



Maintenance and Service Guide

HP 255 G7 Notebook PC

© Copyright 2018 HP Development Company, L.P.

AMD is a trademark of Advanced Micro Devices, Inc. Intel is a trademark of Intel Corporation in the U.S. and other countries. Bluetooth is a trademark owned by its proprietor and used by HP Inc. under license. Microsoft and Windows are either registered trademarks or trademarks 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: December 2018

Document Part Number: L47794-001

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.

Important Notice about Customer Self-Repair Parts

 **CAUTION:** Your computer includes Customer Self-Repair parts and parts that should only be accessed by an authorized service provider. See Chapter 5, "Removal and replacement procedures for Customer Self-Repair parts," for details. Accessing parts described in Chapter 6, "Removal and replacement procedures for Authorized Service Provider only parts," can damage the computer or void your warranty.

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 Getting to know your computer	5
Right side	5
Left side	6
Display	7
Keyboard area	8
TouchPad	8
Lights	9
Button and speakers	10
Special keys	11
Action keys	12
Bottom	13
Labels	14
3 Illustrated parts catalog	15
Computer major components	15
Cables	18
Display assembly subcomponents	19
Miscellaneous parts	20
Mass storage devices	21
4 Removal and replacement procedures preliminary requirements	22
Tools required	22
Service considerations	22
Plastic parts	22
Cables and connectors	22
Drive handling	23
Workstation guidelines	23
Electrostatic discharge information	23
Generating static electricity	24
Preventing electrostatic damage to equipment	24
Personal grounding methods and equipment	25
Grounding the work area	25
Recommended materials and equipment	25
Packaging and transporting guidelines	26

5 Removal and replacement procedures for Customer Self-Repair parts	27
Preparation for disassembly	27
Component replacement procedures	27
Optical drive	28
6 Removal and replacement procedures for Authorized Service Provider parts	30
Component replacement procedures	30
Bottom cover	31
Battery	33
Memory	35
Hard drive	37
Solid-state drive	39
Solid-state drive bracket and connector board	40
WLAN module	42
Hard drive connector board	43
USB/card reader board	44
TouchPad button board	45
TouchPad module	46
Fan	48
Heat sink assembly	49
Display assembly	53
System board	62
Speakers	64
Power connector cable (DC-in)	65
Top cover with keyboard	66
7 Computer Setup (BIOS), TPM, and HP Sure Start	67
Using Computer Setup	67
Starting Computer Setup	67
Navigating and selecting in Computer Setup	67
Restoring factory settings in Computer Setup	67
Updating the BIOS	68
Determining the BIOS version	68
Downloading a BIOS update	68
Changing the boot order using the f9 prompt	69
TPM BIOS settings (select products only)	69
Using HP Sure Start (select products only)	70
8 Using HP PC Hardware Diagnostics	71
Using HP PC Hardware Diagnostics Windows (select products only)	71

Downloading HP PC Hardware Diagnostics Windows	71
Downloading the latest HP PC Hardware Diagnostics Windows version	72
Downloading HP Hardware Diagnostics Windows by product name or number (select products only)	72
Installing HP PC Hardware Diagnostics Windows	72
Using HP PC Hardware Diagnostics UEFI	72
Starting HP PC Hardware Diagnostics UEFI	73
Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive	73
Downloading the latest HP PC Hardware Diagnostics UEFI version	73
Downloading HP PC Hardware Diagnostics UEFI by product name or number (select products only)	73
Using Remote HP PC Hardware Diagnostics UEFI settings (select products only)	74
Downloading Remote HP PC Hardware Diagnostics UEFI	74
Downloading the latest Remote HP PC Hardware Diagnostics UEFI version	74
Downloading Remote HP PC Hardware Diagnostics UEFI by product name or number	74
Customizing Remote HP PC Hardware Diagnostics UEFI settings	74
9 Backing up, restoring, and recovering	76
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
10 Specifications	78
Computer specifications	78
39.6-cm (15.6-in) display specifications	79
M.2 SATA solid-state drive specifications	79
M.2 PCIe solid-state drive specifications	80
Hard drive specifications	81
11 Power cord set requirements	82
Requirements for all countries	82
Requirements for specific countries and regions	83
12 Statement of memory volatility	85
Nonvolatile memory usage	87
Questions and answers	89

Using HP Sure Start (select models only) 90

13 Recycling 91

Index 92

1 Product description

Table 1-1 Product components and their descriptions

Category	Description
Product Name	HP 255 G7 Notebook PC
Processor	AMD® Dual-Core A9-Series processor A9-9425 (3.1 GHz, turbo up to 3.7 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W
	AMD Dual-Core A6-Series processor A6-9225 (2.6 GHz, turbo up to 3.0 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W
	AMD Dual-Core A4-Series processor A4-9125 (2.3 GHz, turbo up to 2.6 GHz), 2133 MHz/1 MB L2 cache, dual core, 15 W
	AMD Quad-Core E2-Series processor E2-9000e (1.5 GHz, turbo up to 2.0 GHz), 1866 MHz/1 MB L2 cache, dual core, 6 W
	AMD Dual-Core R3-Series Accelerated processor Ryzen 3-2200U (2.5 GHz, turbo up to 3.4 GHz), 1 MB L3 cache, DDR4-2400 MHz, dual core, 15 W
Graphics	Supports HD decode, DX12, HDMI
	Internal graphics
	AMD Radeon™ Vega 3 Mobile Graphics (Ryzen 3 processor)
	AMD Radeon R5 Graphics (A9 processor)
	AMD Radeon R4 Graphics (A6 processor)
	AMD Radeon R2 Graphics (E2 processor)
Panel	39.6-cm (15.6-in), WLED, anti glare, SVA, eDP, slim-flat (3.2 mm); 220 nits
	High definition (HD)(1366 × 768)
	Full high-definition (FHD) (1920 × 1080)
Memory	Two memory module slots
	Memory is non-customer accessible/non-upgradeable
	DDR4-2400 dual channel support
	Supports up to 8 GB of system RAM in the following configurations:
	<ul style="list-style-type: none">• 8192 MB (8192 MB × 1 + 4096 × 2)• 4096 MB (4096 MB × 1)
	One memory module slot (A9, A6, E2 processors)
	Memory is non-customer accessible/non-upgradeable
	DDR4-1866 single channel support

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

Category	Description
	Supports up to 8 GB of system RAM in the following configurations: <ul style="list-style-type: none"> 8192 MB (8192 MB × 1) 4096 MB (4096 MB × 1)
Primary storage	Single hard drive configurations, 6.35 cm (2.5-in), 7.0 mm/7.2 mm/9.5 mm, SATA hard drives <ul style="list-style-type: none"> 1 TB, 5400 rpm, 9.5 mm 1 TB, 5400 rpm, 7.2 mm 500 GB, 7200 rpm, 7.0 mm 500 GB, 5400 rpm, 7.0 mm M.2, SATA-3, solid-state drives <ul style="list-style-type: none"> 256 GB, TLC 128 GB, TLC
Optical drive	9.0 mm tray load DVD+/-RW Double-Layer Writer
Camera	HP TrueVision HD Camera - indicator LED, USB2.0, HD BSI sensor, f2.0 720p by 30 frames per second Single digital microphone HP Webcam - VGA camera, indicator LED, USB 2.0, f2.4 640 × 480 by 30 frames per second Single digital microphone
Audio	Audio Control Panel: HP Audio Control Dual speakers
Ethernet	Ethernet Integrated 10/100/1000 NIC
Wireless networking	Integrated Wireless options with single antenna (M.2/PCIe): Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)
External media cards	HP Multi-Format Digital Media Card Reader Supports SD/SDHC/SDXC Push-push insertion/removal
Internal card expansion	One M.2 slot for solid-state drive One M.2 slot for WLAN
Ports	Hot plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video (auto adjust panel resolution to fit embedded panel and external monitor connected) HDMI v1.4 supporting: up to 1920 × 1080 @ 60Hz USB 2.0 port (right side) (2) USB 3.1 Gen 1 ports (left side)

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

Category	Description
	RJ-45/Ethernet
	Audio-out (headphone)/audio-in (microphone) combo jack
	AC Smart Pin adapter plug
Keyboard/pointing devices	Keyboard:
	Full-size, textured, island-style keyboard with numeric keypad (ash silver and jet black)
	TouchPad:
	Multitouch gestures enabled
	Support Modern Trackpad Gestures
	Taps enabled by default
Power requirements	Battery:
	3-cell battery, 41 Whr
	Supports long life and battery fast charge
	AC adapter, barrel type:
	65 W Smart, nPFC, 4.5 mm, EM
	45 W Smart, nPFC, right angle, 4.5 mm
	Power cord (C5):
	1 m, conventional
Security	Kensington Mini Security Lock
	Supports firmware-based Trusted Platform Module (TPM) 2.0
Operating system	FreeDOS 2.0
	Windows® 10 Home 64
	Windows 10 Home 64 Chinese Market CPPP
	Windows 10 Home 64 High-End Chinese Market CPPP
	Windows 10 Home 64 Plus
	Windows 10 Home 64 Plus Single Language
	Windows 10 Home 64 Single Language
	Windows 10 Home 64 Single Language Africa Market PPP
	Windows 10 Pro 64
	Windows 10 Pro 64 StF MSNA Emerging Market
	Windows 10 Pro 64 StF MSNA Standard
	Windows 10 Pro 64 StF MSNA Strategic
Serviceability	End user replaceable parts:

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

Category	Description
	AC adapter
	Optical drive

2 Getting to know your computer

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

Right side

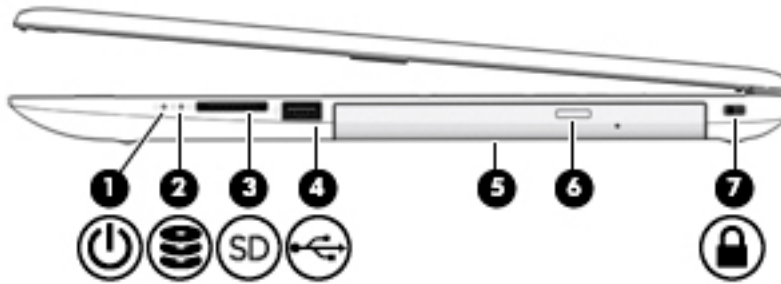







Table 2-1 Right-side components and their descriptions

Component	Description
(1)  Power light	<ul style="list-style-type: none">• On: The computer is on.• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)  Drive light	<ul style="list-style-type: none">• Blinking white: The hard drive is being accessed.
(3)  Memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information. To insert a card: <ol style="list-style-type: none">1. Hold the card label-side up, with connectors facing the computer.2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: <ul style="list-style-type: none">▲ Pull to remove the card from the memory card reader.
(4)  USB port	Connects a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provides data transfer.
(5) Optical drive	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.
(6) Optical drive eject button	Releases the optical drive disc tray.
(7)  Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left side

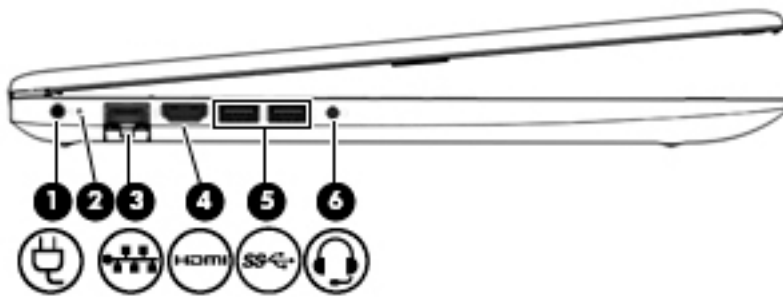








Table 2-2 Left-side components and their descriptions

Component	Description
(1) 	Connects an AC adapter.
(2) 	<ul style="list-style-type: none"> White: The AC adapter is connected and the battery is fully charged. Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. Amber: The AC adapter is connected and the battery is charging. Off: The battery is not charging.
(3) 	Connects a network cable. <ul style="list-style-type: none"> White: The network is connected. Amber: Activity is occurring on the network.
(4) 	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.
(5) 	Connect a USB device, such as a cell phone, camera, activity tracker, or smartwatch, and provide high-speed data transfer.
(6) 	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>.</p> <p>To access this guide:</p> <ul style="list-style-type: none"> ▲ Select the Start button, select HP Help and Support, and then select HP Documentation. <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>

Display

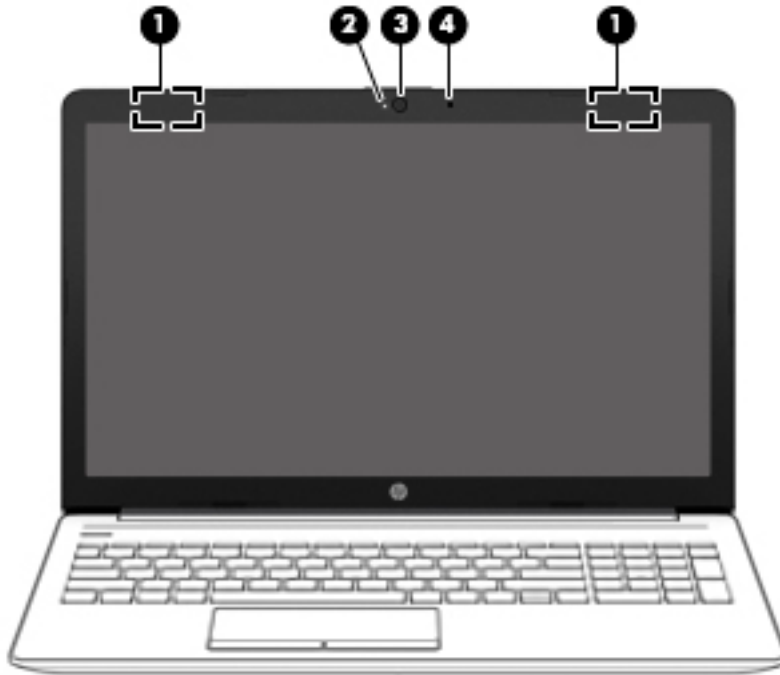


Table 2-3 Display components and their descriptions

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

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

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

To access this guide:

1. Type `support` in the taskbar search box, and then select the **HP Support Assistant** app.
– or –
Click the question mark icon in the taskbar.
2. Select **My PC**, select the **Specifications** tab, and then select **User Guides**.

Keyboard area

TouchPad



Table 2-4 TouchPad components and their descriptions

Component	Description
(1) TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2) Left 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

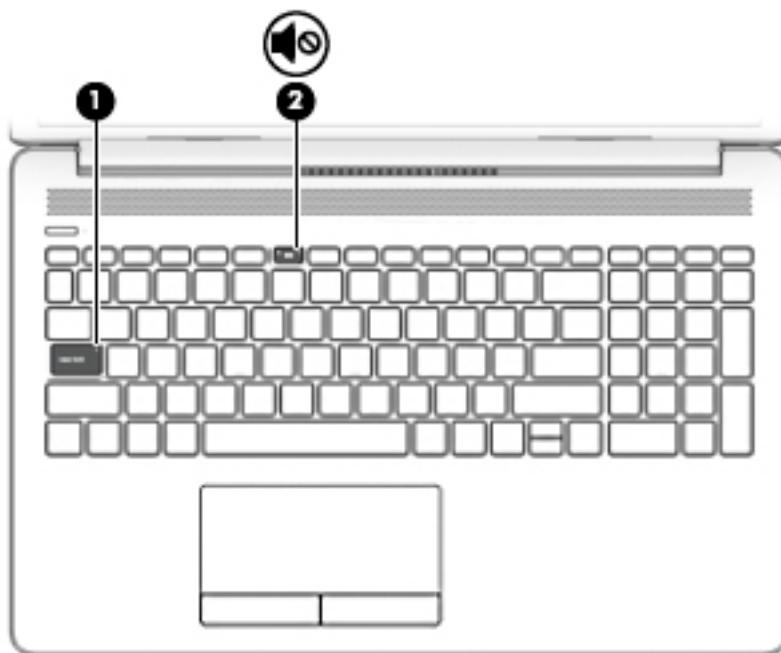



Table 2-5 Lights and their descriptions

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

Button and speakers

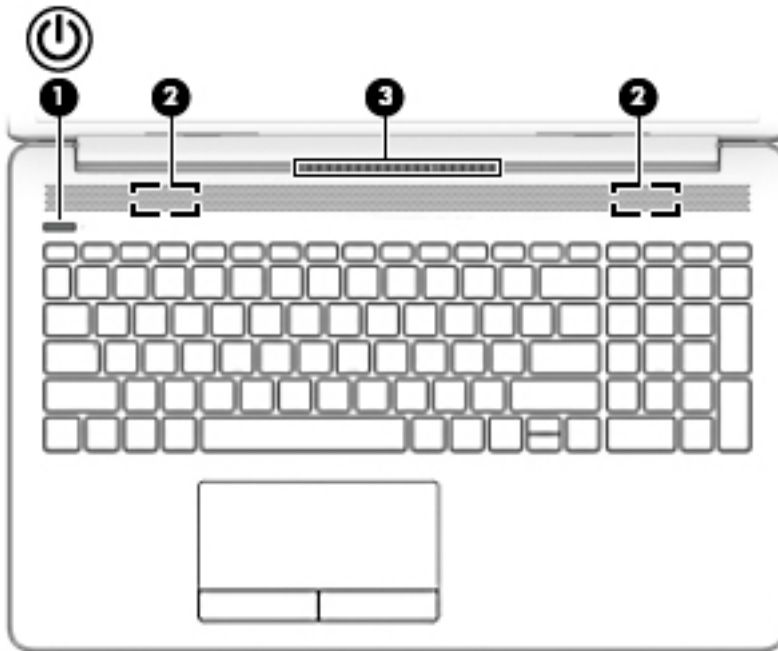




Table 2-6 Button and speakers and their descriptions

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

Special keys

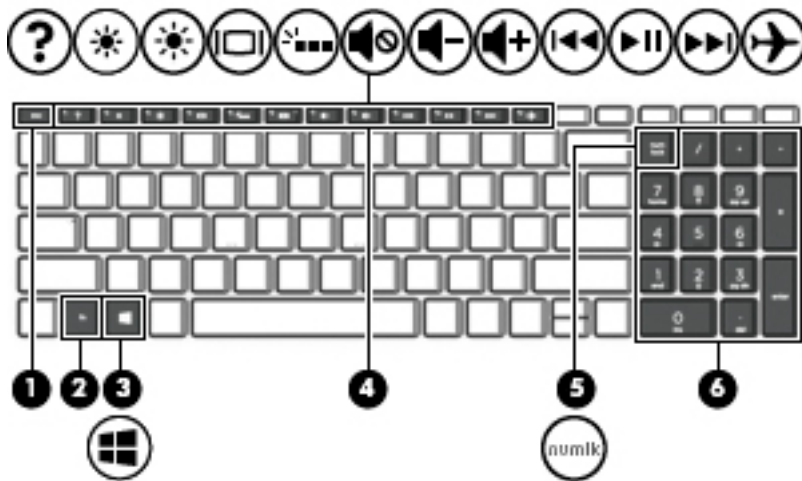



Table 2-7 Special keys and their descriptions













Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes specific functions when pressed in combination with another key.
(3)  Windows key	Opens the Start menu. NOTE: Pressing the Windows key again will close the Start menu.
(4) Action keys	Execute frequently used system functions. NOTE: On select products, the <code>f5</code> action key turns the keyboard backlight feature off or on.
(5) <code>num lock</code> key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6) Integrated numeric keypad	A separate keypad to the right of the alphabet keyboard. When <code>num lock</code> is pressed, the keypad can be used like an external numeric keypad. NOTE: If the keypad function is active when the computer is turned off, that function is reinstated when the computer is turned back on.

Action keys

An action key performs the function indicated by the icon on the key. To determine which keys are on your product, see [Special keys on page 11](#).

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

Table 2-8 Action keys and their descriptions

Icon	Description
	Opens the “How to get help in Windows 10” webpage.
	Decreases the screen brightness incrementally as long as you hold down the key.
	Increases the screen brightness incrementally as long as you hold down the key.
	Switches the screen image between display devices connected to the system. For example, if a monitor is connected to the computer, repeatedly pressing this key alternates the screen image from the computer display to the monitor display to a simultaneous display on both the computer and the monitor.
	Turns the keyboard backlight off or on. NOTE: To conserve battery power, turn off this feature.
	Mutes or restores speaker sound.
	Decreases speaker volume incrementally while you hold down the key.
	Increases speaker volume incrementally while you hold down the key.
	Plays the previous track of an audio CD or the previous section of a DVD or a Blu-ray Disc (BD).
	Starts, pauses, or resumes playback of an audio CD, a DVD, or a BD.
	Plays the next track of an audio CD or the next section of a DVD or a BD.
	Turns the airplane mode and wireless feature on or off. NOTE: The airplane mode key is also referred to as the wireless button. NOTE: A wireless network must be set up before a wireless connection is possible.

Bottom



Table 2-9 Bottom components and their descriptions

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

Labels

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

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

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

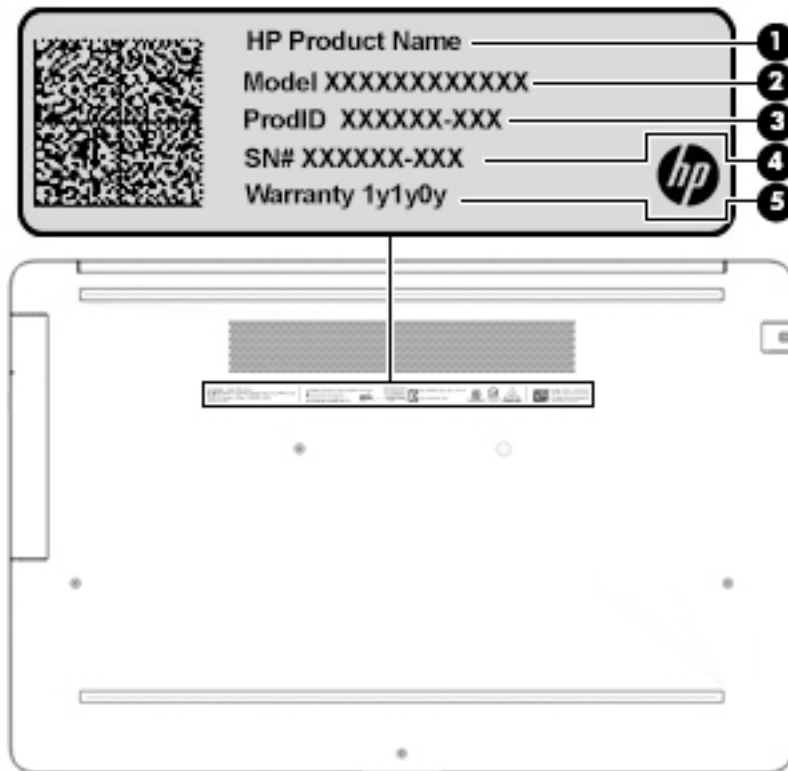


Table 2-10 Service label components


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

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

3 Illustrated parts catalog

Computer major components

 **NOTE:** HP continually improves and changes product parts. For complete and current information 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 14](#) for details.

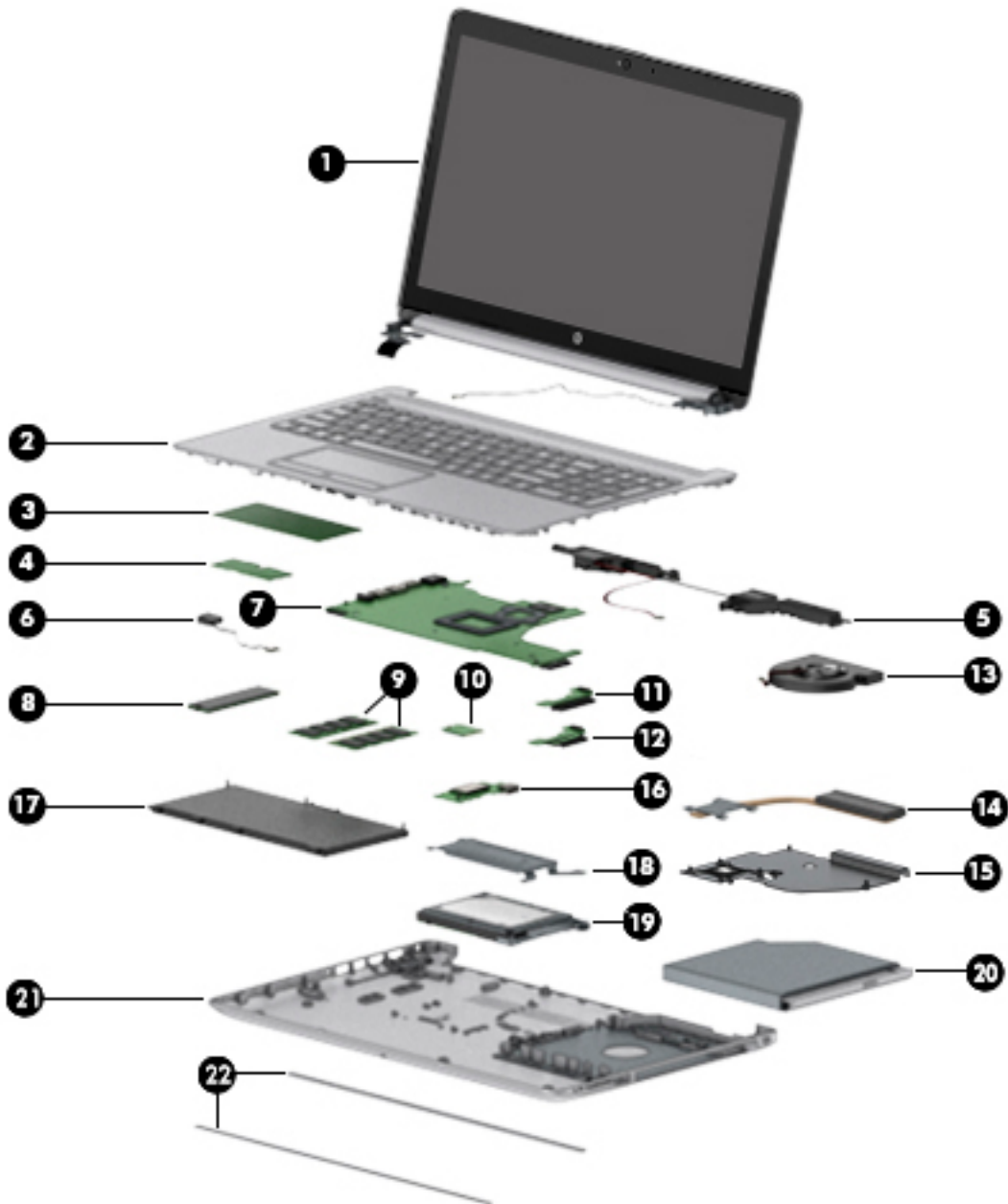


Table 3-1 Computer major components and their descriptions

Item	Component	Spare part number
(1)	Display NOTE: Displays are not spared as whole units. Display subcomponent spare parts are available. For spare part information, see Display assembly subcomponents on page 19 .	Not spared
(2)	Top cover/keyboard NOTE: For a detailed list of country codes, see Top cover with keyboard on page 66 .	
	Keyboard, jet black, for use in the United States	L50000-xx1
	Keyboard, silver, for use in Saudi Arabia	L50001-xx1
(3)	TouchPad module	L20449-001
(4)	TouchPad button board	not spared
(5)	Speakers (includes cable)	L20453-001
(6)	Power connector cable (DC-in)	L20475-001
(7)	System board NOTE: All system board spare part kits include replacement thermal material. All system boards use the following part numbers: xxxxxx-001: Non-Windows operating systems xxxxxx-601: Windows operating system	
	AMD Ryzen 3-2200U processor	L50003-xx1
	AMD A9-9425 processor	L50004-xx1
	AMD A6-9225 processor	L50005-xx1
	AMD A4-9125 processor	L54792-xx1
	AMD E2-9000e processor	L50006-xx1
(8)	Solid-state drive NOTE: For spare part information, see Mass storage devices on page 21 .	
(9)	Memory modules (DDR4-2666)	
	8 GB	937236-855
	4 GB	L10598-855
(10)	WLAN module	
	Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)	L17365-005
(11)	Hard drive connector board	L20454-001
(12)	Solid-state drive connector board	L20457-001
(13)	Fan	L20474-001
	Heat sink	
(14)	For use in models with AMD Ryzen processors	L20483-001
	For use in models with AMD A6/A9 processors	L20491-001

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

Item	Component	Spare part number
(15)	For use in fanless models with AMD E2-9000e processors	L20494-001
(16)	USB/card reader board The USB/card reader board cable is available using spare part number L20452-001.	L20448-001
(17)	Battery (3-cell, 48 Whr)	L11119-855
(18)	Solid-state drive bracket	L20458-001
(19)	Hard drive NOTE: For spare part information, see Mass storage devices on page 21 .	
(20)	DVD+/-RW Double-Layer Writer	L50025-001
(21)	Bottom cover For use in models with an optical drive	
	<ul style="list-style-type: none">Asteroid silver	L49982-001
	<ul style="list-style-type: none">Dark ash silver	L49983-001
	For use in models without an optical drive	
	<ul style="list-style-type: none">Asteroid silver	L49984-001
	<ul style="list-style-type: none">Dark ash silver	L49985-001
(22)	Rubber feet Front feet:	
	<ul style="list-style-type: none">Asteroid silver	L20407-001
	<ul style="list-style-type: none">Dark ash silver	L20406-001
	Rear feet:	
	<ul style="list-style-type: none">Asteroid silver	L20414-001
	<ul style="list-style-type: none">Dark ash silver	L20413-001

Cables

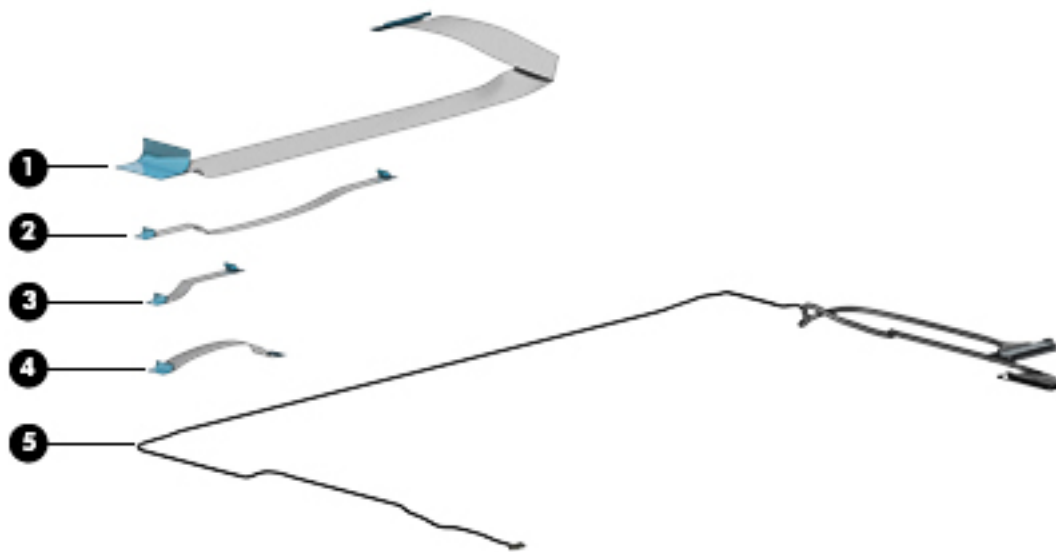


Table 3-2 Cables and their descriptions

Item	Component	Spare part number
(1)	USB/card reader board cable	L20452-001
(2)	TouchPad button board cable	L20451-001
(3)	TouchPad cable	L20450-001
(4)	Hard drive/solid-state drive cable	L20456-001
(5)	Display cable	
	Display cable, non-touch, HD	L20443-001
	Display cable, non-touch, FHD	L23064-001

Display assembly subcomponents

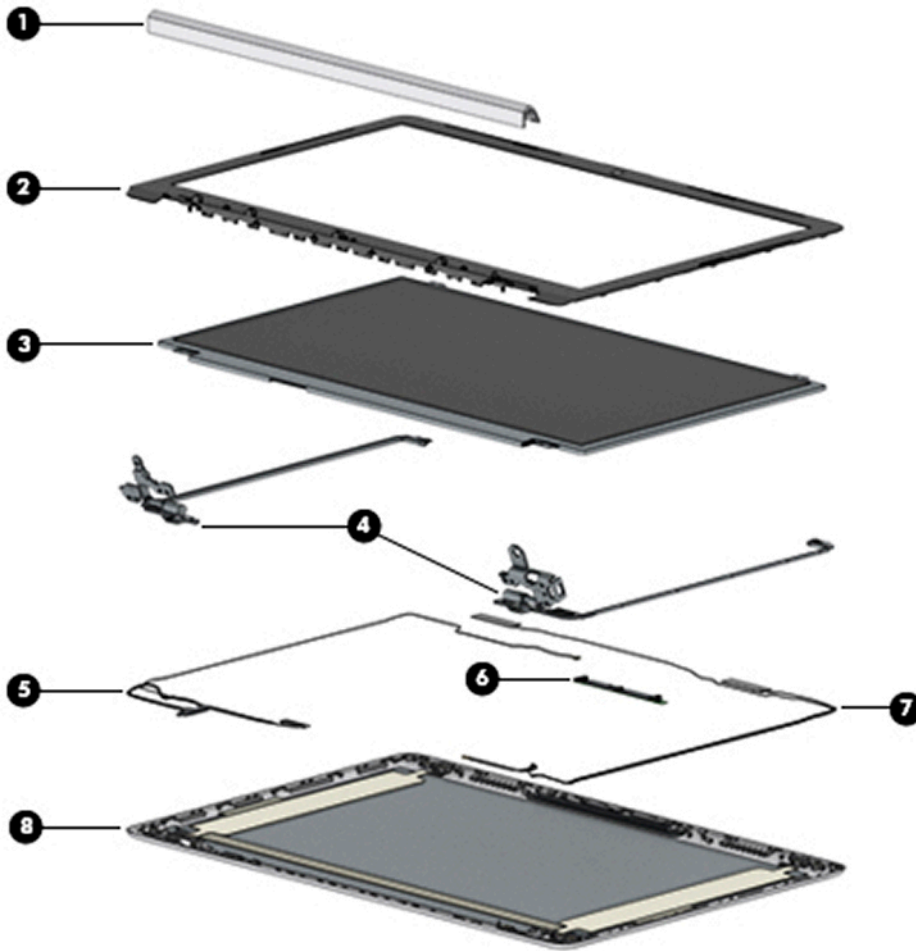


Table 3-3 Display components and their descriptions

Item	Component	Spare part number
(1)	Hinge cover	
	Asteroid silver	L49990-001
	Dark ash silver	L49991-001
(2)	Display bezel	L20421-001
(3)	Display panel	
	HD	L50021-001
	FHD	L50022-001
	Miscellaneous Display Kit (includes gaskets [4] and rubber corner positioning tools [4]; not illustrated)	L23065-001
	Display panel stretchable adhesive tape (not illustrated)	L29080-001
(4)	Hinge Kit (includes left and right hinges)	L20420-001
(5)	Display cable	
	Non-touch, HD	L20443-001

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

Item	Component	Spare part number
	Non-touch, FHD	L23064-001
(6)	Camera module	
	HD camera	L20447-001
	VGA camera	L20446-001
(7)	WLAN antenna cable	
	Single antenna	L20445-001
	Single antennas, narrow bezel	L23060-001
	Dual antennas	L20444-001
	Dual antennas, narrow bezel	L23059-001
(8)	Back cover	
	Asteroid silver	L49986-001
	Dark ash silver	L49987-001

Miscellaneous parts

Table 3-4 Miscellaneous parts and their descriptions

Component	Spare part number
AC adapter	
65 W AC adapter, nPFC, SMART, RC, 4.5 mm, EM	913691-850
45 W AC adapter, nPFC, SMART, RC, 4.5 mm, non-slim	741727-001
Power cord (C5, 1 m)	
For use in Denmark	L19360-001
For use in Europe	L19361-001
For use in Israel	L19362-001
For use in Japan	L19365-001
For use in North America	L19367-001
For use in the People's Republic of China	L19368-001
For use in South Africa	L13369-001
For use in South Korea	L19366-001
For use in Switzerland	L19370-001
For use in Thailand	L19371-001
For use in the United Kingdom	L19373-001
Power adapter for use in Japan (C5)	226768-001
Screw Kit	L20476-001

Mass storage devices

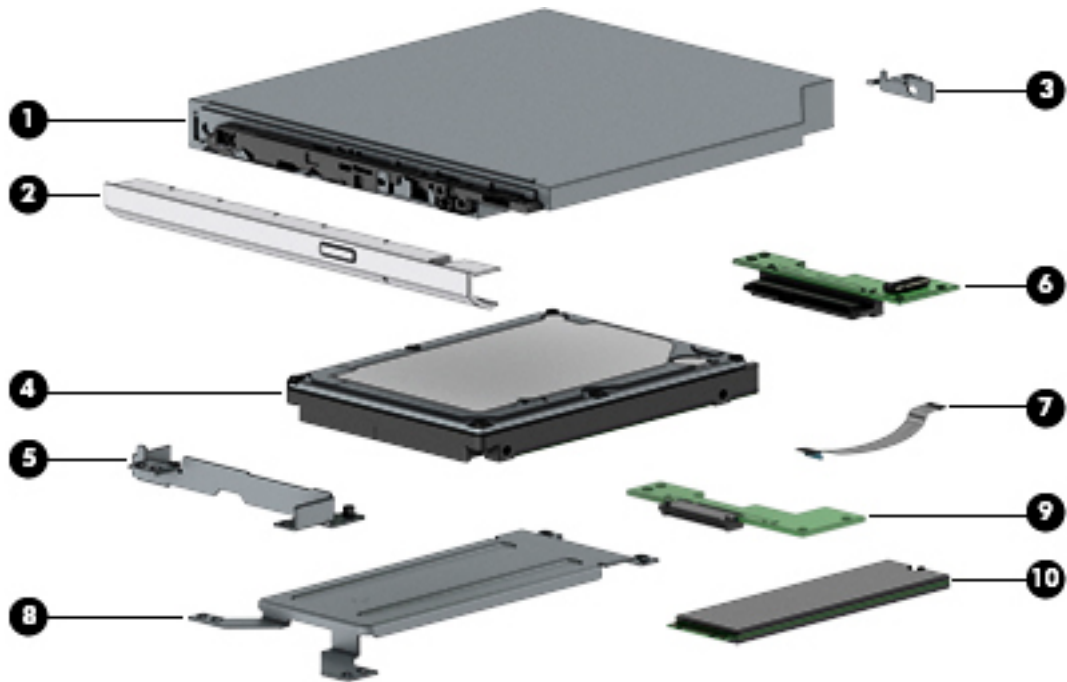


Table 3-5 Mass storage devices and their descriptions

Item	Component	Spare part number
(1)	DVD+/-RW Double-Layer Writer	L50025-001
(2)	Optical drive bezel	
	Asteroid silver	L49988-001
	Dark ash silver	L49989-001
(3)	Optical drive bracket	L20459-001
(4)	Hard drive, 7 mm	
	1 TB, 5400 rpm	L30422-005
	500 GB, 7200 rpm	703267-005
	500 GB, 5400 rpm	778186-005
(5)	Hard drive bracket	L20455-001
(6)	Hard drive connector board	L20454-001
(7)	Hard drive/solid-state drive cable	L20456-001
(8)	Solid-state drive bracket	L20458-001
(9)	Solid-state drive connector board	L20457-001
(10)	Solid-state drive (M.2)	
	256 GB, SATA-3, TLC	L50020-001
	128 GB, SATA-3, TLC	L50019-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Non-conductive, non-marking plastic tool
- Magnetic Phillips P1 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.

Cables and connectors



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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Electrostatic discharge information

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

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



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

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

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

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

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

Generating static electricity

Note the following:

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

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

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

Electronic components are then multi-packaged inside plastic tubes, trays, or Styrofoam.



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

Preventing electrostatic damage to equipment

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

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

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

Personal grounding methods and equipment

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

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

Table 4-2 Static shielding protection levels

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

Grounding the work area

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

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

Recommended materials and equipment

Materials and equipment that are recommended for use in preventing static electricity include:

- Antistatic tape
- Antistatic smocks, aprons, or sleeve protectors
- Conductive bins and other assembly or soldering aids
- Conductive foam
- Conductive tabletop workstations with ground cord of one-megohm \pm 10% resistance
- Static-dissipative table or floor mats with hard tie to ground

- Field service kits
- Static awareness labels
- Wrist straps and footwear straps providing one-megohm +/- 10% resistance
- Material handling packages
- Conductive plastic bags
- Conductive plastic tubes
- Conductive tote boxes
- Opaque shielding bags
- Transparent metallized shielding bags
- Transparent shielding tubes


Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

5 Removal and replacement procedures for Customer Self-Repair parts

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


 **NOTE:** The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

Preparation for disassembly

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

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

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 14](#) 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.

Optical drive

Table 5-1 Spare part description and number

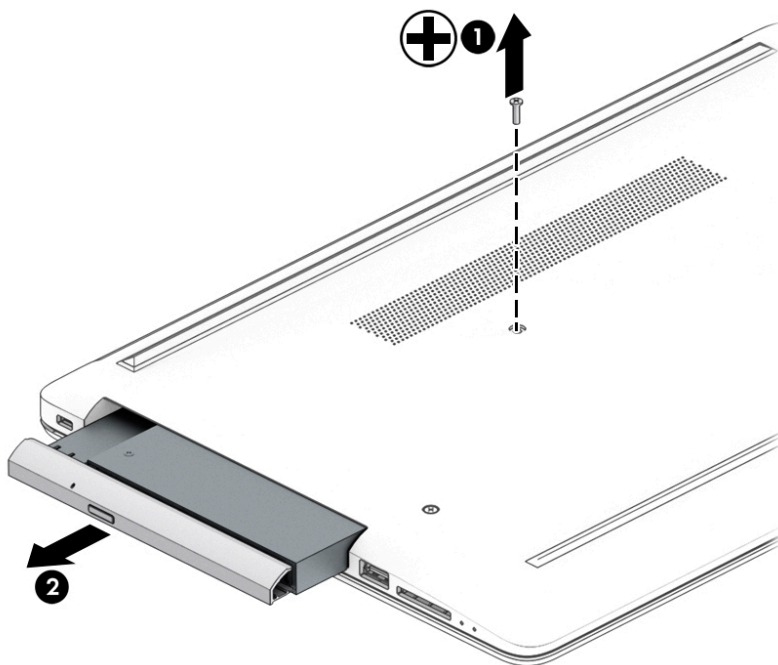
Description	Spare part number
DVD+/-RW Double-Layer Writer	L50025-001
Optical drive bracket	L20459-001
Optical drive bezel - asteroid silver	L49988-001
Optical drive bezel - dark ash silver	L49989-001

Before removing the optical drive, follow these steps:

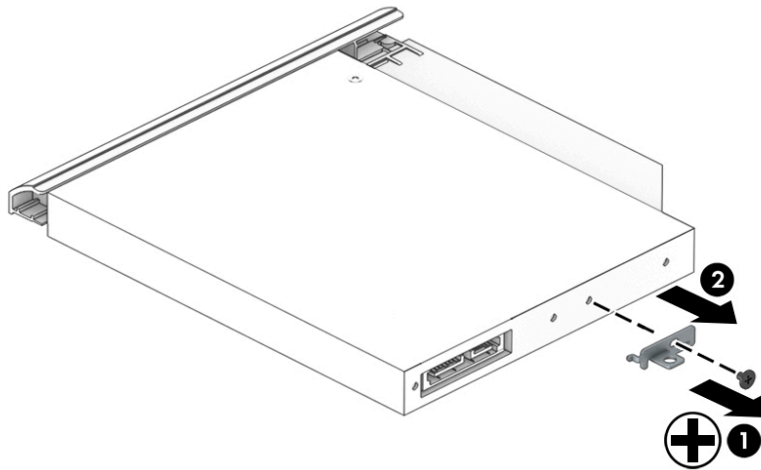
- ▲ Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).

Remove the optical drive:

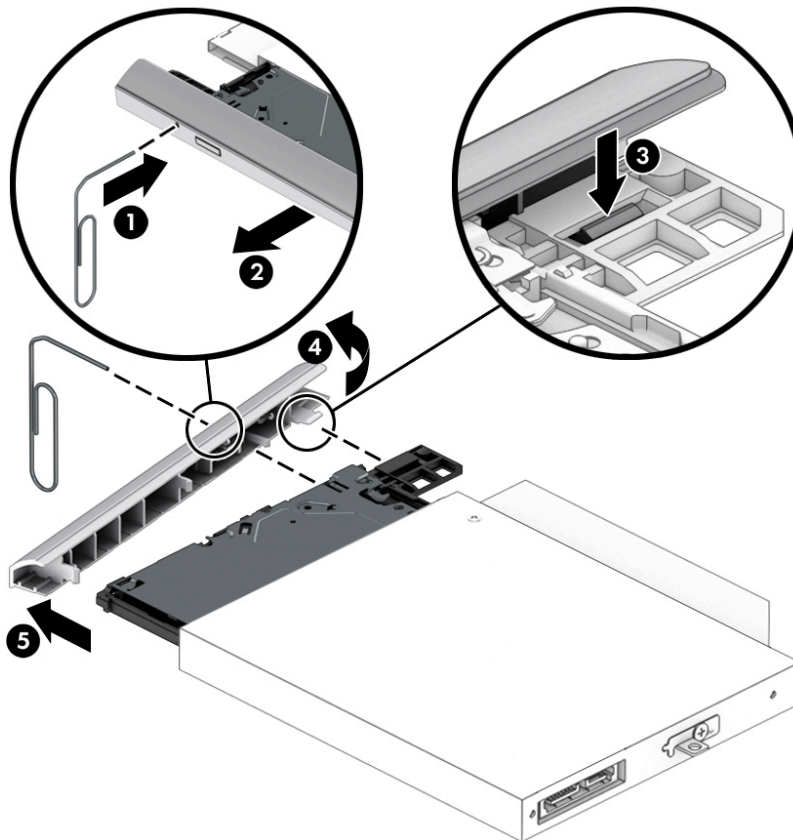
1. Remove the Phillips M2.5 × 9.0 screw **(1)** that secures the drive to the computer.
2. Slide the optical drive out of the computer **(2)**.



3. If it necessary to remove the bracket from the rear of the optical drive, remove the Phillips M2.0 × 3.0 screw **(1)**, and the remove the bracket from the drive **(2)**.




4. If it necessary to remove the bezel from the front of the optical drive:
- Insert a paper clip into the release hole on the front of the bezel **(1)**. The left side of the bezel rotates outward **(2)**.
 - Press the tab to release the bezel from the drive **(3)**.
 - Rotate the side of the bezel **(4)**, and then remove it **(5)**.




Reverse this procedure to reassemble and install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

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.

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 14](#) 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 46 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

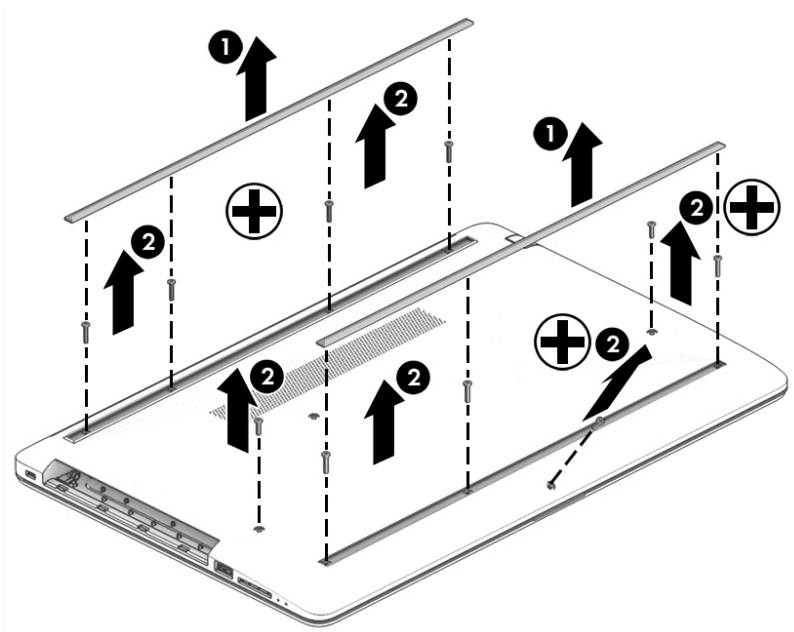
Table 6-1 Spare part description and number

Description	Spare part number
Bottom cover for use in models with an optical drive	
<ul style="list-style-type: none">Asteroid silver	L49982-001
<ul style="list-style-type: none">Dark ash silver	L49983-001
Bottom cover for use in models without an optical drive	
<ul style="list-style-type: none">Asteroid silver	L49984-001
<ul style="list-style-type: none">Dark ash silver	L49985-001
Front rubber feet:	
<ul style="list-style-type: none">Asteroid silver	L20407-001
<ul style="list-style-type: none">Dark ash silver	L20406-001
Rear rubber feet:	
<ul style="list-style-type: none">Asteroid silver	L20414-001
<ul style="list-style-type: none">Dark ash silver	L20413-001

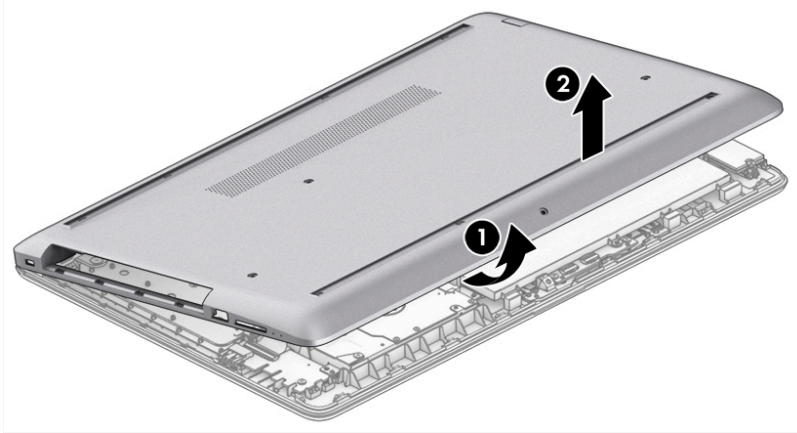
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).

Remove the bottom cover:

1. Peel the rubber feet off the bottom of the computer (**1**).
2. Remove the 10 Phillips M2.5 × 9.0 screws that secure the bottom cover to the computer.



3. Starting near the middle, bottom of the bottom cover **(1)**, pry the cover up to remove it **(2)**.



Reverse this procedure to install the bottom cover.

Battery

Table 6-2 Spare part description and number

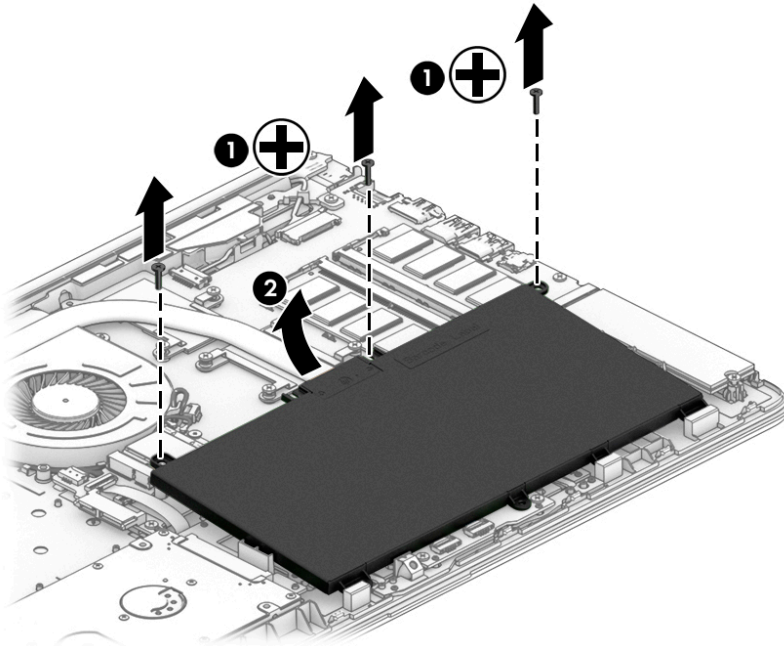
Description	Spare part number
Battery (3-cell, 48 Wh)	L11119-855

Before removing the battery, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).

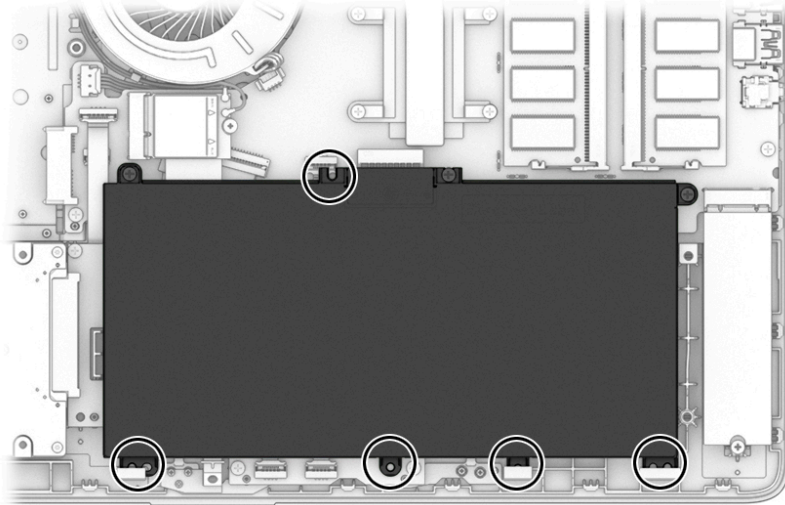
Remove the battery:

1. Remove the three Phillips M2.0 × 8.0 screws **(1)** that secure the battery to the computer.
2. Remove the battery from the computer **(2)**.



Reverse this procedure to install the battery.

When installing the battery, be sure to install screws in the proper locations. The following image shows the locations around the battery that have holes but do NOT require screws.



Memory

Table 6-3 Spare part description and number

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

Before removing the memory modules, follow these steps:

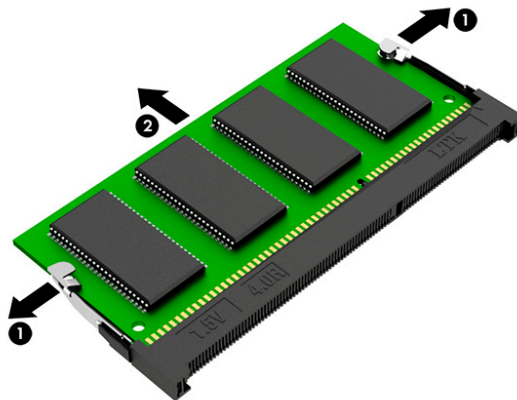
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the memory modules:

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

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

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

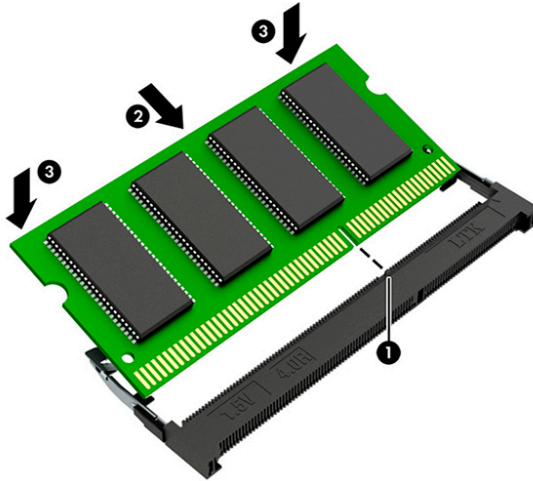


Install the memory modules:

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

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

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



Hard drive

Table 6-4 Spare part description and number

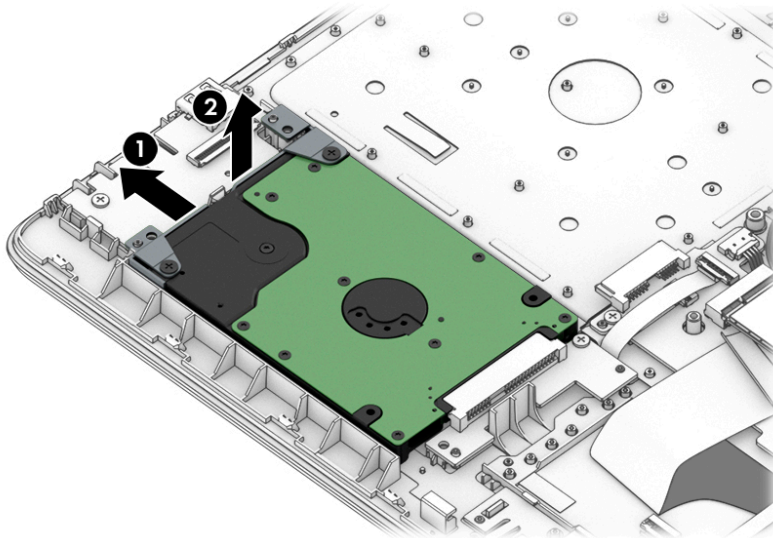
Description	Spare part number
Hard drive, 1 TB, 5400 rpm, 7 mm	L30422-005
Hard drive, 500 GB, 7200 rpm, 7 mm	703267-005
Hard drive, 500 GB, 5400 rpm, 7 mm	778186-005
Hard drive bracket	L20455-001

Before removing the hard drive, follow these steps:

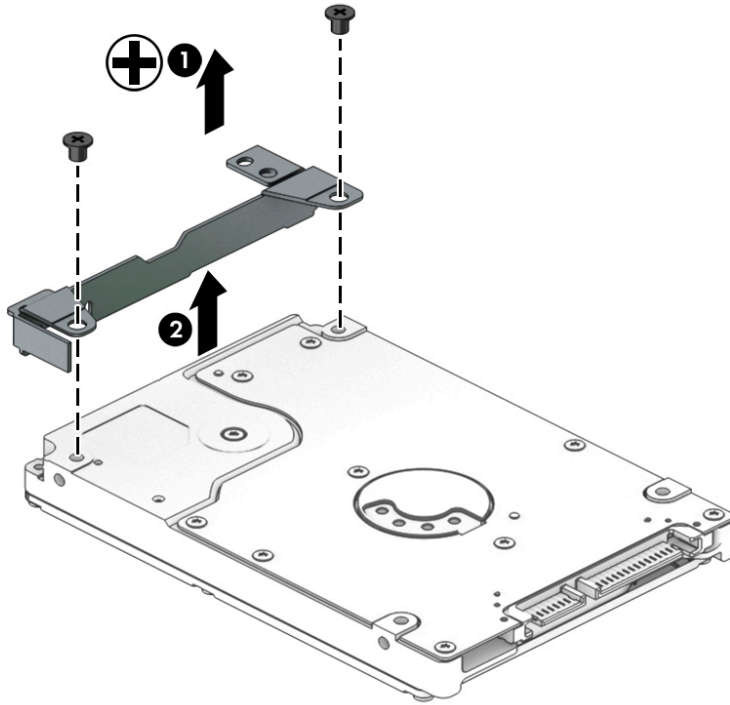
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the hard drive:

1. Slide the hard drive away from the connector **(1)**, and then lift the hard drive out of the computer **(2)**.



2. If it is necessary to disassemble the hard drive, remove the two Phillips M3.0 × 3.0 screws **(1)**, and then lift the bracket off the drive **(2)**.



Reverse this procedure to reassemble and install the hard drive.

Solid-state drive

Table 6-5 Spare part description and number

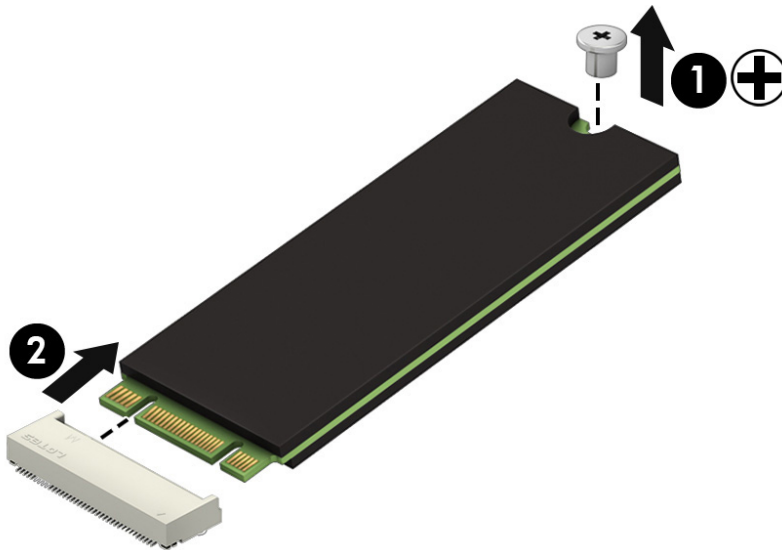
Description	Spare part number
256 GB, SATA-3, TLC	L50020-001
128 GB, SATA-3, TLC	L50019-001

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

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the solid-state drive:

- ▲ Remove the Phillips M2.0 × 3.0 screw **(1)**, and then pull the solid-state drive module from the socket **(2)**.



Reverse this procedure to install the solid-state drive.

Solid-state drive bracket and connector board

Table 6-6 Spare part description and number

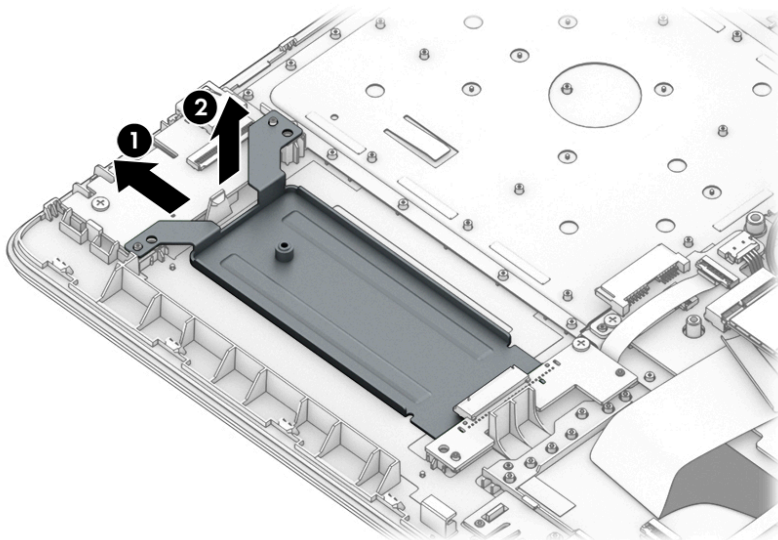
Description	Spare part number
Solid-state drive bracket	L20458-001
Solid-state drive connector board	L22542-001
Solid-state drive cable	L20456-001

Before removing the solid-state drive bracket and connector board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).
5. Remove the solid-state drive (see [Solid-state drive on page 39](#)).

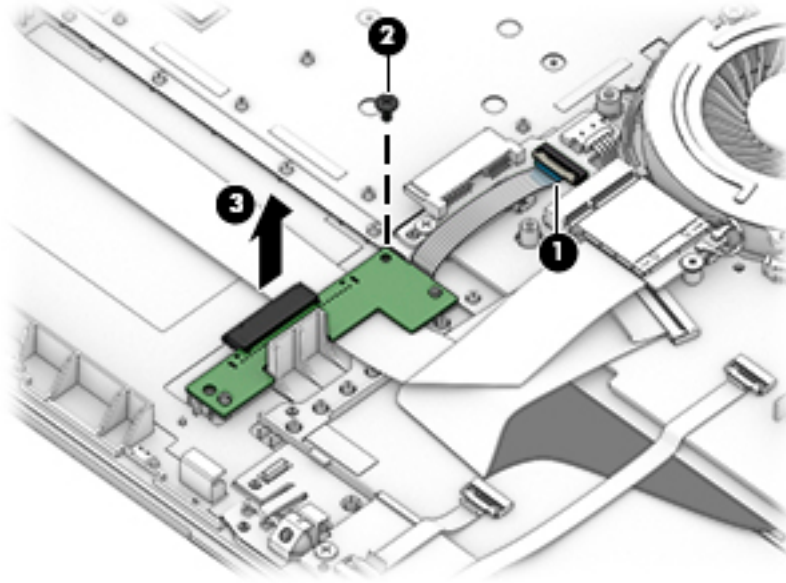
Remove the solid-state drive bracket and connector board:

1. Slide the bracket toward the side of the computer **(1)**, and then lift the bracket out of the computer **(2)**.



2. Disconnect the solid-state connector board cable from the system board ZIF connector **(1)**.
3. Remove the Phillips M2.0 x 3.0 screw **(2)** that secures the board to the computer.

4. Remove the connector board from the computer (3).



Reverse this procedure to install the solid-state drive bracket and connector board.

WLAN module

Table 6-7 Spare part description and number

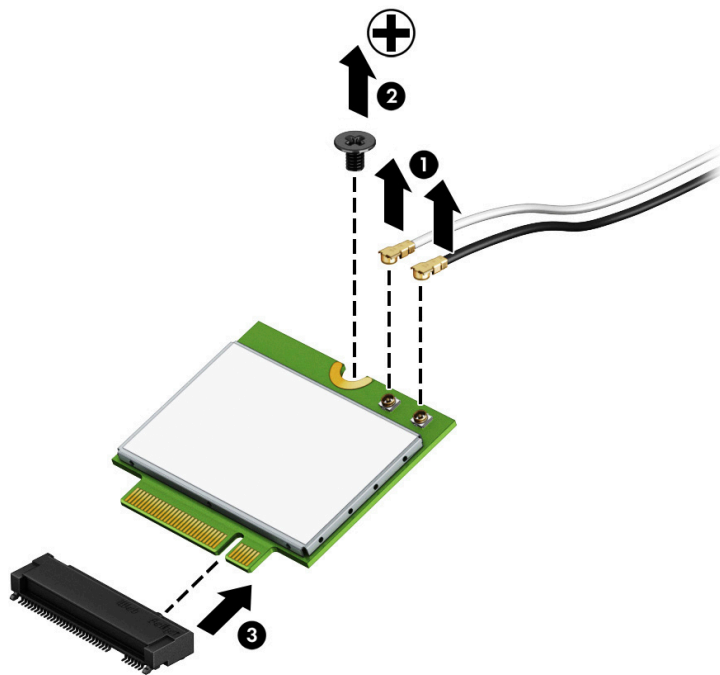
Description	Spare part number
Realtek RTL8821CE 802.11ac 1 × 1 WiFi + Bluetooth 4.2 Combo Adapter (MU-MIMO supported)	L17365-005

Before removing the WLAN, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the WLAN module:

1. Disconnect the two antenna cables from the module **(1)**.
2. Remove the Phillips M2.0 × 3.0 screw **(2)**, and then pull the module out of the socket **(3)**.



Reverse this procedure to install the WLAN module.

Hard drive connector board

Table 6-8 Spare part description and number

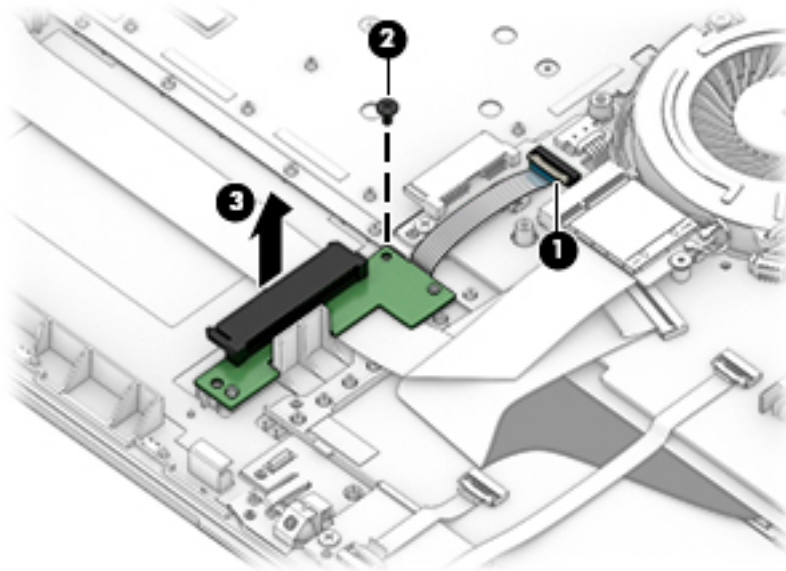
Description	Spare part number
Hard drive connector board	L20454-001

Before removing the hard drive connector board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).
5. Remove the hard drive (see [Hard drive on page 37](#)).

Remove the hard drive connector:

1. Disconnect the cable from the system board ZIF connector **(1)**.
2. Remove the Phillips M2.0 × 3.0 screw **(2)** that secures the board to the computer.
3. Remove the board from the computer **(3)**.



Reverse this procedure to install the hard drive connector board.

USB/card reader board

Table 6-9 Spare part description and number

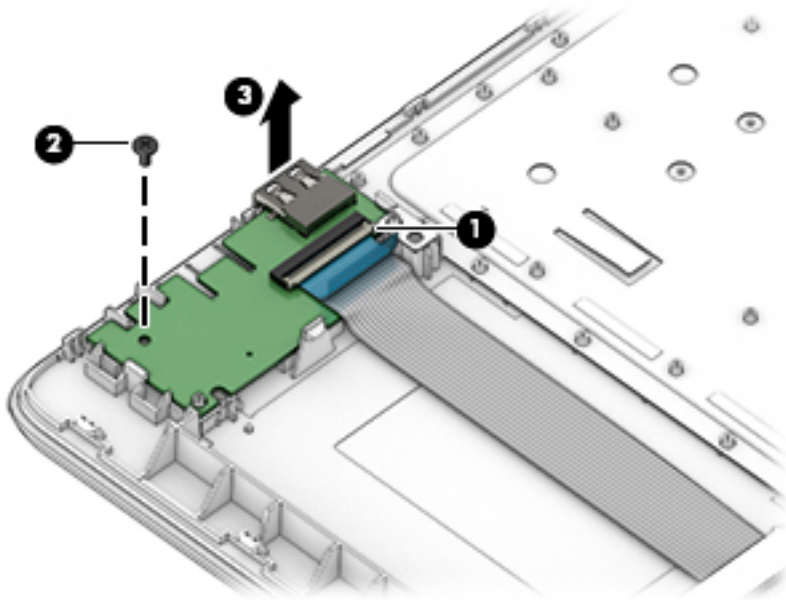
Description	Spare part number
USB/card reader board	L20448-001
USB/card reader board cable	L20452-001

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

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the USB/card reader board:

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



Reverse this procedure to replace the USB/card reader board.

TouchPad button board

Table 6-10 Spare part description and number

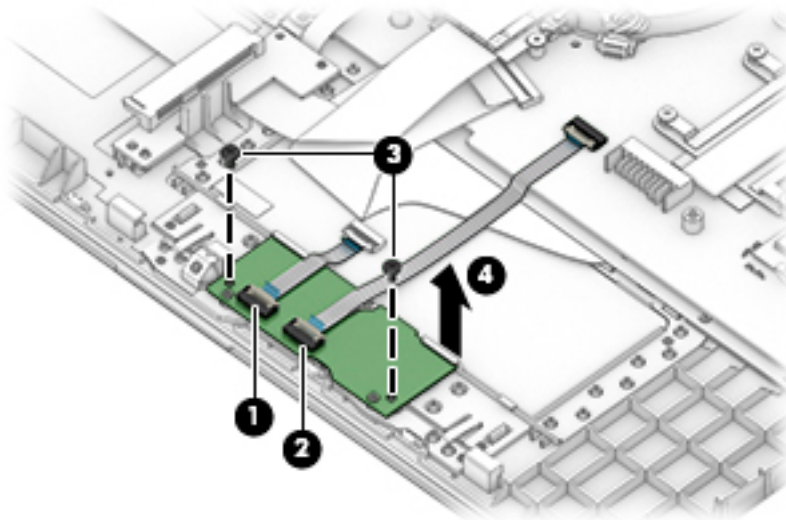
Description	Spare part number
TouchPad button board	not spared
TouchPad button board cable	L20451-001

Before removing the TouchPad button board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the TouchPad button board:

1. Disconnect the system board cable from the ZIF connector on the TouchPad button board **(1)**.
2. Disconnect the TouchPad cable from the ZIF connector on the TouchPad button board **(2)**.
3. Remove the two Phillips M2.0 × 3.0 screws **(3)** that secure the board to the computer.
4. Remove the TouchPad button board from the computer **(4)**.



Reverse this procedure to install the TouchPad button board.

TouchPad module

Table 6-11 Spare part description and number

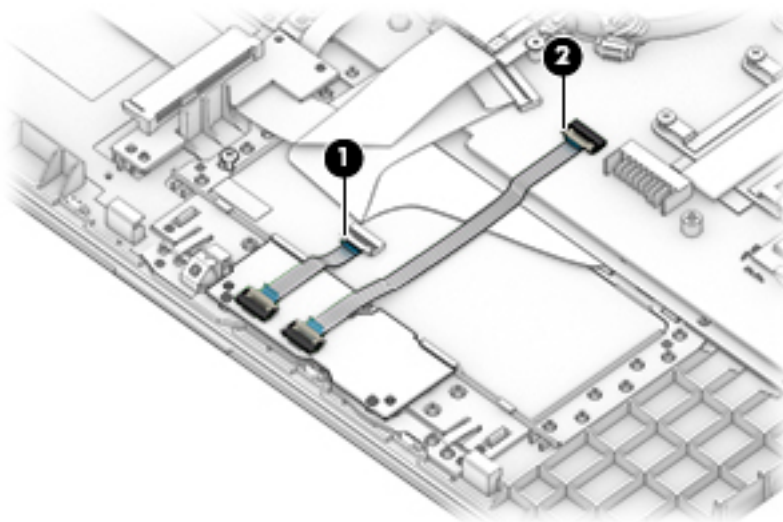
Description	Spare part number
TouchPad module	L20449-001
TouchPad module cable	L20450-001

Before removing the TouchPad module, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

To remove the TouchPad module:

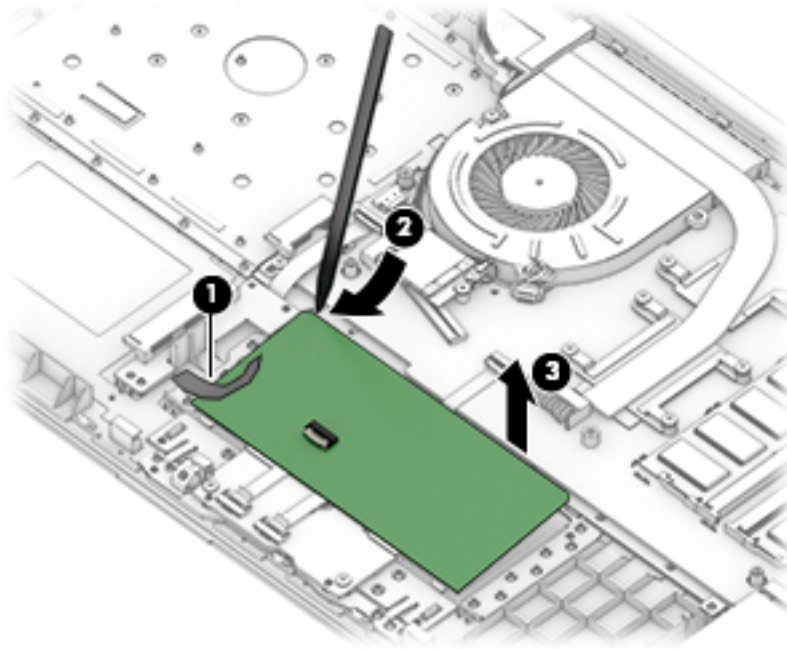
1. Disconnect the TouchPad cable from the ZIF connector on the TouchPad **(1)** and the TouchPad button board cable from the ZIF connector on the system board **(2)**.



2. Peel the tape off the TouchPad **(1)**.
3. Starting in the corner, use a plastic, non-marking tool to pry up the TouchPad module to disengage the adhesive that secures it to the top cover **(2)**

4. Working around each edge, pry the TouchPad module loose, and then remove it from the computer **(3)**.

 **NOTE:** The TouchPad module may be very tight and difficult to remove.



Reverse this procedure to install the TouchPad module.

Fan

Table 6-12 Spare part description and number

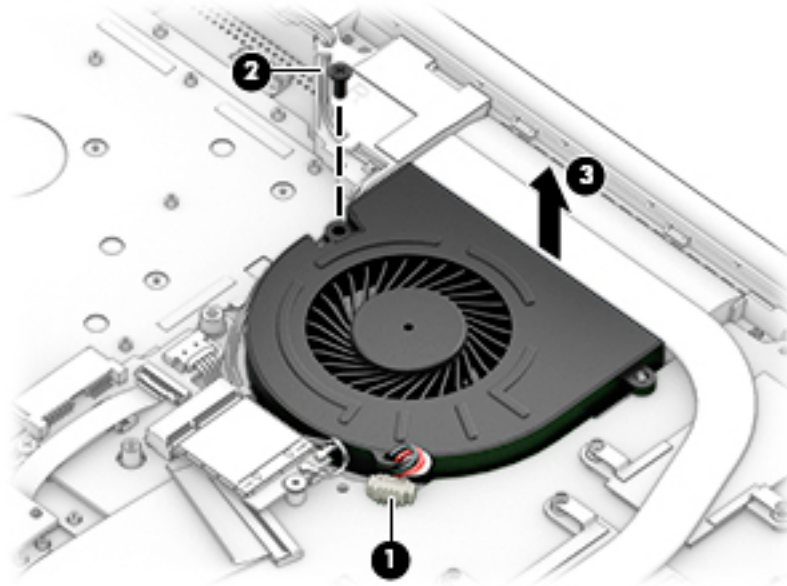
Description	Spare part number
Fan	L20474-001

Before removing the fan, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

Remove the fan:

1. Disconnect the fan cable from the system board **(1)**.
2. Remove the Phillips M2.5 × 6.0 screw **(2)** that secures the fan to the computer.
3. Lift the fan from the computer **(3)**.



Reverse this procedure to install the fan.

Heat sink assembly

Table 6-13 Spare part description and number

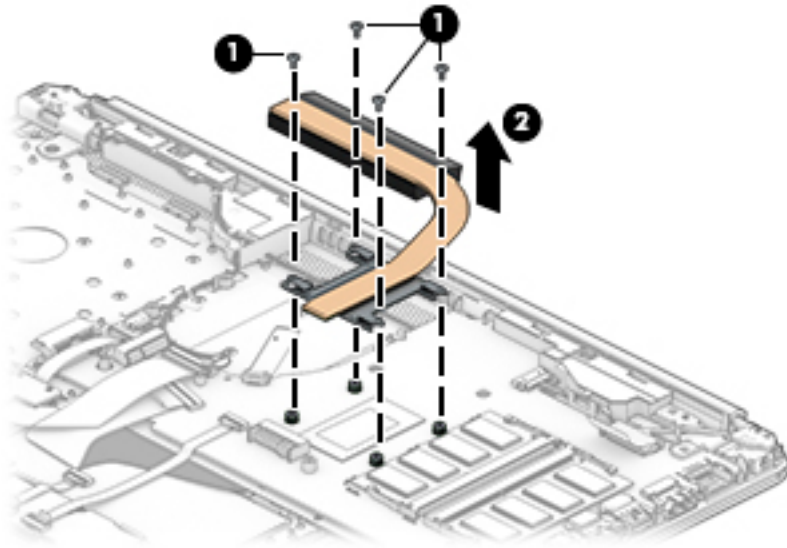
Description	Spare part number
Heat sink for use in models with AMD Ryzen processors and integrated UMA graphics	L20483-001
Heat sink for use in models with AMD A6/A9 processors and integrated UMA graphics	L20491-001
Heat plate for use in fanless models with AMD E2-9000e processors	L20494-001

Before removing the heat sink, follow these steps:

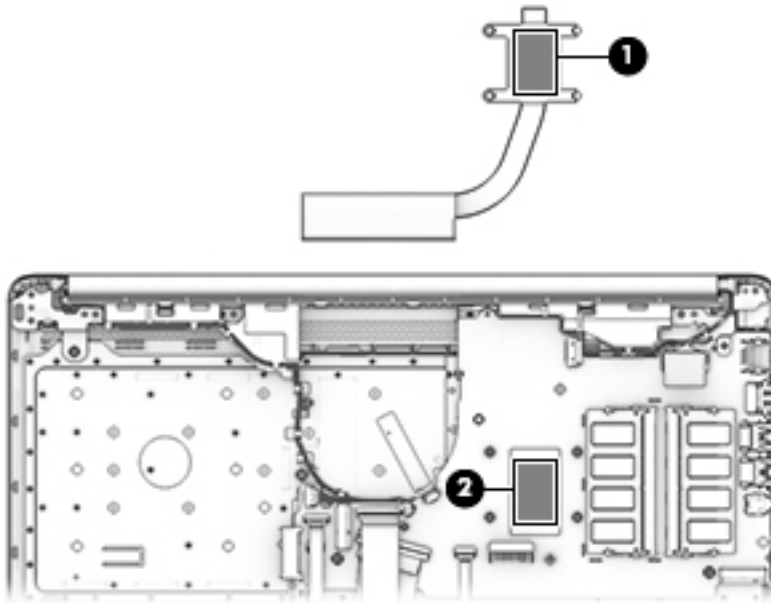
1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

To remove the heat sink assembly from products with integrated UMA graphics:

1. In the order indicated on the heat sink assembly, remove the four Phillips M2.0 × 3.0 screws **(1)** that secure the heat sink to the computer.
2. Lift the heat sink assembly from the computer **(2)**.

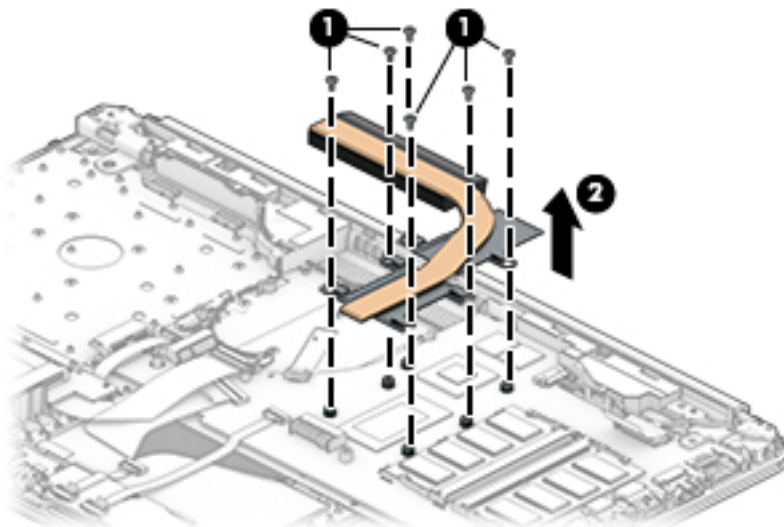


3. Thoroughly clean the thermal material from the surface of the heat sink **(1)** and its associated system board component **(2)** each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

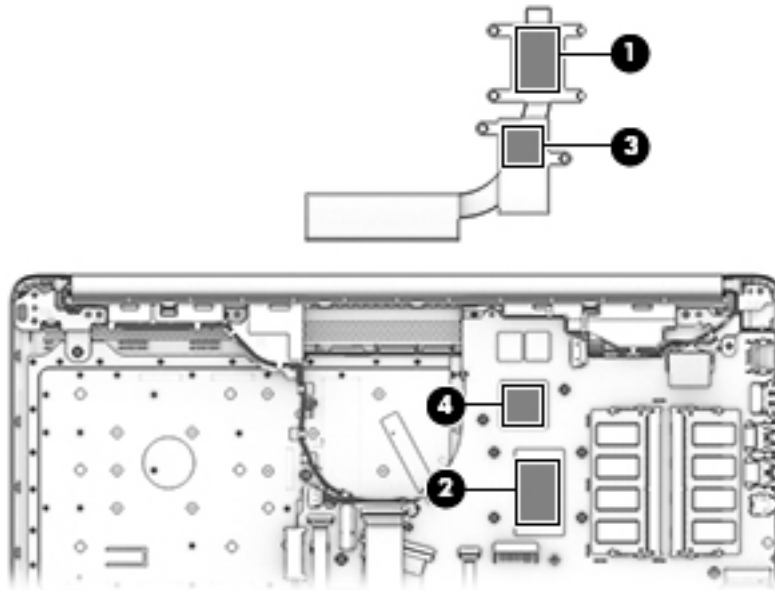


To remove the heat sink assembly from products with discrete graphics:

1. In the order indicated on the heat sink assembly, remove the six Phillips M2.0 × 3.0 screws **(1)** that secure the heat sink to the computer.
2. Lift the heat sink assembly from the computer **(2)**.

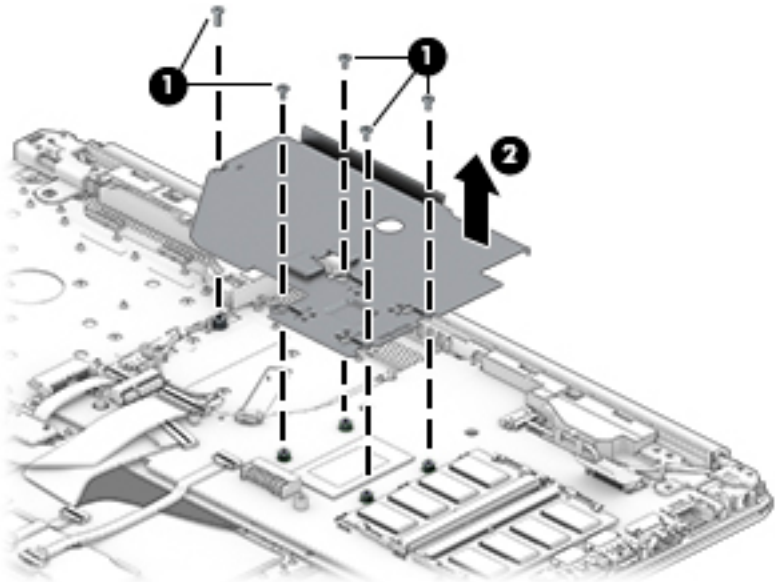


3. Thoroughly clean the thermal material from the surfaces of the heat sink **(1)(3)** and associated system board components **(2)(4)** each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

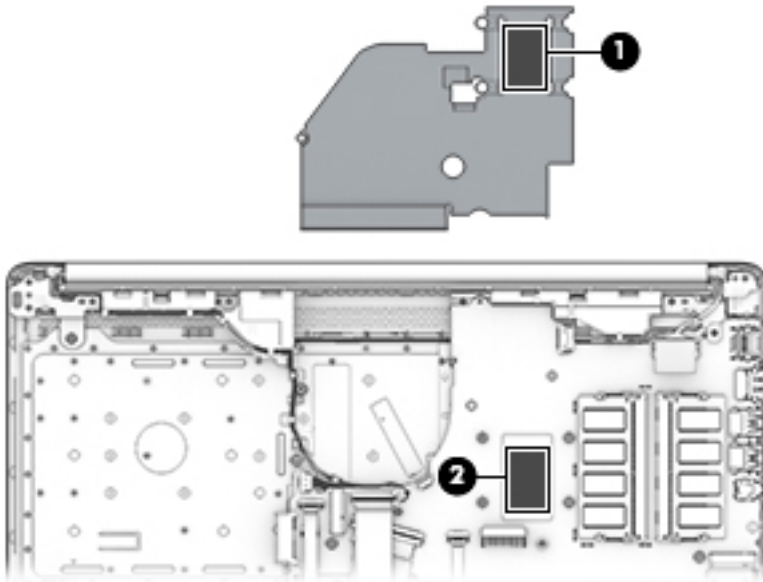


To remove the heat plate from fanless models:

1. In the order indicated on the heat plate, remove the five Phillips M2.0 × 3.0 screws **(1)** that secure the heat plate to the computer.
2. Lift the heat plate from the computer **(2)**.



3. Thoroughly clean the thermal material from the surface of the heat plate **(1)** and associated system board component **(2)** each time the heat plate is removed. Replacement thermal material is included with the heat plate and system board spare part kits.



Reverse this procedure to install the heat plate or heat sink assembly.

Display assembly

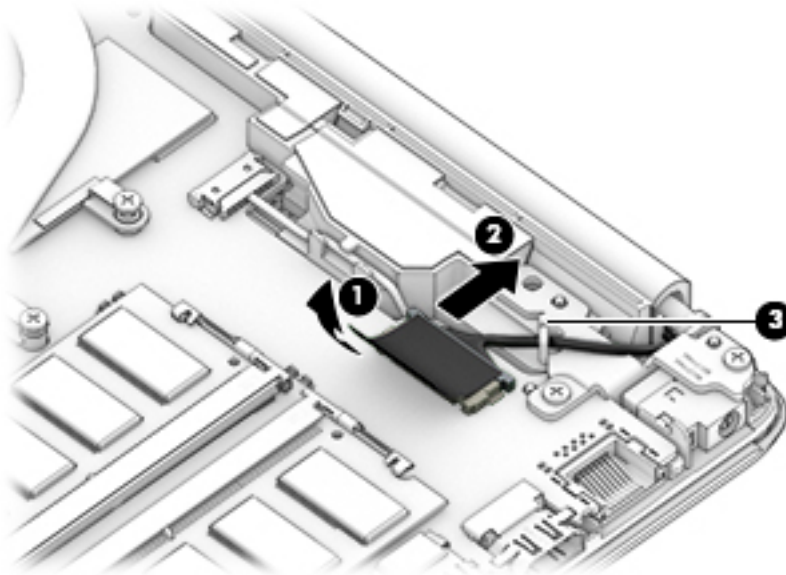
Full hinge-up displays are not spared. Displays are spared only at the subcomponent level.

Before removing the display panel, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).

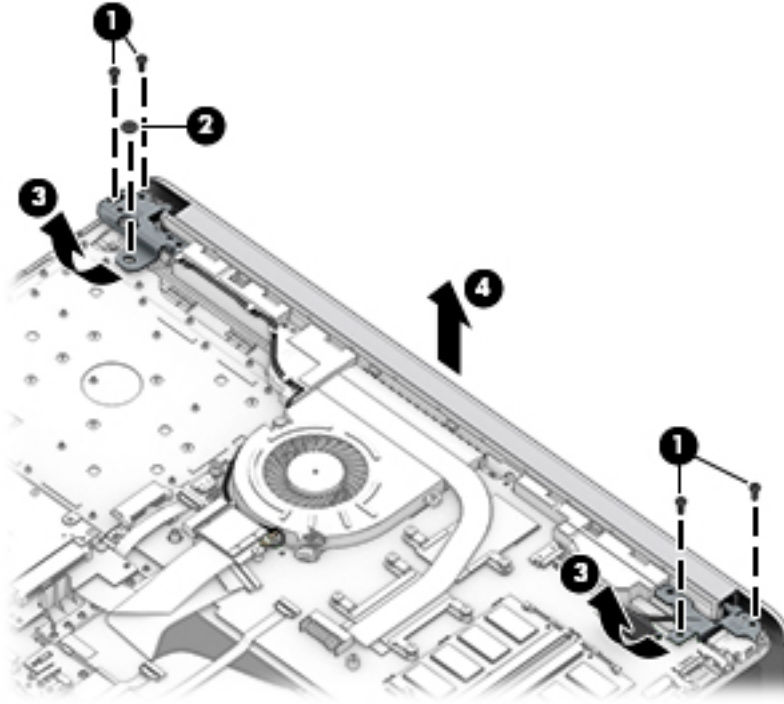
Remove the display assembly:

1. Lift the tape from the display connector on the system board **(1)**.
2. Disconnect the cable from the connector **(2)**.
3. Remove the cable from the clip **(3)**.



4. Remove the four Phillips M2.5 × 6.0 screws **(1)** from the display hinges.
5. Remove the Phillips broad head M2.0 × 2.0 screw **(2)** from the right display hinge.
6. Rotate the hinges upward **(3)**.

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



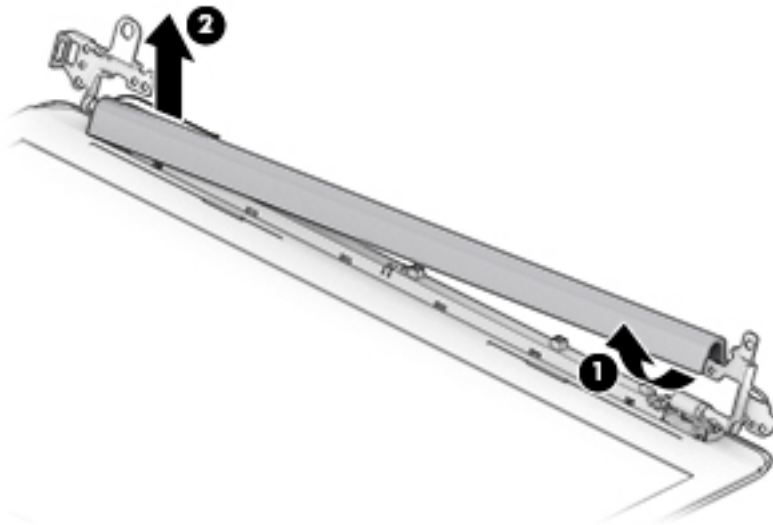
Remove the display assembly subcomponents:

1. To remove the hinge cover, pull upward near the hinge to disengage it from the display enclosure (1), and then remove the hinge cover from the display enclosure (2).

Hinge covers are available using the following spare part numbers:

L49990-001: Asteroid silver

L49991-001: Dark ash silver

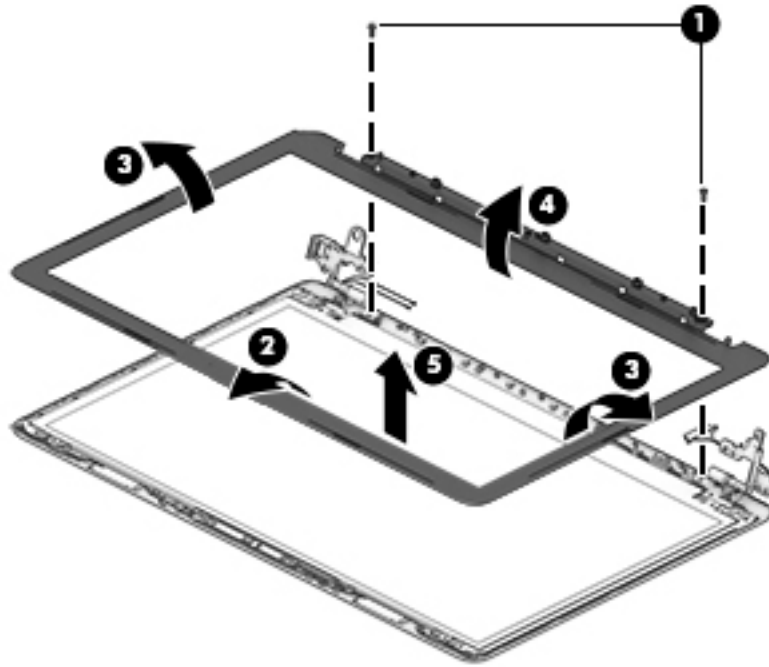


When replacing the hinge cover, make sure the hinges rotate downward as far as they can go. Align the cover, and then start from above and rotate the cover downward onto the hinges. Make sure the clips snap into place along the bottom of the display cover.

2. If it is necessary to replace the display bezel:

- a.** Remove the two Phillips M2.0 × 3.0 screws **(1)**, flex the top **(2)** of the bezel, the inside edges of the left and right sides **(3)**, and then the bottom **(4)** of the bezel until it disengages from the display enclosure.
- b.** Remove the bezel **(5)**.

The display bezel is available using spare part number L20421-001.

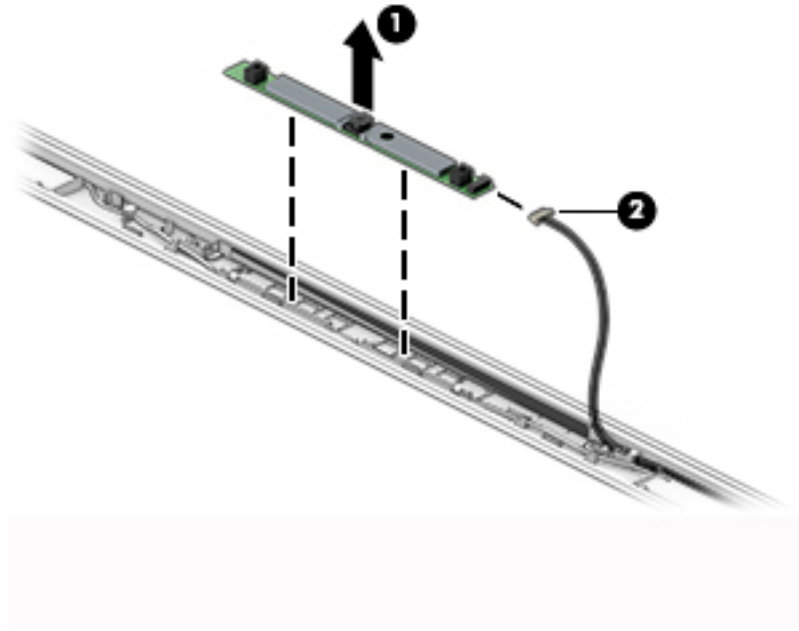


3. If it is necessary to replace the camera/microphone module:


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

- b.** Disconnect the cable **(2)** from the camera/microphone module.

The HD camera module is available using spare part number L20447-001. The VGA camera module is available using spare part number L20446-001.

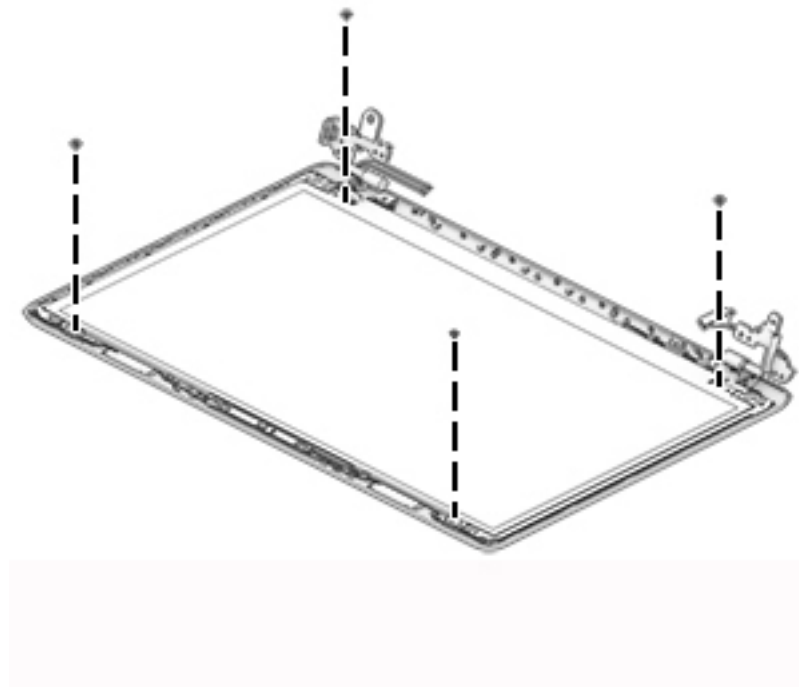


- 4.** If it is necessary to replace the display panel:

 **IMPORTANT:** HD panels are secured to the display enclosure with screws. FHD panels are secured with tape.


- a.** **HD panels:**

Remove the four Phillips M2.0 × 3.0 screws that secure the panel to the display enclosure.

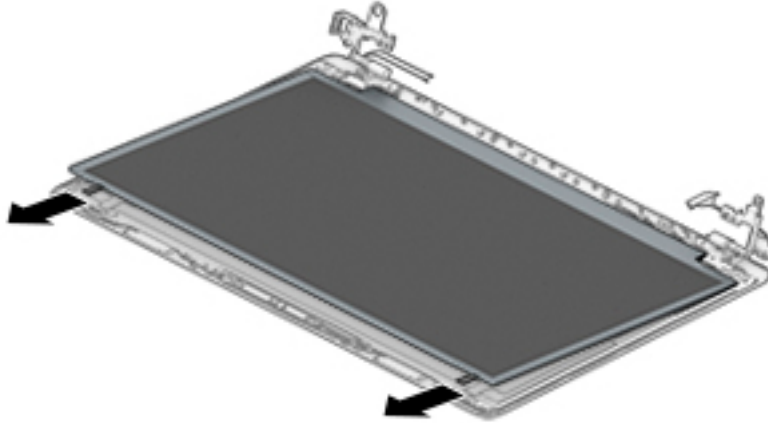


FHD panels:

- b. Pull the tape out from behind the left and right sides of the panel.

 **NOTE:** You have to pull on the tape multiple times before it is completely removed.

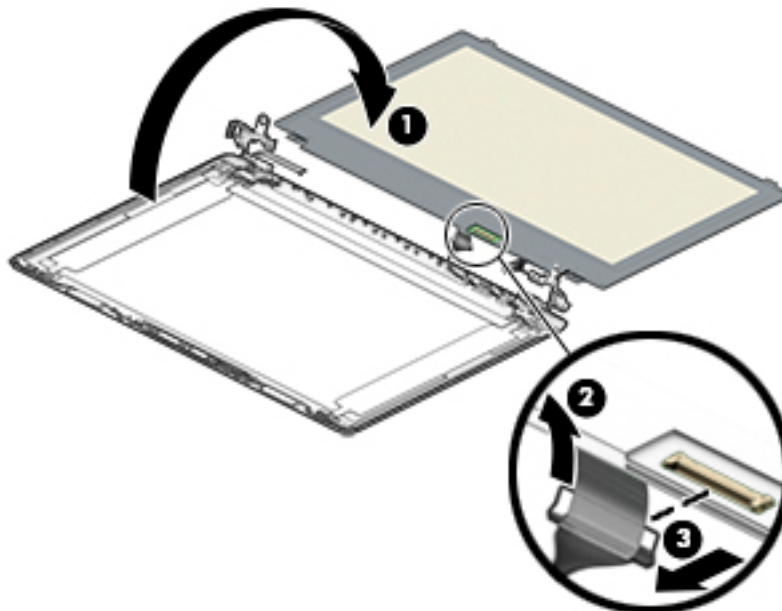
Display panel stretchable adhesive tape is available using spare part number L29080-001.



- c. **HD and FHD panels:**

Swing the top edge of the display panel forward and position it upside down next to the display enclosure **(1)**.

- d. Release the adhesive support strip **(2)** that secures the display panel cable connector to the display panel.
- e. Disconnect the display panel cable **(3)** from the display panel.



- f. Remove the display panel.

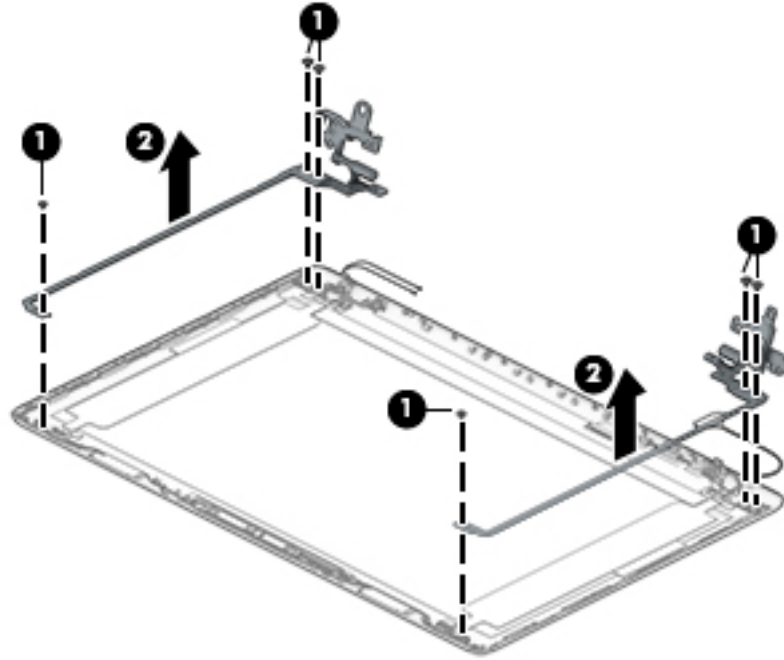
Raw display panels are available using the following spare part numbers:

L50021-001: HD

L50022-001: FHD

5. If it is necessary to replace the display hinges:
 - a. Remove the three Phillips M2.5 × 2.5 screws (1) from each hinge.
 - b. Remove the display hinges (2).

The display hinges are available using spare part number L20420-001.



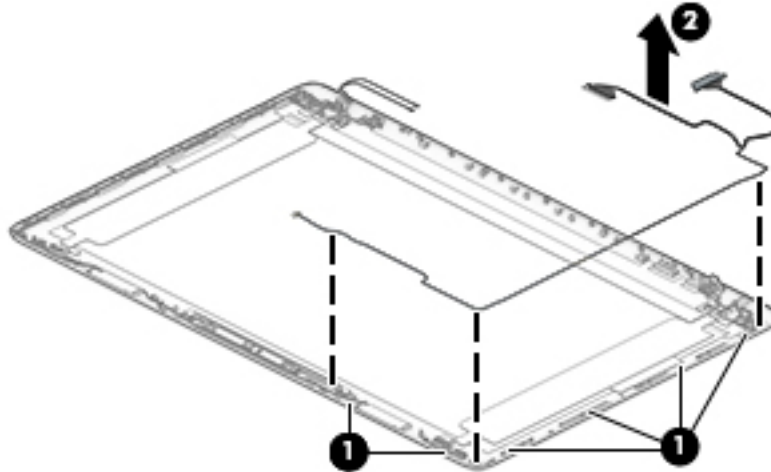
6. If it is necessary to replace the display panel cable:
 - a. Release the cable from the retention clips and routing channel built into the bottom edge and side of the display enclosure (1).

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

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

L20443-001: HD, non-touch display

L23064-001: FHD, non-touch display



- 7.** If it is necessary to replace the wireless antenna cables and transceivers:

- a.** Remove the antennas from the top of the display enclosure (1).
- b.** Release the wireless antenna cables from the retention clips and routing channel built into the sides of the display enclosure (2).

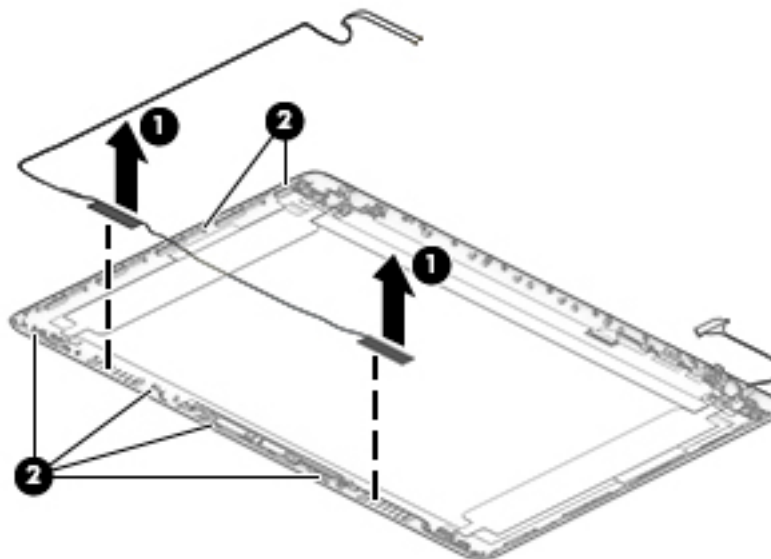
Antennas are available using the following spare part numbers:

L20445-001: Single antenna models

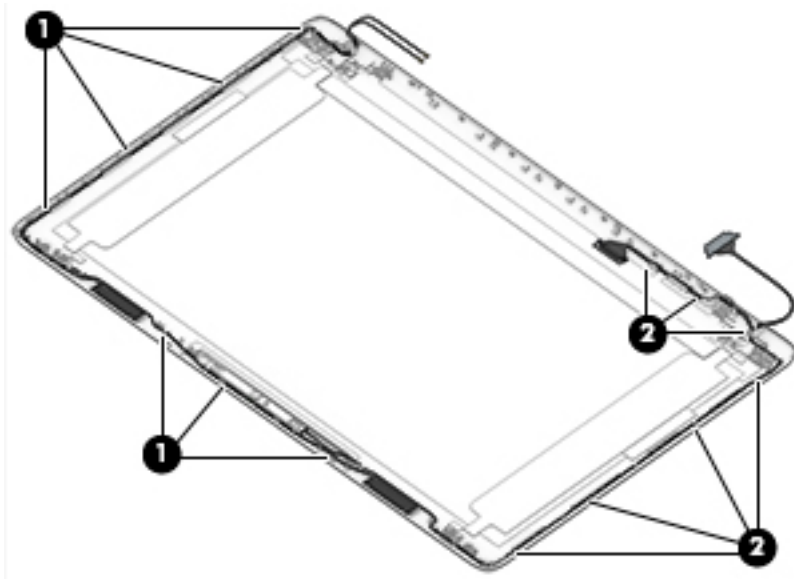
L23060-001: Single antenna, narrow bezel models

L20444-001: Dual antenna models

L23059-001: Dual antenna, narrow bezel models



Use the following image to determine proper cable routing in the display of the antenna cable **(1)** and display cable **(2)**.



The display rear cover is available using the following spare part numbers:

L49986-001: Asteroid silver

L49987-001: Dark ash silver

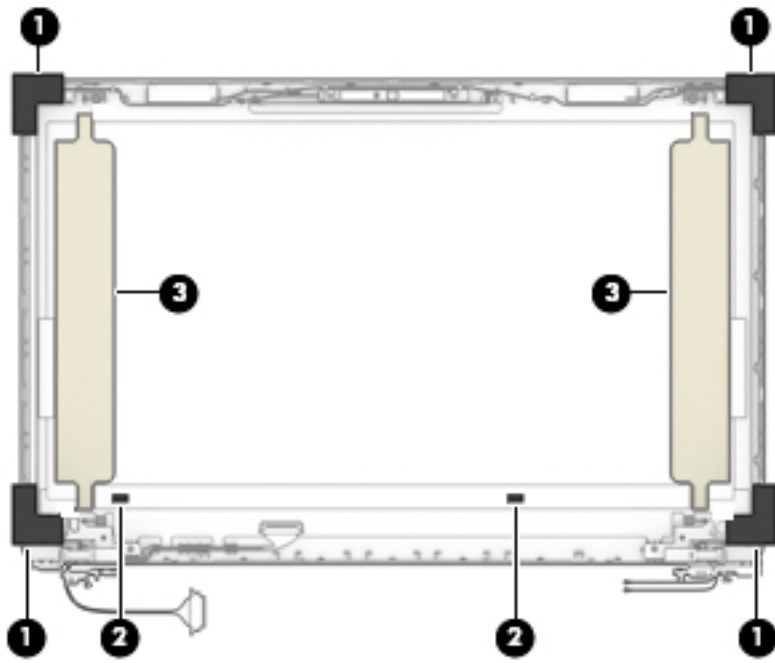
Reverse these procedures to reassemble and install the display assembly components.

When reassembling an FHD display assembly, be sure to install the following parts into the display enclosure from the Display Miscellaneous Kit, spare part number L23065-001 and display panel stretchable adhesive tape, spare part number L29080-001.

(1): Four positioning corner pieces

(2): Two gaskets

(3): Display panel stretchable adhesive tape



System board



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

All system boards use the following part numbers:

xxxxxx-001: Non-Windows operating systems

xxxxxx-601: Windows operating system

Table 6-14 Spare part description and number

Description	Spare part number
AMD Ryzen 3-2200U processor	L50003-xx1
AMD A9-9425 processor	L50004-xx1
AMD A6-9225 processor	L50005-xx1
AMD A4-9125 processor	L54792-xx1
AMD E2-9000e processor	L50006-xx1

Before removing the system board, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the following components:
 - a. Optical drive (see [Optical drive on page 28](#))
 - b. Bottom cover (see [Bottom cover on page 31](#))
 - c. Battery (see [Battery on page 33](#))
 - d. Display (see [Display assembly on page 53](#))

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

- WLAN module (see [WLAN module on page 42](#))
- Memory modules (see [Memory on page 35](#))
- Heat sink (see [Heat sink assembly on page 49](#))

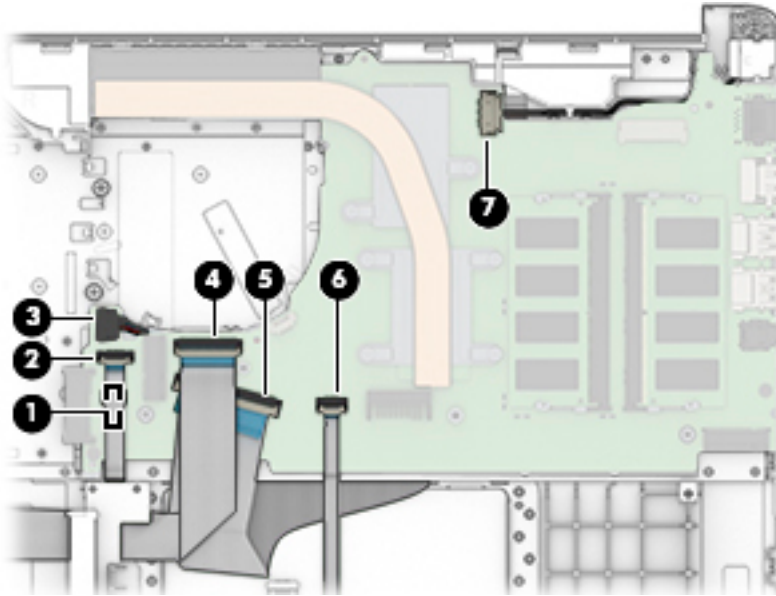
Remove the system board:



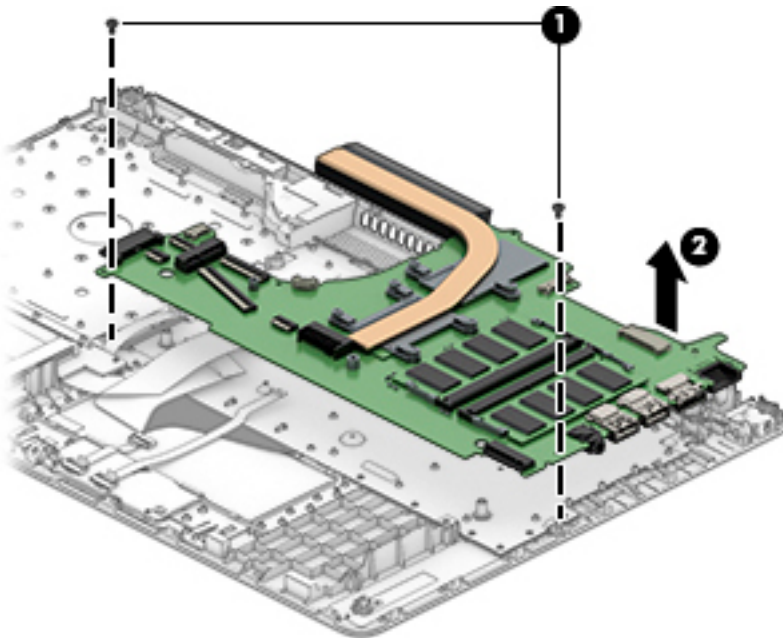
IMPORTANT: Make special note of each screw size and location during removal and replacement

1. Disconnect the following cables from the system board:
 - (1): Keyboard backlight cable
 - (2): Hard drive connector cable
 - (3): Speaker cable
 - (4): USB/card reader board cable
 - (5): Keyboard cable
 - (6): TouchPad button board cable

(7): Power connector cable



2. Remove the two Phillips M2.0 × 3.0 screws that secure the system board to the computer **(1)**.
3. Lift the left side of the system board, and then remove the system board from the computer **(2)**.



Reverse this procedure to install the system board.

Speakers

Table 6-15 Spare part description and number

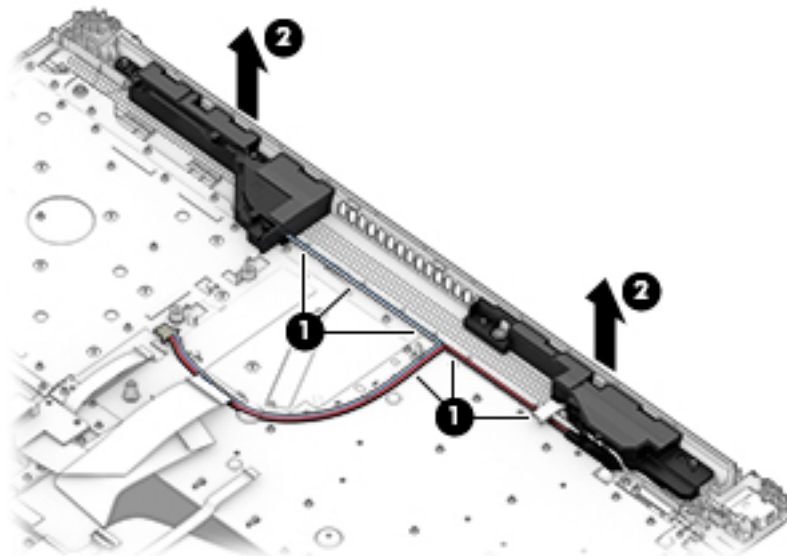
Description	Spare part number
Speaker Kit	L20453-001

Before removing the speakers, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).
5. Remove the display (see [Display assembly on page 53](#)).

Remove the speakers:

1. Remove the speaker cable from the clips built into the computer **(1)**.
2. Remove the speakers from the computer **(2)**.



Reverse this procedure to install the speakers.

Power connector cable (DC-in)

Table 6-16 Spare part description and number

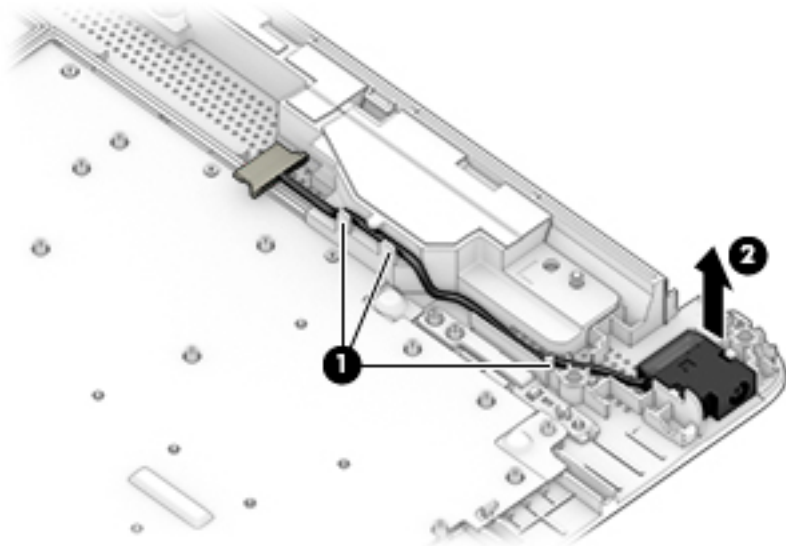
Description	Spare part number
Power connector cable	L20475-001

Before removing the power connector cable, follow these steps:

1. Prepare the computer for disassembly ([Preparation for disassembly on page 27](#)).
2. Remove the optical drive (see [Optical drive on page 28](#)).
3. Remove the bottom cover (see [Bottom cover on page 31](#)).
4. Remove the battery (see [Battery on page 33](#)).
5. Remove the system board (see [System board on page 62](#)).
6. Remove the display (see [Display assembly on page 53](#)).

Remove the power connector cable:

1. Remove the cable from the clips built into the computer (**1**).
2. Remove the power connector cable from the computer (**2**).



Reverse this procedure to install the power connector cable.

Top cover with keyboard

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

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

Table 6-17 Spare part description and number

Description	Spare part number
Keyboard, jet black	L50000-xx1
Keyboard, no backlight, silver	L50001-xx1

Table 6-18 Spare part country codes

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Hungary	-211	Slovenia	-BA1
Bulgaria	-261	India	-D61	South Korea	-AD1
Chile	-161	Israel	-BB1	Spain	-071
Czech Republic/Slovakia	-FL1	Italy	-061	Switzerland	-BG1
Denmark, Finland, and Norway	-DH1	Japan	-291	Taiwan	-AB1
French Canada	-DB1	The Netherlands	-B31	Thailand	-281
France	-051	Portugal	-131	Turkey	-141
Germany	-041	Russia	-251	United Kingdom	-031
Greece	-151	Saudi Arabia	-171	United States	-001

7 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.

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, choose one of the following methods:

- To exit Computer Setup menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

- To save your changes and exit Computer Setup menus, select **Main**, select **Save Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must 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**, select **Apply Factory Defaults and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

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

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 menus without saving your changes, select **Main**, select **Ignore Changes and Exit**, and then select **Yes**.

 **NOTE:** If you are using arrow keys to highlight your choice, you must then press **enter**.

To check for later BIOS versions, see [Downloading a BIOS update on page 68](#).

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.

8 Using HP PC Hardware Diagnostics

Using HP PC Hardware Diagnostics Windows (select products only)

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

If HP PC Hardware Diagnostics Windows is not installed on your computer, first you must download and install it. To download HP PC Hardware Diagnostics Windows, see [Downloading HP PC Hardware Diagnostics Windows on page 71](#).

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

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

– or –

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

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



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

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

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

Downloading HP PC Hardware Diagnostics Windows

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


Downloading the latest HP PC Hardware Diagnostics Windows version

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

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

The tool is downloaded to the selected location.

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

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

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

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


The tool is downloaded to the selected location.

Installing HP PC Hardware Diagnostics Windows

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

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

Using HP PC Hardware Diagnostics UEFI

 **NOTE:** For Windows 10 S computers, you must use a Windows computer and a USB flash drive to download and create the HP UEFI support environment because only .exe files are provided. For more information, see [Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive on page 73](#).

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


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

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

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

– or –

Contact support, and provide the Failure ID code.

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

 **NOTE:** If you need to stop a diagnostic test, press [esc](#).

Starting HP PC Hardware Diagnostics UEFI

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

1. Turn on or restart the computer, and quickly press [esc](#).
2. Press [f2](#).

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

- a. Connected USB flash drive

 **NOTE:** To download the HP PC Hardware Diagnostics UEFI tool to a USB flash drive, see [Downloading the latest HP PC Hardware Diagnostics UEFI version on page 73](#).

- b. Hard drive


- c. BIOS

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

Downloading HP PC Hardware Diagnostics UEFI to a USB flash drive

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

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

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

Downloading the latest HP PC Hardware Diagnostics UEFI version

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

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

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

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

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

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

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

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

Downloading Remote HP PC Hardware Diagnostics UEFI



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

Downloading the latest Remote HP PC Hardware Diagnostics UEFI version

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

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

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



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

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

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

Customizing Remote HP PC Hardware Diagnostics UEFI settings

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

- Set a schedule for running diagnostics unattended. You can also start diagnostics immediately in interactive mode by selecting **Execute Remote HP PC Hardware Diagnostics**.
- Set the location for downloading the diagnostic tools. This feature provides access to the tools from the HP website or from a server that has been preconfigured for use. Your computer does not require the traditional local storage (such as a disk drive or USB flash drive) to run remote diagnostics.
- Set a location for storing the test results. You can also set the user name and password settings used for uploads.
- Display status information about the diagnostics run previously.

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


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

Your changes take effect when the computer restarts.

9 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.

10 Specifications

Computer specifications

Table 10-1 Computer specifications

	Metric	U.S.
Dimensions		
Length	246.0 mm	10.72 in
Width	376.0 mm	16.33 in
Height	22.5 mm	0.97 in
Weight (lowest configuration)		
SSD, Ryzen processors, UMA graphics	1829.5 g	4.03 lbs
SSD, A9/A6/A4 processors, UMA graphics	1771.5 g	3.91 lbs
SSD, Ryzen/A9/A6/A4 processors, discrete graphics	1855.5 g	4.09 lbs
HDD and ODD, Ryzen processors, UMA graphics	2062.7 g	4.55 lbs
HDD and ODD, A9/A6/A4 processors, UMA graphics	2004.7 g	4.42 lbs
HDD and ODD, Ryzen/A9/A6/A4 processors, discrete graphics	2088.7 g	4.60 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W or 18.5 V dc @ 3.5 A - 65 W or 45 W	
Operating current	4.74 A or 3.5 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 95%	
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.		

39.6-cm (15.6-in) display specifications

Table 10-2 Display specifications

	Metric	U.S.
Active diagonal size	39.6-cm	15.6-in
Resolution	FHD: 1920 × 1080 HD: 1366 × 768	
Surface treatment	Anti-glare BrightView	
Brightness	220 nits 200 nits (BrightView, HD, Touch-on Panel)	
Viewing angle	SVA UWVA (FHD, anti glare panel)	
Backlight	WLED	
Aspect ratio	16:10 ultra wide	
Display panel interface	eDP	
Width	Slim-flat, 3.2 mm	

M.2 SATA solid-state drive specifications

Table 10-3 Solid-state drive specifications

	128-GB*	256-GB*
Height	1.35 mm	1.35 mm
Weight	< 10 g	< 10 g
Form factor	M.2 2280-D2-B-M	M.2 2280-D2-B-M
Transfer rate	up to 540 MB/sec	up to 540 MB/sec
Interface type	SATA-3	SATA-3
Ready time, maximum (to not busy)	1.0 ms	< 1.0 ms
Access times, logical	0.1 ms	0.1 ms
Total logical sectors	234,441,648	468,883,296
Operating temperature	0°C to 70°C (32°F to 158°F)	
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.		
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.		

M.2 PCIe solid-state drive specifications

Table 10-4 Solid-state drive specifications

	256-GB*
Dimensions	
Height	1 mm
Length	50.8 mm
Width	28.9 mm
Weight	< 10 g
Interface type	ATA-7
Transfer rate	
Sequential Read	Up to 2150 MB/s
Random Read	Up to 300,000 IOPs
Sequential Write	Up to 1260 MB/s
Random Write	Up to 100,000 IOPs
Ready time, Maximum (to not busy)	1.0 s
Access times	
Logical	0.1 ms
Total logical sectors	500,118,192
Operating temperature	
Operating	0° to 70°C (32°F to 158°F)
Non-operating	-40° to 80°C (-40°F to 176°F)
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.	
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.	

Hard drive specifications

Table 10-5 Hard drive specifications

	2-TB*	1-TB*	500-GB*
Dimensions			
Height	7.2 mm or 9.5 mm	7.2 mm or 9.5 mm	7.0 mm
Length	100.4 mm	100.4 mm	100.6 mm
Width	69.9 mm	69.9 mm	70.1 mm
Weight	130.0 g	107.0 g	92.0 g
Interface type	SATA	SATA	SATA
Transfer rate			
Synchronous (maximum)	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	2.0 ms	2.0 ms	3 ms
Average (read/write)	12 ms	12 ms	13 ms
Maximum	22 ms	22 ms	24 ms
Logical blocks	3,907,029,168	1,953,525,168	1,048,576,000
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)		
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.			
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.			

11 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

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

Requirements for specific countries and regions

Table 11-1 Power cord requirements for specific countries and regions

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

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

Table 11-1 Power cord requirements for specific countries and regions (continued)


Country/region	Accredited agency	Applicable note number
		2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
		3. The appliance coupler, flexible cord, and wall plug must bear a “T” mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm ² or 1.25 mm ² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
		4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm ² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
		5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm ² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
		6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm ² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
		7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm ² or 1.00 mm ² conductor size, with plug BS 1363/A with BSI or ASTA marks.

12 Statement of memory volatility

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


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


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


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

Current BIOS steps

1. Follow steps (a) through (l) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - b. Select **Main**, select **Apply Factory Defaults and Exit**, and then select **Yes** to load defaults.
The computer will reboot.
 - c. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - d. Select the **Security** menu, select **Restore Security Settings to Factory Defaults**, and then select **Yes** to restore security level defaults.
The computer will reboot.
 - e. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.

 **NOTE:** If the system has a BIOS administrator password, enter the password at the prompt.
 - f. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select **Asset Tracking Number**. Clear the tag, and then make the selection to return to the prior menu.

- g. If a DriveLock password is set, select the **Security** menu, and scroll down to **Hard Drive Utilities** under the **Utilities** menu. Select **Hard Drive Utilities**, select **DriveLock**, then uncheck the checkbox for **DriveLock password on restart**. Select **OK** to proceed.
- h. Select the **Main** menu, and then select **Reset BIOS Security to factory default**. Click **Yes** at the warning message.
The computer will reboot.
- i. During the reboot, press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.



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

- j. Select the **Main** menu, select **Apply Factory Defaults and Exit**, select **Yes** to save changes and exit, and then select **Shutdown**.
 - k. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint sensor, one or two prompts will appear—one to clear the TPM and the other to Reset Fingerprint Sensor; press or tap **F1** to accept or **F2** to reject.
 - l. Remove all power and system batteries for at least 24 hours.
2. Complete one of the following:
- Remove and retain the storage drive.
 - or –
 - Clear the drive contents by using a third party utility designed to erase data from an SSD.
 - or –
 - Clear the contents of the drive by using the following BIOS Setup Secure Erase command option steps:



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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu and scroll down to the **Utilities** menu.
- c. Select **Hard Drive Utilities**.
- d. Under **Utilities**, select **Secure Erase**, select the hard drive storing the data you want to clear, and then follow the on-screen instructions to continue.

Nonvolatile memory usage

Table 12-1 Nonvolatile memory usage

Nonvolatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write-protected?
HP Sure Start flash (select models only)	8 MBytes	No	Yes	Provides protected backup of critical System BIOS code, EC firmware, and critical computer configuration data for select platforms that support HP Sure Start. For more information, see Using HP Sure Start (select models only) on page 90.	Data cannot be written to this device via the host processor. The content is managed solely by the HP Sure Start Embedded Controller.	This memory is protected by the HP Sure Start Embedded Controller.
Real Time Clock (RTC) battery backed-up CMOS configuration memory	256 Bytes	No	Yes	Stores system date and time and noncritical data.	RTC battery backed-up CMOS is programmed using the Computer Setup (BIOS), or changing the Microsoft® Windows date & time.	This memory is not write-protected.
Controller (NIC) EEPROM	64 KBytes (not customer accessible)	No	Yes	Stores NIC configuration and NIC firmware.	NIC EEPROM is programmed using a utility from the NIC vendor that can be run from DOS.	A utility is required to write data to this memory and is available from the NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC non-functional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	DIMM SPD is programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a computer. The specific write-protection method varies by memory vendor.
System BIOS	9 MBytes	Yes	Yes	Stores system BIOS code and computer configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the Computer Setup (BIOS) or a custom utility.	NOTE: Writing data to this ROM in an inappropriate manner can render the computer non-functional. A utility is required for writing data to this memory and is available on the HP website; go to http://www.hp.com/

Table 12-1 Nonvolatile memory usage (continued)

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

Questions and answers

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



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

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Apply Factory Defaults and Exit**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

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

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

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

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

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

3. Where does the UEFI BIOS reside?

The UEFI BIOS resides on a flash memory chip. A utility is required to write to the chip.

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

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

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

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

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

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

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select **Main**, and then select **Reset Security to Factory Defaults**.
- c. Follow the on-screen instructions.
- d. Select **Main**, select **Save Changes and Exit**, and then follow the on-screen instructions.

7. How can the Custom Secure Boot Keys be reset?

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

- a. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
- b. Select the **Security** menu, select **Secure Boot Configuration**, and then follow the on-screen instructions.
- c. At the **Secure Boot Configuration** window, select **Secure Boot**, select **Clear Secure Boot Keys**, and then follow the on-screen instructions to continue.

Using HP Sure Start (select models only)

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

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

13 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, identifying 6
 - AC adapter, spare part numbers 20
 - action keys
 - airplane mode 12
 - help 12
 - identifying 11, 12
 - keyboard backlight 12
 - mute 12
 - next track 12
 - pause 12
 - play 12
 - screen brightness 12
 - speaker volume 12
 - switch screen image 12
 - using 12
 - airplane mode key 12
 - antenna
 - removal 59
 - audio
 - adjusting volume 12
 - audio-out (headphone)/audio-in (microphone) combo jack, identifying 6
- B**
 - back cover
 - spare part number 20
 - backup, creating 76
 - backups 76
 - battery
 - removal 33
 - spare part number 17, 33
 - BIOS
 - determining version 68
 - downloading an update 68
 - updating 68
 - Bluetooth label 14
 - boot order
 - changing using the f9 prompt 69
 - boot order, changing 77
 - bottom components 13
 - bottom cover
 - removal 31
 - spare part number 17, 31
 - buttons
 - left TouchPad 8
 - optical drive eject 5
 - power 10
 - right TouchPad 8
- C**
 - camera
 - identifying 7
 - product description 2
 - camera light, identifying 7
 - camera module
 - spare part number 20
 - camera/microphone module
 - spare part numbers 56
 - caps lock light, identifying 9
 - cautions
 - electrostatic discharge 23
 - chipset, product description 1
 - components
 - bottom 13
 - display 7
 - keyboard area 8
 - left side 6
 - right side 5
 - computer major components 15
 - Computer Setup
 - navigating and selecting 67
 - restoring factory settings 67
 - starting 67
 - computer setup 67
 - computer specifications 78
 - connector, power 6
- D**
 - Display assembly
 - spare part numbers 16
 - display assembly
 - removal 53
 - subcomponents 19
 - display assembly components
 - removal 53
 - spare part numbers 53
 - display bezel
 - removal 55
 - spare part numbers 19, 55
 - display cable, spare part number 19
 - display components 7
 - display panel
 - product description 1
 - removal 56
 - display panel cable
 - removal 58
 - spare part numbers 59
 - display specifications 79
 - drive light, identifying 5
 - DVD+/-RW Double-Layer Writer
 - spare part number 17, 21, 28
- E**
 - electrostatic discharge (ESD) 23
 - preventing damage 24
 - esc key, identifying 11
 - ethernet
 - product description 2
- F**
 - fan
 - removal 48
 - spare part number 16, 48
 - fn key, identifying 11
- G**
 - Get Help in Windows 10 action key 12
 - grounding methods 25
 - guidelines
 - packaging 26
 - transporting 26
 - workstation 23
- H**
 - hard drive
 - product description 2
 - removal 37

- spare part number 17, 21
 - spare part numbers 37
 - specifications 81
- hard drive bracket
 - spare part number 21
- hard drive connector board
 - removal 43
 - spare part number 16, 21, 43
- hard drive/solid-state drive cable
 - spare part number 21
- HDMI port
 - identifying 6
- heat sink
 - spare part numbers 16
- heat sink assembly
 - removal 49
 - spare part numbers 49
- hinge
 - removal 58
 - spare part number 58
- hinge cover
 - spare part number 19
- Hinge Kit
 - spare part number 19
- HP PC Hardware Diagnostics UEFI
 - downloading 73
 - starting 73
 - using 72
- HP PC Hardware Diagnostics Windows
 - downloading 71
 - installing 72
 - using 71
- HP Recovery Manager
 - correcting boot problems 77
- HP Recovery media
 - recovery 77
- HP Sure Start 90

I

- integrated numeric keypad, identifying 11
- internal microphones, identifying 7

J

- jacks
 - audio-out (headphone)/audio-in (microphone) 6
 - network 6
 - RJ-45 (network) 6

K

- keyboard
 - product description 3
 - removal 66
 - spare part number 66
 - spare part numbers 16
- keyboard backlight action key 12
- keypad, integrated numeric 11
- keys
 - action 11
 - airplane mode 12
 - esc 11
 - fn 11
 - num lock 11
 - Windows 11

L

- labels
 - Bluetooth 14
 - regulatory 14
 - serial number 14
 - service 14
 - wireless certification 14
 - WLAN 14
- left side components 6
- lights
 - AC adapter and battery 6
 - camera 7
 - caps lock 9
 - drive 5
 - mute 9
 - power 5
 - RJ-45 (network) status 6

M

- M.2 solid-state drive
 - specifications 80
- memory
 - nonvolatile 85
 - product description 1
 - removal 35
 - spare part number 16
 - spare part numbers 35
 - volatile 85
- MicroSD memory card reader, identifying 5
- model name 1
- mute light, identifying 9
- mute volume action key 12

N

- network jack, identifying 6
- next track action key 12
- nonvolatile memory 85

O

- operating system, product description 3
- optical drive
 - product description 2
 - removal 28
 - spare part numbers 28
- optical drive eject button, identifying 5
- optical drive, identifying 5

P

- packaging guidelines 26
- panel
 - spare part numbers 19
- pause action key 12
- play action key 12
- pointing device, product description 3
- ports
 - HDMI 6
 - product description 2
 - USB 5
 - USB SuperSpeed 6
- power button, identifying 10
- power connector
 - identifying 6
- power connector cable
 - removal 65
 - spare part numbers 65
- power cord
 - requirements for all countries 82
 - requirements for specific countries and regions 83
 - set requirements 82
- power lights, identifying 5
- power requirements, product description 3
- processor 1
- product description
 - camera 2
 - chipset 1
 - display panel 1
 - ethernet 2

- external media cards 2
 - hard drive 2
 - keyboard 3
 - memory 1
 - operating system 3
 - optical drive 2
 - pointing device 3
 - ports 2
 - power requirements 3
 - processor 1
 - product name 1
 - security 3
 - serviceability 3
 - wireless networking 2
 - product name 1
 - product name and number, computer 14
- R**
- recovery 76
 - discs 77
 - HP Recovery partition 77
 - media 77
 - USB flash drive 77
 - recovery media
 - creating using HP Cloud Recovery Download Tool 76
 - creating using Windows tools 76
 - regulatory information
 - regulatory label 14
 - wireless certification labels 14
 - Remote HP PC Hardware Diagnostics UEFI settings
 - customizing 74
 - using 74
 - removal/replacement
 - procedures 27, 30
 - removing personal data from volatile system memory 85
 - restoring 76
 - right side components 5
 - RJ-45 (network) jack, identifying 6
 - RJ-45 (network) status lights, identifying 6
- S**
- screen brightness action keys 12
 - Screw Kit, spare part numbers 20
 - security cable slot, identifying 5
 - security, product description 3
 - serial number, computer 14
 - service labels, locating 14
 - serviceability, product description 3
 - setup utility
 - navigating and selecting 67
 - restoring factory settings 67
 - slots
 - memory card reader 5
 - security cable 5
 - solid-state drive
 - removal 39
 - spare part number 16, 21
 - spare part numbers 39
 - specifications 79
 - solid-state drive bracket and connector board
 - removal 40
 - spare part numbers 40
 - solid-state drive cable
 - spare part number 21
 - solid-state drive connector board
 - spare part number 16
 - speaker volume action keys 12
 - speakers
 - identifying 10
 - removal 64
 - spare part number 16
 - spare part numbers 64
 - special keys, using 11
 - specifications
 - computer 78
 - display 79
 - hard drive 81
 - M.2 solid-state drive 80
 - solid-state drive 79
 - static electricity 24
 - Sure Start
 - using 70
 - switch screen image action key 12
 - system board
 - removal 62
 - spare part number 16
 - spare part numbers 62
 - system memory, removing personal data from volatile 85
 - system restore point, creating 76
- T**
- top cover
 - removal 66
 - spare part number 66
 - top cover/keyboard
 - spare part numbers 16
 - TouchPad button board
 - removal 45
 - spare part number 16
 - spare part numbers 45
 - TouchPad buttons
 - identifying 8
 - TouchPad module
 - removal 46
 - spare part number 16, 46
 - TouchPad zone, identifying 8
 - TPM settings 69
 - transporting guidelines 26
 - traveling with the computer 14
- U**
- USB port, identifying 5
 - USB SuperSpeed port, identifying 6
 - USB/card reader board
 - removal 44
 - spare part number 17, 44
- V**
- vents, identifying 10, 13
 - volume
 - adjusting 12
 - mute 12
- W**
- webcam/microphone module
 - removal 55
 - Windows
 - backup 76
 - recovery media 76
 - system restore point 76
 - Windows key, identifying 11
 - Windows tools, using 76
 - wireless antenna
 - removal 59
 - wireless certification label 14
 - wireless networking
 - product description 2
 - WLAN
 - removal 42
 - spare part numbers 42

WLAN antenna
 removal 59
WLAN antennas, identifying 7
WLAN cable
 spare part number 20
WLAN device 14
WLAN label 14
WLAN module
 spare part number 16
workstation guidelines 23