-xx1

Before removing the system board, follow these steps:

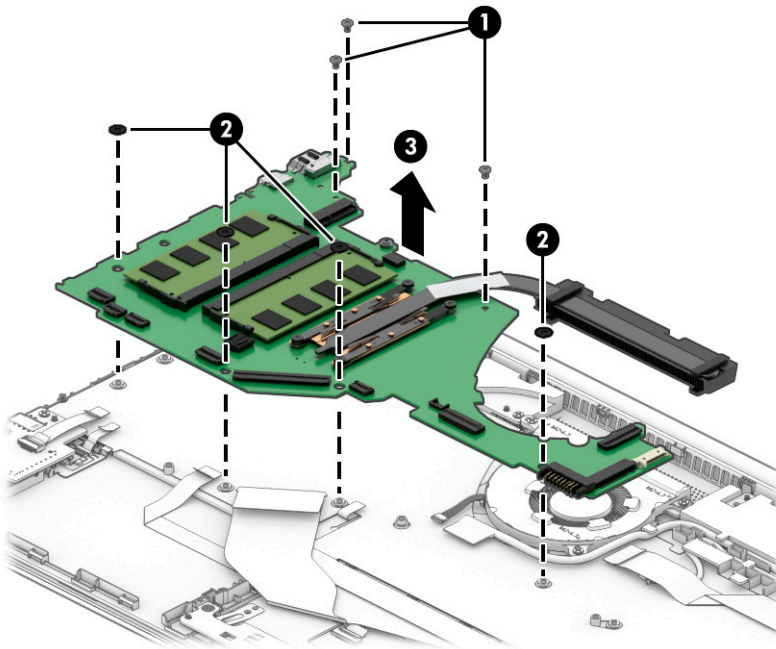
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the solid-state drive (see [Solid-state drive on page 33](#)).
5. Remove the heat sink (see [Heat sink \(thermal module\) on page 43](#)).

Remove the system board:

1. **Models with a fan:** Disconnect the following cables from the system board:
 - a. WLAN module antennas **(1)**
 - b. Speaker cable **(2)**
 - c. USB board cable (ZIF) **(3)**
 - d. Power connector cable **(4)**
 - e. Display cable (ZIF) **(5)**
 - f. Fan cable **(6)**
 - g. Keyboard backlight cable (ZIF) **(7)**
 - h. Keyboard cable (ZIF) **(8)**
 - i. Touchpad cable (ZIF) **(9)**
 - j. Fingerprint reader cable (ZIF) **(10)**
 - k. Card reader/audio board cable (ZIF) **(11)**

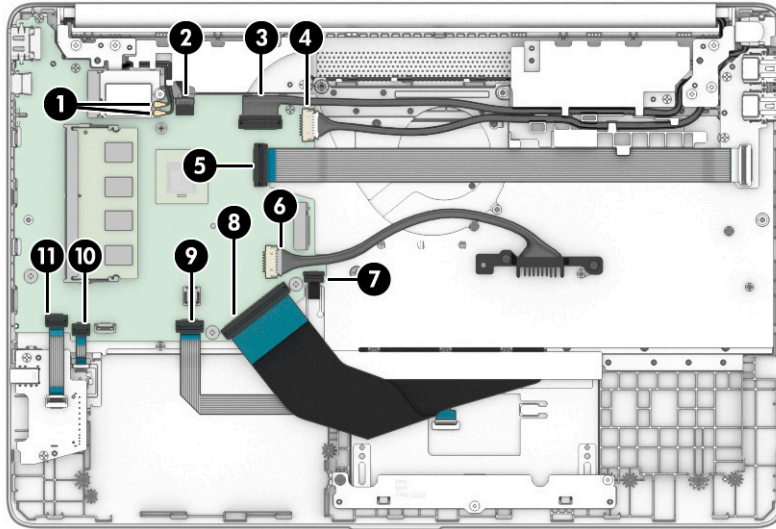


2. Remove the three silver Phillips M2.0 × 3.0 screws **(1)** and the three black Phillips M2.0 × 2.0 screws **(2)** that secure the system board to the computer.
3. Remove the system board from the computer **(3)**.

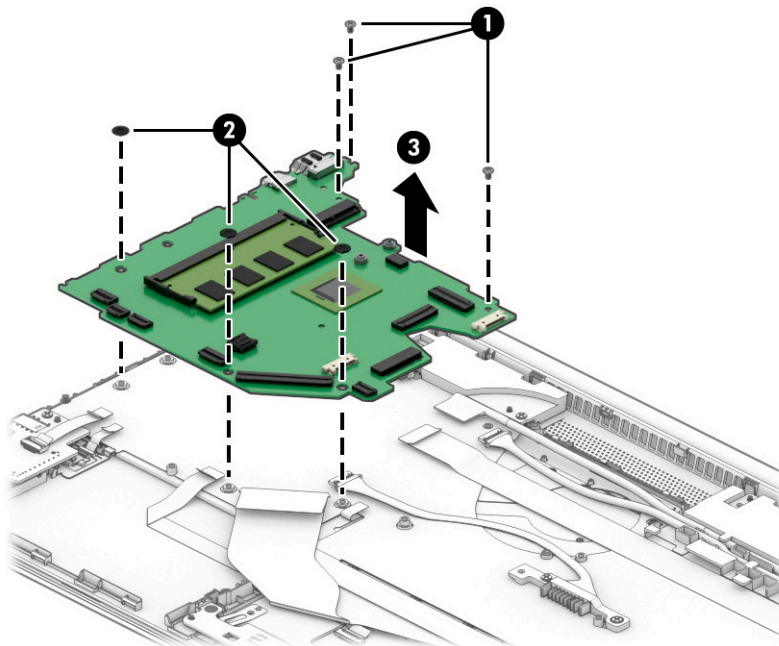


4. **Fanless models:** Disconnect the following cables from the system board:
 - a. WLAN module antennas **(1)**
 - b. Speaker cable **(2)**
 - c. Display cable (ZIF) **(3)**
 - d. Power connector cable **(4)**
 - e. USB board cable (ZIF) **(5)**

- f. Battery connector cable **(6)**
- g. Keyboard backlight cable (ZIF) **(7)**
- h. Keyboard cable (ZIF) **(8)**
- i. Touchpad cable (ZIF) **(9)**
- j. Fingerprint reader cable (ZIF) **(10)**
- k. Card reader/audio board cable (ZIF) **(11)**




5. Remove the three silver Phillips M2.0 × 3.0 screws **(1)** and the three black Phillips M2.0 × 1.6 screws **(2)** that secure the system board to the computer.
6. Remove the system board from the computer **(3)**.



Reverse this procedure to install the system board.

Display assembly

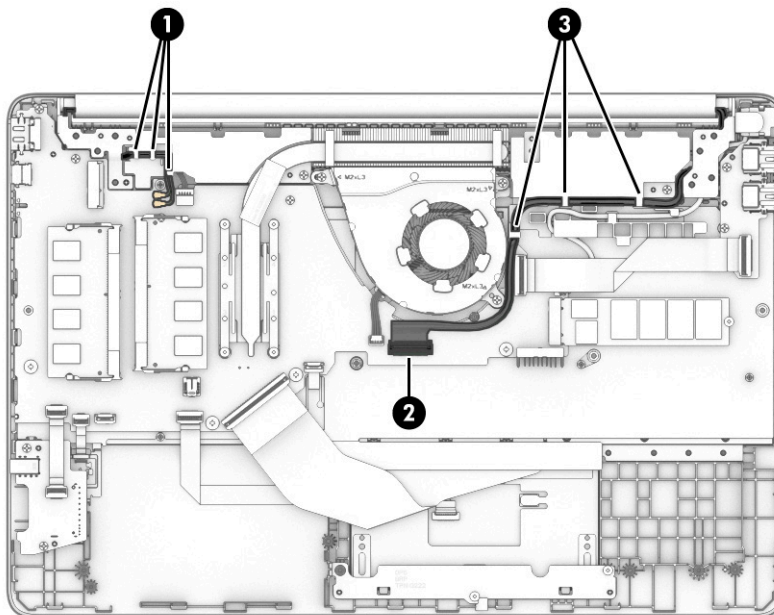
 **NOTE:** Display assemblies are offered as spare parts only at a subcomponent level.

Before removing the display assembly, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the WLAN module (see [WLAN module on page 34](#)).

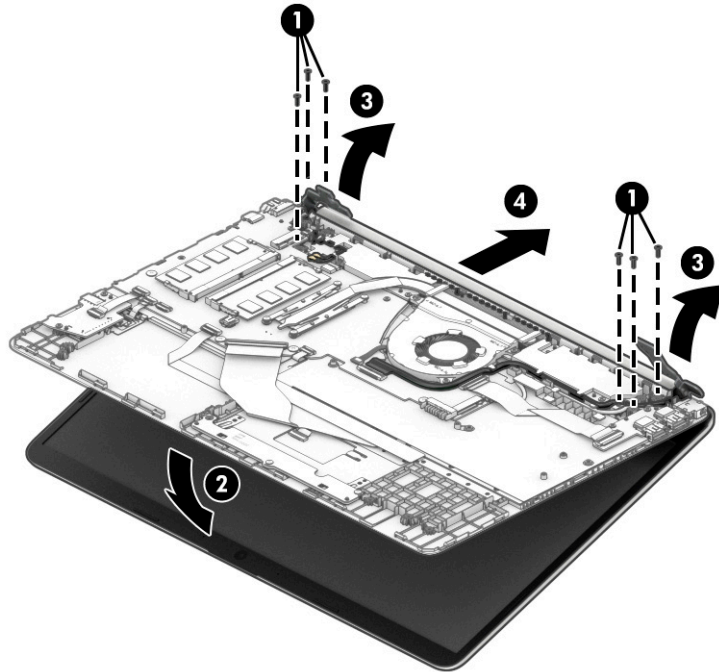
Remove the display assembly:

1. Disconnect the wireless antenna cables from the WLAN module and remove the cable from the clips in the computer **(1)**.
2. Disconnect the display cable from the system board **(2)**, and then remove the cable from the channel in the left speaker **(3)**.



3. Remove the six Phillips M2.5 × 4.0 screws **(1)** from the hinges.
4. Open the display **(2)** until the hinges **(3)** are in the open position.

5. Separate the display from the computer (4).



6. If it is necessary to replace display assembly subcomponents:

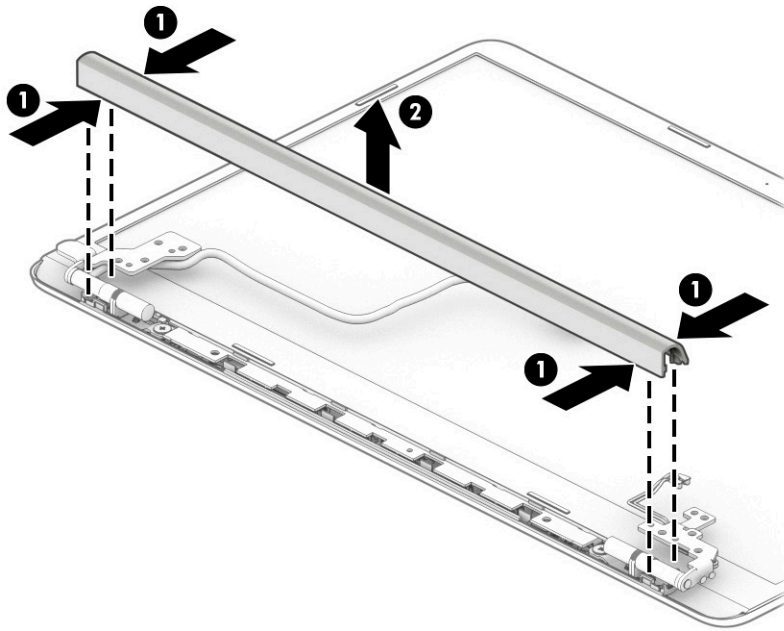
- a. Remove the hinge cover by squeezing both ends of the cover (1), and then pulling the cover off the display (2).

The hinge cover is available as the following spare part numbers:

L63609-001: Natural silver

L63610-001: Pale gold

L63611-001: Snowflake white



- b. Release the top edge of the display bezel **(1)** from the display assembly.

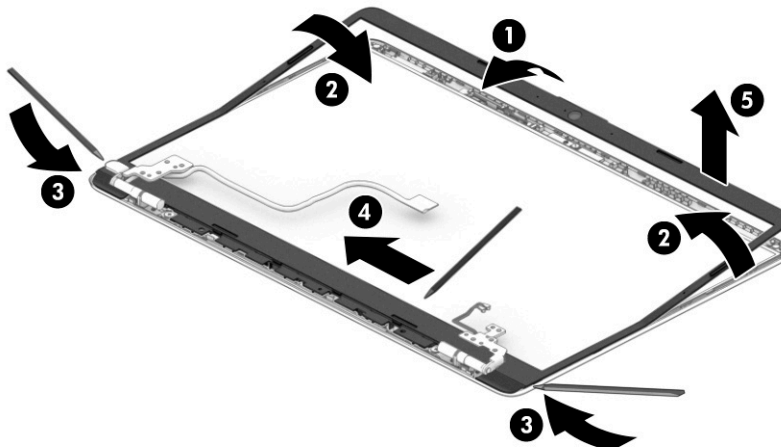


IMPORTANT: Be careful not to bend or break the narrow sections of the bezel when removing.

Follow the specific bezel removal procedures to avoid damaging the tape that secures the bottom of the bezel to the display.

- c. Release the left and right edges of the display bezel **(2)** from the display assembly.
- d. Using a flat-plastic lifter tool, release the bottom left and right corners of the display bezel **(3)** from the display assembly.
- e. Insert a tool into the right side of the inside-bottom of the bezel, and then pull the tool to the left carefully to separate the bezel adhesive from the panel **(4)**.
- f. Remove the display bezel from the display **(5)**.

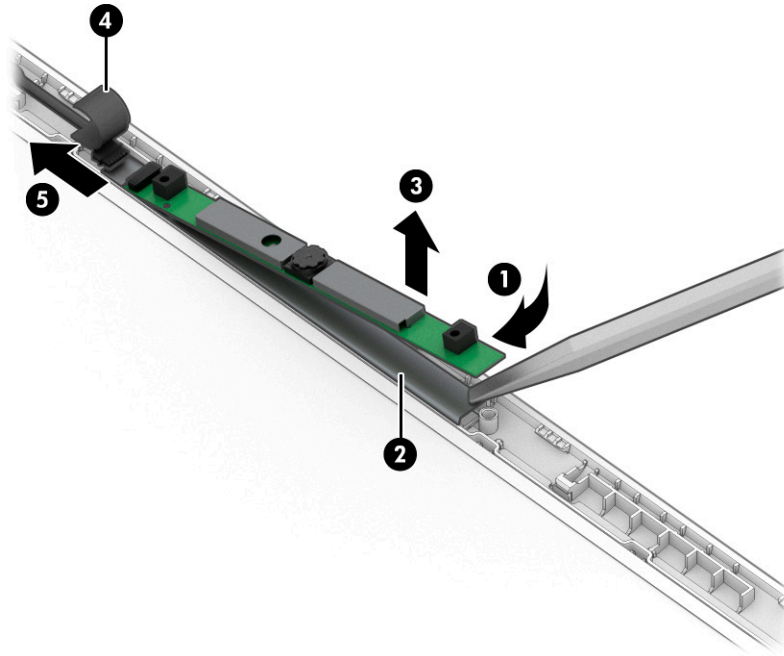
The display bezel is available as spare part number L63608-001.



7. If it is necessary to remove the webcam module:


- ▲ Starting from the right side, use a tool to lift and release **(1)** the webcam module from the metal tape behind it **(2)**. Lift the module from the display back cover **(3)**, remove the tape from the connector **(4)**, and then disconnect the cable **(5)**.

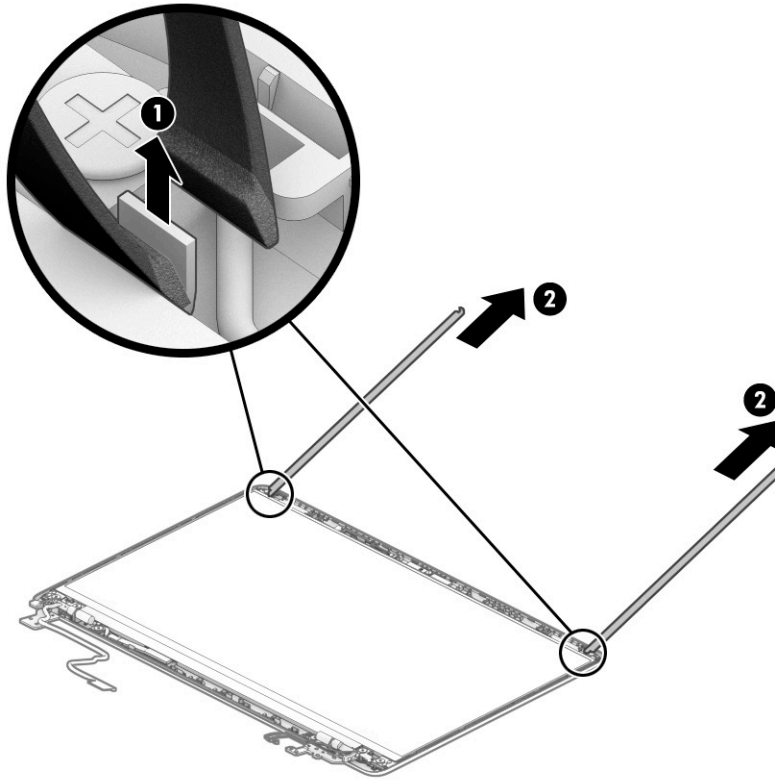
The webcam is available as spare part number L63564-001.



8. If it is necessary to remove the display panel:
 - a. Use tweezers to grasp the tape that routes behind both the left and right sides of the display panel **(1)**.

- b. Pull the tape from behind the left and right sides of the panel **(2)**.

 **IMPORTANT:** You have to pull on the tape multiple times before it is completely removed. To avoid tearing the tape, pull the tape evenly and carefully. Rolling the tape around the tweezer or the shaft of a screwdriver as you pull it can help to avoid pulling too hard and breaking the tape. Be sure to pull the tape straight out – do not pull it out along the sides of the panel.



- c. Rotate the display panel over and place next to the display back cover **(1)**.

- d. Lift the tape from the connector on the rear of the panel (2), open the locking lever (3), and then disconnect the cable from the panel (4).

Display panels are available as the following spare part numbers:

L63565-001: FHD, antiglare, SVA

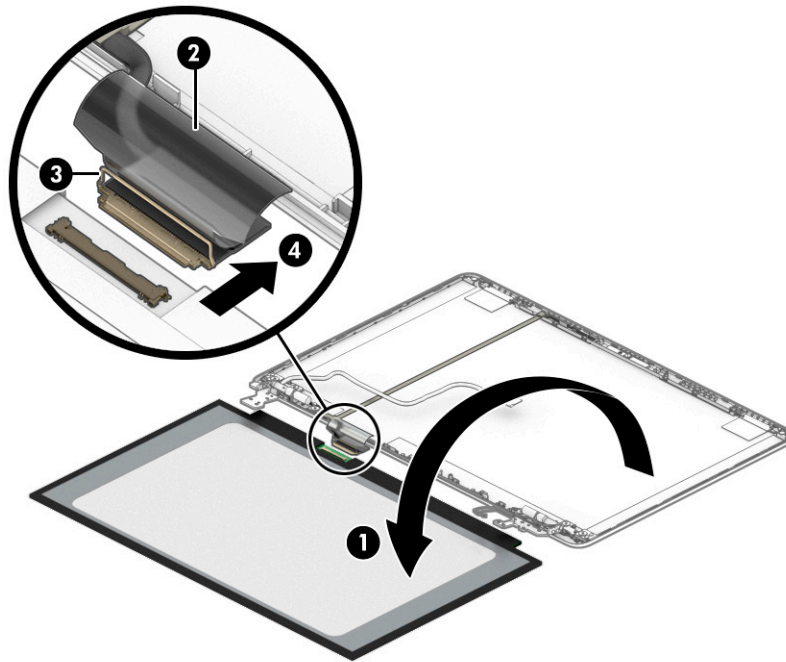
L63566-001: FHD, antiglare, UWVA

L69126-001: FHD, BrightView, Touch-on Panel (TOP)

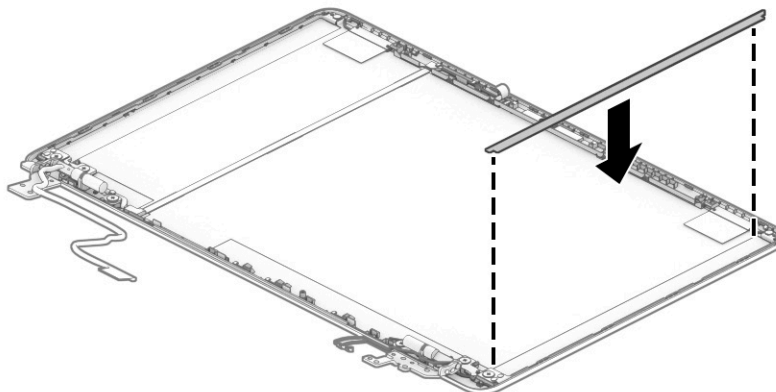
L63567-001: HD, antiglare

L63568-001: HD, BrightView

L63569-001: HD, BrightView, Touch-on Panel (TOP)



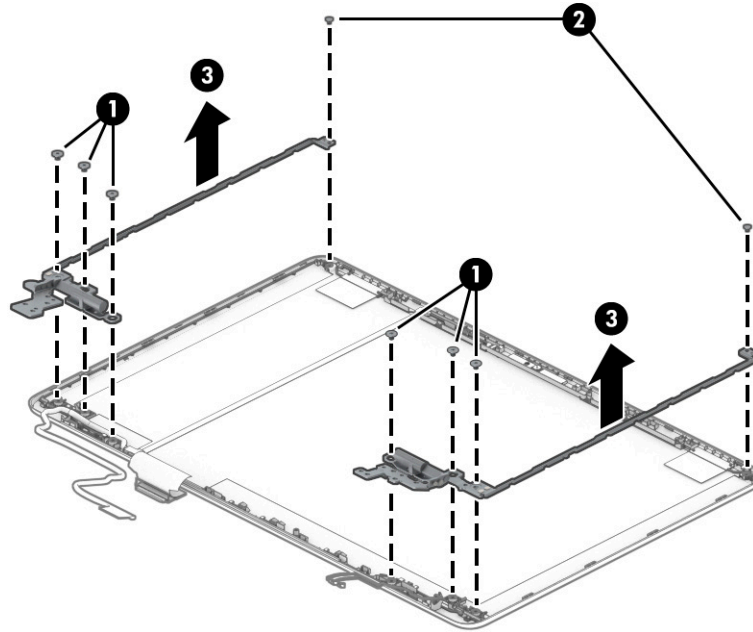
- e. When installing the display panel, apply the adhesive in the location as shown in the following illustration.



- 9. If it is necessary to remove the display hinges:

- a. Remove the three Phillips M2.5 × 3.0 screws **(1)** from the bottom of each hinge.
- b. Remove the Phillips M2.0 × 2.5 screw **(2)** from the top of each hinge.
- c. Remove the display hinges from the display back cover **(3)**.

The display hinges are available as spare part number L63612-001.



10. If it is necessary to remove the display panel cable:

- a. Remove the tape from the connector on the webcam module **(1)**, and then disconnect the cable from the webcam module **(2)**.
- b. Remove the cable from the channel at the top of the display back cover **(3)**.

- c. Peel the cable from the inside of the display back cover **(4)**, and then remove the cable **(5)**.

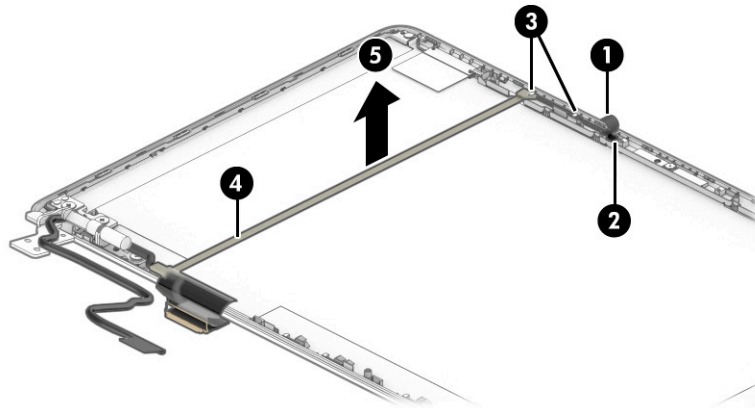
The display cable is available as the following spare part numbers:

L63613-001: Touch displays for use in models with an Intel Core or Pentium Gold 4417U or 5405U processor

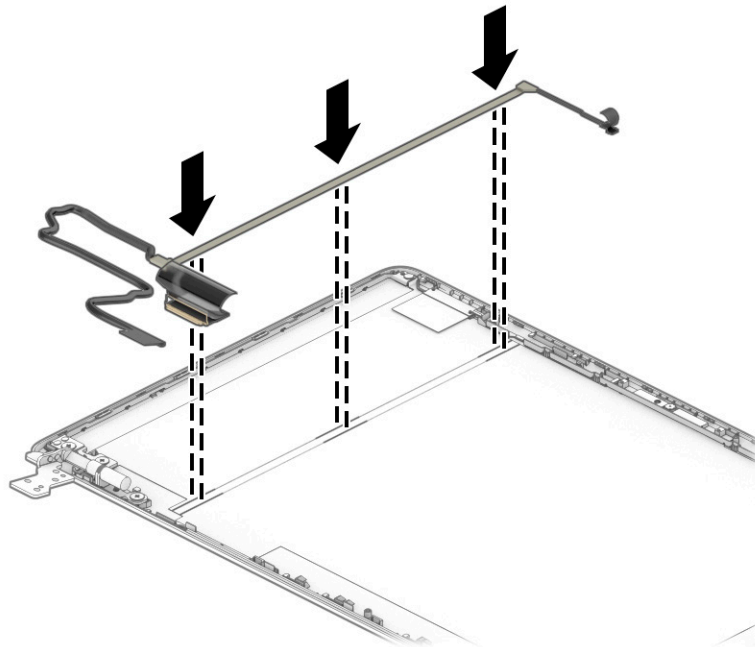
L63614-001: Touch displays for use in on models with a Pentium N5000 or Celeron N4000 processor

L63615-001: Non-touch displays for use in models with an Intel Core or Pentium Gold 4417U or 5405U processor

L63616-001: Non-touch displays for use in models with a Pentium N5000 or Celeron N4000 processor



- d. When installing the display cable, position the cable in the middle of the alignment notch as marked on the inside of the display back cover.

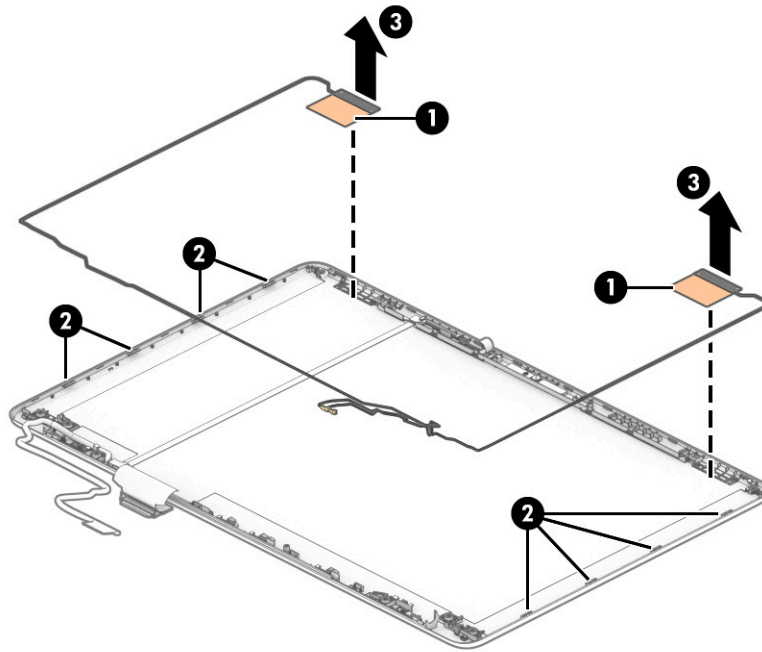


11. If it is necessary to remove the wireless antennas:

- a. Peel the antennas off the top of the display back cover **(1)**.
- b. Remove the antenna cables from the channels on the sides of the display back cover **(2)**, and then remove the antennas and cables **(3)**.

The wireless antennas are available as spare part number L63607-001 for dual antennas and L63606-001 for single antenna.

The display back cover is available as spare part number L63603-001 for use in natural silver models, L63604-001 for use in pale gold models, and L63605-001 for use in snowflake white models.



Reverse this procedure to install the display assembly.

Power connector

Table 5-15 Power connector description and part number

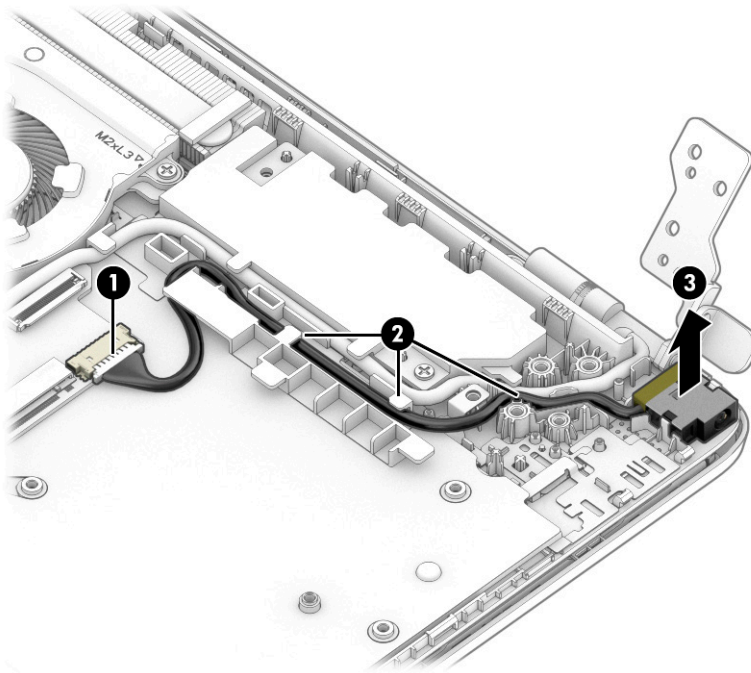
Description	Spare part number
Power connector for use in models with an Intel Core or Pentium Gold 4417U or 5405U processor	806746-001
Power connector for use in models with a Pentium N5000 or Celeron N4000 processor	810327-004

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the display assembly (see [Display assembly on page 50](#)).

Remove the power connector cable:

1. Disconnect the cable from the system board (**1**).
2. Remove the cable from the routing channel in the left speaker (**2**), and then remove the cable from the computer (**3**).



Reverse this procedure to install the power connector cable.

Speaker assembly

Table 5-16 Speaker assembly description and part number

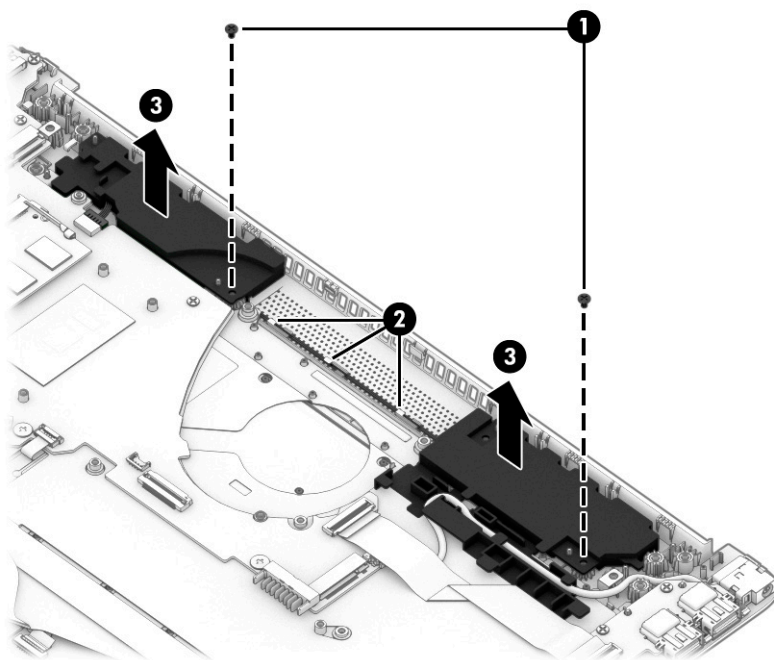
Description	Spare part number
Speaker assembly	L63594-001

Before removing the speaker assembly, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the bottom cover (see [Bottom cover on page 28](#)).
3. Remove the battery (see [Battery on page 30](#)).
4. Remove the heat sink from models that include a fan (see [Heat sink \(thermal module\) on page 43](#)).
5. Remove the display (see [Display assembly on page 50](#)).

Remove the speakers:

1. Remove the two Phillips M2.0 × 3.0 screws **(1)** that secure the speakers to the computer.
2. Remove the speaker cable from the clips in the routing channel in the computer **(2)**.
3. Remove the speakers from the computer **(3)**.



Reverse this procedure to install the speaker assembly.

Keyboard/top cover

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

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

Table 5-17 Keyboard/top cover description and part number


Description	Spare part number
Snow white; no backlight	L63574-xx1
Snow white; backlit	L63575-xx1
Ash silver; no backlight	L63576-xx1
Ash silver; backlit	L63577-xx1
Natural silver; no backlight	L63578-xx1
Natural silver; backlit	L63579-xx1

Table 5-18 Keyboard country codes


For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Israel	-BB1	South Korea	-AD1
Bulgaria	-261	Italy	-061	Spain	-071
Czech Republic and Slovakia	-FL1	Latin America	-161	Switzerland	-BG1
Denmark, Finland, and Norway	-DH1	The Netherlands	-B31	Taiwan	-AB1
France	-051	Portugal	-131	Thailand	-281
French Arabic	-FP1	Romania	-271	Turkey	-141
French Canada	-DB1	Russia	-251	Ukraine	-BD1
Germany	-041	Saudi Arabia	-171	United Kingdom	-031
Greece	-151	Slovenia	-BA1	United States	-001
Hungary	-211				

6 Using Setup Utility (BIOS)

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

 **NOTE:** To start Setup Utility on convertible computers, your computer must be in notebook mode and you must use the keyboard attached to your notebook.

Starting Setup Utility (BIOS)

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

▲ Turn on or restart the computer and quickly press **f10**.

– or –

Turn on or restart the computer, quickly press **esc**, and then press **f10** when the Start menu is displayed.

Updating Setup Utility (BIOS)

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

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

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

Determining the BIOS version


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

To reveal the BIOS version information (also known as *ROM date* and *System BIOS*), use one of these options.


- HP Support Assistant
 1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
– or –
Select the question mark icon in the taskbar.
 2. Select **My notebook**, and then select **Specifications**.
- Setup Utility (BIOS)
 1. Start Setup Utility (BIOS) (see [Starting Setup Utility \(BIOS\) on page 62](#)).
 2. Select **Main**, and then make note of the BIOS version.
 3. Select **Exit**, select one of the options, and then follow the on-screen instructions.
- In Windows, press **CTRL+Alt+S**.

To check for later BIOS versions, see [Downloading a BIOS update on page 63](#).

Downloading a BIOS update

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

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

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


1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
– or –
Select the question mark icon in the taskbar.
2. Select **Updates**, and then select **Check for updates and messages**.
3. Follow the on-screen instructions.
4. At the download area, follow these steps:
 - a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

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

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

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 64](#).

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 –

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)

 **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 66](#).

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


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

When HP PC Hardware Diagnostics UEFI detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. For assistance in 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 66](#).

- 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 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 69](#)).
- **Creating a restore point**—You can use Windows tools to create a restore point (see [Using Windows tools on page 69](#)).
- **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 69](#)).
- **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 69](#)).

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

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

Backing up information and creating recovery media

Using Windows tools


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

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

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

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

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

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

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

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

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 69](#).

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 69](#).



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.

9 Specifications

Computer specifications

Table 9-1 Computer specifications

	Metric	U.S.
Computer dimensions		
Width	358.5 mm	14.1 in
Depth	242.0 mm	9.5 in
Height	18.0 mm	0.7 in
Weight (lowest configuration)	1699.0 g	3.75 lbs
Input power		
	Rating	
Operating voltage and current	18.5 V dc @ 3.5 A – 65 W or 45 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

35.6 cm (14.0 in) display specifications

	Metric	U.S.
Active diagonal size	39.6 cm	15.6 in
Resolution	FHD: 1920 × 1080 HD: 1366 × 768	
Surface treatment	Antiglare or BrightView	
Brightness	HD: 220 nits FHD: 220 nits or 250 nits	
Viewing angle	HD: SVA FHD: SVA or UWVA	
Backlight	LED	
Aspect ratio	16:9	
Display panel interface	eDP	

M.2 SATA solid-state drive specifications

	128 GB*
Height	1.35 mm
Weight	< 10 g
Form factor	M.2 2280-D2-B-M
Transfer rate	up to 540 MB/sec
Interface type	SATA-3
Ready time, maximum (to not busy)	1.0 ms
Access times, logical	0.1 ms
Total logical sectors	234,441,648
Operating temperature	0°C to 70°C (32°F to 158°F)
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.	
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.	

M.2 PCIe solid-state drive specifications

	256 GB*	512 GB*
Dimensions		
Height	1 mm	1 mm
Length	50.8 mm	50.8 mm
Width	28.9 mm	28.9 mm
Weight	< 10 g	< 10 g
Interface type		
	ATA-7	ATA-7
Transfer rate		
Sequential Read	Up to 2150 MB/s	Up to 2150 MB/s
Random Read	Up to 300,000 IOPs	Up to 300,000 IOPs
Sequential Write	Up to 1260 MB/s	Up to 1550 MB/s
Random Write	Up to 100,000 IOPs	Up to 100,000 IOPs
Ready time, Maximum (to not busy)		
	1.0 sec	1.0 sec
Access times		
Logical	0.1	0.1
Total logical sectors		
	500,118,192	1,000,215,216
Operating temperature		
Operating	0° to 70°C (32°F to 158°F)	0° to 70°C (32°F to 158°F)
Non-operating	-40° to 80°C (-40°F to 176°F)	-40° to 85°C (-40°F to 185°F)

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

NOTE: Certain restrictions and exclusions apply. Contact technical support for details.

10 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 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 10-1 Power cord requirements for specific countries and regions

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

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

Table 10-1 Power cord requirements for specific countries and regions (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 ² or 1.25 mm ² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
		4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm ² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
		5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm ² conductor size. KTL logo and individual approval number must be on each element. Approval number and logo must be printed on a flag label.
		6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm ² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
		7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-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 ² or 1.00 mm ² conductor size, with plug BS 1363/A with BSI or ASTA marks.

11 Recycling

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

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

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