Maintenance and Service Guide

HP Spectre x360 15 Convertible PC
IMPORTANT! This document is intended for HP authorized service providers only.

© Copyright 2018 HP Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by HP Inc. under license. Intel, Core, and Thunderbolt are trademarks of Intel Corporation in the U.S. and other countries. NVIDIA, the NVIDIA logo, and GeForce are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Windows is either a registered trademark or trademark of Microsoft Corporation in the United States and/or other countries.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

First Edition: September 2018

Document Part Number: L33534-001

Product notice

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

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

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

Software terms

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

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

Safety warning notice

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

Table of contents

1 Product description 1

2 External component identification 3

Locating hardware 3

Locating software 3

Right side 4

Left side 7

Display 9

Keyboard area 10

TouchPad 10

Lights 11

Speakers and fingerprint reader 12

Special keys 13

Bottom 14

Labels 15

3 Illustrated parts catalog 16

Computer major components 16

Miscellaneous parts 22

4 Removal and replacement procedures preliminary requirements 24

Tools required 24

Service considerations 24

Plastic parts 24

Cables and connectors 25

Drive handling 25

Electrostatic discharge damage 26

Packaging and transporting guidelines 27

Workstation guidelines 27

Equipment guidelines 28

5 Removal and replacement procedures 29

Component replacement procedures 29

Bottom cover 30

Battery 31

Memory module 33

Solid-state drive ... 35
Power button board cable ... 36
Power button board ... 37
Display assembly ... 38
Front speakers ... 41
Card reader board ... 42
Card reader board cable ... 43
Fingerprint reader module ... 45
Fingerprint reader module cable ... 47
TouchPad cable ... 48
TouchPad ... 38
Audio jack board cable ... 51
Audio jack board ... 38
Fans ... 53
System board ... 55
Heat sink ... 59
Rear speakers ... 63
Infrared board ... 64
Infrared board cable ... 43
Power connector cable ... 66

6 Computer Setup (BIOS), TPM, and HP Sure Start ... 67
Using Computer Setup ... 67
Starting Computer Setup ... 67
Using a USB keyboard or USB mouse to start Computer Setup (BIOS) ... 67
Navigating and selecting in Computer Setup ... 67
Restoring factory settings in Computer Setup ... 68
Updating the BIOS ... 69
Determining the BIOS version ... 69
Downloading a BIOS update ... 69
Changing the boot order using the f9 prompt ... 70
TPM BIOS settings (select products only) ... 70
Using HP Sure Start (select products only) ... 71

7 Using HP PC Hardware Diagnostics (UEFI) ... 72
Downloading HP PC Hardware Diagnostics (UEFI) to a USB device ... 73
Using Remote HP PC Hardware Diagnostics (UEFI) settings (select products only) ... 73
Customizing Remote HP PC Hardware Diagnostics (UEFI) settings ... 74

8 Backing up, restoring, and recovering 75
Backing up information and creating recovery media 76
Using Windows tools 76
Using the HP Cloud Recovery Download Tool to create recovery media (select products only) 76
Restoring and recovery 77
Restoring, resetting, and refreshing using Windows tools 77
Recovering using HP Recovery media 77
Changing the computer boot order 77

9 Specifications 78
Computer specifications 78

10 Power cord set requirements 79
Requirements for all countries 79
Requirements for specific countries and regions 80

11 Recycling 82

Index 83

1 Product description

Category	Description
Product Name	HP Spectre x360 15 Convertible PC (model number 15-dfxxx; CTO model number 15t-df000)
Processors	Intel® Core™ i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W) Intel Core i7-8565U 1.80-GHz (turbo up to 4.60-GHz) quad core processor (2400-MHz, 8.0 MB L3 cache, 15-W)
Chipset	Intel HM370 and Intel integrated soldered-on-circuit (SoC)
Graphics	**Discrete graphics:** Nvidia® GeForce® GTX1050Ti graphics controller with 4096-MB discrete memory Nvidia GeForce MX150 graphics controller with 2048-MB discrete memory Support for DX12, high-definition multimedia interface (HDMI), and HD decode **Internal graphics:** Intel ultrahigh-definition (UHD) Graphics 630 Intel UHD Graphics 620
Panel	15.6-inch AntiGlare, TouchScreen, UHD (3840×2160), WLED, UWVA, 72, 340, eDP 1.3+PSR, ultraslim display assembly with narrow bezel 15.6-inch AntiGlare, TouchScreen, full high-definition (FHD) (1920×1080), WLED, UWVA, 72, 650, eDP 1.4+PSR, ultraslim display assembly with narrow bezel
Memory	Support for DDR4, 1.2V system memory Two SODIMM slots, customer non-accessible/non-upgradeable DDR4-2400 Dual Channel Support (DDR4-2666 downgrade to DDR4-2400) Support for up to 16-GB of system memory in the following configurations: 16384-MB (8-GB ×2 pieces) 8192-MB (8-GB × 1 piece)
Storage	**Support for the following solid-state drives:** • 2-TB, 2280, Peripheral Component Interconnect Express (PCIe)-3×4, Non-Volatile Memory Express (NVMe), DS solid-state drive with triple level cell (TLC) • 1-TB, 2280, PCIe-3×4, NVMe, DS solid-state drive with TLC • 512-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC • 256-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC
Audio and video	**Audio:** Bang & Olufsen Support for quad speakers Support for HP Audio Boost 2.0 **Camera:** HP FHD camera **Microphones:** Dual array microphones

Category	Description
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module Dual PCIe WLAN antennas built into display assembly Support for the Intel 9560 ac 2×2 MU-MIMO + Bluetooth 5 M.2 1216 non-vPro MIPI+BRI WW WLAN module
Ports	• Combination audio-out (headphone)/audio-in (microphone) combo jack • High-definition multimedia interface (HDMI) V2.0a • HP Smart AC adapter • USB Type-A port 3.1 Gen 2 • USB Type-C port 3.1 Gen 2 with Thunderbolt™ Gen 3 technology (1 or 2, varying by computer model) • USB Type-C port 3.1 Gen 2 (varies by computer model)
Keyboard/pointing devices	Island-style keyboard, 3-coat paint, ClickPad with Image Sensor, Backlit
Power requirements	Support for a 6-cell, 84-Wh, 3.64-Ah, Li-Ion battery Support for 135-W HP Smart AC adapter (PFC, RC, slim, 4.5-mm) and 90-W HP Smart AC adapter (PFC, RA, 4.5-mm) Support for a 1.00-m power cord with a C5 connector
Sensors	• Accelerometer • Accelerometer + Gyroscope + eCompass • Infrared thermal sensor • Sensor hub
Security	Fingerprint reader Trusted Platform Module (TPM) 2.0

2 External component identification

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

Locating hardware

To find out what hardware is installed on the computer:

- Type `device manager` in the taskbar search box, and then select the **Device Manager** app.

  A list displays all the devices installed on the computer.

For information about system hardware components and the system BIOS version number, press fn+esc (select products only).

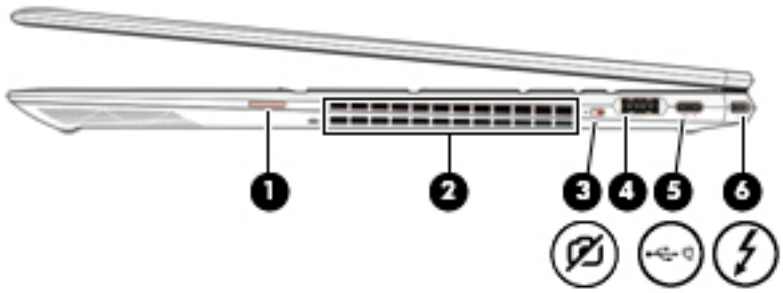
Locating software

To find out what software is installed on the computer:

- Right-click the **Start** button, and then select **Apps and Features**.

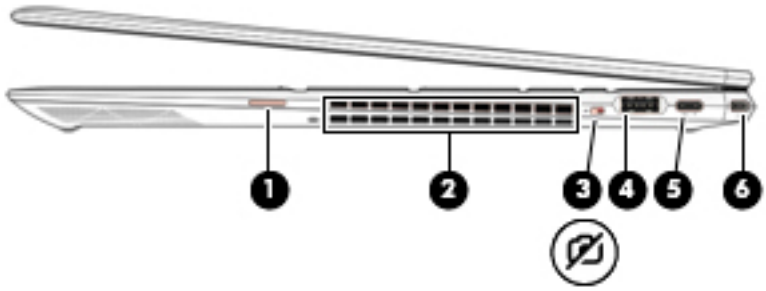
Right side

NOTE: Refer to the illustration that most closely matches the computer.



Component			Description
(1)		MicroSD memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(2)		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.
(3)		Camera privacy switch	Turns the camera off and on.
(4)		USB SuperSpeed port with HP Sleep and Charge	Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.
(5)		USB Type-C power connector and port with HP Sleep and Charge	Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery. – and – Even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output.

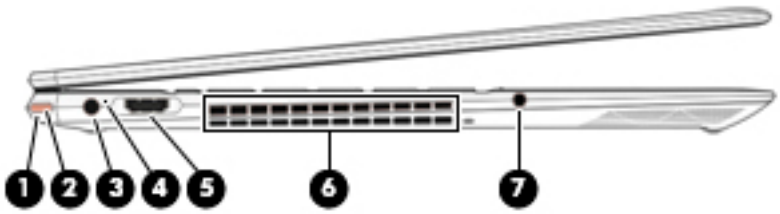
Component		Description
		NOTE: Cables and/or adapters (purchased separately) may be required.
(6)	USB Type-C Thunderbolt™ port	Even when the computer is off, connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. NOTE: Your computer may also support a Thunderbolt docking station. NOTE: Cables and/or adapters (purchased separately) may be required.



Component		Description
(1)	MicroSD memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the memory card reader.
(2)	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.
(3)	Camera privacy switch	Turns the camera off and on.
(4)	USB SuperSpeed port with HP Sleep and Charge	Connects a USB device, provides high-speed data transfer, and even when the computer is off, charges most products such as a cell phone, camera, activity tracker, or smartwatch.

Component		Description
(5)	USB Type-C power connector and Thunderbolt port with HP Sleep and Charge	Connects an AC adapter that has a USB Type-C connector, supplying power to the computer and, if needed, charging the computer battery. – and – Even when the computer is off, connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. NOTE: Your computer may also support a Thunderbolt docking station. NOTE: Cables and/or adapters (purchased separately) may be required.
(6)	USB Type-C Thunderbolt port	Even when the computer is off, connects and charges most USB devices that have a Type-C connector, such as a cell phone, camera, activity tracker, or smartwatch, and provides high-speed data transfer. – and – Connects a display device that has a USB Type-C connector, providing DisplayPort output. NOTE: Your computer may also support a Thunderbolt docking station. NOTE: Cables and/or adapters (purchased separately) may be required.

Left side



Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button briefly to initiate Sleep. • When the computer is in the Sleep state, press the button briefly to exit Sleep (select products only). • When the computer is in Hibernation, press the button briefly to exit Hibernation. CAUTION: Pressing and holding down the power button results in the loss of unsaved information. If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer. To learn more about your power settings, see your power options
(2)	Power light	• On: The computer is on. • Off: The computer is off, in Hibernation, or in the Sleep state.
(3)	Power connector	Connects an AC adapter.
(4)	AC adapter and battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.
(5)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(6)	Vent	Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(7)	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.

Component	Description
	WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this guide: ▲ Select the **Start** button, select **HP Help and Support**, and then select **HP Documentation**. **NOTE:** When a device is connected to the jack, the computer speakers are disabled.

Display

Component		Description
(1)	WLAN antennas*	Send and receive wireless signals to communicate with WLANs.
(2)	Internal microphones (2)	Record sound.
(3)	Camera light(s)	On: One or more cameras are 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.

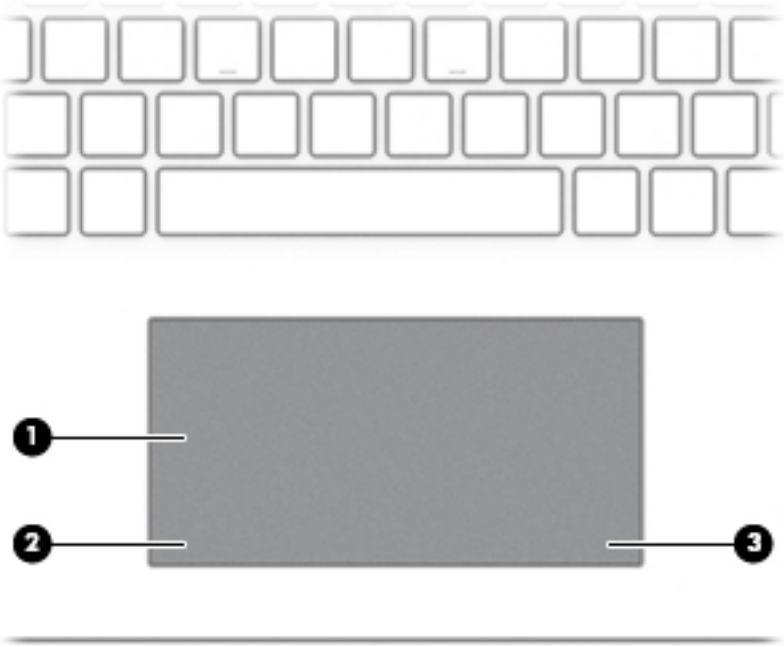
For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this guide:

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

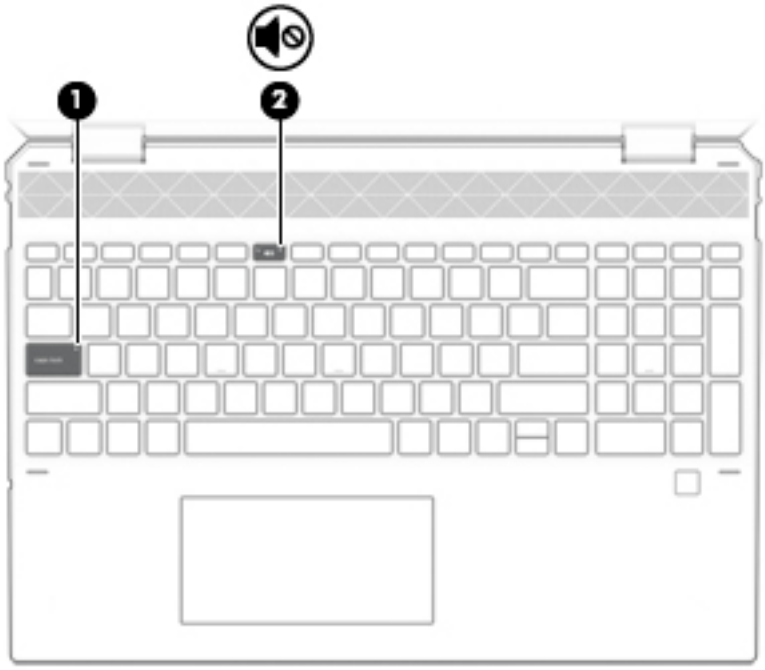
Keyboard area

TouchPad



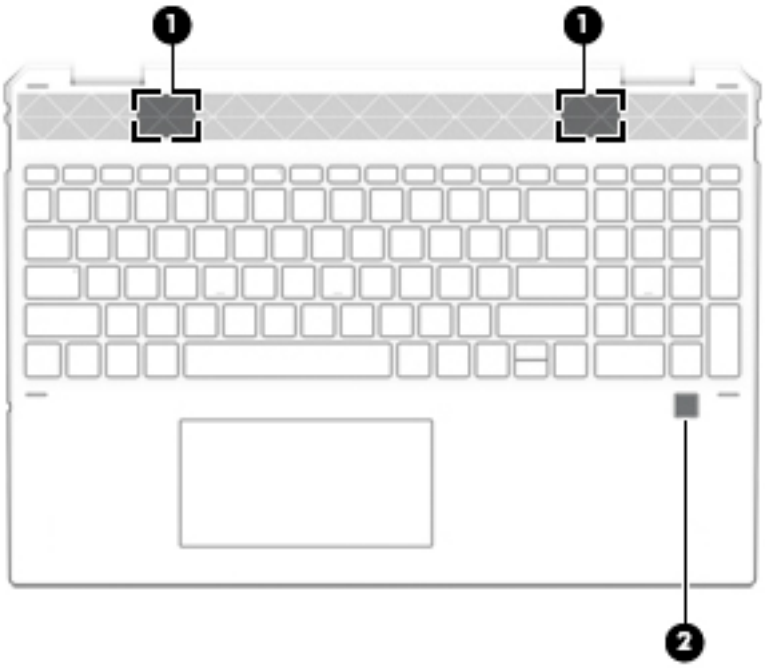
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights



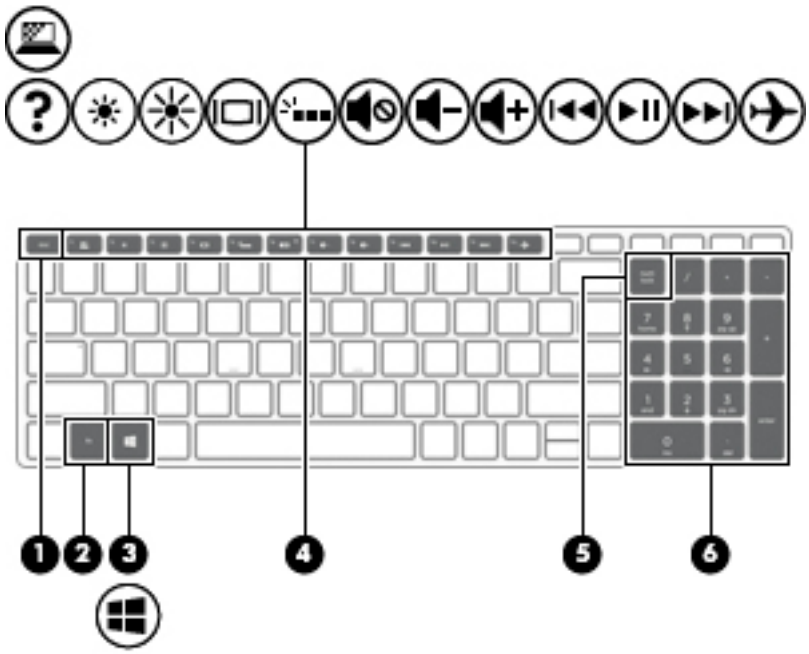
Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(2)	Mute light	• On: Computer sound is off. • Off: Computer sound is on.

Speakers and fingerprint reader



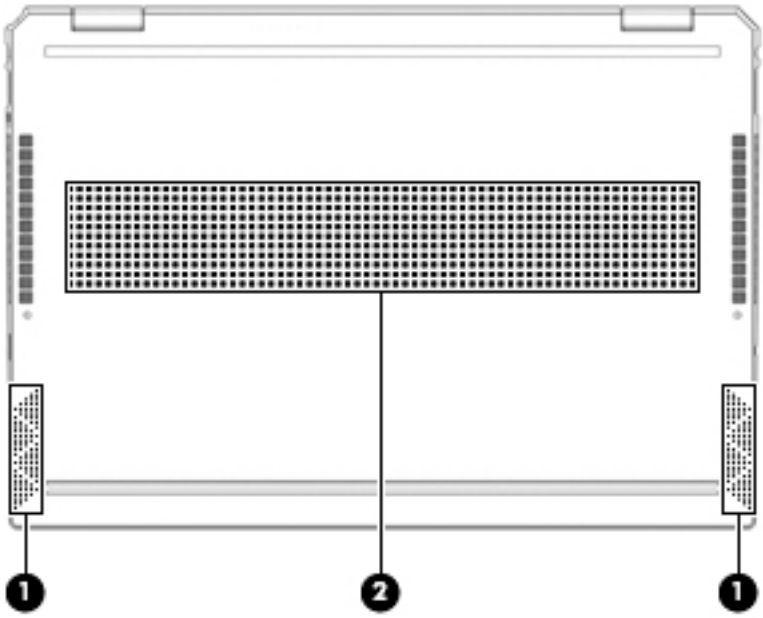
Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Fingerprint reader	Allows a fingerprint logon to Windows, instead of a password logon. ▲ To use the fingerprint reader, tap or swipe the upper-left corner of the TouchPad.

Special keys



Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn 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)	num lock 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 num lock 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



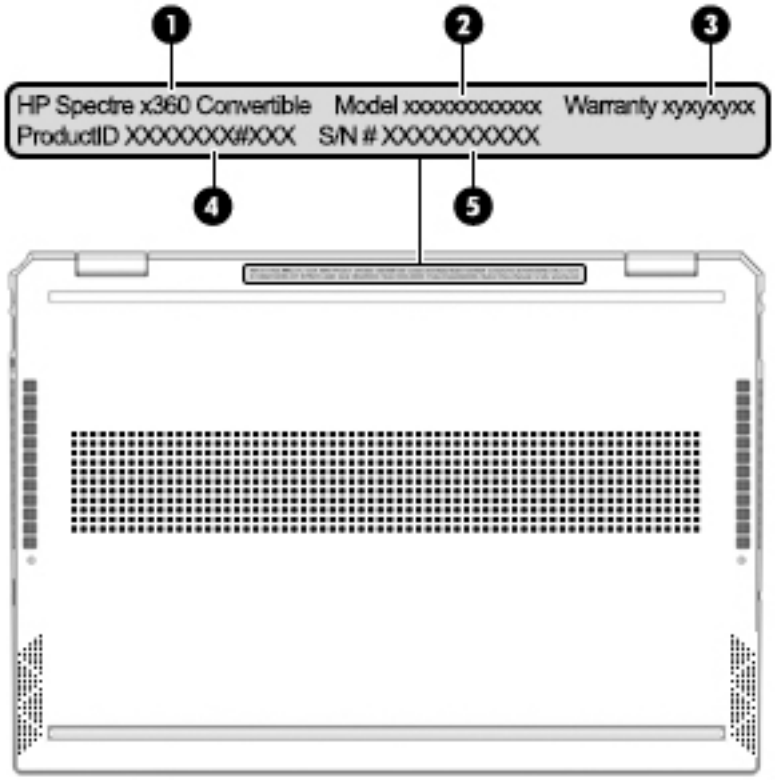
Component		Description
(1)	Speakers (2)	Produce sound.
(2)	Vent	Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Labels

The labels affixed to the computer provide information that may be needed when troubleshooting system problems or traveling internationally with the computer. Labels may be in paper form or imprinted on the product.

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

  The service label will resemble the example shown below.



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

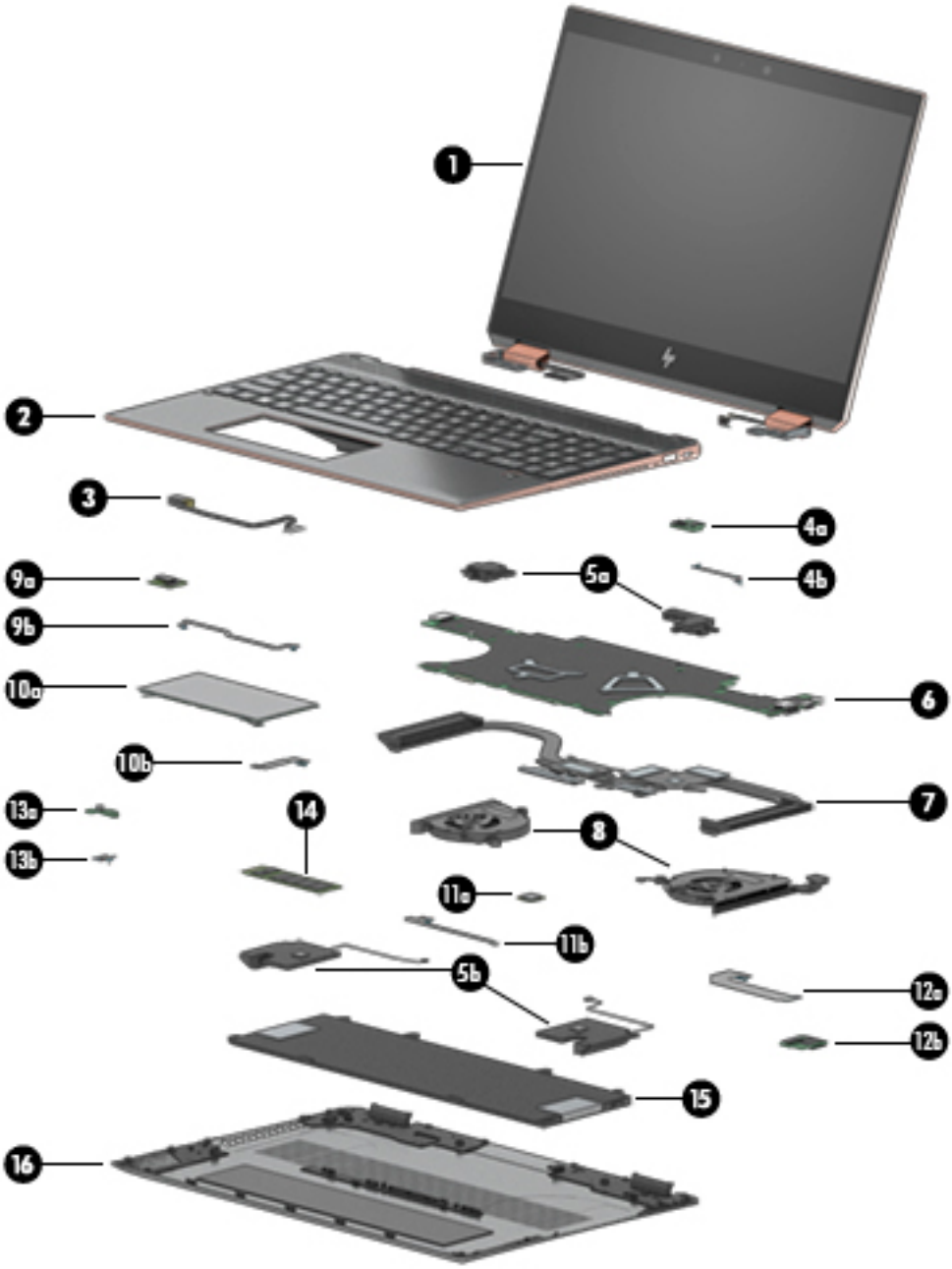
- Regulatory label(s)—Provide(s) regulatory information about the computer.
- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

Computer major components

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

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 15 for details.



Item	Component	Spare part number
(1)	**15.6-inch AntiGlare TouchScreen display assembly with narrow bezel:**	
	UHD (3840×2160), WLED, UWVA, 72, 340, eDP 1.3+PSR, ultraslim display assembly in dark ash silver finish	L38114-001
	UHD (3840×2160), WLED, UWVA, 72, 340, eDP 1.3+PSR, ultraslim display assembly in Poseidon blue finish	L38115-001
	FHD (1920×1080), WLED, UWVA, 72, 650, eDP 1.4+PSR, ultraslim display assembly with privacy filter in Poseidon blue finish	L38112-001
(2)	**Keyboard/top cover** with backlight and privacy filter in dark ash silver finish for use only on computer models equipped with an Intel Core i7-8750H processor:	

Item	Component	Spare part number
	For use in Belgium	L38267-A41
	For use in the Czech Republic and Slovakia	L38267-FL1
	For use in Denmark, Finland, and Norway	L38267-DH1
	For use in France	L38267-051
	For use in Germany	L38267-041
	For use in Greece	L38267-151
	For use in Italy	L38267-061
	For use in Portugal	L38267-B31
	For use in Russia	L38267-251
	For use in Saudi Arabia	L38267-171
	For use in Switzerland	L38267-BG1
	For use in the United Kingdom	L38267-031
	Keyboard/top cover in dark ash silver finish for use only on computer models equipped with an Intel Core i7-8750H processor (includes keyboard cable):	
	For use in Belgium	L38264-A41
	For use in the Canada	L38264-DB1
	For use in the Czech Republic and Slovakia	L38264-FL1
	For use in Denmark, Finland, and Norway	L38264-DH1
	For use in France	L38264-051
	For use in Germany	L38264-041
	For use in Greece	L38264-151
	For use in Italy	L38264-061
	For use in Japan	L38264-291
	For use in Portugal	L38264-B31
	For use in Russia	L38264-251
	For use in Saudi Arabia	L38264-171
	For use in Switzerland	L38264-BG1
	For use in the United Kingdom	L38264-031
	For use in the United States	L38264-001
	Keyboard/top cover in Poseidon blue finish for use only on computer models equipped with an Intel Core i7-8750H processor:	
	For use in Belgium	L38265-A41
	For use in the Canada	L38265-DB1
	For use in the Czech Republic and Slovakia	L38265-FL1
	For use in Denmark, Finland, and Norway	L38265-DH1
	For use in France	L38265-051

Item	Component	Spare part number
	For use in Germany	L38265-041
	For use in Greece	L38265-151
	For use in Italy	L38265-061
	For use in Portugal	L38265-B31
	For use in Russia	L38265-251
	For use in Saudi Arabia	L38265-171
	For use in Switzerland	L38265-BG1
	For use in the United Kingdom	L38265-031
	For use in the United States	L38265-001
	Keyboard/top cover with backlight and privacy filter in dark ash silver finish for use only on computer models equipped with an Intel Core i7-8565U processor:	
	For use in Belgium	L38266-A41
	For use in the Czech Republic and Slovakia	L38266-FL1
	For use in Denmark, Finland, and Norway	L38266-DH1
	For use in France	L38266-051
	For use in Germany	L38266-041
	For use in Greece	L38266-151
	For use in Italy	L38266-061
	For use in Portugal	L38266-B31
	For use in Russia	L38266-251
	For use in Saudi Arabia	L38266-171
	For use in Switzerland	L38266-BG1
	For use in the United Kingdom	L38266-031
	Keyboard/top cover in dark ash silver finish for use only on computer models equipped with an Intel Core i7-8565U processor:	
	For use in Belgium	L38262-A41
	For use in the Canada	L38262-DB1
	For use in the Czech Republic and Slovakia	L38262-FL1
	For use in Denmark, Finland, and Norway	L38262-DH1
	For use in France	L38262-051
	For use in Germany	L38262-041
	For use in Greece	L38262-151
	For use in Italy	L38262-061
	For use in Japan	L38262-291
	For use in Portugal	L38262-B31
	For use in Russia	L38262-251

Item	Component	Spare part number
	For use in Saudi Arabia	L38262-171
	For use in Switzerland	L38262-BG1
	For use in the United Kingdom	L38262-031
	For use in the United States	L38262-001
	Keyboard/top cover in Poseidon blue finish for use only on computer models equipped with an Intel Core i7-8565U processor:	
	For use in Belgium	L38263-A41
	For use in the Canada	L38263-DB1
	For use in the Czech Republic and Slovakia	L38263-FL1
	For use in Denmark, Finland, and Norway	L38263-DH1
	For use in France	L38263-051
	For use in Germany	L38263-041
	For use in Greece	L38263-151
	For use in Italy	L38263-061
	For use in Portugal	L38263-B31
	For use in Russia	L38263-251
	For use in Saudi Arabia	L38263-171
	For use in Switzerland	L38263-BG1
	For use in the United Kingdom	L38263-031
	For use in the United States	L38263-001
(3)	**Power connector cable**	L38105-001
(4a)	**Infrared board**	L38119-001
(4b)	**Infrared board cable**	L38102-001
	Speaker Kit, includes:	L38123-001
(5a)	**Rear speakers**	
(5b)	**Front speakers**	
(6)	**System board** (includes replacement thermal material):	
	Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 16-GB of system memory, and the Windows 10 operating system	L38130-601
	Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 16-GB of system memory, and a non-Windows operating system	L38130-001
	Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 8-GB of system memory, and the Windows 10 operating system	L38129-601

Item	Component	Spare part number
	Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 8-GB of system memory, and a non-Windows operating system	L38129-001
	Equipped with an Intel Core i7-8565U 1.80-GHz (turbo up to 4.60-GHz) quad core processor (2400-MHz, 8.0 MB L3 cache, 15-W), an Intel integrated SoC chipset, an Nvidia GeForce MX150 graphics controller with 2048-MB discrete memory, 8-GB of system memory, and the Windows 10 operating system	L38128-601
	Equipped with an Intel Core i7-8565U 1.80-GHz (turbo up to 4.60-GHz) quad core processor (2400-MHz, 8.0 MB L3 cache, 15-W), an Intel integrated SoC chipset, an Nvidia GeForce MX150 graphics controller with 2048-MB discrete memory, 8-GB of system memory, and a non-Windows operating system	L38128-001
	System board shield (not illustrated; includes adhesive)	L42789-001
(7)	**Heat sink** (includes replacement thermal material):	
	For use only on computer models equipped with an Intel Core i7-8750H processor	L38111-001
	For use only on computer models equipped with an Intel Core i7-8565U processor	L38110-001
(8)	**Fans** (2, include cables):	
	Left fan for use only on computer models equipped with an Intel Core i7-8750H processor	L38109-001
	Left fan for use only on computer models equipped with an Intel Core i7-8565U processor	L38107-001
	Right fan for use only on computer models equipped with an Intel Core i7-8750H processor	L38108-001
	Right fan for use only on computer models equipped with an Intel Core i7-8565U processor	L38106-001
(9a)	**Audio jack board**	L38118-001
(9b)	**Audio jack board cable** (includes adhesive)	L38101-001
(10a)	**TouchPad:**	
	In dark ash silver finish	L37661-001
	In Poseidon blue finish	L37662-001
(10b)	**TouchPad cable**	L38103-001
(11a)	**Fingerprint reader board:**	
	In dark ash silver finish	L37672-001
	In Poseidon blue finish	L37673-001
(11b)	**Fingerprint reader board cable**	L38104-001
(12a)	**Card reader board**	L38117-001
(12b)	**Card reader board cable**	L38100-001
(13a)	**Power button board**	L38116-001
(13b)	**Power button board cable**	L38099-001
	Power button actuator in brass finish (not illustrated)	L38459-001
	Power button actuator in copper finish (not illustrated)	L38131-001
	Privacy camera switch in brass finish (not illustrated)	L38460-001

Item	Component	Spare part number
	Privacy camera switch in copper finish (not illustrated)	L38132-001
(14)	**Solid-state drive**	
	2-TB, 2280, PCIe-3×4, NVMe, DS solid-state drive with TLC	L38126-001
	1-TB, 2280, PCIe-3×4, NVMe, DS solid-state drive with TLC	L38124-001
	512-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC	L38127-001
	256-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC	L38125-001
(15)	**Memory modules** (2, 8-GB, 1.2-v, DDR4)	
	8-GB, 3200	L46598-005
	8-GB, 2666	L937236-855
	8-GB, 2400	862398-855
(16)	**Memory module shield** (not available as a spare part kit)	
(17)	**Battery** (6-cell, 84-Wh, 3.64-Ah, Li-Ion; includes cable and speaker retention clips)	L29184-005
(18)	**Bottom cover:**	
	In dark ash silver finish	L38097-001
	In Poseidon blue finish	L38098-001
	Rubber Kit (not illustrated, includes bottom cover front and rear rubber foot strips):	
	In dark ash silver finish	L38120-001
	In Poseidon blue finish	L38121-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
135-W HP Smart AC adapter (PFC, RC, slim, 4.5-mm)	L15534-001
90-W HP Smart AC adapter (PFC, RA, 4.5-mm)	937532-850
Adapter:	
Duck head adapter for use in Japan	L33157-001
HP HDMI–to–VGA adapter	701943-001
HP USB-C–to–HDMI 2.0 adapter	935325-001
HP USB-C–to–RJ45 adapter	855560-001
HP USB-C–to–USB-A dongle	833960-001
HP USB-C–to–VGA adapter	831751-001
HP USB–to–Gigabit RJ45 adapter	829941-001
Hub:	

Component	Spare part number
HP USB-C–to–MultiPort hub	919666-001
HP USB-C–to–USB-A hub	916838-001
HP external DVD±RW DL SuperMulti Drive	747080-001
Pen:	
Pen in dark ash silver finish (Impreza)	929863-001
Pen in dark ash silver finish (Sunwoda, MS, active stylus)	920241-001
Pen tip (Cadillac/Sunwoda)	L04536-001
Pen tip (Impreza/Sunwoda)	L04536-002
Impreza-C–to–A cable	L12232-001
Power cord (C5 connector, 1.00-m, STR PRM):	
For use in Australia	L22327-001
For use in Denmark	L22322-001
For use in Europe	L22321-001
For use in Japan	L22330-001
For use in North America	L22319-001
For use in the People's Republic of China	L21930-001
For use in Switzerland	L22324-001
For use in the United Kingdom	L22320-001
Rubber Kit (not illustrated, includes bottom cover front and rear rubber foot strips):	
In dark ash silver finish	L38120-001
In Poseidon blue finish	L38121-001
Screw Kit	L38122-001
HP 15.6-in sleeve in black finish	938246-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Flat-bladed screwdriver
- Magnetic screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T5 screwdriver

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

5 Removal and replacement procedures

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

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

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

Component replacement procedures

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 15 for details.

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

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

Bottom cover

Description	Spare part number
In dark ash silver finish	L38097-001
In Poseidon blue finish	L38098-001

Before disassembling the computer, follow these steps:

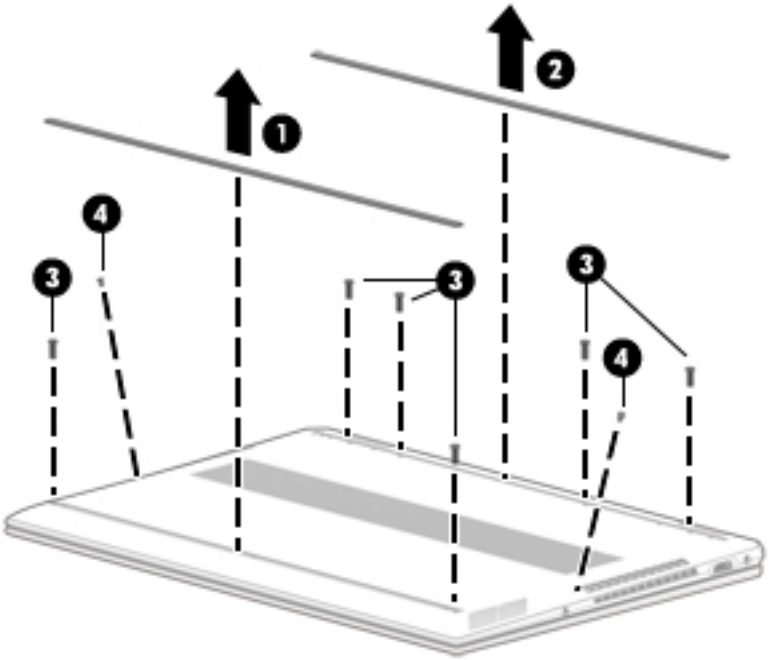
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the bottom cover:

1. Remove the front rubber foot strip **(1)** and the rear rubber foot strip **(2)**.

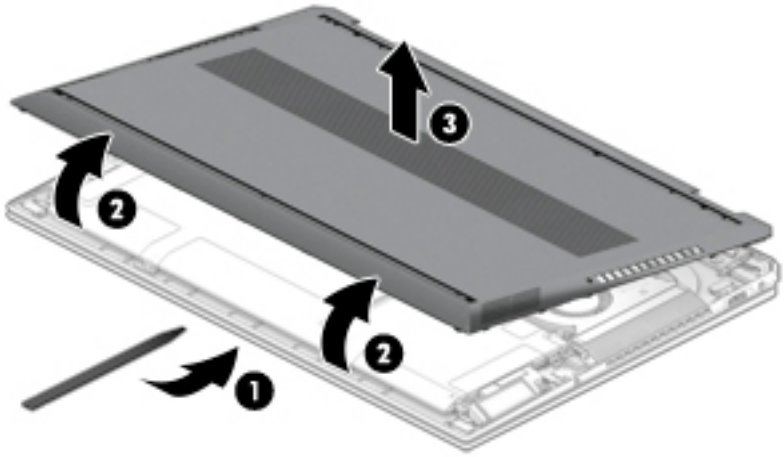
   The rubber foot strips are included in the Rubber Foot Kit, spare part numbers L38120-001 (dark ash silver finish) and L38121-001 (in Poseidon blue finish).

2. Remove the six Phillips M2.0×9.0 screws **(3)** and the two Torx5 M2.0×3.8 screws **(4)** that secure the bottom cover to the computer.



3. Use a case utility tool **(1)** or similar thin plastic tool to separate the front edge of the bottom cover from the keyboard/top cover.
4. Lift the front edge of the bottom cover **(2)** until it separates from the keyboard/top cover.

5. Remove the bottom cover **(3)**.



Reverse this procedure to install the bottom cover.

Battery

Description	Spare part number
6-cell, 84-WHr, 3.64-AHr, Li-ion battery (includes cable and speaker retention clips)	L29184-005

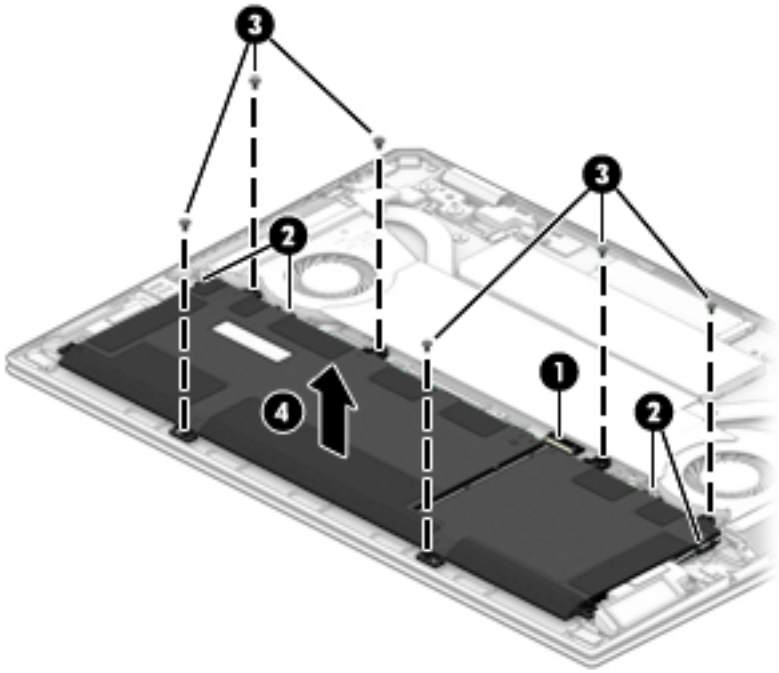
Before removing the battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).

Remove the battery:

1. Disconnect the battery cable **(1)** from the system board.
2. Release the speaker cables from the retention clips **(2)** built into the battery.
3. Remove the six Phillips M2.0×4.2 screws **(3)** that secure the battery to the keyboard/top cover.

4. Remove the battery **(4)**.



Reverse this procedure to install the battery.

Memory module

Description	Spare part number
8-GB memory module (3200, 1.2-v, DDR4)	L46598-005
8-GB memory module (2666, 1.2-v, DDR4)	937236-855
8-GB memory module (2400, 1.2-v, DDR4)	862398-855

Before removing the memory module, follow these steps:

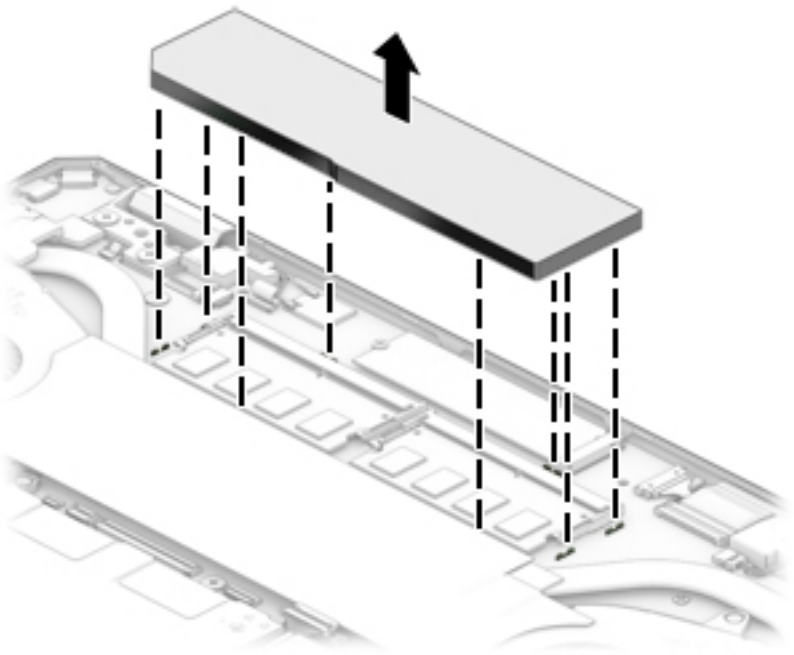
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

Remove the memory module:

⚠ WARNING! Take care when removing the memory module shield. The shield has sharp edges that can result in injuries.

1. Remove the memory module shield that covers the memory module slots.

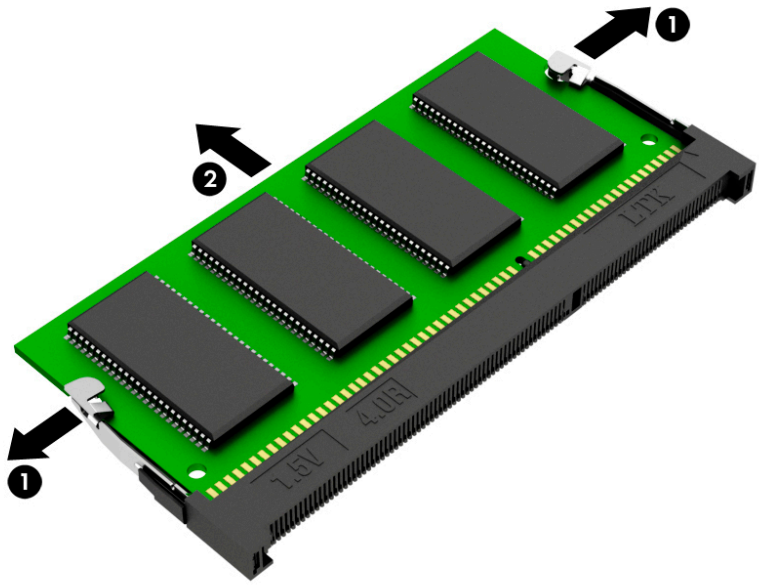
   The memory module shield is available in the Bracket Kit, spare part number L03254-001.



2. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The memory module tilts up.)

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

NOTE: Memory modules are designed with notches to prevent incorrect insertion.



Reverse this procedure to install a memory module.

Solid-state drive

Description	Spare part number
2-TB, 2280, PCIe-3×4, NVMe, DS solid-state drive with TLC	L38126-001
1-TB, 2280, PCIe-3×4, NVMe, DS solid-state drive with TLC	L38124-001
512-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC	L38127-001
256-GB, 2280, PCIe-3×4, NVMe, SS solid-state drive with TLC	L38125-001

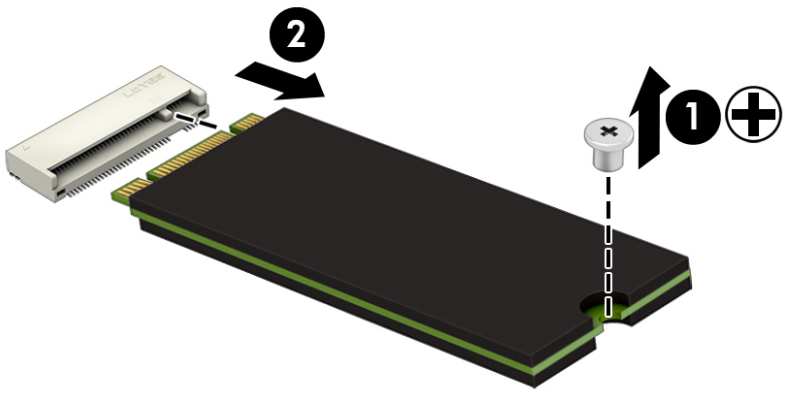
Before removing the solid-state drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

Remove the solid-state drive:

1. Remove the Phillips M2.0×3.2 screw **(1)** that secures the solid-state drive to the system board.
2. Remove the solid-state drive **(2)** by pulling it away from the connector.

NOTE: Solid-state drives are designed with notches to prevent incorrect insertion.



Reverse this procedure to install the solid-state drive.

Power button board cable

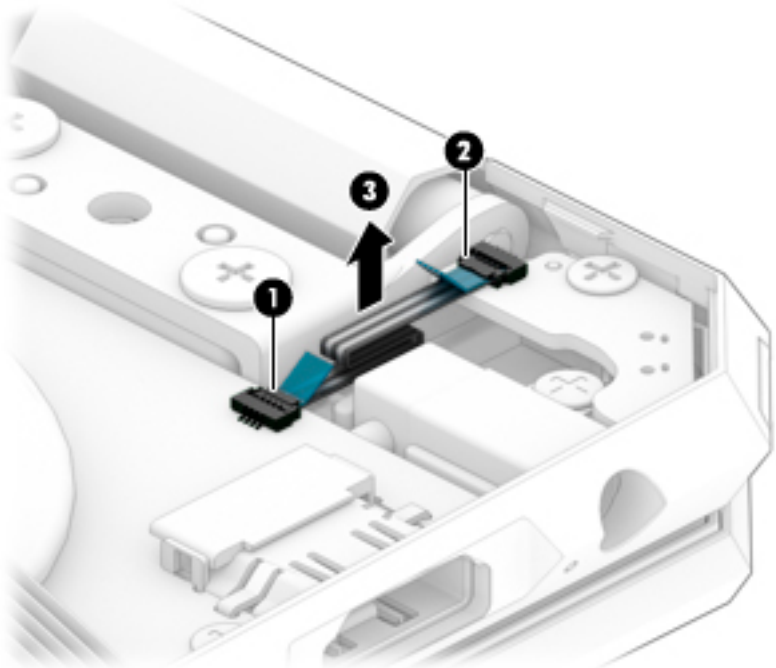
Description	Spare part number
Power button board cable	L38099-001

Before removing the power button board cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

Remove the power button board cable:

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



Reverse this procedure to install the power button board cable.

Power button board

NOTE: The power button board spare part kit does not include the power button board cable. The power button board cable is available using spare part number L38099-001.

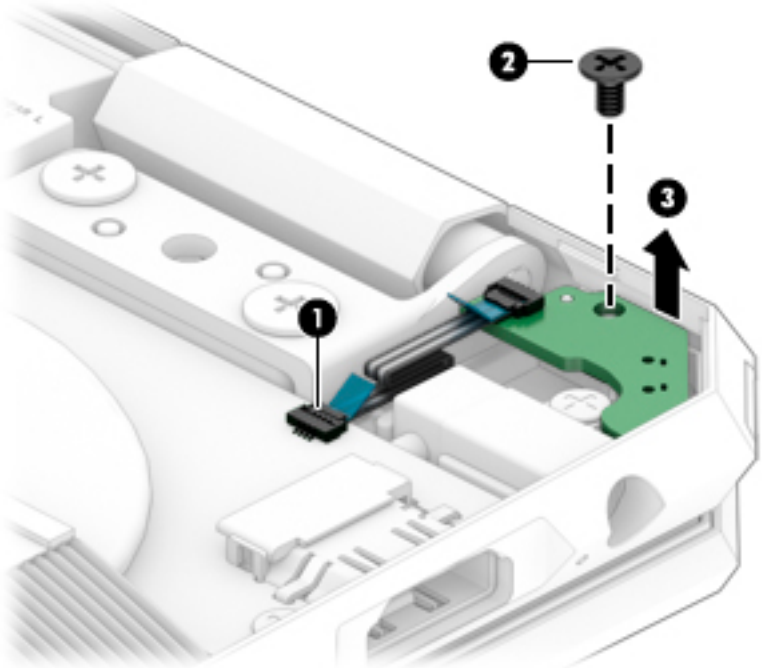
Description	Spare part number
Power button board	L38116-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

Remove the power button board:

1. Release the ZIF connector **(1)** to which power button board cable is connected, and then disconnect the power button board cable from the system board.
2. Remove the Phillips M2.0×4.2 screw **(2)** that secures the power button board to the keyboard/top cover.
3. Remove the power button board **(3)**.



Reverse this procedure to install the power button board.

Display assembly

Description	Spare part number
15.6-inch AntiGlare, TouchScreen, UHD (3840×2160), WLED, UWVA, 72, 340, eDP 1.3+PSR, ultraslim display assembly with narrow bezel in dark ash silver finish	L38114-001
15.6-inch AntiGlare, TouchScreen, UHD (3840×2160), WLED, UWVA, 72, 340, eDP 1.3+PSR, ultraslim display assembly with narrow bezel in Poseidon blue finish	L38115-001
15.6-inch AntiGlare, TouchScreen, FHD (1920×1080), WLED, UWVA, 72, 650, eDP 1.4+PSR, ultraslim display assembly with narrow bezel and privacy filter in Poseidon blue finish	L38112-001

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

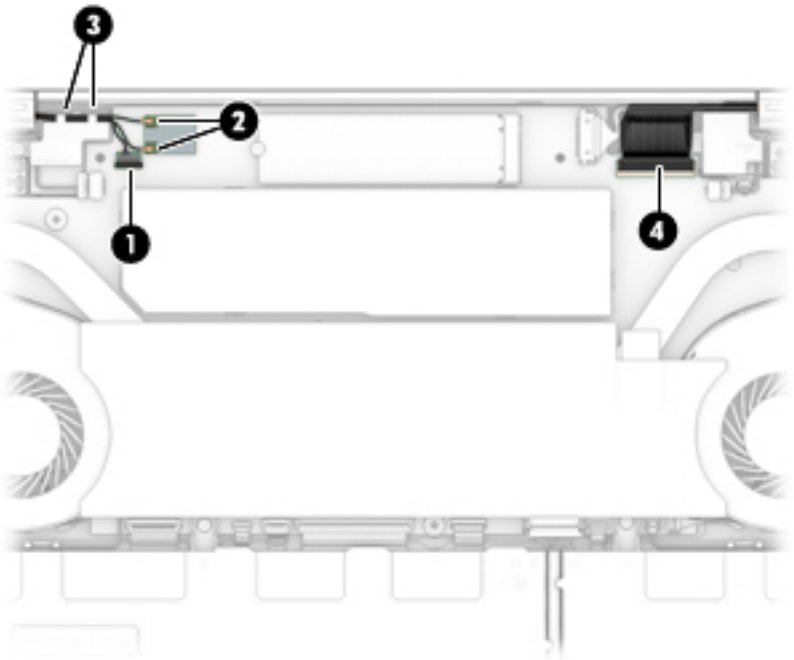
Remove the display assembly:

1. Disconnect the webcam cable **(1)** from the system board.
2. Disconnect the WLAN antenna cables **(2)** from the terminals on the WLAN module.

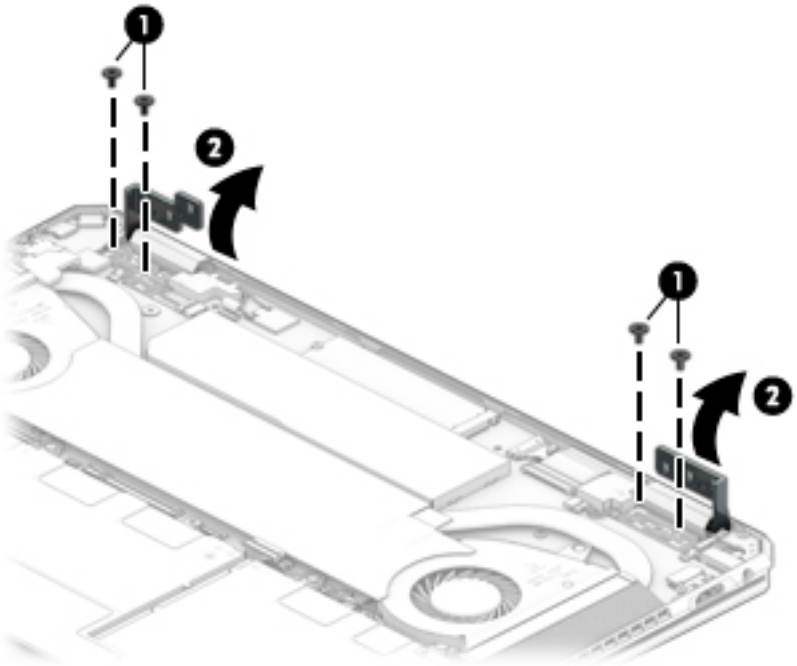
NOTE: The WLAN antenna cable labeled "1/MAIN" connects to the WLAN module "Main" terminal. The WLAN antenna cable labeled "2/AUX" connects to the WLAN module "Aux" terminal.

3. Release the webcam cable and the WLAN antenna cables from the retention clips **(3)** and routing channel built into the keyboard/top cover.

4. Release the ZIF connector **(4)** to which the display panel cable is connected, and then disconnect the display panel cable from the system board.



5. Remove the four Phillips M2.5×5.7 screws **(1)** that secure the display hinges to the keyboard/top cover.
6. Swing the display hinges **(2)** up and back as far as they will go.



7. Open the computer **(1)** until the keyboard/top cover disengages from the display assembly.

8. Separate the keyboard/top cover (2) from the display assembly and remove the display assembly.

Reverse this procedure to install the display assembly.

Front speakers

Description	Spare part number
Speaker Kit (includes front and rear speakers, cables, and rubber isolators)	L38123-001

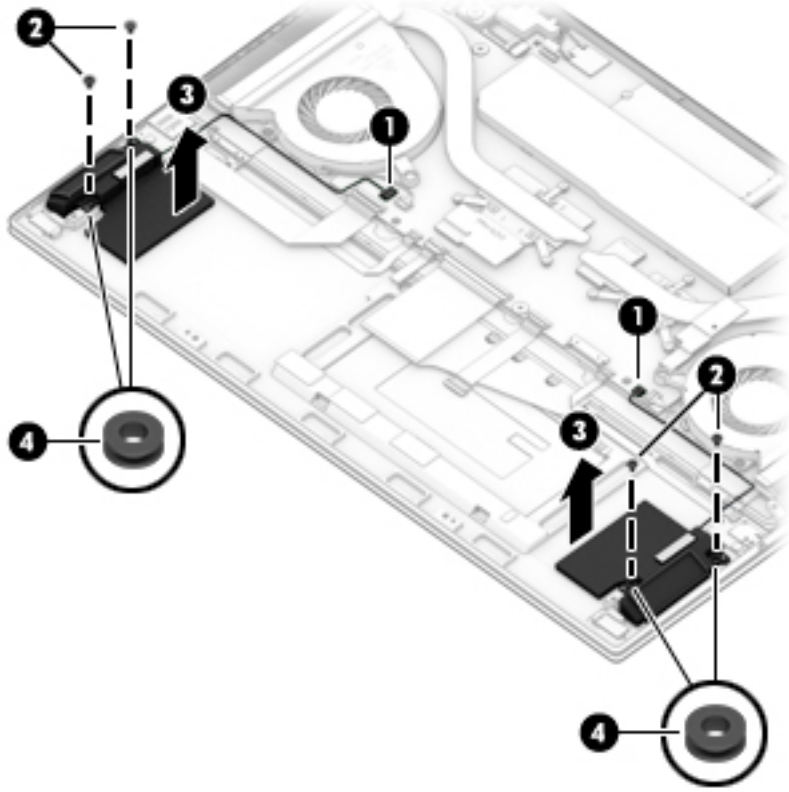
Before removing the front speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the front speakers:

1. Disconnect the front speaker cables **(1)** from the system board.
2. Remove the four Phillips M2.0×5.0 screws **(2)** that secure the front speakers to the keyboard/top cover.
3. Remove the front speakers **(3)**.

NOTE: When removing the front speakers, make note of the location and condition of the four rubber isolators **(4)**. These isolators are critical to the performance of the front speakers. The absence of these isolators or damage to them can degrade front speaker performance.



Reverse this procedure to install the front speakers.

Card reader board

NOTE: The card reader board spare part kit does not include the card reader board cable. The card reader board cable is available using spare part number L38100-001.

Description	Spare part number
Card reader board	L38117-001

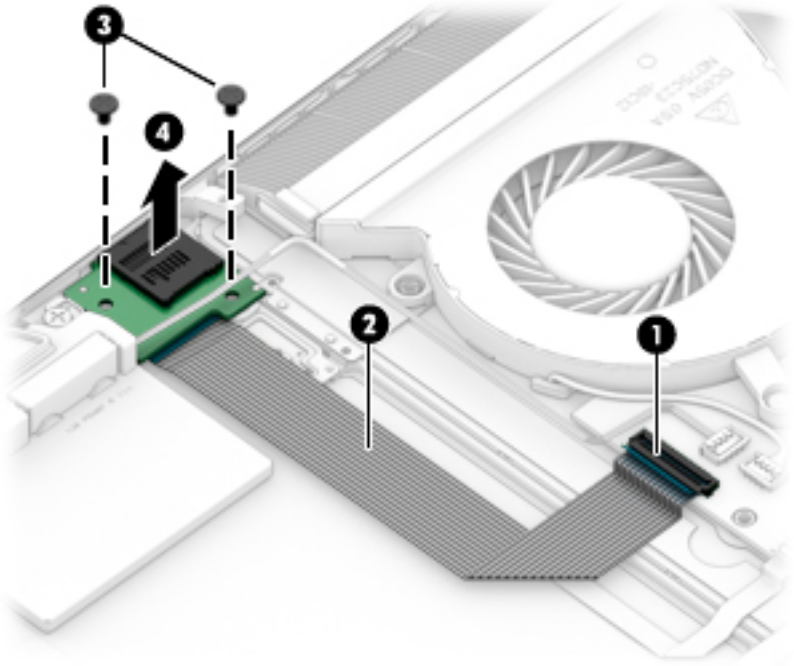
Before removing the card reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the card reader board:

1. Release the ZIF connector **(1)** to which card reader board cable is connected, and then disconnect the card reader board cable from the system board.
2. Detach the card reader board cable **(2)** from the keyboard/top cover. (The card reader board cable is attached to the system board with adhesive.)
3. Remove the two Phillips M2.0×4.2 screws **(3)** that secure the card reader board to the keyboard/top cover.

4. Remove the card reader board **(4)**.



Reverse this procedure to install the card reader board.

Card reader board cable

Description	Spare part number
Card reader board cable (includes adhesive)	L38100-001

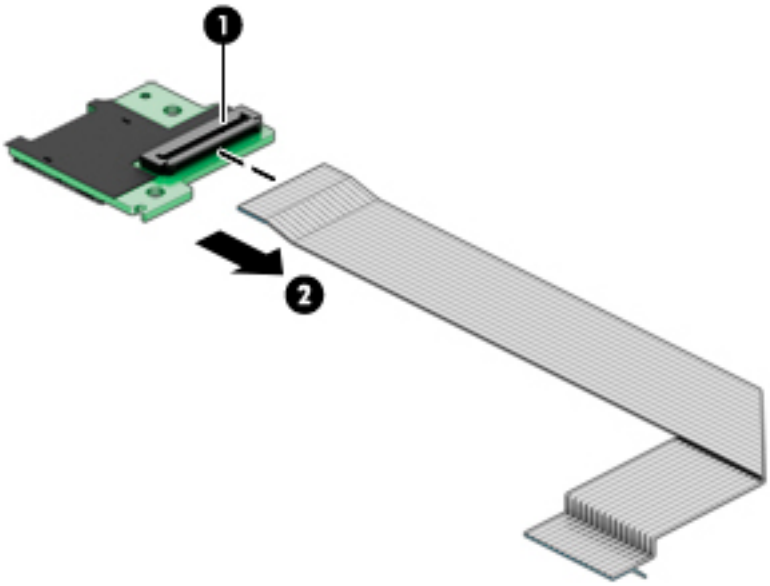
Before removing the card reader board cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).
6. Remove the card reader board (see Card reader board on page 42).

Remove the card reader board cable:

1. Turn the card reader board upside down with the card reader board cable connector toward you.
2. Release the ZIF connector **(1)** to which the card reader board cable is connected, and then disconnect the card reader board cable from the card reader board.

3. Disconnect the card reader board cable (2) from the card reader board.



4. Remove the card reader board cable.

Reverse this procedure to install the card reader board cable.

Fingerprint reader module

NOTE: The fingerprint reader module spare part kit does not include the fingerprint reader module cable. The fingerprint reader module cable is available using spare part number L38104-001.

Description	Spare part number
In dark ash silver finish (includes bracket)	L37672-001
In Poseidon blue finish (includes bracket)	L37673-001

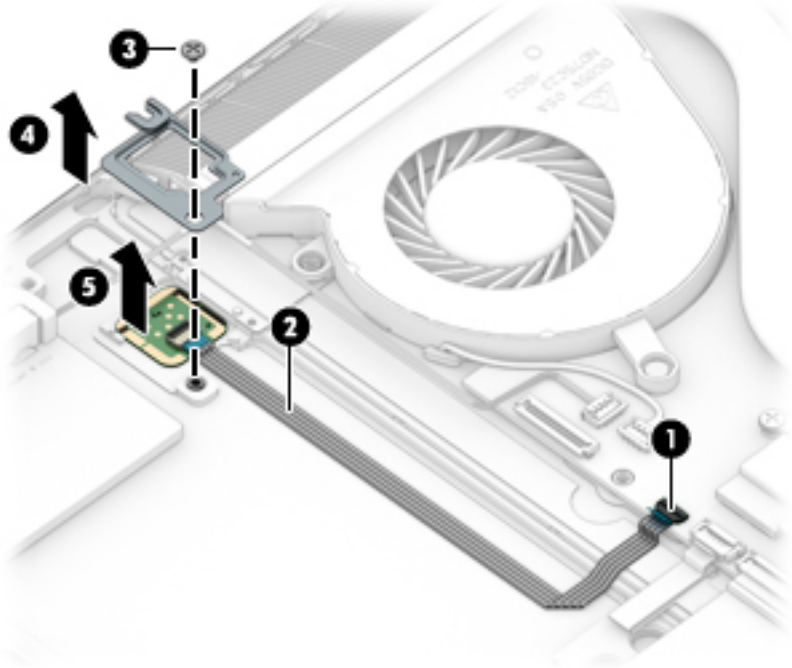
Before removing the fingerprint reader module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Disconnect the battery cable from the system board (see Battery on page 31).

Remove the fingerprint reader module:

1. Release the ZIF connector **(1)** to which the fingerprint reader module cable is connected, and then disconnect the fingerprint reader module cable from the system board.
2. Detach the fingerprint reader module cable **(2)** from the keyboard/top cover. (The fingerprint reader module cable is attached to the keyboard/top cover with adhesive.)
3. Remove the Phillips M2.0×2.5 screw **(3)** that secures the fingerprint reader module and bracket to the keyboard/top cover.
4. Remove the fingerprint reader module bracket **(4)**.

5. Remove the fingerprint reader module **(5)**.



Reverse this procedure to install the fingerprint reader module.

Fingerprint reader module cable

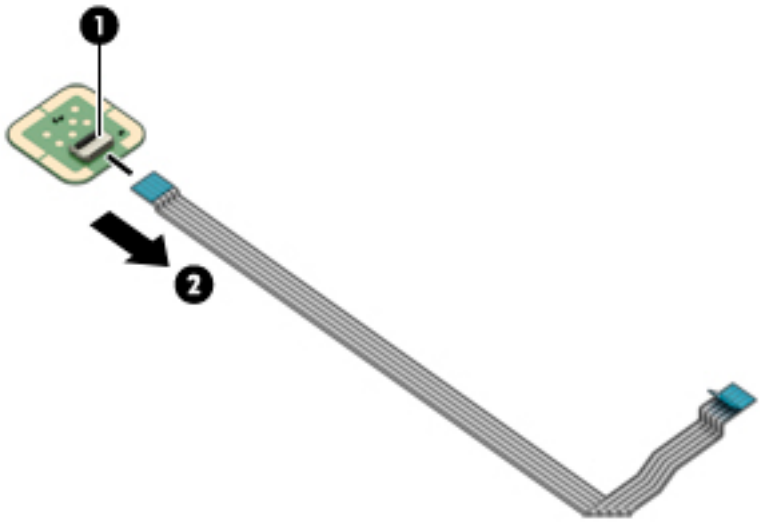
Description	Spare part number
Fingerprint reader module cable	L38104-001

Before removing the fingerprint reader module cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).
6. Remove the fingerprint reader module (see Fingerprint reader module on page 45).

Remove the fingerprint reader module cable:

1. Release the ZIF connector **(1)** to which fingerprint reader module cable is connected, and then disconnect the fingerprint reader module cable from the fingerprint reader module.
2. Remove the fingerprint reader module cable **(3)**.



Reverse this procedure to install the fingerprint reader module cable.

TouchPad cable

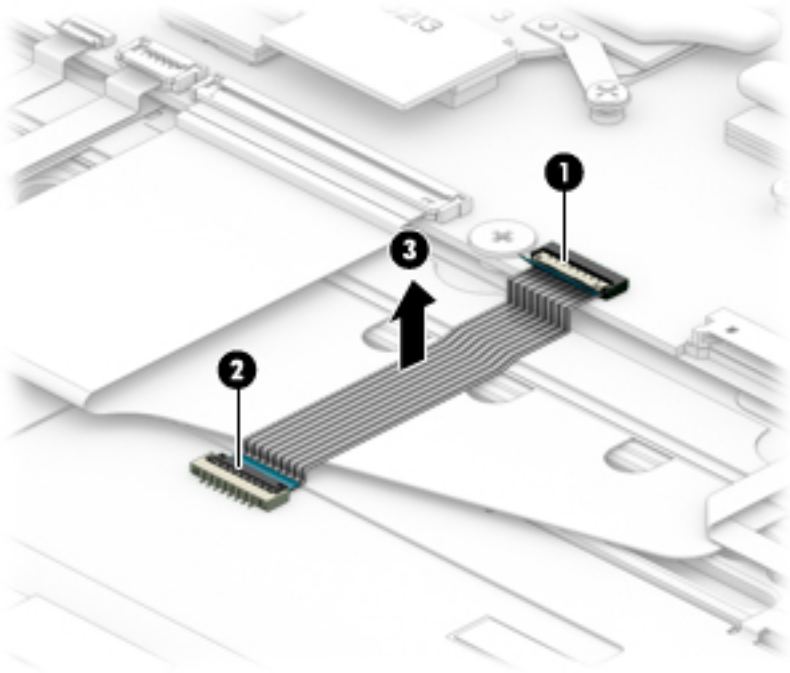
Description	Spare part number
TouchPad cable	L38103-001

Before removing the TouchPad cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the TouchPad cable:

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



Reverse this procedure to install the TouchPad cable.

TouchPad

NOTE: The TouchPad spare part kit does not include the TouchPad cable. The TouchPad cable is available using spare part number L38103-001.

Description	Spare part number
In dark ash silver finish	L37661-001
In Poseidon blue finish	L37662-001

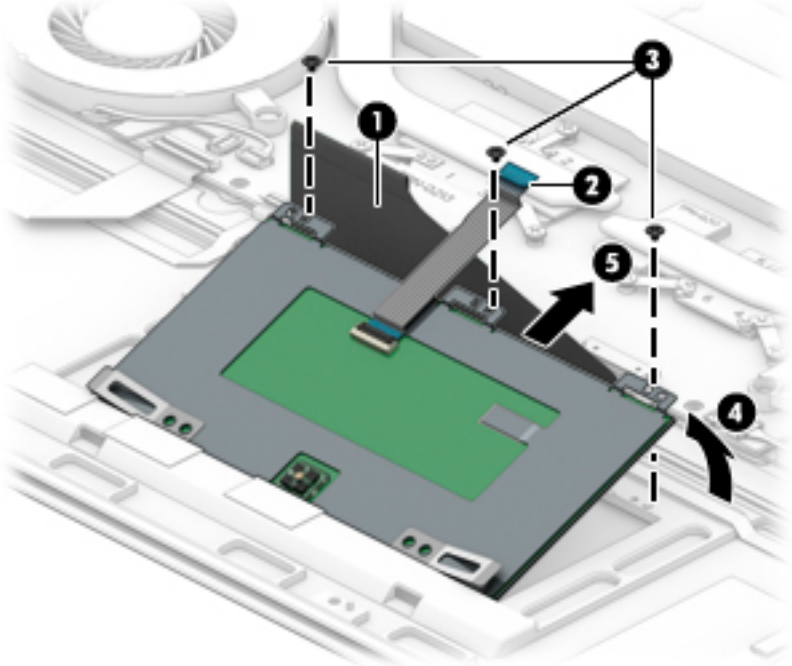
Before removing the TouchPad, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the TouchPad:

1. Release the keyboard cable **(1)** until the top edge of the TouchPad is accessible. (The keyboard cable is attached to the TouchPad with adhesive.)
2. Release the ZIF connector to which the TouchPad cable is connected, and then disconnect the TouchPad cable **(2)** from the system board.
3. Remove the three Phillips M2.0×2.2 screws **(3)** that secure the TouchPad to the keyboard/top cover.
4. Lift the top edge of the TouchPad **(4)** until it rests at an angle.

5. Remove the TouchPad **(5)** by sliding it up and back at an angle.



Reverse this procedure to install the TouchPad.

Audio jack board cable

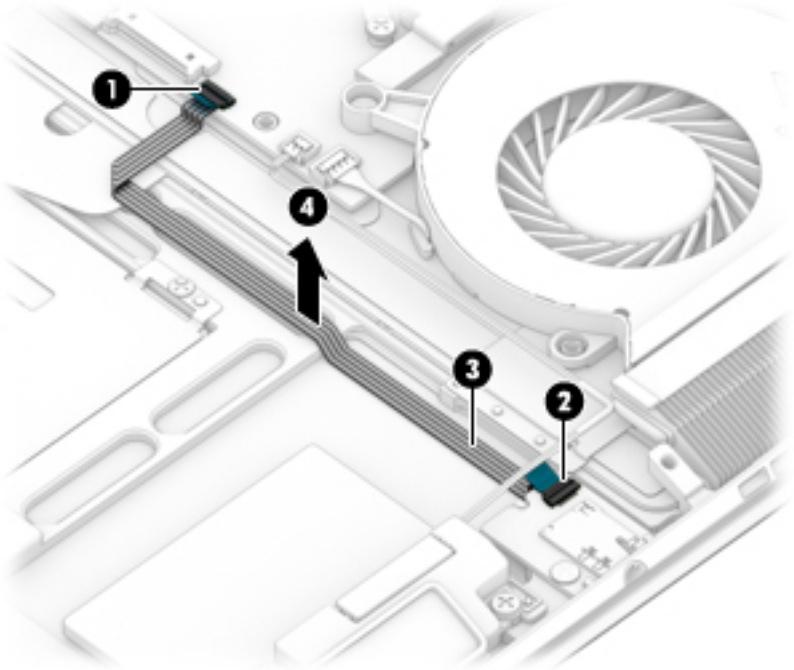
Description	Spare part number
Audio jack board cable (includes adhesive)	L38101-001

Before removing the audio jack board cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the audio jack board cable:

1. Release the ZIF connector **(1)** to which audio jack board cable is connected, and then disconnect the audio jack board cable from the system board.
2. Release the ZIF connector **(2)** to which audio jack board cable is connected, and then disconnect the audio jack board cable from the audio jack board.
3. Detach the audio jack board cable **(3)** from the keyboard/top cover. (The audio jack board cable is attached to the keyboard/top cover with adhesive.)
4. Remove the audio jack board cable **(4)**.



Reverse this procedure to install the audio jack board cable.

Audio jack board

NOTE: The audio jack board spare part kit does not include the audio jack board cable. The audio jack board cable is available using spare part number 941833-001.

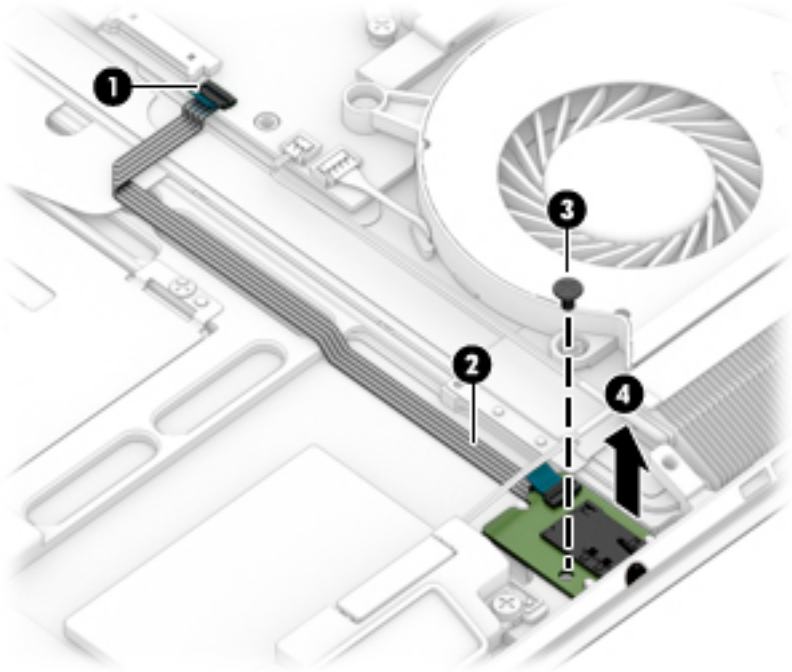
Description	Spare part number
Audio jack board	L38118-001

Before removing the audio jack board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the audio jack board:

1. Release the ZIF connector **(1)** to which audio jack board cable is connected, and then disconnect the audio jack board cable from the system board.
2. Detach the audio jack board cable **(2)** from the keyboard/top cover. (The audio jack board cable is attached to the keyboard/top cover with adhesive.)
3. Remove the Phillips M2.0×4.2 screw **(3)** that secures the audio jack board to the keyboard/top cover.
4. Remove the audio jack board **(4)**.



Reverse this procedure to install the audio jack board and cable.

Fans

NOTE: The fan spare part kit includes the fan cable.

Description	Spare part number
Left fan for use only on computer models equipped with an Intel Core i7-8750H processor	L38109-001
Left fan for use only on computer models equipped with an Intel Core i7-8565U processor	L38107-001
Right fan for use only on computer models equipped with an Intel Core i7-8750H processor	L38108-001
Right fan for use only on computer models equipped with an Intel Core i7-8565U processor	L38106-001

Before removing the fans, follow these steps:

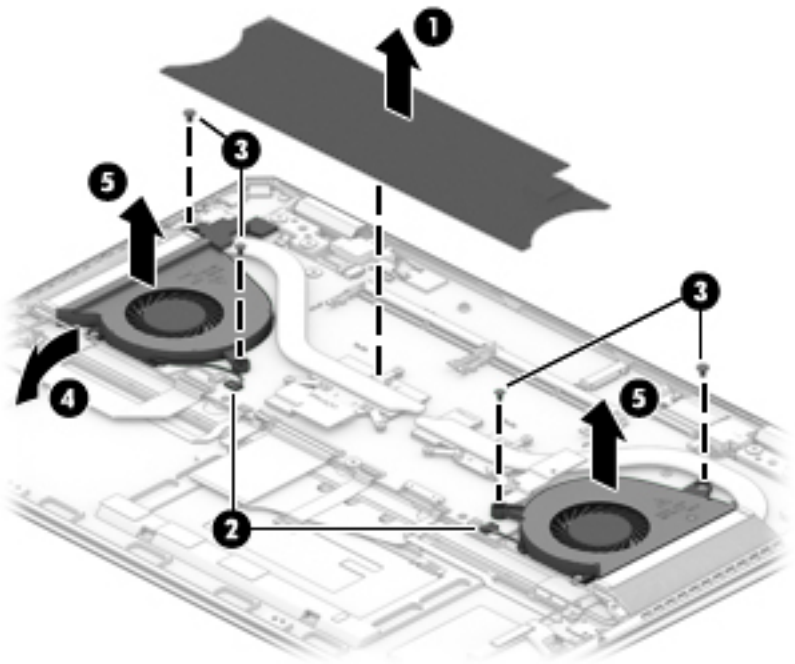
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).

Remove the fans:

1. Remove the system board shield **(1)**.

   The system board shield is available using spare part number .
2. Disconnect the fan cables **(2)** from the connectors on the system board.
3. Remove the four Phillips M2.0×4.2 screws **(3)** that secure the fans to the keyboard/top cover.
4. Swing the left fan **(4)** in a clockwise circle to release it from the heat sink.

5. Remove the fans (5).



Reverse this procedure to install the fans.

System board

NOTE: The system board spare part kit includes a processor and replacement thermal material.

Description	Spare part number
Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 16-GB of system memory, and the Windows 10 operating system	L38130-601
Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 16-GB of system memory, and a non-Windows operating system	L38130-001
Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 8-GB of system memory, and the Windows 10 operating system	L38129-601
Equipped with an Intel Core i7-8750H 2.20-GHz (turbo up to 4.10-GHz) six core processor (2666-MHz, 9.0 MB L3 cache, 45-W), the Intel HM370 chipset, an Nvidia GeForce GTX1050Ti graphics controller with 4096-MB discrete memory, 8-GB of system memory, and a non-Windows operating system	L38129-001
Equipped with an Intel Core i7-8565U 1.80-GHz (turbo up to 4.60-GHz) quad core processor (2400-MHz, 8.0 MB L3 cache, 15-W), an Intel integrated SoC chipset, an Nvidia GeForce MX150 graphics controller with 2048-MB discrete memory, 8-GB of system memory, and the Windows 10 operating system	L38128-601
Equipped with an Intel Core i7-8565U 1.80-GHz (turbo up to 4.60-GHz) quad core processor (2400-MHz, 8.0 MB L3 cache, 15-W), an Intel integrated SoC chipset, an Nvidia GeForce MX150 graphics controller with 2048-MB discrete memory, 8-GB of system memory, and a non-Windows operating system	L38128-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30).
5. Remove the battery (see Battery on page 31).
6. Remove the fans (see Fans on page 53).

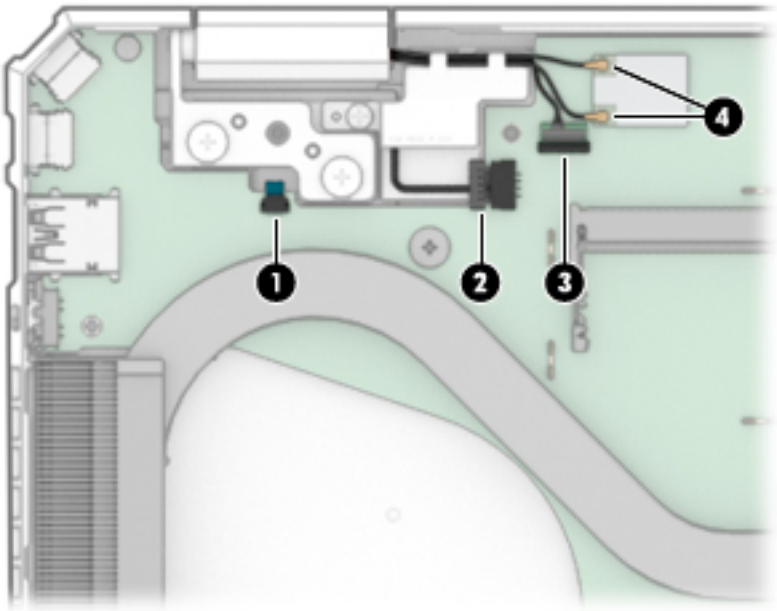
When replacing the system board, be sure to remove the heat sink (see Heat sink on page 59) from the defective system board and install it on the replacement system board.

Remove the system board:

1. Release the ZIF connector **(1)** to which infrared board cable is connected, and then disconnect the infrared board cable from the system board.
2. Disconnect the right rear speaker cable **(2)** from the system board.
3. Release the ZIF connector **(3)** to which webcam cable is connected, and then disconnect the webcam cable from the system board.

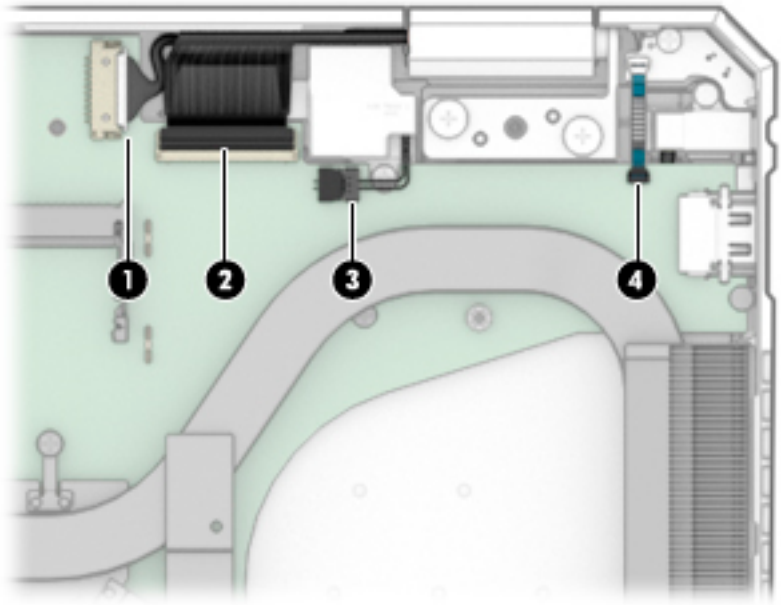
4. Disconnect the WLAN antenna cables **(4)** from the WLAN module built onto the system board.

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

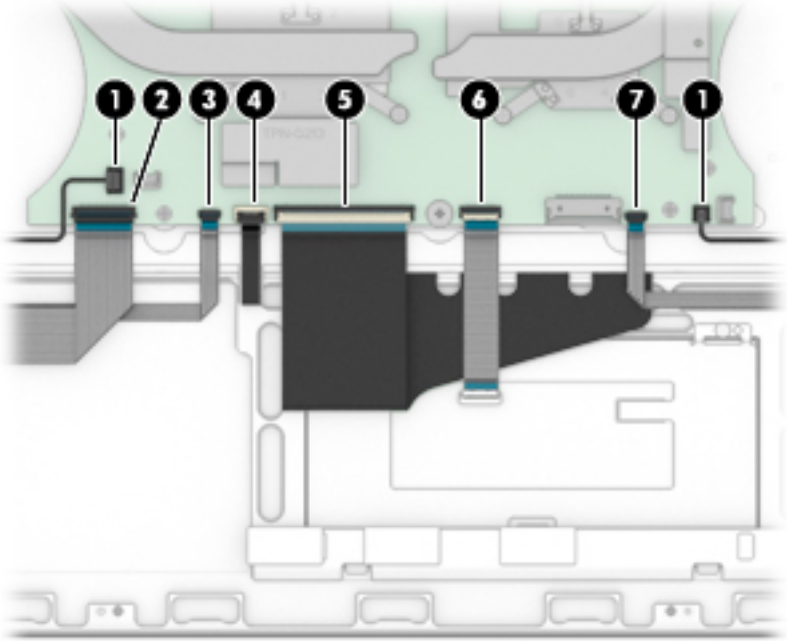


5. Disconnect the power connector cable **(1)** from the system board.
6. Release the ZIF connector **(2)** to which display panel cable is connected, and then disconnect the display panel cable from the system board.
7. Disconnect the left rear speaker cable **(3)** from the system board.

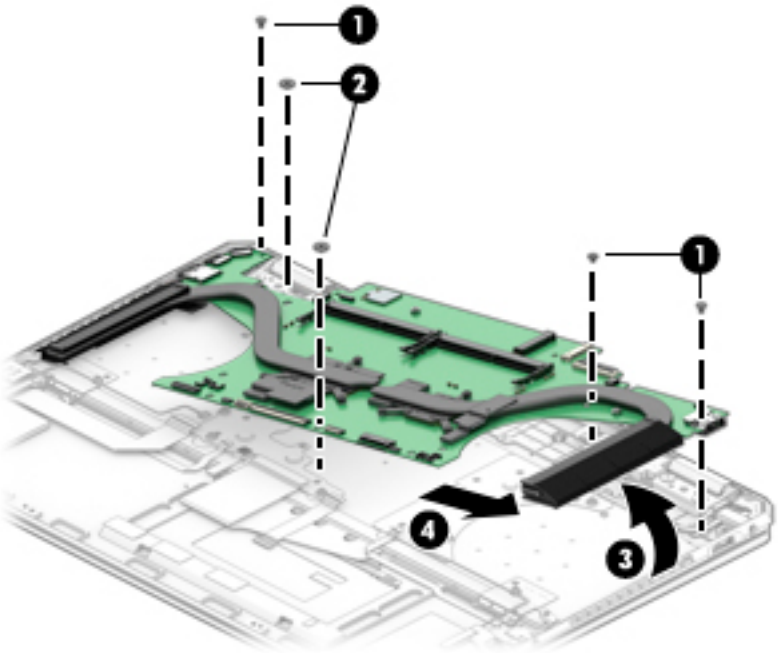
8. Release the ZIF connector **(4)** to which power button board cable is connected, and then disconnect the power button board cable from the system board.



9. Disconnect the following cables from the system board:
   - **(1)** Front speaker cables (two locations)
   - **(2)** Card reader board ZIF connector cable
   - **(3)** Fingerprint reader module ZIF connector cable
   - **(4)** Backlight ZIF connector cable
   - **(5)** Keyboard ZIF connector cable
   - **(6)** TouchPad ZIF connector cable
   - **(7)** Audio jack board ZIF connector cable



10. Remove the three Phillips M2.0×4.2 screws **(1)** and the two Phillips M2.0×2.6 broad head screws **(2)** that secure the system board to the keyboard/top cover.
11. Lift the right side of the system board **(3)** until it rests at an angle.
12. Slide the system board **(4)** up and to the right until it is clear of the keyboard/top cover.



13. Remove the system board.

Reverse this procedure to install the system board.

Heat sink

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

Description	Spare part number
For use only on computer models equipped with an Intel Core i7-8750H processor	L38111-001
For use only on computer models equipped with an Intel Core i7-8565U processor	L38110-001

Before removing the heat sink, follow these steps:

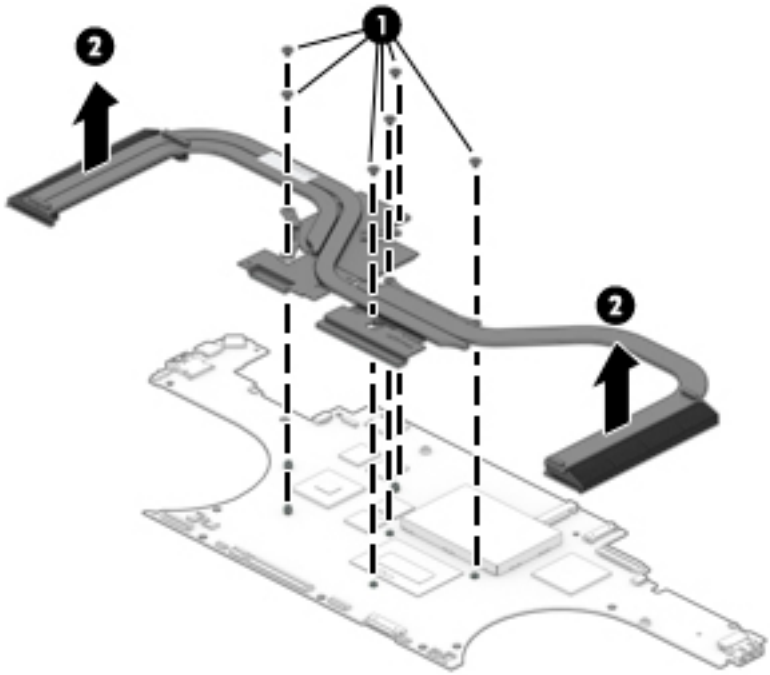
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see Bottom cover on page 30), and then remove the following components:
   a. Battery (see Battery on page 31)
   b. Fans (see Fans on page 53)
   c. System board (see System board on page 55)

Remove the heat sink:

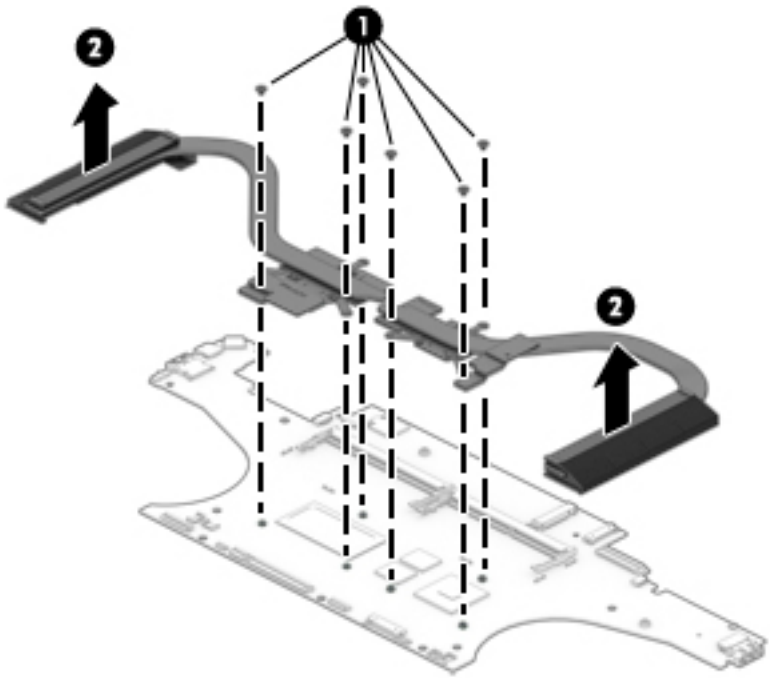
1. Remove the six Phillips M2.0×2.0 screws **(1)** that secure the heat sink to the system board.

2. Remove the heat sink (2).

NOTE: The following illustration shows the removal of the heat sink used only on computer models equipped with an Intel Core i7-8750H processor.



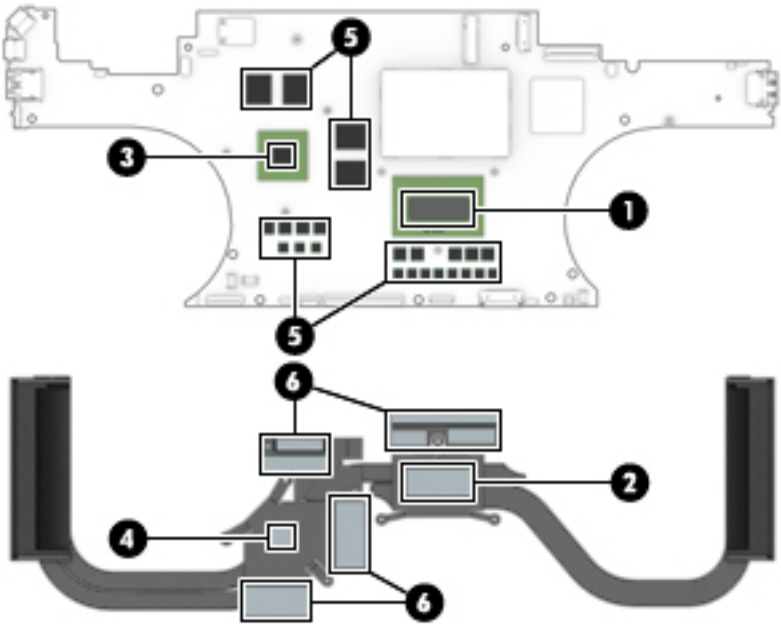
NOTE: The following illustration shows the removal of the heat sink used only on computer models equipped with an Intel Core i7-8565U processor.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

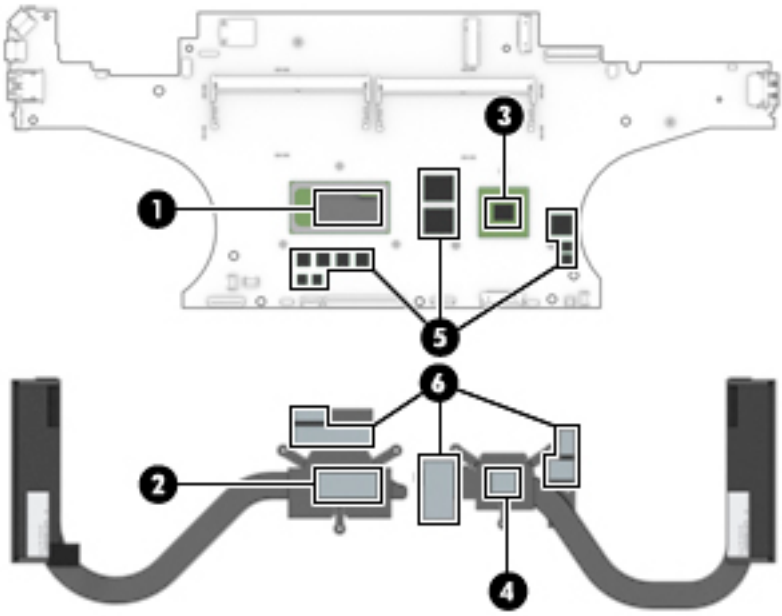
NOTE: The following illustration shows the replacement thermal material locations on the system board and the heat sink on computer models equipped with an Intel Core i7-8750H processor.

Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it. Thermal paste is also used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it. Thermal pads are used on the other system board components **(5)** and the heat sink sections **(6)** that services them.



NOTE: The following illustration shows the replacement thermal material locations on the system board and the heat sink on computer models equipped with an Intel Core i7-8565U processor.

Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it. Thermal paste is also used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that service it. Thermal pads are used on the other system board components **(5)** and the heat sink sections **(6)** that service them.



Reverse this procedure to install the heat sink.

Rear speakers

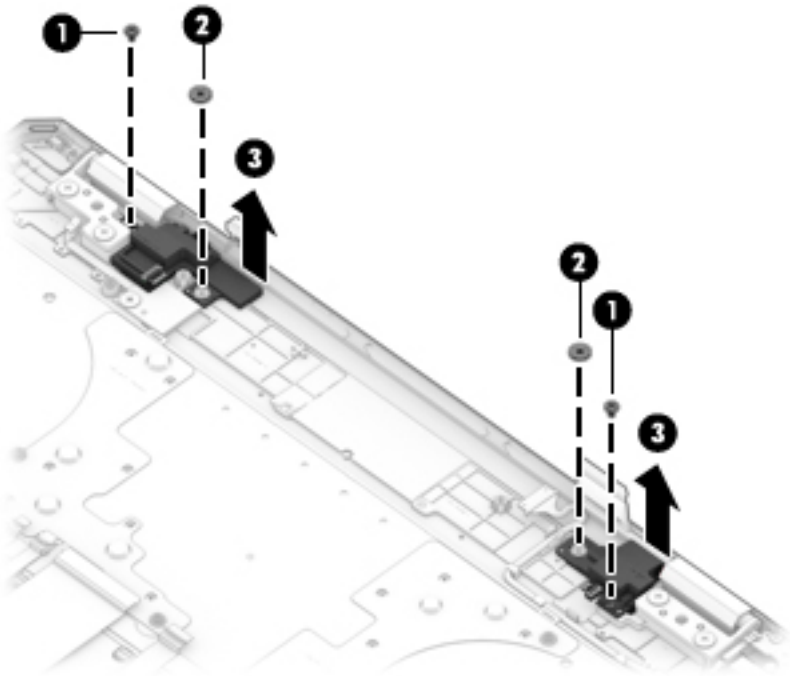
Description	Spare part number
Speaker Kit (includes front and rear speakers, cables, and rubber isolators)	L38123-001

Before removing the rear speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see Bottom cover on page 30), and then remove the following components:
   a. Battery (see Battery on page 31)
   b. Fans (see Fans on page 53)
   c. System board (see System board on page 55)

Remove the rear speakers:

1. Remove the two Phillips M2.0×4.2 screws **(1)** and the two Phillips M2.0×2.6 broad head screws **(2)** that secure the rear speakers to the keyboard/top cover.
2. Remove the rear speakers **(3)**.



Reverse this procedure to install the rear speakers.

Infrared board

NOTE: The infrared board spare part kit does not include the infrared board cable. The infrared board cable is available using spare part number L38102-001.

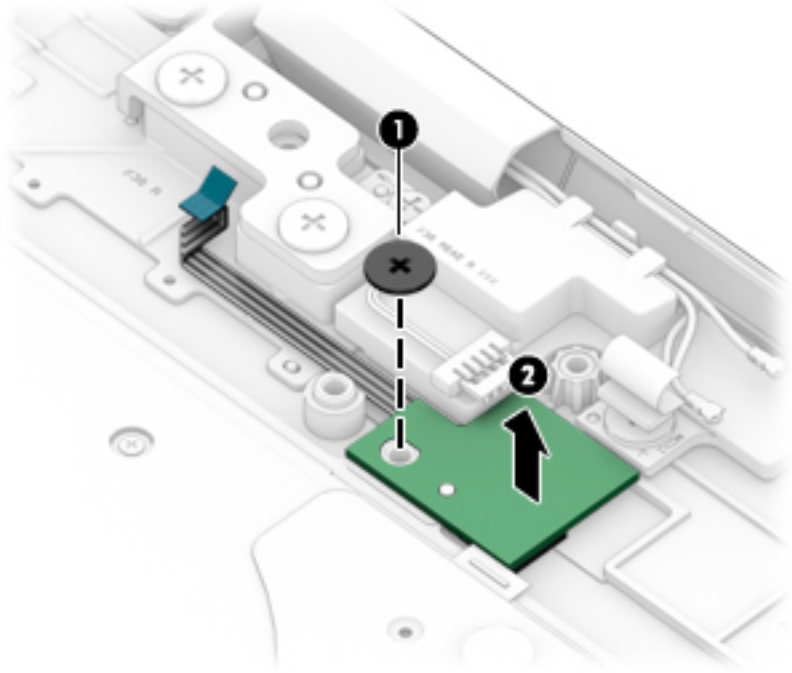
Description	Spare part number
Infrared board	L38119-001

Before removing the infrared board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30), and then remove the following components:
   a. Battery (see Battery on page 31)
   b. Fans (see Fans on page 53)
   c. System board (see System board on page 55)

Remove the infrared board:

1. Remove the Phillips M2.0×2.6 broad head screw **(1)** that secures the infrared board to the keyboard/top cover.
2. Remove the infrared board **(2)**.



Reverse this procedure to install the infrared board.

Infrared board cable

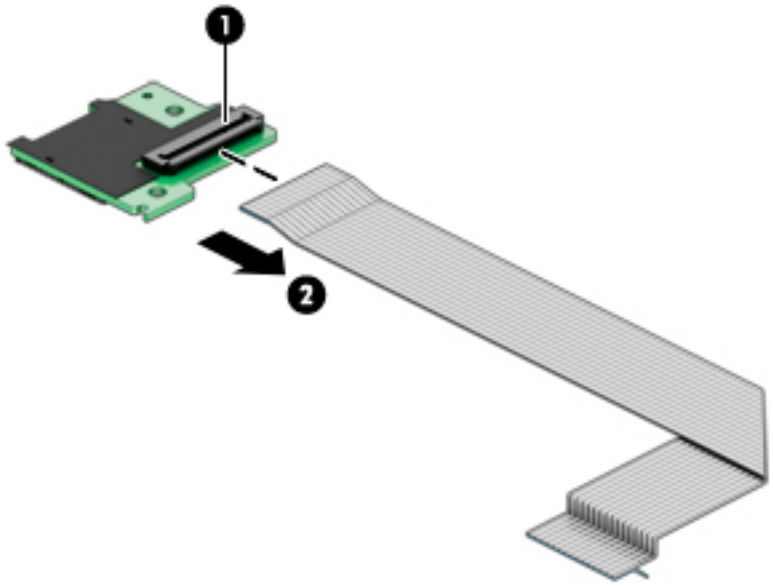
Description	Spare part number
Infrared board cable	L38102-001

Before removing the infrared board cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30), and then remove the following components:
   a. Battery (see Battery on page 31)
   b. Fans (see Fans on page 53)
   c. System board (see System board on page 55)
   d. Infrared board (see Infrared board on page 64)

Remove the infrared board cable:

1. Turn the infrared board upside down with the infrared board cable connector toward you.
2. Release the ZIF connector **(1)** to which the infrared board cable is connected, and then disconnect the infrared board cable from the infrared board.
3. Disconnect the infrared board cable **(2)** from the infrared board.



4. Remove the infrared board cable.

Reverse this procedure to install the infrared board cable.

Power connector cable

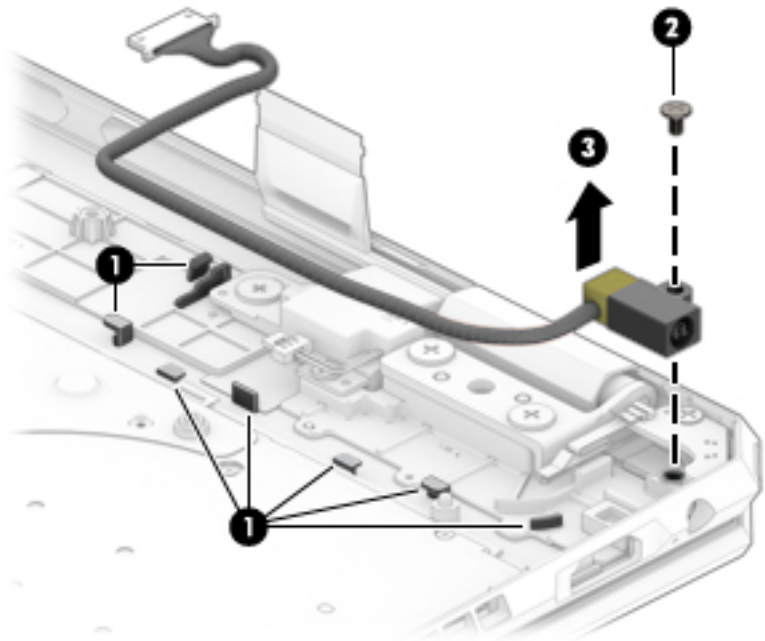
Description	Spare part number
Power connector cable	L38105-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see Bottom cover on page 30), and then remove the following components:
   a. Battery (see Battery on page 31)
   b. Fans (see Fans on page 53)
   c. System board (see System board on page 55)

Remove the power connector cable:

1. Release the power connector cable from the retention clips **(1)** built into the keyboard/top cover that secure the cable.
2. Remove the Phillips M2.0×4.2 screw **(2)** that secures the power connector to the keyboard/top cover.
3. Remove the power connector cable **(3)**.



Reverse this procedure to install the power connector cable.

6 Computer Setup (BIOS), TPM, and HP Sure Start

Using Computer Setup

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

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

Starting Computer Setup

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

Using a USB keyboard or USB mouse to start Computer Setup (BIOS)

You can start Computer Setup by using a keyboard or mouse connected to a USB port, but you must first disable FastBoot.

1. Turn on or restart the computer, and when the HP logo appears, press f9 to enter the Boot Device Options menu.
2. Clear the check box for **Fast Boot**.
3. To save your changes and exit, select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

– or –

Select **Main**, select **Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Navigating and selecting in Computer Setup

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

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

- To exit Computer Setup menus without saving your changes:

  Select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

  – or –

  Select **Main**, select **Ignore Changes and Exit**, and then press enter.

- To save your changes and exit Computer Setup menus:

  Select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

  – or –

  Select **Main**, select **Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

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

1. Start Computer Setup. See Starting Computer Setup on page 67.
2. Select **Main**, and then select **Apply Factory Defaults and Exit**.

   NOTE: On select products, the selections may display **Restore Defaults** instead of **Apply Factory Defaults and Exit**.

3. Follow the on-screen instructions.
4. To save your changes and exit, select the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Select **Main**, select **Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

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

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

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

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

Determining the BIOS version

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

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

1. Start Computer Setup. See Starting Computer Setup on page 67.
2. Select **Main**, and then select **System Information**.
3. To exit Computer Setup without saving your changes, select the **Exit** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Select **Main**, select **Ignore Changes and Exit**, and then press enter.

To check for later BIOS versions, see Downloading a BIOS update on page 69.

Downloading a BIOS update

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

Do not disconnect power on the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep.

Do not insert, remove, connect, or disconnect any device, cable, or cord.

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

   – 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. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

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

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

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

Changing the boot order using the f9 prompt

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

1. Access the Boot Device Options menu:
   - Turn on or restart the computer, and when the HP logo appears, press f9 to enter the Boot Device Options menu.
2. Select a boot device, press enter, and then follow the on-screen instructions.

TPM BIOS settings (select products only)

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

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

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

To access TPM settings in Computer Setup:

1. Start Computer Setup. See Starting Computer Setup on page 67.
2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

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

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

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

7 Using HP PC Hardware Diagnostics (UEFI)

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

When HP PC Hardware Diagnostics (UEFI) detects a failure that requires hardware replacement, a 24-digit Failure ID code is generated. This ID code can then be provided to support to help determine how to correct the problem.

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

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 drive

      NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 73.

   b. Hard drive

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

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

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

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 offered.

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

Download the latest UEFI version

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

Download any version of UEFI for a specific product

1. Go to http://www.hp.com/support.
2. Select **Get software and drivers**.
3. Enter the product name or number.
4. Select your computer, and then select your operating system.
5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

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

Your computer supports Remote HP PC Hardware Diagnostics (UEFI). This is a firmware (BIOS) feature that downloads HP PC Hardware Diagnostics UEFI to your computer.

It executes the diagnostics on your computer, and then may upload results to a preconfigured server.

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.

Customizing Remote HP PC Hardware Diagnostics (UEFI) settings

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.

To access documentation on using Remote HP PC Hardware Diagnostics (UEFI) to configure a server for remote diagnostics or to customize which diagnostic tests are run, go to http://www.hp.com/support. Select **Find your product**, and then follow the on-screen instructions.

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 76).
- **Creating a restore point**—You can use Windows tools to create a restore point (see Using Windows tools on page 76).
- **Creating recovery media** (select products only)—You can use the HP Cloud Recovery Download Tool (select products only) to create recovery media (see Using the HP Cloud Recovery Download Tool to create recovery media (select products only) on page 76.
- **Restoring and recovery**—Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state (see Using Windows tools on page 76).

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

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

Backing up information and creating recovery media

Using Windows tools

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

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

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

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

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

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

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

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

1. Go to http://www.hp.com/support.
2. Select **Software and Drivers**, and then follow the on-screen instructions.

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 76).

Recovering using HP Recovery media

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

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

	Metric	U.S.
Dimensions		
Width	**36.13 cm**	14.22 in
Depth	**25.00 cm**	9.84 in
Height (front to back)	**1.94 cm**	0.76 in
Weight:		
Computer models equipped with an Intel Core i7-8750H processor	**2.18 kg**	4.81 lbs
Computer models equipped with an Intel Core i7-8565U processor	**2.17 kg**	4.79 lbs
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W 19 V dc @ 4.62 A – 90 W 19.5 V dc @ 2.31 – 45 W (select models only)	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

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

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

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

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

Country/region	Accredited agency	Applicable note number

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

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.

Index

A
AC adapter and battery light 7
AC adapter, spare part numbers 22
action keys 13
adapter, spare part numbers 22
antenna
  location 9
audio jack board
  removal 52
  spare part number 21, 52
audio jack board cable
  removal 51
  spare part number 21, 51, 52
audio, product description 1
audio-in jack 7
audio-out jack 7

B
battery
  removal 31
  spare part number 22, 31
BIOS
  determining version 69
  downloading an update 69
  updating 69
Bluetooth label 15
boot order
  changing using the f9 prompt 70
bottom components 14
bottom cover
  removal 30
  spare part numbers 22, 30
buttons
  left TouchPad 10
  power 7
  right TouchPad 10

C
camera 9
camera light 9
camera privacy switch 4, 5
caps lock light 11
card reader board
  removal 42
  spare part number 21
  spare part numbers 42
card reader board cable
  removal 43
  spare part number 21, 42, 43
chipset, product description 1
components
  bottom 14
  display 9
  keyboard area 10
  left side 7
  right side 4
computer major components 16
Computer Setup
  navigating and selecting 67
  restoring factory settings 68
  using a USB keyboard or USB mouse to start Computer Setup 67
computer setup 67
computer specifications 78

D
display assembly
  removal 38
  spare part numbers 17, 38
display components 9
display panel, product description 1
duck head adapter, spare part number 22

E
electrostatic discharge 26
equipment guidelines 28
esc key 13

F
fan
  removal 53
  spare part numbers 21, 53
fingerprint reader 12
fingerprint reader board
  spare part numbers 21
fingerprint reader board cable
  spare part number 21
fingerprint reader module
  removal 45
  spare part numbers 45
fingerprint reader module cable
  removal 47
  spare part number 45, 47
fn key 13
front speaker
  removal 41
  spare part number 41
front speakers
  spare part number 20

G
graphics, product description 1
grounding guidelines 26
guidelines
  equipment 28
  grounding 26
  packaging 27
  transporting 27
  workstation 27

H
hardware, locating 3
HDMI port 7
HDMI–to–VGA adapter, spare part number 22
headphone jack 7
heat sink
  removal 59
  spare part numbers 21, 59
HP PC Hardware Diagnostics (UEFI)
  using 72
hub, spare part numbers 22

I
Impreza-C–to–A cable, spare part number 23
infrared board
  removal 64
  spare part number 20
  spare part numbers 64

infrared board cable
removal 65
spare part number 20, 64, 65
integrated numeric keypad 13
internal microphone 9

J
jacks
audio-in 7
audio-out 7
headphone 7
microphone 7

K
keyboard, product description 2
keyboard/top cover
spare part numbers 17, 18, 19, 20
keypad, integrated numeric 13
keys
action 13
esc 13
fn 13
num lock 13
Windows 13

L
labels
Bluetooth 15
regulatory 15
serial number 15
service 15
wireless certification 15
WLAN 15
left fan
removal 53
spare part number 53
left side components 7
lights
AC adapter and battery 7
camera 9
caps lock 11
mute 11
power 7

M
memory module
removal 33
spare part numbers 22, 33
memory module shield
removal 33
spare part number 33
memory shield
spare part number 22
memory, product description 1
microphone
product description 1
microphone jack 7
microSD memory card reader 4, 5
model name 1
mute light 11

O
optical drive, spare part number 23

P
packaging guidelines 27
pen tip, spare part numbers 23
pen, spare part numbers 23
pointing device, product description 2
ports
HDMI 7
product description 2
Thunderbolt 5
USB SuperSpeed with HP Sleep and Charge 4, 5
USB Type-C power connector and Thunderbolt with HP Sleep and Charge 6
USB Type-C power connector with HP Sleep and Charge 4
USB Type-C Thunderbolt port 5, 6
power button 7
power button actuator
spare part numbers 21
power button board
removal 37
spare part number 21, 37
power button board cable
removal 36
spare part number 21, 36, 37
power connector 7
power connector cable
removal 66
spare part number 20
spare part numbers 66
power cord
requirements for all countries 79
requirements for specific countries and regions 80
set requirements 79
spare part numbers 23
power lights 7
power requirements, product description 2
privacy camera switch
spare part numbers 21, 22
processor, product description 1
product description
audio 1
chipset 1
display panel 1
graphics 1
keyboard 2
memory 1
microphone 1
pointing device 2
ports 2
power requirements 2
processors 1
product name 1
security 2
sensors 2
solid-state drive 1
storage 1
video 1
wireless 2
product name 1
product name and number, computer 15

R
rear speaker
removal 63
spare part number 63
rear speakers
spare part number 20
regulatory information
regulatory label 15
wireless certification labels 15
right fan
removal 53
spare part number 53
right-side components 4

rubber foot strip
removal 30
spare part numbers 30
Rubber Kit, spare part numbers 22, 23

S
Screw Kit, spare part number 23
security, product description 2
sensors, product description 2
serial number, computer 15
service labels, locating 15
setup utility
navigating and selecting 67
restoring factory settings 68
sleeve, spare part number 23
software
locating 3
software installed
locating 3
solid-state drive
product description 1
removal 35
spare part numbers 22, 35
Speaker Kit, spare part number 20
speakers
identifying 14
location 12
removal 41, 63
spare part number 20, 41
spare part numbers 63
special keys, using 13
specifications
computer 78
Sure Start
using 71
system board
removal 55
spare part numbers 20, 55
system board shield
removal 53
spare part number 21, 53

T
Thunderbolt port 5
Thunderbolt portC 6
TouchPad
removal 49
spare part numbers 21, 49
TouchPad buttons
identifying 10
TouchPad cable
removal 48
spare part number 21, 48, 49
TouchPad zone 10
TPM settings 70
transporting guidelines 27
traveling with the computer 15

U
USB SuperSpeed port with HP Sleep and Charge 4, 5
USB Type-C power connector and port with HP Sleep and Charge 4
USB Type-C power connector and Thunderbolt port with HP Sleep and Charge 6
USB Type-C Thunderbolt port 5, 6
USB-C–to–HDMI 2.0 adapter, spare part number 22
USB-C–to–MultiPort hub, spare part number 23
USB-C–to–RJ45 adapter, spare part number 22
USB-C–to–USB-A dongle, spare part number 22
USB-C–to–USB-A hub, spare part number 23
USB-C–to–VGA adapter, spare part number 22
USB–to–Gigabit RJ45 adapter, spare part number 22

V
vents 4, 5, 7, 14
video, product description 1

W
Windows key 13
wireless antenna
location 9
wireless certification label 15
wireless, product description 2
WLAN antenna
location 9
WLAN device 15
WLAN label 15
workstation guidelines 27