OMEN by HP Laptop PC
Models 17-w001 through 17-w099 and
Models 17-w201 through 17w299

Maintenance and Service Guide

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 parts," can damage the computer or void your warranty.

Processor information

IMPORTANT: This version of Windows running with the processor or chipsets used in this system has limited support from Microsoft. For more information about Microsoft's support, please see Microsoft's Support Lifecycle FAQ at https://support.microsoft.com/lifecycle.

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

OMEN by HP Laptop PC		Intel 6th generation processors		Intel 7th generation processors	
Category	**Description**	**NV 960M**	**NV 965M**	**NV N17P-G0**	**NV N17P-G1**
Product Name	OMEN by HP Laptop PC	√	√	√	√
Processors	Intel® Core™ i7-6700HQ (2.6 GHz, turbo up to 3.5 GHz), 2133 MHz/6 MB L3, Quad cTDP 35 W	√	√		
	Intel Core i5-6300HQ (2.3 GHz, turbo up to 3.2 GHz), 2133 MHz/6 MB L3, Quad cTDP 35 W	√	√		
	Intel Core i7-7700HQ (2.8 GHz, turbo up to 3.8 GHz), 2400 MHz/6 MB L3, Quad cTDP 35 W			√	√
	Intel Core i5-7300HQ (2.5 GHz, turbo up to 3.5 GHz), 2400 MHz/6 MB L3, Quad cTDP 35 W			√	√
Chipset	Intel HM170	√	√		
	Intel HM 175			√	√
Graphics	**Internal graphics:** Intel HD Graphics 530	√	√		
	Intel HD Graphics 630			√	√
	Switchable Discrete Graphics:				
	NVIDIA N16E-GR (GeForce GTX 965M) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)		√		
	NVIDIA® N16P-GR (GeForce® GTX 960M) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)	√			
	NVIDIA N16P-GX (GeForce GTX 960 M) with up to 2048 MB of dedicated video memory (128 M x 32 GDDR5 x 4 PCs)	√			
	NVIDIA N17P-G1 (GeForce GTX 1050Ti) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)				√
	NVIDIA N17P-G0 (GeForce GTX 1050) with up to 4096 MB of dedicated video memory (256 M x 32 GDDR5 x 4 PCs)			√	

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	NVIDIA N17P-G0 (GeForce GTX 1050) with up to 2048 MB of dedicated video memory (128 M x 32 GDDR5 x 4 PCs)			√	
	Supports HD Decode, DX12, and HDMI; Optimus; dynamic switching; and GPU Performance Scaling (GPS)	√	√	√	√
Panel	**43.94 cm (17.3") 16:9 Ultra Wide Aspect Ratio panel:**	√	√	√	√
	• Full High Definition (FHD), WLED AntiGlare (1920 x 1080) flat-flat (4.2 mm) UWVA, eDP, typical brightness 300 nits (cd/m²); touch solution with flush glass multitouch enabled				
	• Ultra High Definition (UHD) WLED AntiGlare (3840 x 2160) flat-flat (4.2mm) UWVA, eDP +PSR, typical brightness 300 nits (cd/m²), for non-touch only				
	Supports eDP1.3+PSR				
Memory	**Two SODIMM slots**, not customer accessible or upgradable:				
	DDR4-2133 dual channel support (DDR4-2400 bridge to DDR4-2133)	√	√		
	DDR4-2400 dual channel support			√	√
	Supports up to 16 GB max system memory with the following:	√	√	√	√
	• 4096 MB (4096 MB x 1)				
	• 6144 MB (2048 MB x 1 + 4096 MB x 1), no support for 32-bit OS				
	• 8192 MB (4096 MB x 2) or 8192 MB (8192 MB x 1), no support for 32-bit OS				
	• 8192 MB (8196 MB x 1), no support for 32-bit OS				
	• 12288 MB (8192 MB +4096 MB), no support for 32-bit OS				
	• 16384 MB (8192 MB x 2), no support for 32-bit OS or Windows® 7 Home Basic				
Hard drive	**Single HDD configurations:**	√	√	√	√
	• 1 TB (7200) 9.5 mm				
	• 2 TB (5400) 9.5 mm				

OMEN by HP Laptop PC		Intel 6th generation processors		Intel 7th generation processors	
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	• 2 TB (5400) 7.0 mm				
	Supports all 7 mm/9.5 mm, SATA 2.5" HDDs				
	HP 3D DriveGuard				
	Supports a second drive				
	7 mm and 9.5 mm share the same bracket				
	Hybrid HDD configurations:	√	√	√	√
	• 1 TB 5400 RPM 9.5 mm SSHD with 8 GB NAND				
	Dual Storage Configurations:				
	1 TB + 128 GB value solid-state drive (SSD)	√	√	√	√
	2 TB + 128 GB value SSD	√	√	√	√
	4 TB: 2 TB (5400) (for use with Intel Core i7–6700HQ processor GeForce GTX 960M switchable discrete graphics, 4 G memory only)	√		√	
	1 TB + 256 GB PCI expansion (PCIe) SSD	√	√	√	√
	1 TB + 512 GB PCIe TLC SSD			√	
	M.2 SATA configurations (TLC) SSD:	√	√	√	√
	• 256 GB				
	M.2 PCIe NVMe (TLC) SSD:	√	√	√	√
	• 256 GB				
	• 512 GB				
Optical drive	9.5 mm tray load - SATA - Fixed (not modular)	√	√	√	√
	Supports Zero-Power Optical drive				
	Supports M-disc				
	DVD+/-RW Double-Layer SuperMulti				
	Blu-ray Disc R/RW with SuperMulti				
Audio and video	**Dual speakers**	√	√	√	√
	Bang & Olufsen				
	Supports HP Audio Boost				
	Supports HP Noise Cancellation				
	Cameras:	√	√	√	√

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	HP Wide Vision HD: HD camera - Indicator LED, USB 2.0, BSI sensor, f2.0, 88° WFOV				
	• Camera with rubber for non-touch products				
	• 720p by 30 frames per second				
	Intel RealSense 3D camera - indicator LED, USB 3.0, 85° WFOV	√	√		
	• 1080p by 30 frames per second, 4x depth resolution				
	• Supports Windows Hello				
Ethernet	Integrated 10/100/1000 NIC	√	√	√	√
Wireless	**Intel Dual Band Wireless-AC 7265** 802.11 ac 2 x 2 WiFi + Bluetooth® 4.2 Combo Adapter (non vPRO)	√	√	√	√
	Integrated wireless options with dual antenna (M.2/PCIe)				
	Intel WiDi support (select products only)				
	Compatible with Miracast-certified devices, for Windows 10				
External media cards	HP Multi-Format Digital Media Card Reader	√	√	√	√
	Supports SD/SDHC/SDXC				
	Push-Push insertion/removal				
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 v2.0 supporting: up to 4096 x 2160 @ 60 Hz				
	Headphone / Line out			√	√
	Microphone input			√	√
	USB 2.0 port	√	√	√	√
	USB 3.0 ports (2)				
	RJ-45/Ethernet port				
	AC Smart Pin adapter plug				
Keyboard/pointing devices	Full-size standard 3-coat paint island-style backlit keyboard with numeric keypad in Dragon Red	√	√	√	√

OMEN by HP Laptop PC		Intel 6th generation processors		Intel 7th generation processors	
Category	Description	NV 960M	NV 965M	NV N17P-G0	NV N17P-G1
	Clickpad with image sensor				
	Multitouch gestures enabled				
	Supports Modern Trackpad Gestures				
	Taps enabled as default				
Power requirements	**Batteries:**	√	√	√	√
	6-cell cylindrical battery – 62 Whr (5600 mAh)				
	Supports battery fast charge (90 minutes to 90% charged)				
	AC Adapters:				
	120W adapter with 1 M length power cord	√	√		
	150W adapter with 1 M length power cord		√	√	√
Security	TPM 2.0	√	√	√	√
	Security lock slot				
Operating system	**Pre-installed:**	√	√	√	√
	Windows 10 Professional				
	Windows 10	√		√	√
	For Developed Market (ML):	√	√	√	√
	Windows 10 Home High End				
	Windows 10 Home ML (for use with Intel Core i7 processors with ≥ 1080P screen and ≥ 8 GB)				
	For Emerging Market (EM/SL):	√	√	√	√
	Windows 10 Home				
	Windows 10 Home High End EM/SL/ China (for use with Intel Core i7 processors with ≥ 1080P screen and ≥ 8 GB)				
	SEAP Windows 10 Home High End				
	SEAP Windows 10 Home				
	CPPP Windows 10 Home China Language Edition				
	FreeDOS 2.0	√	√	√	√
Serviceability	**End user replaceable parts:**	√	√	√	√
	AC adapter				
	Memory				

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Category	**Description**	**NV 960M**	**NV 965M**	**NV N17P-GO**	**NV N17P-G1**
	Battery				

2 External component identification

Right side

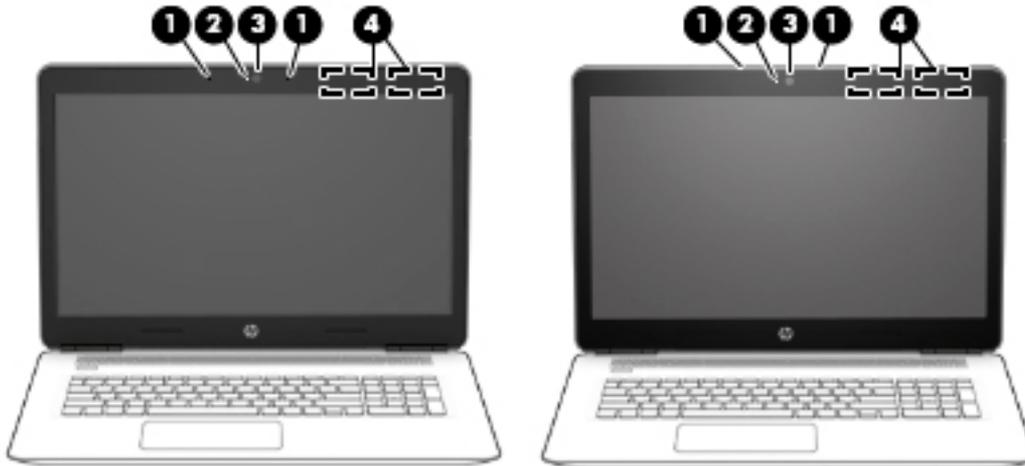| Component		Description
(1)	Drive light (select products only)	• Blinking white: The hard drive or optical drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive (select products only).
(2)	Memory card reader	Reads optional memory cards that enable you to store, manage, share, or access information.
(3)	USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(4)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(5)	RJ-45 (network) jack/status lights	Connects a network cable. • White: The network is connected. • Amber: Activity is occurring on the network.
(6)	Power connector	Connects an AC adapter.
(7)	AC adapter and battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.

Left side

Component		Description
(1)	Security cable slot	Attaches an optional security cable to the computer.
		NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(2)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(3)	USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(4)	Audio-out (headphone)/Audio-in (microphone) combo jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional standalone microphones.
		WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*.
		To access this guide:
		▲ Select the **Start** button, select **All apps** (required on some products), select **HP Help and Support**, and then select **HP Documentation**.
		NOTE: When a device is connected to the jack, the computer speakers are disabled.
(5)	Optical drive	Depending on your computer, reads an optical disc or reads and writes to an optical disc.
(6)	Optical drive eject button	Releases the optical drive disc tray.

Display

Component		Description
(1)	Internal microphones	Record sound.
(2)	Camera light	On: The camera is in use.
(3)	Camera	Allows you to video chat, record video, or record still images. Some products also provide HD (high–definition) or 3D capability, apps for gaming, or facial recognition software like Windows Hello.
		To use your camera:
		▲ Type camera in the taskbar search box, and then select **Camera**.
(4)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

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

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

To access this guide:

▲ Select the **Start** button, select **All apps** (required on some products), select **HP Help and Support**, and then select **HP Documentation**.

Component		Description
(1)	Internal microphones	Record sound.
(2)	Camera	Allows you to video chat, record video, or record still images. Some products also provide HD (high–definition) or 3D capability, apps for gaming, or facial recognition software like Windows Hello.
		To use your camera:
		1. Type camera in the taskbar search box, and then select **Camera**.
		2. Type Intel RealSense in the taskbar search box to explore additional features, demos, and apps.
		When the light is on, the camera is in use.
(3)	WLAN antennas*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

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

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Top

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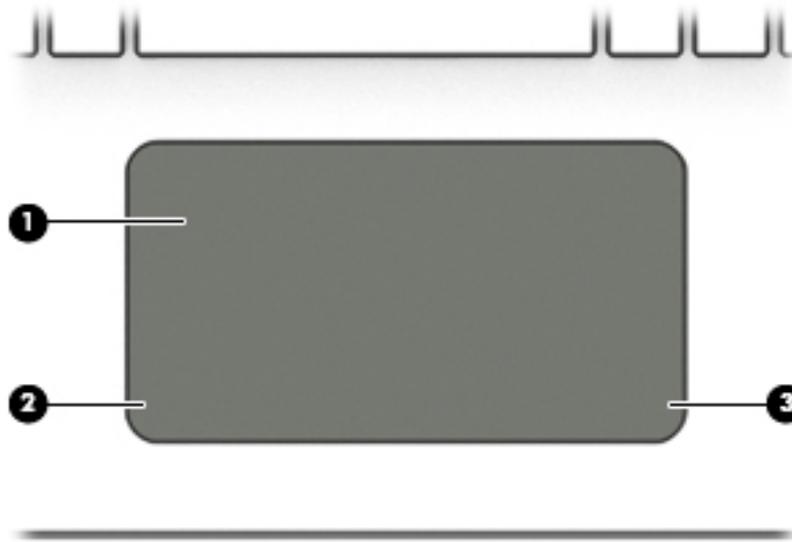
Component		Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights

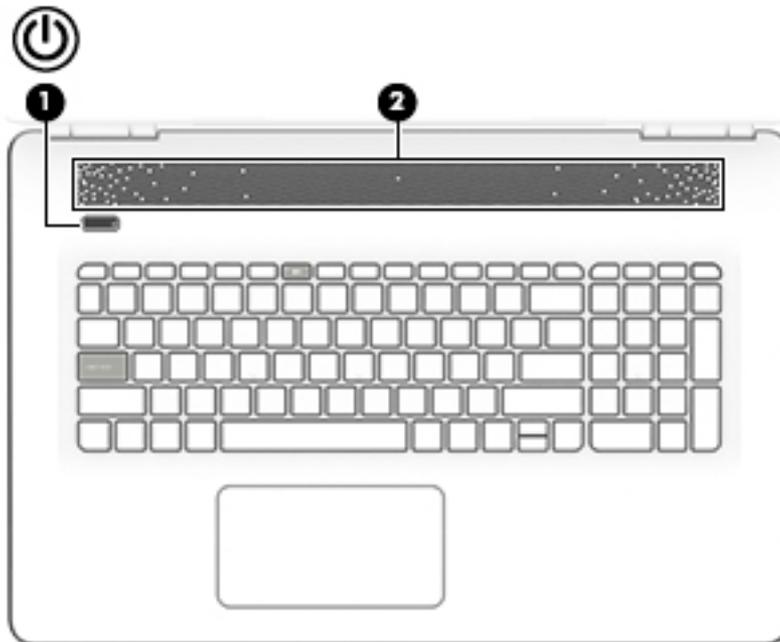| Component		Description
(1)	Power light	• On: The computer is on.
		• Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
		• Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Caps lock light	On: Caps lock is on, which switches the key input to all capital letters.
(3)	Mute light	• Amber: Computer sound is off.
		• Off: Computer sound is on.

Button and speakers

Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer.
		• When the computer is on, press the button briefly to initiate Sleep.
		• When the computer is in the Sleep state, press the button briefly to exit Sleep.
		• When the computer is in Hibernation, press the button briefly to exit Hibernation.
		CAUTION: Pressing and holding down the power button results in the loss of unsaved information.

Component		Description
		If the computer has stopped responding and shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
		To learn more about your power settings, see your power options.
		▲ Type power in the taskbar search box, and then select **Power and sleep settings**.
		– or –
		Right-click the **Start** button, and then select **Power Options**.
(2)	Speakers	Produce sound.

Keys
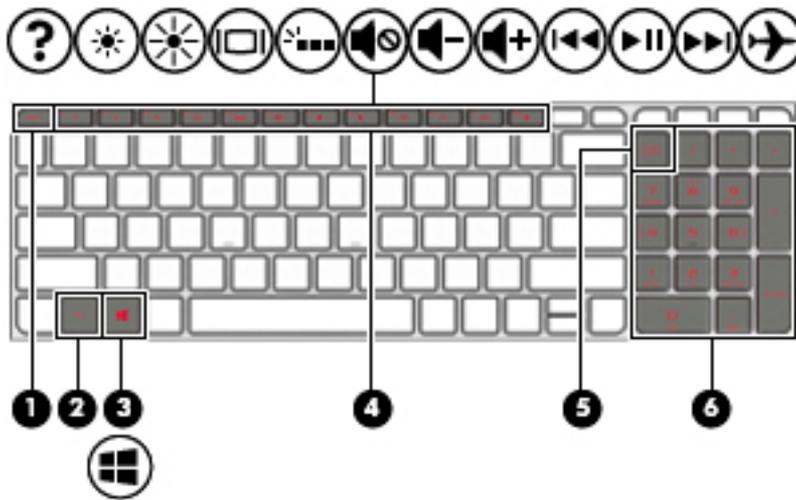
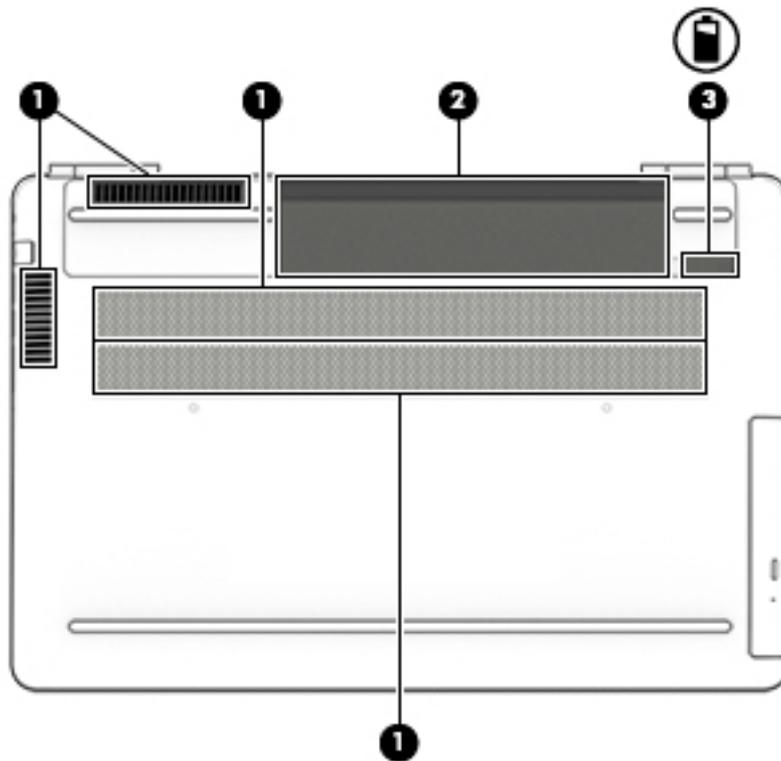| Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes specific system functions when pressed in combination with the esc key or the spacebar.
(3)	Windows® key	Opens the **Start** menu. **NOTE:** Pressing the Windows key again will close the **Start** menu.
(4)	Action keys	Execute frequently used system functions. **NOTE:** On select products, the f5 action key turns the keyboard backlight feature off or on.
(5)	num lock key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	When num lock is on, the keypad can be used like an external numeric keypad.

Using the action keys

- An action key performs an assigned function.
- The icon on each action key illustrates the function for that key.

Icon	Description
?	Opens the Get started app, which provides a broad range of how-to information and troubleshooting tips.
☀	Decreases the screen brightness incrementally as long as you hold down the key.

Icon	Description
☀	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

Component		Description
(1)	Vents	Enable 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.
(2)	Battery bay	Holds the battery.
(3)	Battery release latch	Releases the battery.

Rear

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.

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, or on the back of the display.

- Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

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

Component		
(1)	Serial number	
(2)	Product number	
(3)	Warranty period	
(4)	Model number (select products only)	
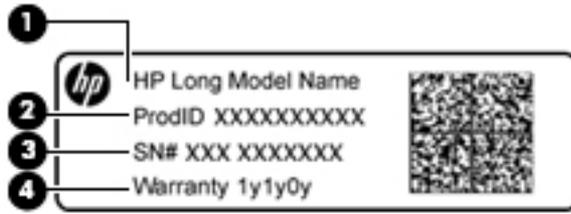
Component

|	
(1)	Model name (select products only)
(2)	Product number
(3)	Serial number
(4)	Warranty period

● Regulatory label(s)—Provide(s) regulatory information about the computer.

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

3 Illustrated parts catalog

Computer major components

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

> **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 17 for details.
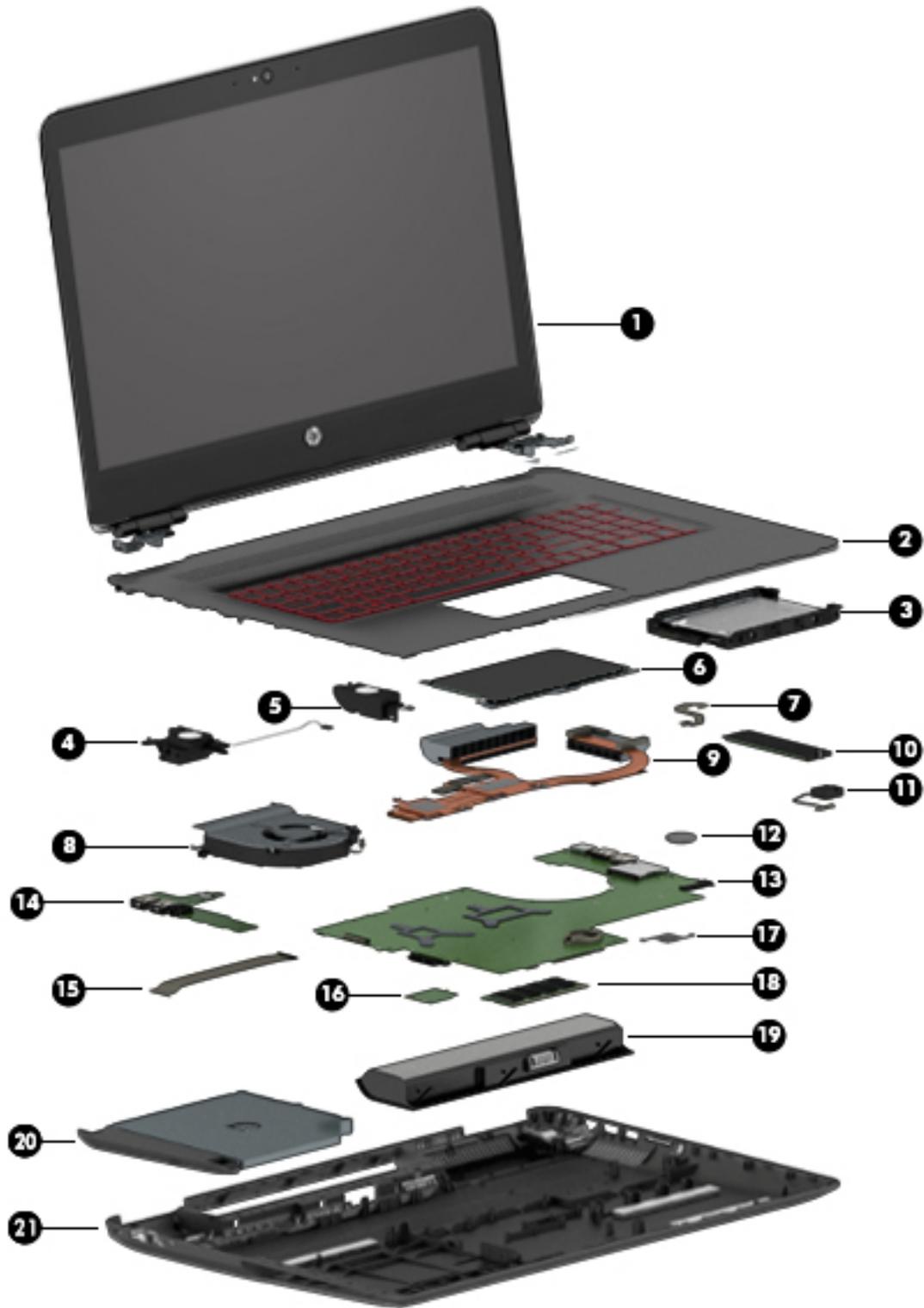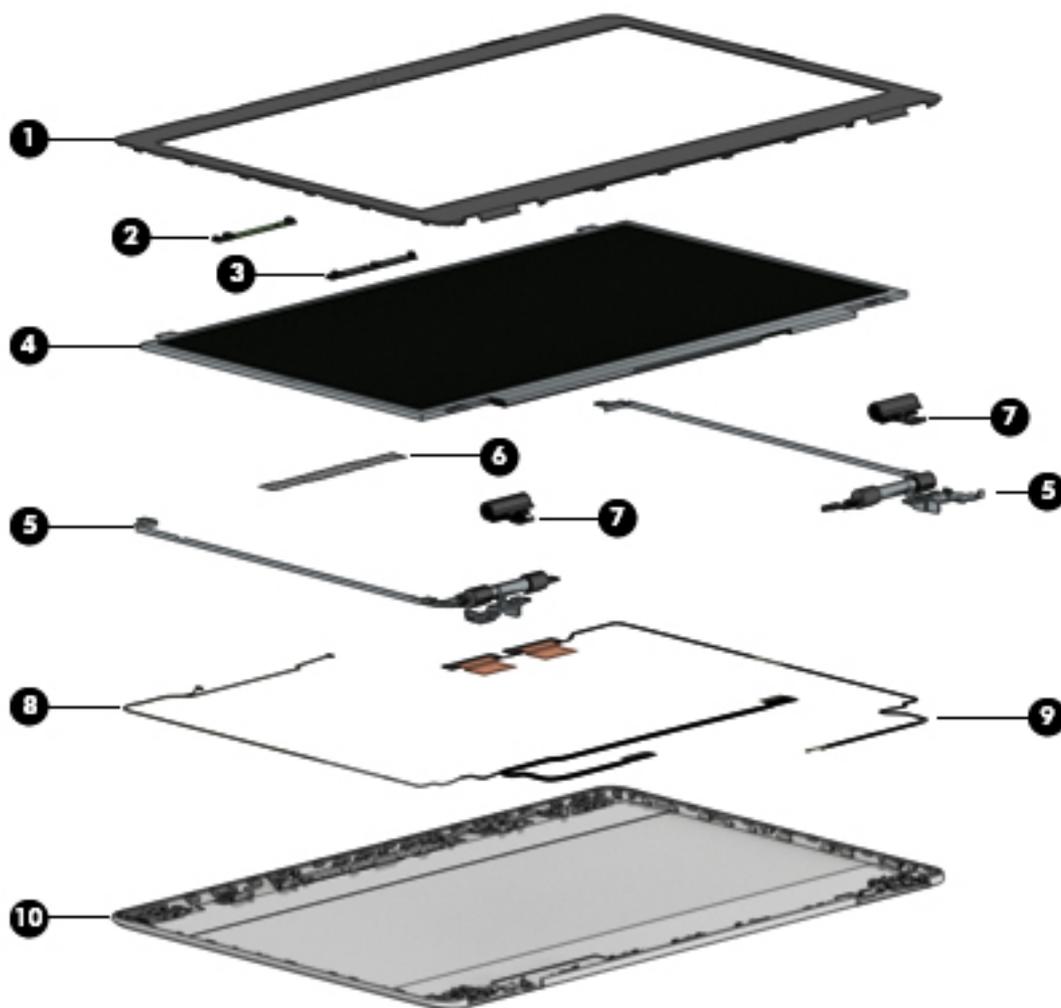
Item	Component	Spare part number
(1)	**Display** (spared at the component level; see Display assembly subcomponents on page 24)	

Item	Component	Spare part number
(2)	**Top cover with keyboard and TouchPad** in Onyx Black, with Carbon Fiber pattern (full-size standard 3-coat paint island-style backlit with numeric keypad)	
	For use in the United States	862972-001
	For use in India (for products with Intel 7th generation processors only)	862972-002
	For use in the United Kingdom	862972-031
	For use in Germany	862972-041
	For use in France	862972-051
	For use in Italy	862972-061
	For use in Latin America (for products with Intel 6th generation processors only)	862972-161
	For use in Spain	862972-071
	For use in Portugal	862972-131
	For use in Turkey	862972-141
	For use in Greece	862972-151
	For use in Saudi Arabia	862972-171
	For use in Hungary	862972-211
	For use in Russia	862972-251
	For use in Bulgaria	862972-261
	For use in Romania	862972-271
	For use in Thailand	862972-281
	For use in Japan	862972-291
	For use in Belgium	862972-A41
	For use in Korea	862972-AD1
	For use Internationally	862972-B31
	For use in Slovenia	862972-BA1
	For use in Israel	862972-BB1
	For use in Switzerland	862972-BG1
	For use in Canada	862972-DB1
	For use in Nordic Regions	862972-DH1
	For use in Czech/Slovakia	862972-FL1
(3)	**Hard drive**	
	1 TB 5400 RPM SATA RAW HYBRID 8 GB	731999-005
	2 TB 5400 RPM SATA RAW 9.5 mm	801808-005
	1 TB 7200 RPM SATA RAW 9.5 mm	766644-005
	2 TB 5400 RPM SATA RAW 7.0 mm	912487-855
(4)	**Right speaker**, part of the speaker kit, which includes left and right speakers	857474-001

Item	Component	Spare part number
(5)	**Left speaker**, part of the speaker kit, which includes left and right speakers	857474-001
(6)	**TouchPad board**	862959-001
(7)	**Touchpad board cable**	857455-001
(8)	**Fan**	857463-001
(9)	**Heat sink** for discrete memory	
	For products with Intel 6th generation processors	857895-001
	For products with Intel 7th generation processors	915470-001
(10)	**M.2 SATA SSD**, PCIe NVMe TLC	
	128 GB 2280 M2 SATA-3 Value PA	827560-026
	256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847109-002
	512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847110-004
(11)	**Power in connector**	858021-001
(12)	**RTC battery**	861876-001
(13)	**System board** (includes processor and replacement thermal material):	
	All system boards use the following part numbers:	
	xxxxxx-001: Non-Windows operating systems	
	xxxxxx-601 Windows 10 operating systems	
	For products with Intel 6th generation processors	
	NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i7-6700HQ	857388-xxx
	NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i7-6700HQ	857389-xxx
	NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i5-6300HQ	857390-xxx
	NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i5-6300HQ	857391-xxx
	NVIDIA N16P-GX (GeForce GTX 965M), 4 GB i7-6700HQ	862259-xxx
	NVIDIA N16P-GX (GeForce GTX 965M), 4 GB i5-6300HQ	862260-xxx
	For products with Intel 7th generation processors	
	NVIDIA N17 P-G0 (GeForce GTX 1050), 2 GB i7-7700HQ	915466-xxx
	NVIDIA N17 P-G0 (GeForce GTX 1050), 4 GB i7-7700HQ	915467-xxx
	NVIDIA N17 P-G0 (GeForce GTX 1050M), 2 GB i5-7300HQ	915468-xxx
	NVIDIA N17 P-G0 (GeForce GTX 1050M), 4 GB i5-7300HQ	915469-xxx
	NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i7-7700HQ	915550-xxx
	NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i5-7300HQ	915551-xxx
(14)	**USB board**	857470-001
(15)	**USB board cable**	857454-001
(16)	**WLAN** Intel Dual Band Wireless–AC 7265 802.11 ac 2x2 WiFi + BT 4.2 Combo Adapter (non vPRO)	793840-005

Item	Component	Spare part number
(17)	**Heat sink** for CPU and graphics	725625-001
(18)	**Memory**	
	4 GB SODIMM 2400 MHz 1.2 v DDR4 shared	862397-850
	8 GB SODIMM 2400 MHz 1.2 v DDR4 shared	862398-850
	2 GB SODIMM 2400 MHz 1.2 v DDR4 shared	864271-850
(19)	**Battery**:	
	6 cell 62 WH 2.8 Ah LI	849911-850
(20)	**Optical drive**, SATA 9.5 mm tray	
	DVD+/-RW Double-Layer SuperMulti	756564-038
	Blu-ray Disc R/RW with SuperMulti	729050-011
(21)	**Base enclosure** in Twinkle Black	862960-001

Display assembly subcomponents

Item	Component	Spare part number
(1)	**Display bezel**	
	For products with 3D camera and Intel 6th generation processors only	857451-001
	For products with HD camera	857450-001
(2)	**Microphone board** (for 3D camera only)	857471-001
(3)	**Camera**	
	3D camera (for products with Intel 6th generation processors only)	781624-005
	HD camera	846006-003
(4)	**43.94 cm (17.3") raw panel**	
	• Non-touch screen, FHD, AG, UWVA, 300 eDP, Flat4 GF	798926-009
	• Non-touch screen, UHD, AG, UWVA, 300 eDP, 1.3 PSR, Flat GF	853322-003
(5)	**Hinge kit (includes left and right hinges)**	857464-001

Item	Component	Spare part number
(6)	**HD camera frame**	857475-001
(7)	**Hinge caps**	862955-001
(8)	**Display cable**	
	For products with non-touch FHD screen and HD camera	857456-001
	For products with non-touch FHD screen, 3D camera, and Intel 6th generation processors	857458-001
	For products with non-touch UHD screen and HD camera	857459-001
	For products with non-touch UHD screen, 3D camera, and Intel 6th generation processors	857461-001
(9)	**Dual antennas**	857443-001
(10)	**Back cover** in Shadow Mesh, includes dual antenna	862968-001

Mass storage devices
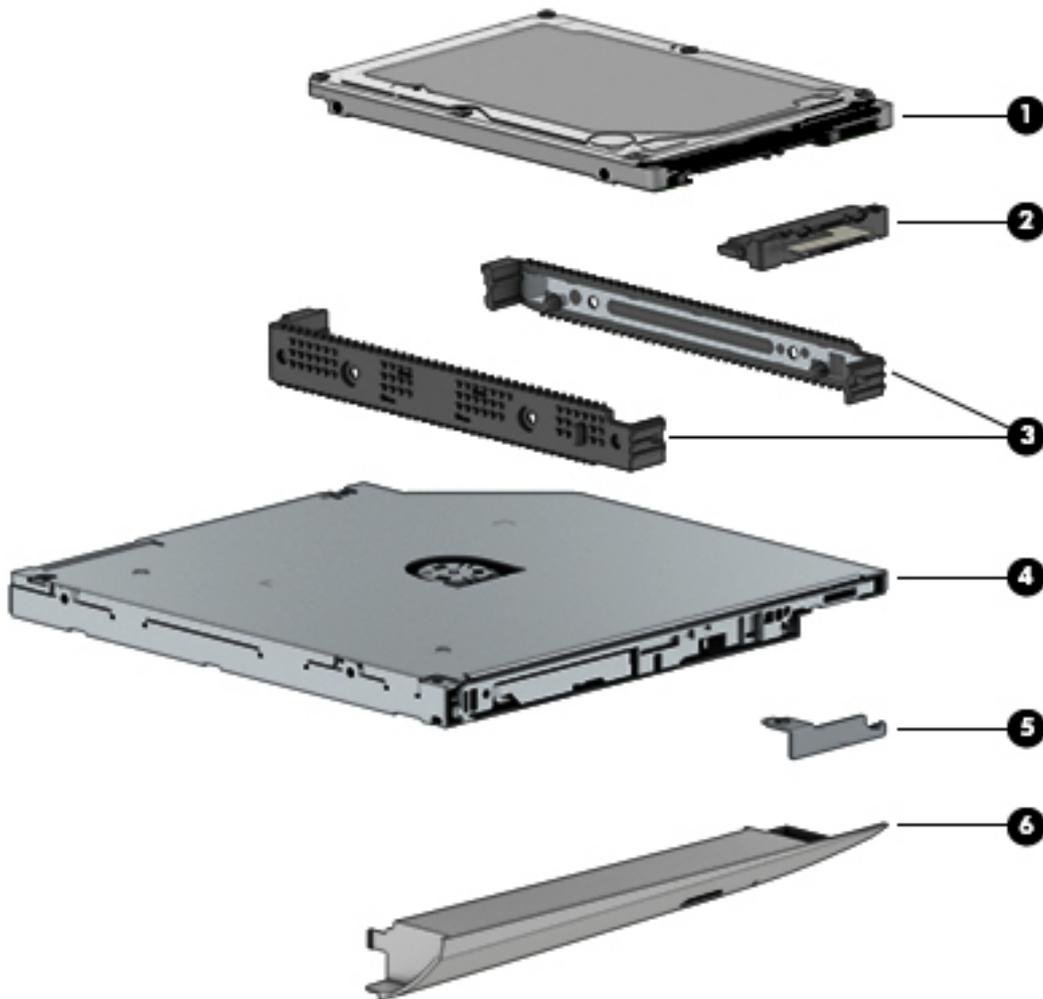
Item	Component	Spare part number
(1)	**Hard drive**	
	1 TB 5400 RPM SATA RAW HYBRID 8 GB	731999-005
	2 TB 5400 RPM SATA RAW 9.5 mm	801808-005
	1 TB 7200 RPM SATA RAW 9.5 mm	766644-005
	2 TB 5400 RPM SATA RAW 7.0 mm	912487-855
(2)	**Hard drive back connector** and hard drive cable	857462-001
(3)	**Hard drive bracket**	911227-001
(4)	**Optical drive**, SATA, 9.5 mm	
	DVD+/-RW Double-Layer SuperMulti	756564-038
	Blu-ray Disc R/RW with SuperMulti	729050-011
(5)	**Optical drive bracket**	not spared
(6)	**Optical drive bezel**	862962-001
	Optical drive bezel for BlueRay	903305-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
150 W PFC, Smart, slim, 4.5 mm (for use with products with NVIDIA N16E-GR (965M) or Intel 7th generation processors only)	776620-001
120 W PFC, S-3P, slim, 4.5 mm (for use with products with NVIDIA N16P-GX only)	710415-001
HDMI to VGA adapter	701943-001
Power cord (black, 1 m):	
For use in North America	213349-009
For use in South Africa	361240-002
For use in Denmark	213353-008
For use in Europe	213350-009
For use in Israel	398063-003
For use in Switzerland	213354-008
For use in Australia	213356-008
For use in South Korea	267836-008
For use in Thailand	285096-006
For use in Japan	349756-002
For use in the United Kingdom and Singapore	213351-008

Component	Spare part number
For use in China (for products with Intel 7th generation processors only)	286497-008
Screw kit	857473-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.

- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.

- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.

- Place items on a grounded surface before removing items from their containers.

- Always be properly grounded when touching a component or assembly.

- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.

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

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.

- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

- Use conductive field service tools, such as cutters, screwdrivers, 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 plastic foam.

- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

- Avoid contact with pins, leads, or circuitry.

- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive equipment must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tape

- Antistatic smocks, aprons, and sleeve protectors

- Conductive bins and other assembly or soldering aids

- Nonconductive foam

- Conductive tabletop workstations with ground cords of one megohm resistance

- Static-dissipative tables or floor mats with hard ties to the ground

- Field service kits

- Static awareness labels

- Material-handling packages

- Nonconductive plastic bags, tubes, or boxes

- Metal tote boxes

- Electrostatic voltage levels and protective materials

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

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

5 Removal and replacement procedures 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.

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 17 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 two screws that must be removed, replaced, and/or loosened when servicing Customer Self-Repair parts. Make special note of the screw sizes and locations during removal and replacement.

Battery

Description	Spare part number
Battery 6 cell 62 WH 2.8 Ah LI	849911-850

Before removing the battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

Remove the battery:

⚠ **WARNING!**   To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

⚠ **CAUTION:**   Removing a user-replaceable battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work or shut down the computer through Windows before removing the battery.

1. Position the computer upside down on a flat surface.

2. Slide the battery release latch **(1)**, and then lift the battery **(2)**.

3. Remove the battery from the computer **(3)**.
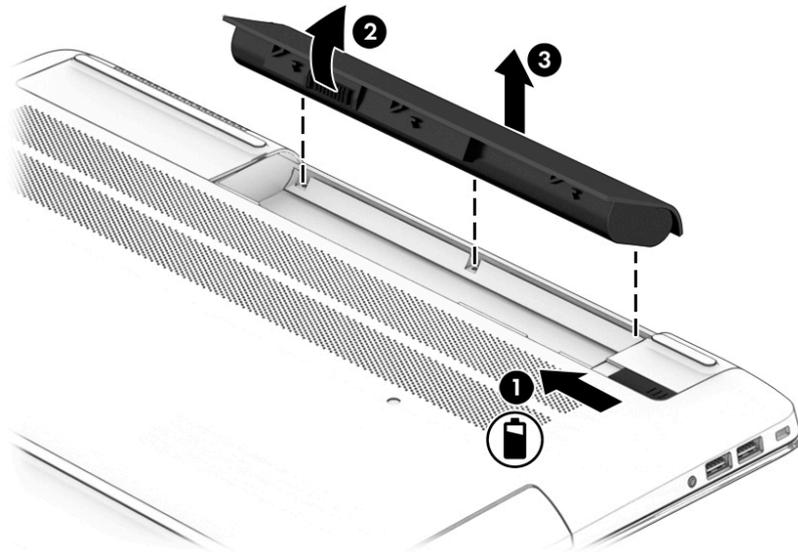
To insert the battery, reverse the removal procedures.

Optical drive

Description	Spare part number
Optical drive	
• DVD+/-RW Double-Layer SuperMulti	756564-038
• Blu-ray Disc R/RW with SuperMulti	729050-011
Optical drive bezel	862962-001

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

Before removing the optical drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the battery (see Battery on page 34).

Remove the optical drive:

1. Remove the Phillips M2.0 x 2.5 screw **(1)** securing the optical drive in the computer, and then slide drive **(2)** away from the computer.
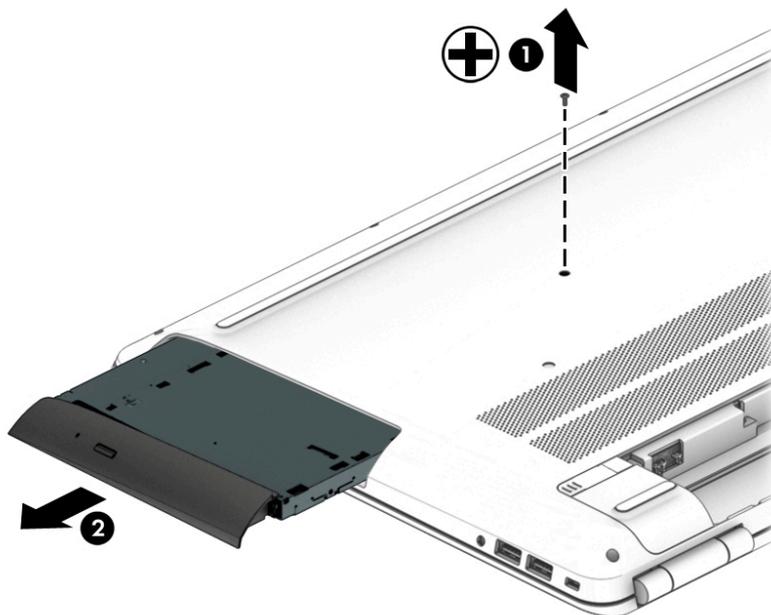
2. If it is necessary to disassemble the optical drive, perform the following steps:

    a. Remove the M2.0 x 2.5 screw **(1)** that secures the optical drive bracket to the optical drive, and then remove the bracket **(2)** from the optical drive.
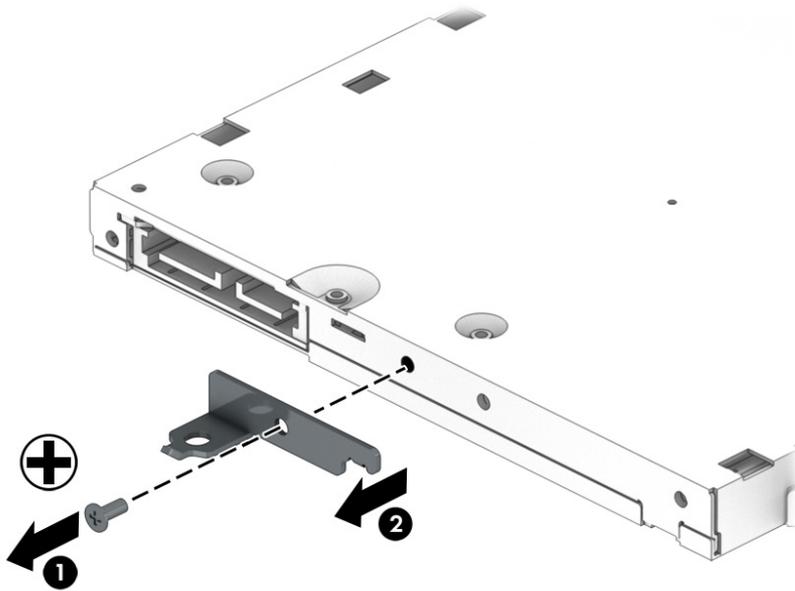
b. Press the release tab **(1)** and remove the bezel from the tab side **(2)**.

c. Remove the bezel **(3)** from the optical drive.
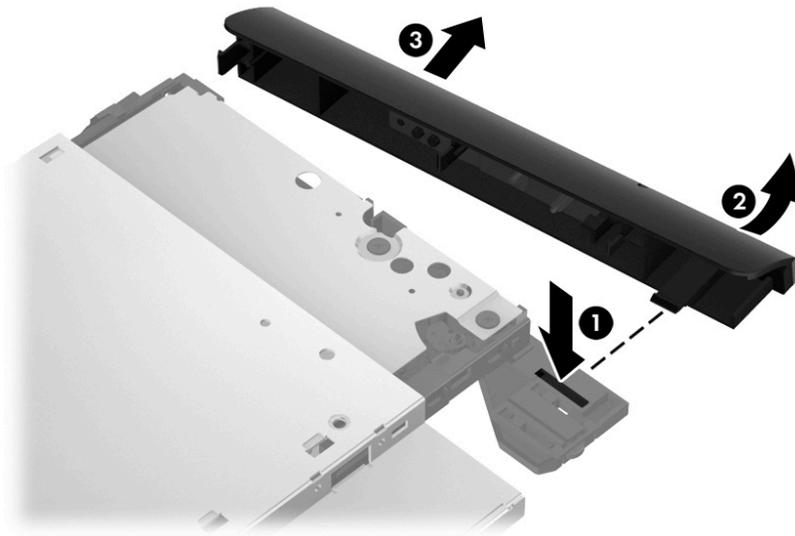
Reverse this procedure to install the optical drive.

6 Removal and replacement procedures for authorized service provider parts

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

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 17 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 may be as many as 85 screws that must be removed, replaced, and/or loosened when servicing the parts described in this chapter. Make special note of each screw size and location during removal and replacement.

Base enclosure

Description	Spare part number
Base enclosure in Twinkle Black	862960-001

Before removing the base enclosure, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

Remove the base enclosure:

1. Remove the four M2.0 x 4 screws **(1)** that secure the bottom front to the computer.
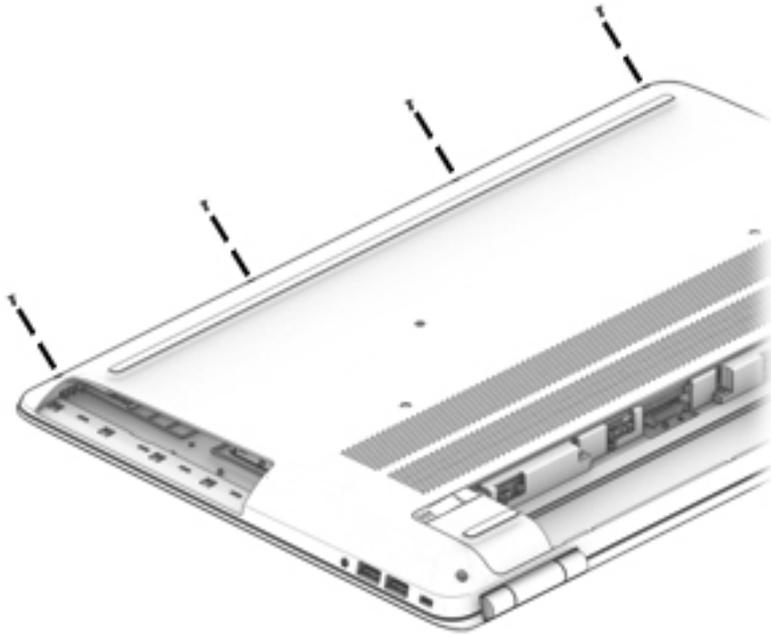
2. Remove the seven M2.0x6 screws **(1)** in the battery bay and on the bottom.

3. Lift the base enclosure **(2)** to remove it.
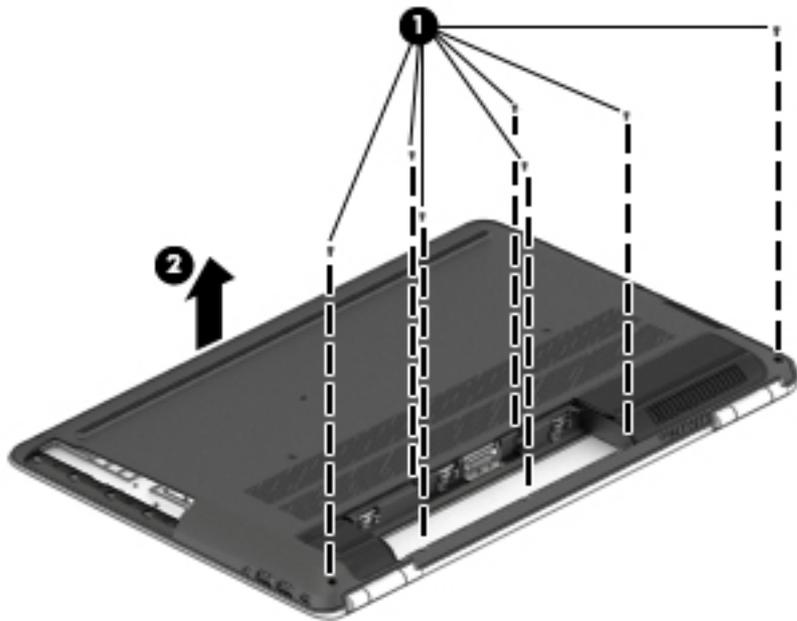
Reverse the removal procedures to install the base enclosure.

Hard drive

Description	Spare part number
Hard drive	
• 1 TB 5400 RPM SATA RAW HYBRID 8 GB	731999-005
• 2 TB 5400 RPM SATA RAW 9.5 mm	801808-005
• 1 TB 7200 RPM SATA RAW 9.5 mm	766644-005
Hard drive connector and cable	857462-001

Before removing the hard drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see)

   b. Optical drive (see)

   c. Base enclosure (see)

Remove the hard drive:

NOTE: Use minimal force when lifting the locking bar up on the ZIF connector and disconnecting the cable.

1. Open the zero insertion force (ZIF) connector to release the hard drive cable **(1)** from the system board.

2. Lift the hard drive **(2)** up, and then slide the drive **(3)** forward to remove it from the computer.
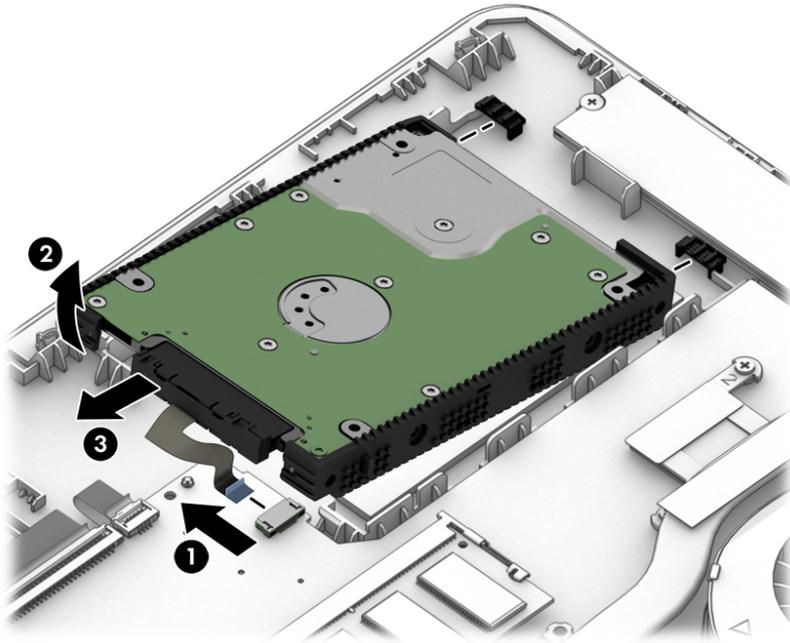
3. If it is necessary to disassemble the hard drive, perform the following steps:

a. Remove the hard drive cable connector **(1)** from the hard drive.

b. Slide the two hard drive brackets **(2)** off the hard drive.
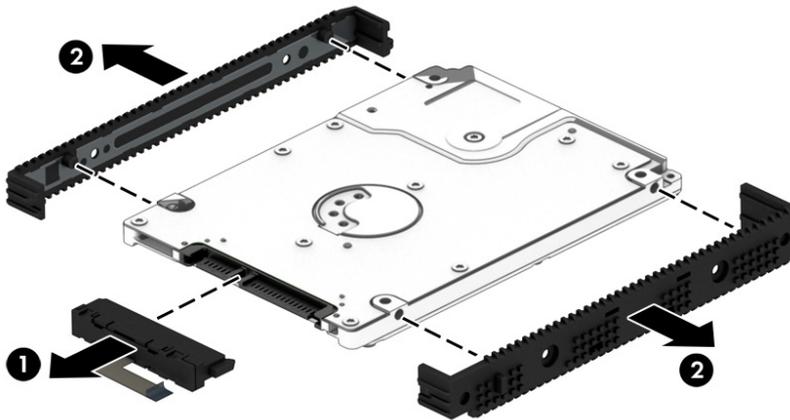
To remove the second hard drive, follow these steps:

1. Open the zero insertion force (ZIF) connector to release the hard drive cable **(1)** from the system board.

2. Lift the hard drive **(2)** up.

3. Release the hard drive from the notch **(3)**, and then slide the drive **(4)** forward to remove it from the computer.
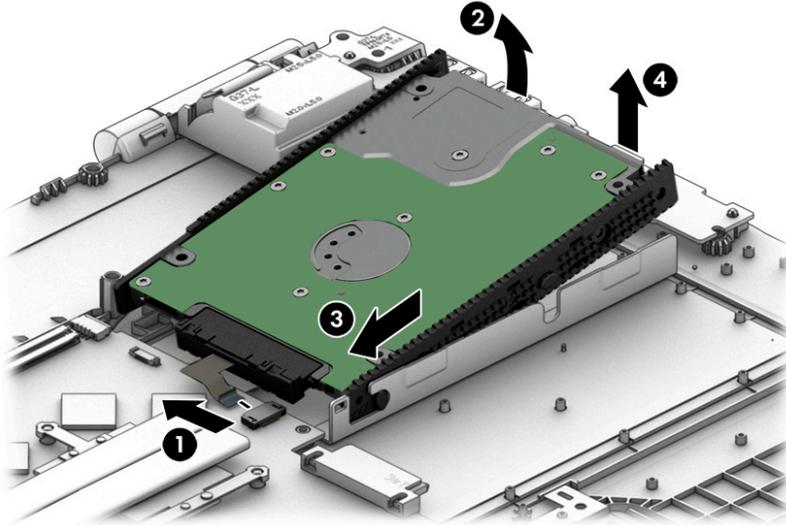
4. If it is necessary to disassemble the hard drive, perform the following steps:

    a. Remove the hard drive cable connector **(1)** from the hard drive.

    b. Slide the two hard drive brackets **(2)** off the hard drive.
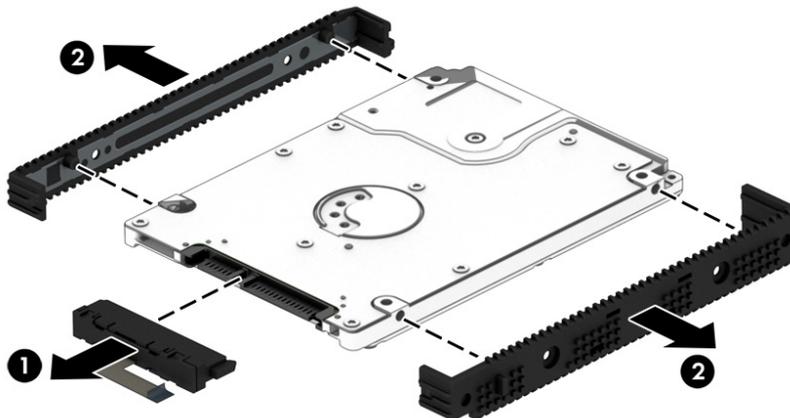
Reverse this procedure to reassemble and install the hard drive.

SSD (M.2)

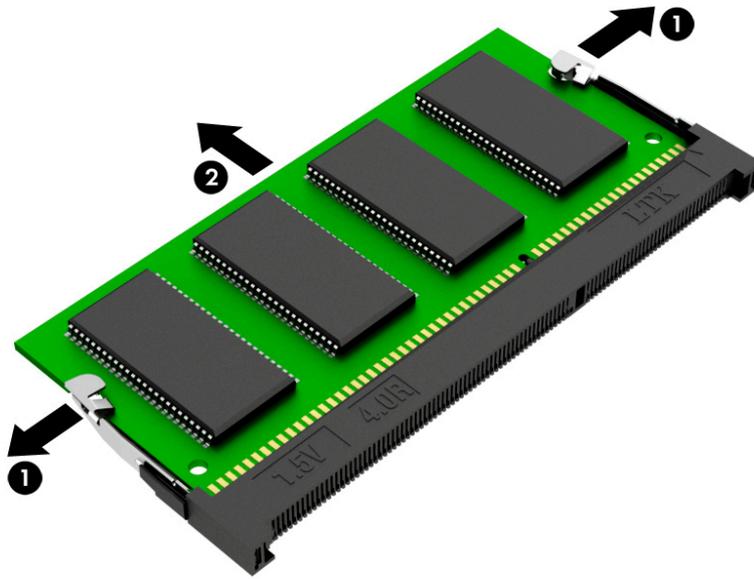| Description	Spare part number
M.2 SATA SSD, PCIe NVMe TLC	
• 128 GB 2280 M2 SATA-3 Value PA	827560-026
• 256 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847109-002
• 512 GB 2280 M2 PCIe 3x4SS NVMe TLC PA	847110-004

Before removing the SSD, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

    a. Battery (see)

    b. Optical drive (see)

    c. Base enclosure (see)

Remove the SSD:

1. Remove the Phillips M2.0 x 2.5 screw **(1)** that secures the SSD to the system board.

2. Remove the SSD **(2)** by pulling the drive away from the slot at an angle.
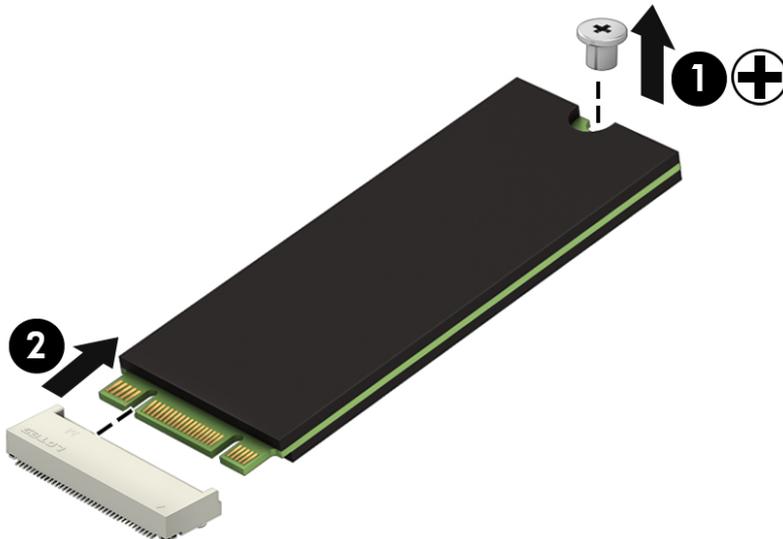
Reverse this procedure to install the SSD.

Memory module

Description	Spare part number
Memory	
2 GB SODIMM 2400 MHz 1.2 v DDR4 shared	864271-850
4 GB SODIMM 2400 MHz 1.2 v DDR4 shared	862397-850
8 GB SODIMM 2400 MHz 1.2 v DDR4 shared	862398-850

Update BIOS before adding memory modules

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

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

To update BIOS:

1. Navigate to http:\\www.hp.com.

2. Select **Support** , and then select **Software & drivers**.

3. In the **Enter my HP model number** box, type the computer model information, and then select **Find my product**.

   -or-

   Select **Identify now**.

4. Select the link for the computer model.

5. Select the language and the operating system.

6. Under the downloads heading, select the **BIOS** link.

7. Select the link for the most recent BIOS.

8. Select the **Download** button, and then follow the on-screen instructions.

Before removing a memory module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

Remove the memory module:

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

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

Reverse this procedure to install a memory module.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + Bluetooth 4.2 Combo Adapter (non vPRO)	793840-005

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

Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

Remove the WLAN module:

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

   📝 **NOTE:** The WLAN antenna cable labeled "1" connects to the WLAN module "Main" terminal labeled "1". The WLAN antenna cable labeled "2" connects to the WLAN module "Aux" terminal labeled "2".

2. Remove the Phillips M2.0 x 2.5 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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

📝 **NOTE:** WLAN modules are notched to prevent incorrect installation.
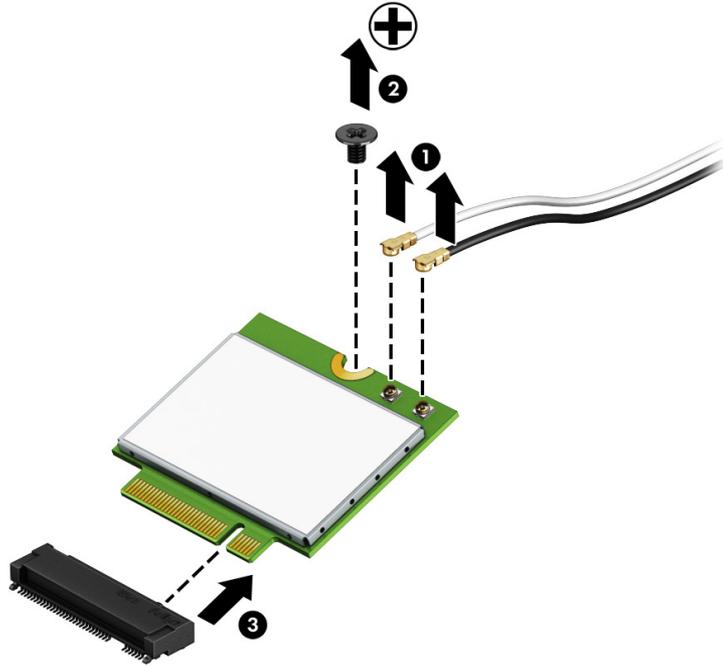
📝 **NOTE:** If the WLAN antenna cables are not connected to the terminals on the WLAN module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.
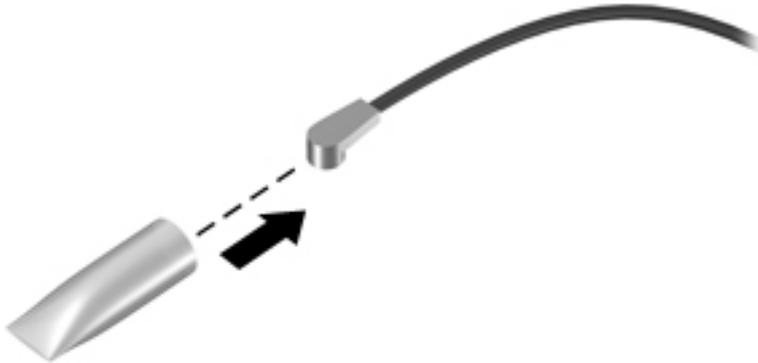
Reverse this procedure to install the WLAN module.

Right speaker

NOTE: The speaker spare part kit includes the cable.

Description	Spare part number
Speaker Kit (includes right and left speakers)	857474-001

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

Before removing the speaker, follow these steps:

1. Shut down the computer.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

Remove the right speaker:

1. Carefully disconnect the right speaker connector **(1)** from the system board.

2. Release the display cable from the routing channels **(2)**.

3. Remove the Phillips M2.0 x 4 screw and Phillips M2.5 x 5 screw **(3)**.

4. Lift the right speaker **(4)** to remove it.
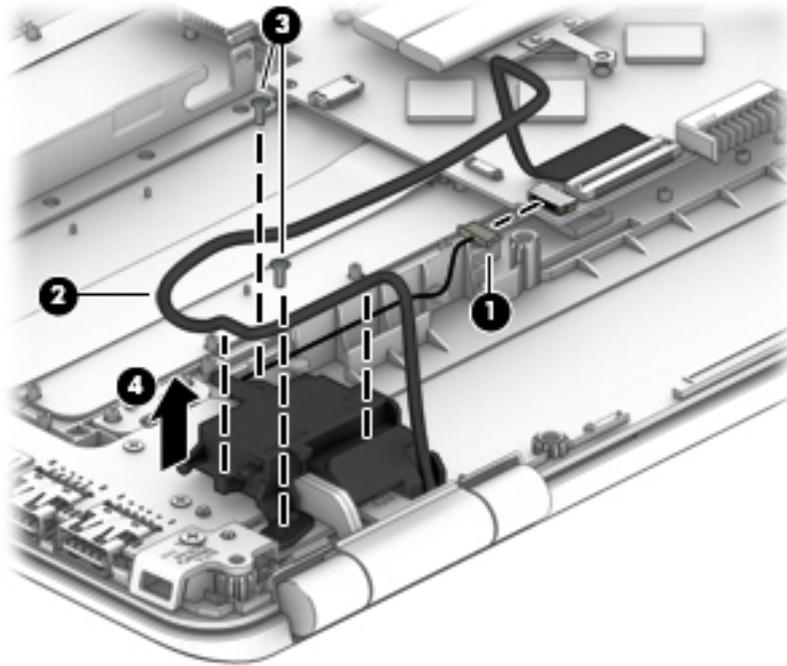
Reverse this procedure to install the right speaker.

USB board

Description	Spare part number
USB board	857470-001

Before removing the USB board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

   d. Right speaker (see Right speaker on page 47)

Remove the USB board:

1. Open the zero insertion force (ZIF) connector **(1)** and release the USB board cable.

2. Remove the two Phillips M2.0 x 4.0 screws **(2)** that secure the USB board to the computer.

3. Remove the USB board **(3)**.
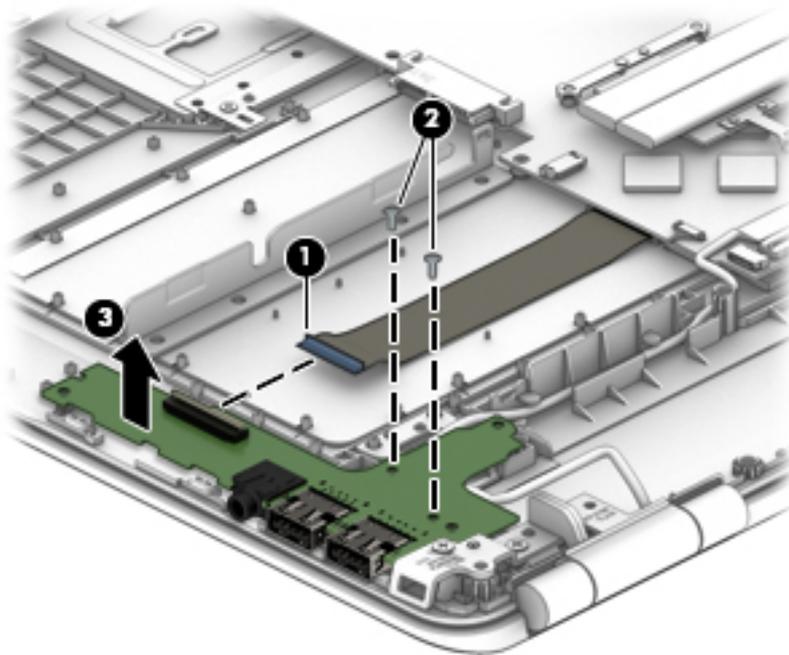
Reverse this procedure to install the USB board.

Fan

| Description	Spare part number
Fan (includes cable)	857463-001

Before removing the fan, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

   d. Disconnect the WLAN cable (see WLAN module on page 45)

Remove the fan:

1. Release the WLAN cable **(1)** from the clips on the left speaker clip and move the WLAN cable out of the way.

2. Disconnect the fan cable **(2)** from the system board.

3. Remove the three Phillips M2.0 x 4.5 screws **(3)** that secure the fan to the top cover.

4. Remove the fan **(4)**.
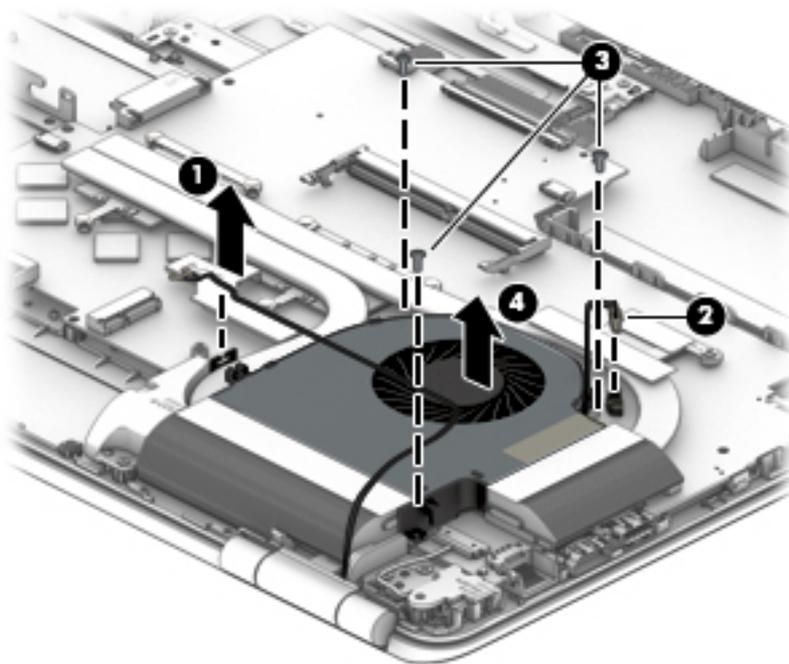
Reverse this procedure to install the fan.

Heat sink for discrete graphics memory

Description	Spare part number
Heat sink for discrete graphics memory (for products with Intel 6th generation processors only)	857895-001
Heat sink for discrete graphics memory (for products with Intel 7th generation processors only)	915470-001

Before removing the heat sink for discrete graphics memory, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

    a. Battery (see Battery on page 34)

    b. Optical drive (see Optical drive on page 35)

    c. Base enclosure (see Base enclosure on page 37)

    d. Hard drive (see Hard drive on page 39)

    e. SSD (see SSD (M.2) on page 42)

    f. Disconnect the WLAN cable (see WLAN module on page 45)

    g. Remove the fan (see Fan on page 50)

Remove the heat sink for discrete graphics memory:

1. Following the sequence stamped into the heat sink, remove the six Phillips M2.0 x 4 screws **(1)** and then carefully lift the heat sink **(2)** to remove it from the system board.

    NOTE: Due to the adhesive quality of the thermal material located between the heat sink and the system board components, it may be necessary to move the heat sink from side to side to detach it.
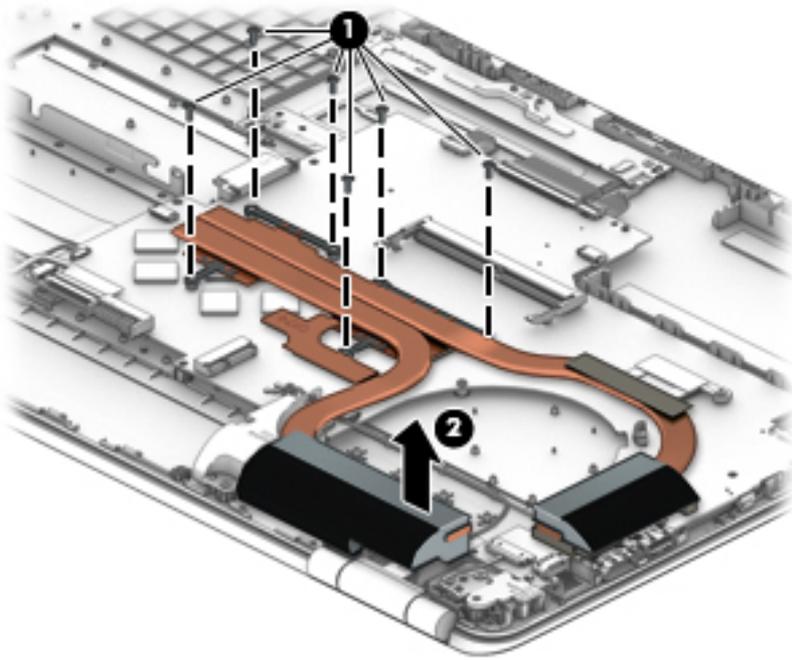
2. The following illustration shows the replacement thermal material locations. The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink and system board spare part kits.

Thermal paste is used on the system board components **(1)**, **(3)** and on the heat sink areas **(2)**, **(4)** that service them.
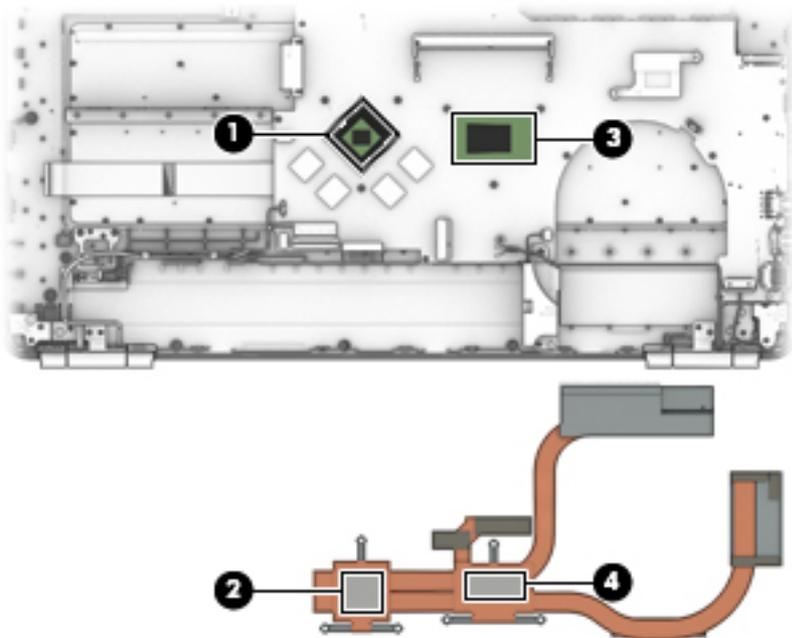
Reverse this procedure to install the heat sink for discrete graphics memory.

Left speaker

Description	Spare part number
Speaker Kit (includes left and right speakers)	857474-001

Before removing the speaker, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

    a. Battery (see Battery on page 34)

    b. Optical drive (see Optical drive on page 35)

    c. Base enclosure (see Base enclosure on page 37)

    d. Disconnect the WLAN cable (see WLAN module on page 45)

    e. Hard drive (see Hard drive on page 39)

    f. SSD (see SSD (M.2) on page 42)

    g. Remove the fan (see Fan on page 50)

    h. Remove the heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

Remove the left speaker:

1. Carefully disconnect the left speaker cable **(1)** from the computer.

2. Remove the two Phillips M2.0 x 4 screws **(2)** from the speaker.

3. Remove speaker **(3)** from the computer.
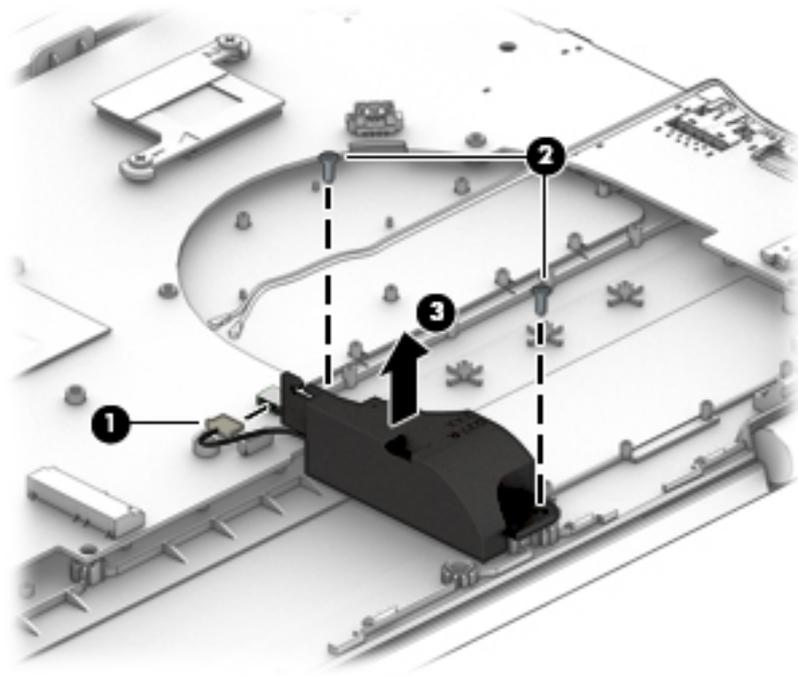
Reverse this procedure to install the left speaker.

heat sink for CPU and graphics

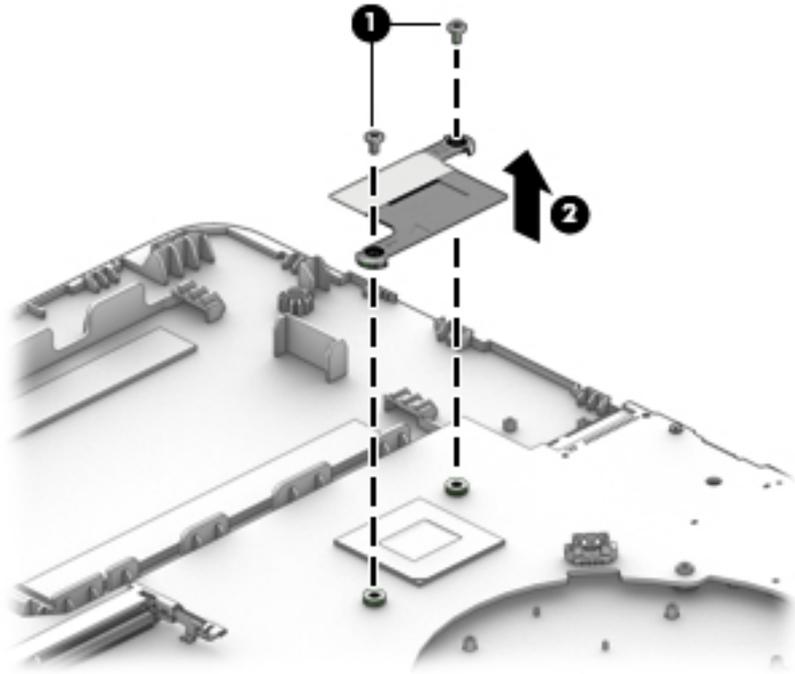| Description	Spare part number
heat sink for CPU and graphics	725625-001

Before removing the heat sink for CPU and graphics, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

   d. Hard drive (see Hard drive on page 39)

   e. SSD (see SSD (M.2) on page 42)

   f. Disconnect the WLAN cable (see WLAN module on page 45)

   g. Right speaker (see Right speaker on page 47)

   h. USB board (see USB board on page 49)

   i. Fan (see Fan on page 50)

   j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

   k. Left speaker (see Left speaker on page 53)

Remove the heat sink for CPU and graphics:

1. Remove the two Phillips screws **(1)** securing the heat sink to the system board.

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

Reverse this procedure to install the heat sink for CPU and graphics.

System board

Description	Spare part number
System board	
All system boards use the following part numbers:	
xxxxxx-001: Non-Windows operating systems	
xxxxxx-601 Windows 10 operating systems	
For products with Intel 6th generation processors	
• NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i7-6700HQ	857388-xxx
• NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i7-6700HQ	857389-xxx
• NVIDIA N16P-GX (GeForce GTX 960M), 2 GB i5-6300HQ	857390-601
• NVIDIA N16P-GX (GeForce GTX 960M), 4 GB i5-6300HQ	857391-601
For products with Intel 7th generation processors	
• NVIDIA N17 P-G0 (GeForce GTX 1060M), 2 GB i7-7700HQ	915466-xxx
• NVIDIA N17 P-G0 (GeForce GTX 1060M), 4 GB i7-7700HQ	915467-xxx
• NVIDIA N17 P-G0 (GeForce GTX 1050M), 2 GB i5-7300HQ	915468-xxx
• NVIDIA N17 P-G0 (GeForce GTX 1050M), 4 GB i5-7300HQ	915469-xxx
• NVIDIA N17 P-G1 (GeForce GTX 1050Ti), 4 GB i7-7700HQ	915550-xxx
• NVIDIA N17 P-G1 (GeForce GTX 1060M), 4 GB i5-7300HQ	915551-xxx
USB board cable	857454-001

📝 **IMPORTANT:**   Make special note of each screw and screw lock size and location during removal and replacement.

Before removing the system board, follow these steps:

1. Shut down the computer.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the following components:

    a. Battery (see Battery on page 34)

    b. Optical drive (see Optical drive on page 35)

    c. Base enclosure (see Base enclosure on page 37)

    d. Hard drive (see Hard drive on page 39)

    e. SSD (see SSD (M.2) on page 42)

    f. Disconnect the WLAN cable (see WLAN module on page 45)

    g. Right speaker (see Right speaker on page 47)

h. USB board (see USB board on page 49)

i. Fan (see Fan on page 50)

j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

k. Left speaker (see Left speaker on page 53)

NOTE: When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

● WLAN module (see WLAN module on page 45)

● Memory module (see Memory module on page 43)

● RTC battery (see RTC battery on page 60)

● heat sink for CPU and graphics (see heat sink for CPU and graphics on page 55)

Remove the system board:

1. If they are not already disconnected, disconnect the following cables from the system board (note the routing location of the cables when removing them):

NOTE: Use minimal force when lifting the locking bar up on a ZIF connector and disconnecting the cable.

(1) USB ribbon cable

(2) WLAN cable

(3) Display cable

(4) Right speaker cable

(5) Touchpad cable

(6) Keyboard cable

(7) Backlight cable

(8) Power in connection cable

(9) Left speaker

(10) WLAN cable
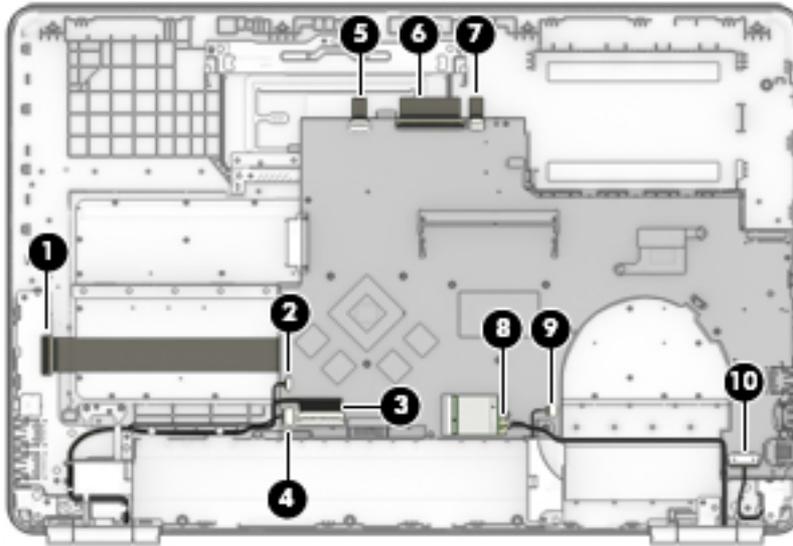
2. Lift the USB board ribbon cable **(1)** to release it from the adhesive securing it to the computer.

3. Remove the Phillips M2.0 x 4.0 screw **(2)** securing the system board to the computer.

4. Lift the system board **(3)**, and then remove it **(4)**.
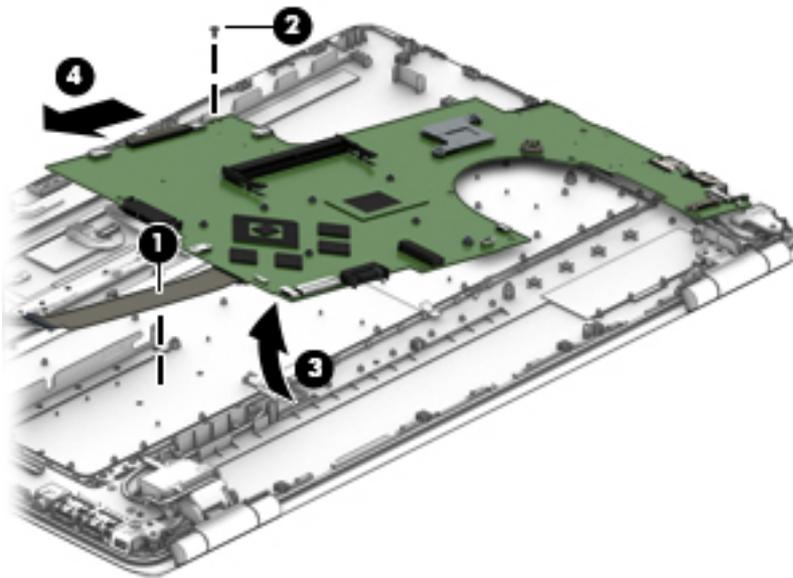
Reverse this procedure to install the system board.

📝 **IMPORTANT:** After system board replacement, be sure to complete post-installation tasks as required that may include:

● Verifying functionality of the computer

● Updating the BIOS; see Using Setup Utility (BIOS) on page 74

RTC battery

Description	Spare part number
RTC battery	861876-001

Before removing the RTC battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

    a. Battery (see Battery on page 34)

    b. Optical drive (see Optical drive on page 35)

    c. Base enclosure (see Base enclosure on page 37)

    d. Hard drive (see Hard drive on page 39)

    e. SSD (see SSD (M.2) on page 42)

    f. Release the WLAN cable (see WLAN module on page 45)

    g. Right speaker (see Right speaker on page 47)

    h. USB board (see USB board on page 49)

    i. Fan (see Fan on page 50)

    j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

    k. Left speaker (see Left speaker on page 53)

    l. System board (see System board on page 57)

Remove the RTC battery:

1. Carefully place the system board face down.

2. Use a thin tool **(1)** to release the battery from the battery holder, and then remove the battery **(2)**.
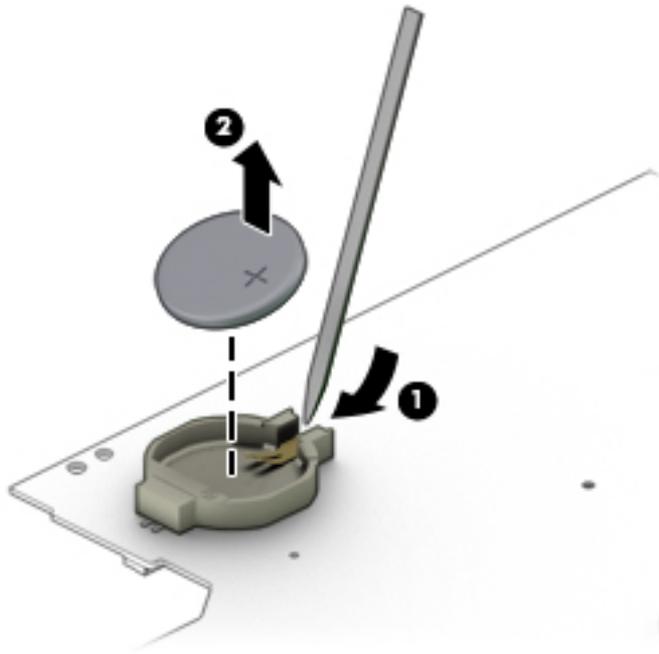
Reverse this procedure to install the RTC battery.

Power in connector

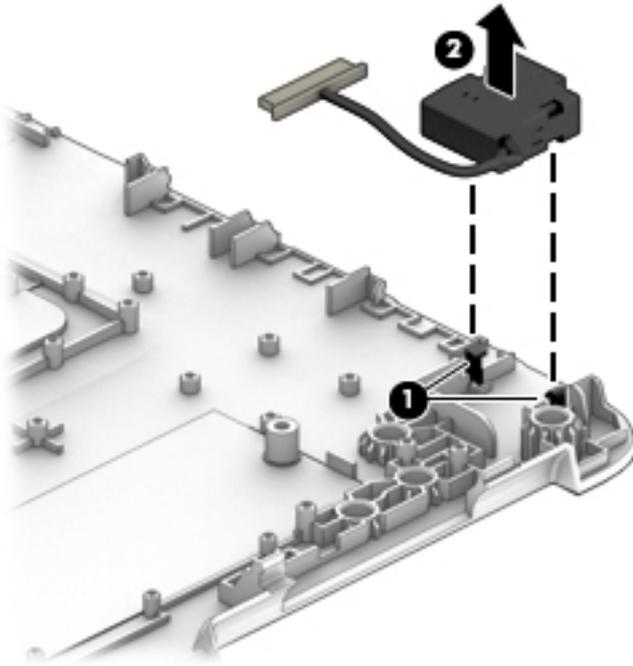| Description	Spare part number
Power in connector	858021-001

Before removing the power in connector, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

    a. Battery (see Battery on page 34)

    b. Optical drive (see Optical drive on page 35)

    c. Base enclosure (see Base enclosure on page 37)

    d. Hard drive (see Hard drive on page 39)

    e. SSD (see SSD (M.2) on page 42)

    f. Disconnect the WLAN cable (see WLAN module on page 45)

    g. Right speaker (see Right speaker on page 47)

    h. USB board (see USB board on page 49)

    i. Fan (see Fan on page 50)

    j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

    k. Left speaker (see Left speaker on page 53)

    l. System board (see System board on page 57)

Remove the power in connector:

1. Release the clips **(1)** holding the power in connector.

2. Remove the connector **(2)**.

Reverse this procedure to install the power in connector.

TouchPad board

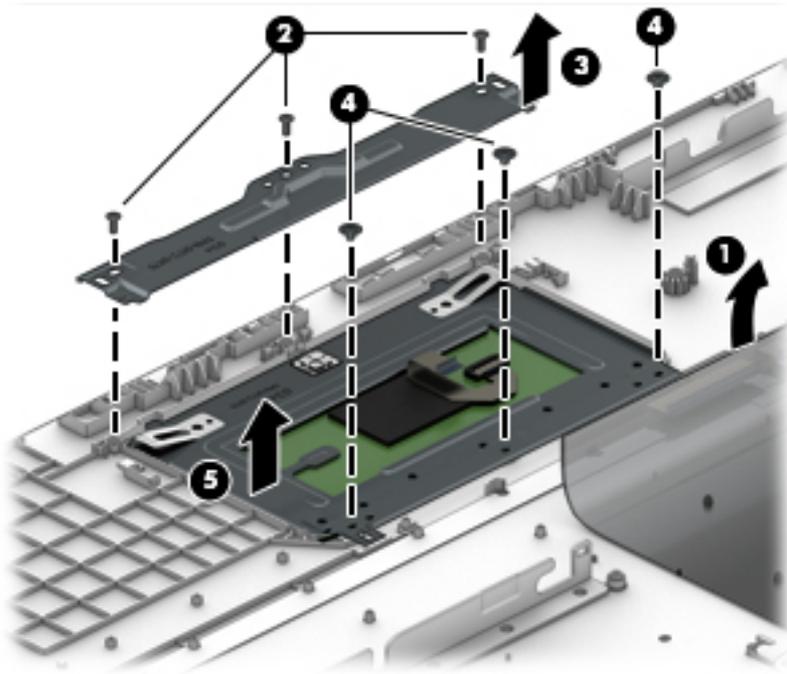| Description	Spare part number
TouchPad board	862959-001
TouchPad cable	857455-001

Before removing the TouchPad board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices from the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

   d. Hard drive (see Hard drive on page 39)

   e. SSD (see SSD (M.2) on page 42)

   f. Disconnect the WLAN cable (see WLAN module on page 45)

   g. Right speaker (see Right speaker on page 47)

   h. USB board (see USB board on page 49)

   i. Fan (see Fan on page 50)

   j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

   k. Left speaker (see Left speaker on page 53)

   l. System board (see System board on page 57)

Remove the TouchPad board:

1. Lift the plastic protector **(1)** away from the TouchPad.

2. Carefully remove the three Phillips M2.0 x 2.0 screws **(2)** that secure the TouchPad bracket to the computer.

3. Remove the TouchPad bracket **(3)** that secures the TouchPad board.

4. Remove the three Phillips M2.0 x 2.5 screws **(4)** that secure the TouchPad board, and then remove the TouchPad board **(5)** from the computer.

Reverse this procedure to install the TouchPad board.

Display assembly

Description	Spare part number
Antenna, dual	857443-001
Back cover in Shadow Mesh, includes dual antenna	862968-001
Camera	
• 3D camera (for products with Intel 6th generation processors only)	781624-005
• HD camera (for all products)	846006-003
Display bezel	
• For products with 3D camera	857451-001
• For products with HD camera	857450-001
Display cable	
• For products with non-touch FHD screen and HD camera	857456-001
• For products with non-touch FHD screen, 3D camera, and Intel 6th generation processors	857458-001
• For products with non-touch UHD screen and HD camera	857459-001
• For products with non-touch UHD screen, 3D camera, and Intel 6th generation processors	857461-001
Frame for HD camera	857475-001
Hinge caps	862955-001
Hinge kit (includes left and right hinges)	857464-001
Microphone board (for 3D camera only)	857471-001
Raw panel 43.94 cm (17.3")	
• Non-touch screen, FHD, AG, UWVA, 300 eDP, Flat4 GF	798926-009
• Non-touch screen, UHD, AG, UWVA, 300 eDP, 1.3 PSR, Flat GF	853322-003

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

Before removing the display assembly, follow these steps:

1. Shut down the computer.

2. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

3. Disconnect all external devices connected to the computer.

4. Remove the following components:

   a. Battery (see Battery on page 34)

   b. Optical drive (see Optical drive on page 35)

   c. Base enclosure (see Base enclosure on page 37)

   d. Hard drive (see Hard drive on page 39)

e. SSD (see SSD (M.2) on page 42)

f. Disconnect the WLAN cable (see WLAN module on page 45)

g. Right speaker (see Right speaker on page 47)

h. USB board (see USB board on page 49)

i. Fan (see Fan on page 50)

j. Heat sink for discrete graphics memory (see Heat sink for discrete graphics memory on page 51)

k. Left speaker (see Left speaker on page 53)

l. System board (see System board on page 57)

Remove the display assembly:

1. Remove the two Phillips screws from the right hinge and the two Phillips screws from the left hinge **(1)**, open the hinges **(2)** as wide as possible, and then remove the display assembly **(3)**.
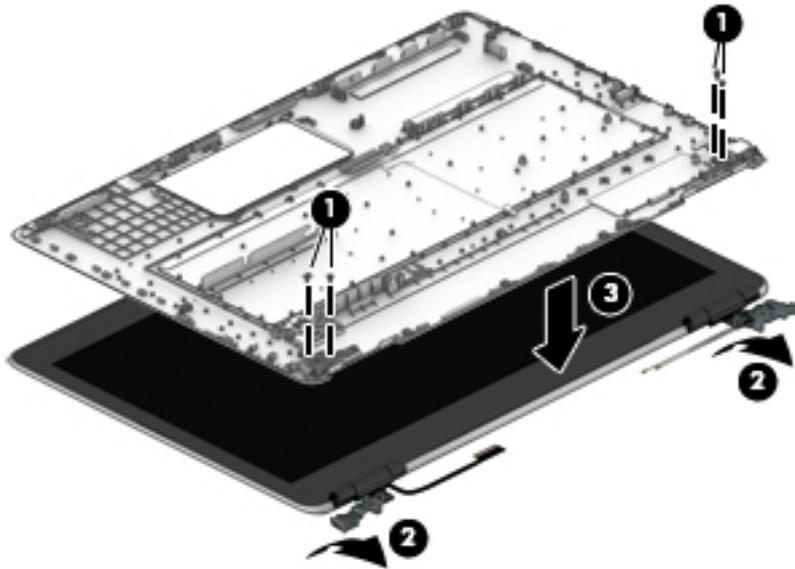
2. If it is necessary to replace the display bezel or any of the LED display assembly subcomponents:

a. Use a plastic tool to disengage the bezel starting at the top **(1)**, left and right sides **(2)**, and bottom **(3)**.

b. Remove the display bezel **(4)**.
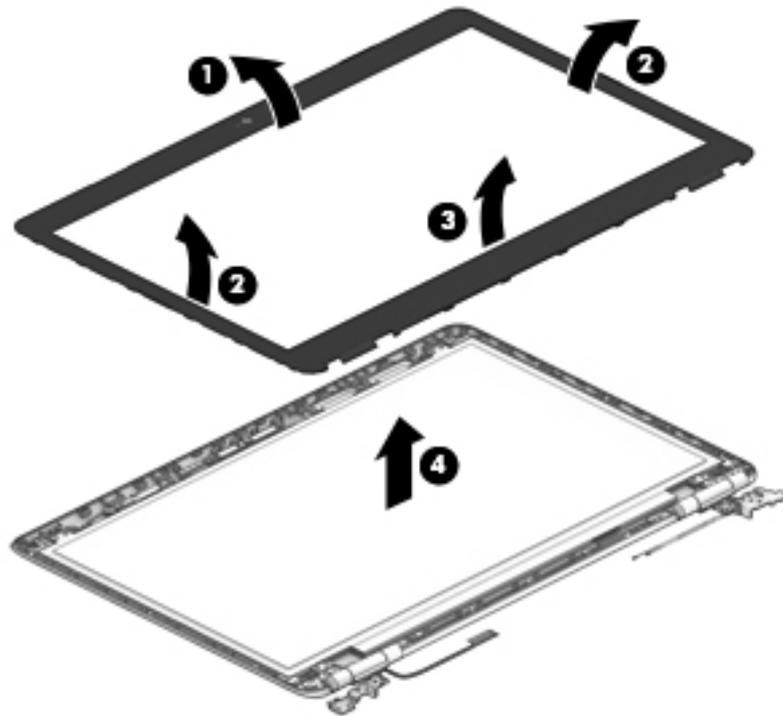
3. If it is necessary to replace the raw display panel, remove the four Phillips M2.0 x 3 screws **(1)** that secure the display panel to the display enclosure, and then lift the panel **(2)** to remove it.
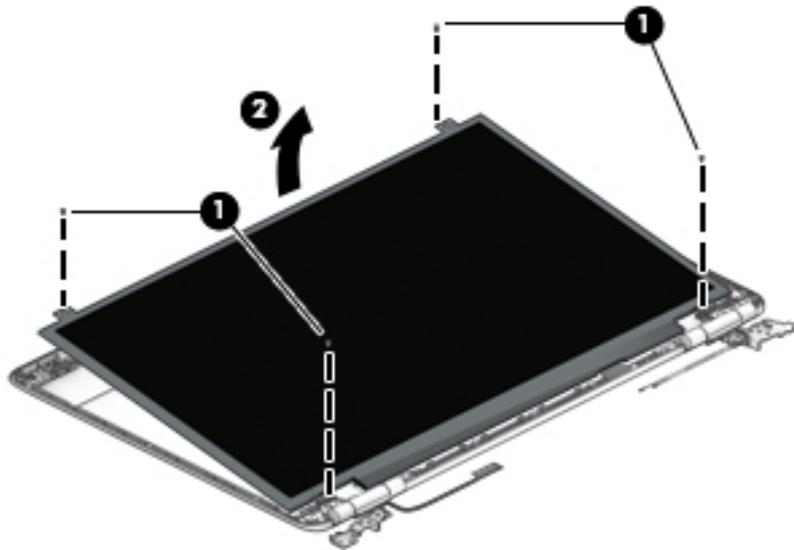
4. Remove the tape **(1)** covering the display panel connector, disconnect the connector **(2)** from the display panel, and then remove the panel **(3)**.
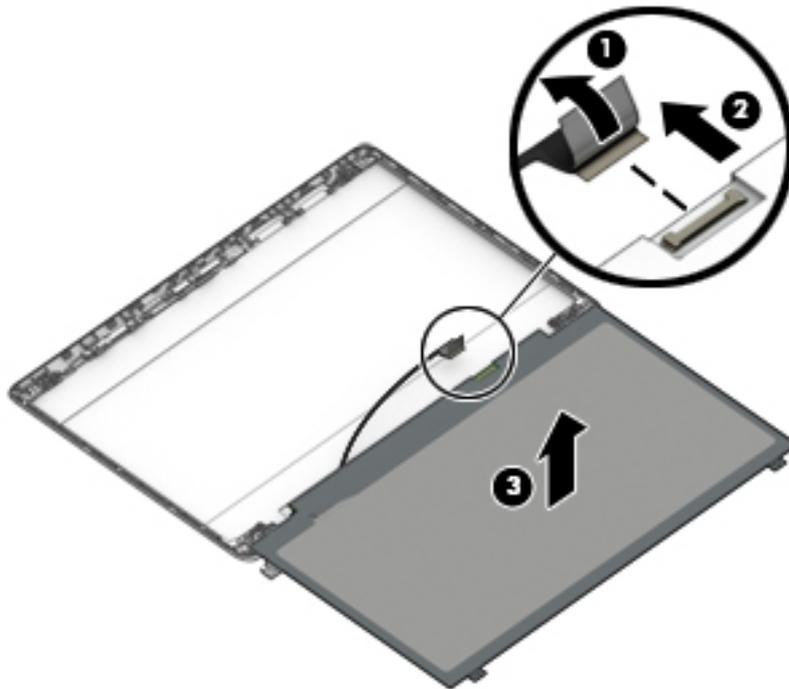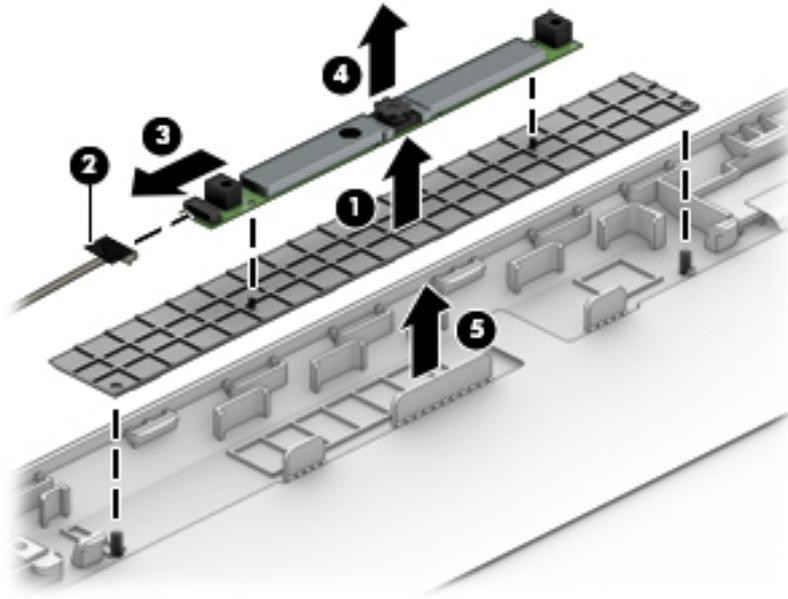

5. If it is necessary to replace the hinge brackets, remove the Phillips M2.0 x 3 screw **(1)** from the top and two Phillips M2.0 x 3 screws **(1)** from the bottom of each hinge bracket, remove the three Phillips M2.5 x 3 screws **(2)** from each hinge, and then remove the hinge brackets **(3)**.
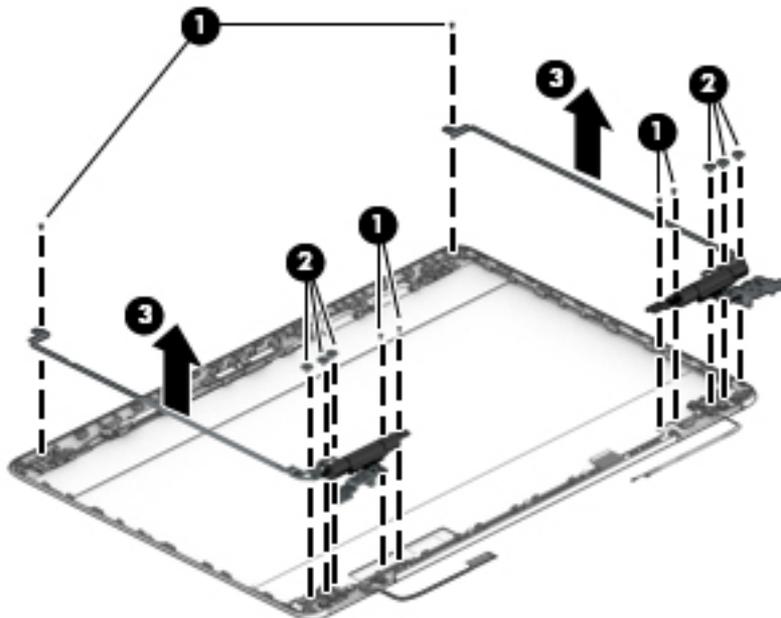
6. If it is necessary to replace the camera module:

⚠ **CAUTION:** Handle the module with caution. This module has a thin profile and is susceptible to damage when not handled carefully.

a. Lift up the camera module and cable **(1)**.

b. Lift the tape **(2)** covering the from the module, and remove the cable **(3)**.

c. Remove the camera module **(3)**.

d. For HD cameras only, lift the frame **(5)** to remove it from the display enclosure.

7. If it is necessary to replace the microphone module :

⚠ **CAUTION:** Handle the module with caution. This module has a thin profile and is susceptible to damage when not handled carefully.

a. Release the module clips **(1)** from the module, and detach the cable **(2)**.

b. Detach the camera or microphone module **(3)** from the display enclosure. (The module is attached to the display enclosure with double-sided adhesive.)
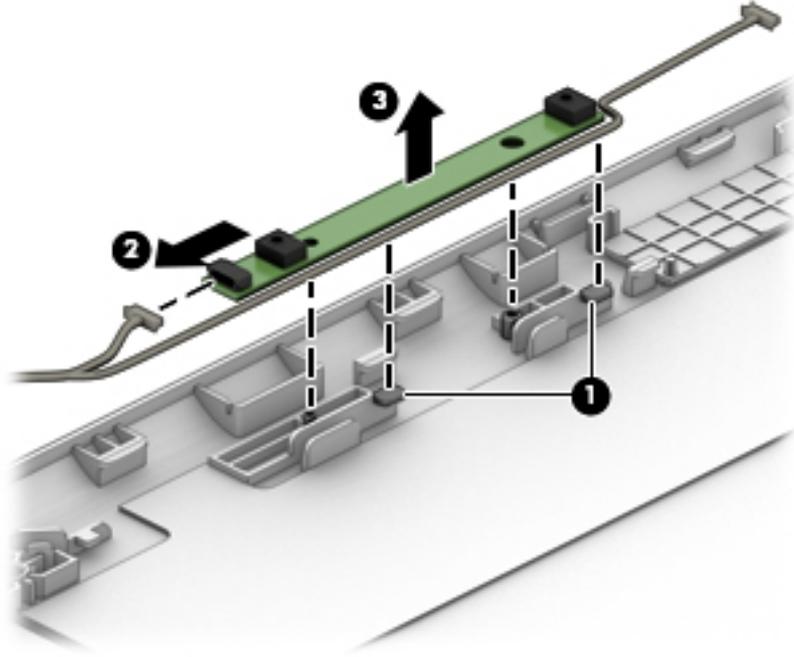
8. If it is necessary to replace the WLAN antennas:

   a. Release the WLAN antenna cable from the routing path **(1)** of the display enclosure.

   b. Carefully peel back the metallic tape **(2)** to release the wireless antenna transceivers from the display enclosure.

c. Remove the WLAN antenna cable **(3)** from the display enclosure.
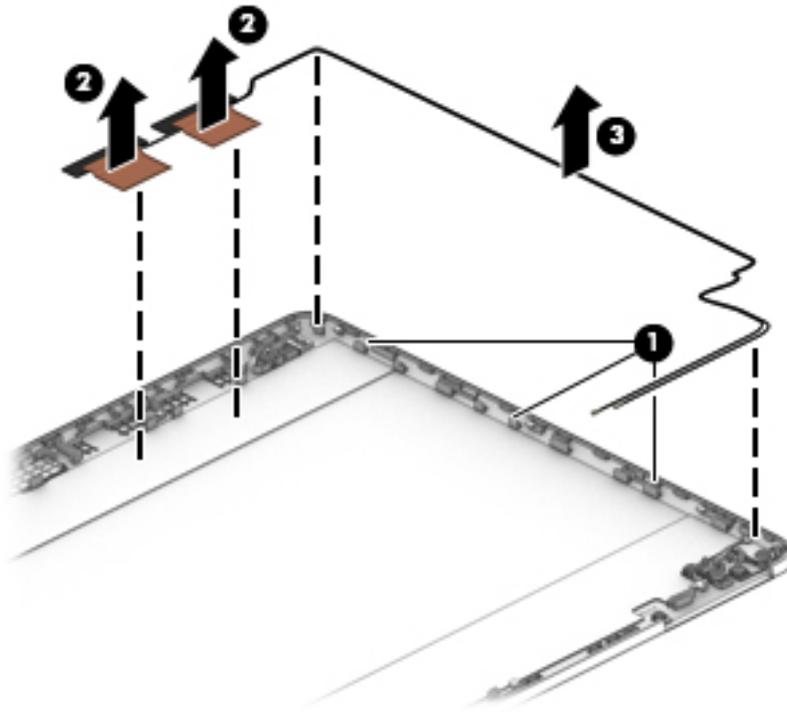
9. If it is necessary to replace the display cable:

a. Release the cable from the routing path **(1)** along the display enclosure.

b. Remove the cable **(2)**.
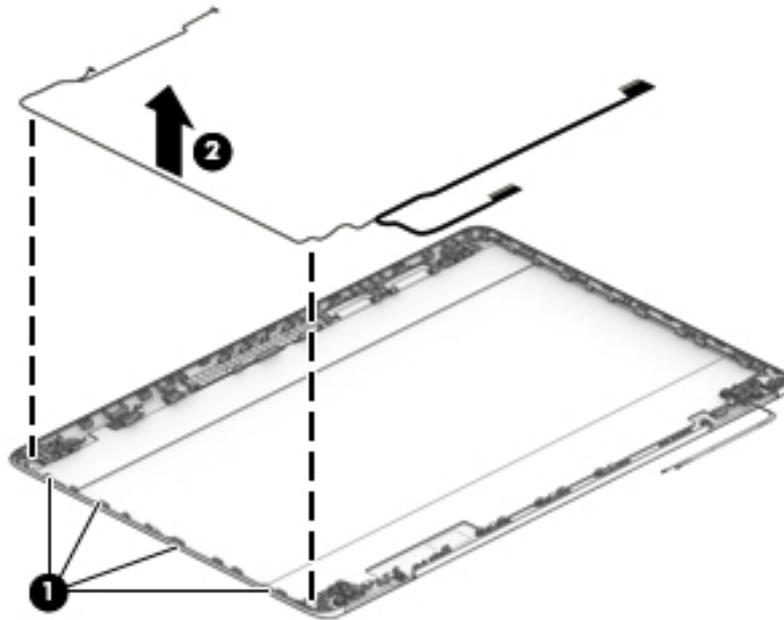
IMPORTANT: Use care when handling and installing the new antennas. Accidental bending of the antenna elements will detune the antenna and degrade the computer's performance.

Reverse this procedure to install the display assembly.

7   Using Setup Utility (BIOS)

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

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

Starting Setup Utility (BIOS)

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

▲   Turn on or restart the computer, quickly press esc, and then press f10.

Updating Setup Utility (BIOS)

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

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

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

Determining the BIOS version

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

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

- HP Support Assistant

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

      – or –

      Click the question mark icon in the taskbar.

  2.   Select **My PC**, and then select **Specifications**.

- Setup Utility (BIOS)

  1.   Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 74).

  2.   Select **Main**, select **System Information**, and then make note of the BIOS version.

  3.   Select **Exit**, select **No**, and then follow the on-screen instructions.

To check for later BIOS versions, see Downloading a BIOS update on page 75.

Downloading a BIOS update

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

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

- Do not shut down the computer or initiate Sleep.

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

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

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

   – or –

   Click the question mark icon in the taskbar.

2. Click **Updates**, and then click **Check for updates and messages**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS version, make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

1. Type `file` in the taskbar search box, and then select **File Explorer**.

2. Click 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.

8 Using HP PC Hardware Diagnostics (UEFI)

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

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

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

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

1. Turn on or restart the computer, and quickly press esc.

2. Press f2.

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

    a. Connected USB drive

        NOTE: To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 76.

    b. Hard drive

    c. BIOS

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

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

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

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

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

Download the latest UEFI version

1. Go to http://www.hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.

2. In the HP PC Hardware Diagnostics section, select the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product

1. Go to http://www.hp.com/support.

2. Select **Get software and drivers**.

3. Enter the product name or number.

   – or –

   Select **Identify now** to let HP automatically detect your product.

4. Select your computer, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

9 Backing up, restoring, and recovering

This chapter provides information about the following processes. The information in the chapter is standard procedure for most products.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP support assistant app.

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

– or –

Click the question mark icon in the taskbar.

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 keyboard to the keyboard dock before beginning any recovery process.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select products only. Choose the available method according to your computer model.

- Use HP Recovery Manager to create HP Recovery media after you successfully set up the computer. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select products only) on page 78. For information on the recovery options that are available using the recovery media, see Using Windows tools on page 79.

- Use Windows tools to create system restore points and create backups of personal information.

  For more information, see Recovering using HP Recovery Manager on page 80.

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

Creating HP Recovery media (select products only)

If possible, check for the presence of the Recovery partition and the Windows partition. From the **Start** menu, select **File Explorer**, and then select **This PC**.

- If your computer does not list the Windows partition and the Recovery partition, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

You can use Windows tools to create system restore points and create backups of personal information, see Using Windows tools on page 79.

- If your computer does list the Recovery partition and the Windows partition, you can use HP Recovery Manager to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and software programs that were installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

  ○ Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

  ○ HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.

  ○ To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.

  ○ If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub. If you cannot create DVD media yourself, you can obtain recovery discs for your computer from HP. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information on the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

  ○ Be sure that the computer is connected to AC power before you begin creating the recovery media.

  ○ The creation process can take an hour or more. Do not interrupt the creation process.

  ○ If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue.

To create HP Recovery media:

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

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.

2. Select **Create recovery media**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 80.

Using Windows tools

You can create recovery media, system restore points, and backups of personal information using Windows tools.

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

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

▲ Select the **Start** button, and then select the **Get started** app.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

IMPORTANT: Not all methods are available on all products.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see the Get started app.

  ▲   Select the **Start** button, and then select the **Get started** app.

- If you need to correct a problem with a preinstalled application or driver, use the Reinstall drivers and/or applications option (select products only) of HP Recovery Manager to reinstall the individual application or driver.

  ▲   Type `recovery` in the taskbar search box, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select products only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

- On select products, if you want to recover the computer's original factory partition and content, or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 80.

- On select products, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select products only) on page 83.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from HP, or by using the HP Recovery partition (select products only). If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

- To use the Factory Reset option (select products only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 78.

- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP

website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

IMPORTANT: HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

NOTE: Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.

- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select products only) allows System Recovery only.

Using the HP Recovery partition (select products only)

The HP Recovery partition allows you to perform a system recovery without the need for recovery discs or a recovery USB flash drive. This type of recovery can be used only if the hard drive is still working.

To start HP Recovery Manager from the HP Recovery partition:

IMPORTANT: For a tablet with a detachable keyboard, connect the keyboard to the keyboard dock before beginning these steps (select products only).

1. Type recovery in the taskbar search box, select **Recovery Manager**, and then select **HP Recovery Environment**.

    - or-

    For computers or tablets with keyboards attached, press f11 while the computer boots, or press and hold f11 as you press the power button.

    For tablets without keyboards:

    Turn on or restart the tablet, and then quickly hold down the volume down button; then select f11.

    - or -

    Turn on or restart the tablet, and then quickly hold down the Windows button; then select f11.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media, and then restart the computer.

    NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See .

3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which 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.

To change the boot order:

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

1. Insert the HP Recovery media.

2. Access BIOS:

   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, and then quickly hold down the volume down button; then select **f9**.

   - or -

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

3. Select the optical drive or USB flash drive from which you want to boot.

4. Follow the on-screen instructions.

Removing the HP Recovery partition (select products only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you will not be able to perform System Recovery or create HP recovery media from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select products only) on page 78.

NOTE: The Remove Recovery Partition option is only available on products that support this function.

Follow these steps to remove the HP Recovery partition:

1. Type `recovery` in the taskbar search box, and then select **HP Recovery Manager**.

2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

10 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**41.68 cm**	16.41 in
Depth	**27.95 cm**	11.0 in
Height (front to back)		
● Touch	**3.09 cm**	1.22 in
● Non-touch	**2.99 cm**	1.18 in
Weight		
● Touch	**3.08 kg** (depending on configuration)	6.78 lbs (depending on configuration)
● Non-touch	**2.85 kg** (depending on configuration)	6.28 lbs (depending on configuration)
Input power		
Operating voltage and current	19.5 V dc @ 7.70 A – 150 W	
	19 V dc @ 6.15 A – 120 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

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

43.94 cm (17.3 in) display specifications

	Metric	U.S.
Dimensions		
Diagonal size	**43.94 cm**	17.3 in
Thickness	**4.2 mm**	0.165 in
Brightness	300 nits (cd/m²)	
Resolution		
● Touch	1920x1080	
● Non-touch	3840x2160	
Backlight	WLED	
Surface treatment	AntiGlare	
Companion standard		
● Touch	eDP	
● Non-touch	eDP+PSR	
Viewing angle	SVA	

Hard drive specifications

	1 TB*	2 TB*
Dimensions		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	115 g	115 g
Interface type	SATA	SATA
Transfer rate	Synchronous (maximum) 300 MB/s (Drive Capability)	
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	1.4 ms	1.4 ms
Average	10 ms	10 ms
Maximum	12 ms	12 ms
Logical blocks	1,938,921,461	3,877,842,922
Disk rotational speed	7200 rpm	5400 rpm
Operating temperature	**0°C to 60°C** (0°F to 140°F)	**0°C to 60°C** (0°F to 140°F)

*Size refers to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.

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

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

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	ISI	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 HO5VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

Country/region	Accredited agency	Applicable note number

3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3-conductor, 0.75 mm² or 1.00 mm2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

12   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

HP Recovery Manager   80
    media   81
    starting   81
    supported discs   79
    system   80
    USB flash drive   81
    using HP Recovery media   79
recovery media
    creating   78
    creating using HP Recovery
      Manager   79
recovery partition
    removing   83
regulatory information
    regulatory label   18
    wireless certification labels   18
removal/replacement
    procedures   33, 37
RJ-45 (network) jack, identifying   7
RJ-45 (network) status lights,
  identifying   7
RTC battery
    removal   60
    spare part number   22, 60

S
screw kit
    spare part numbers   27
security cable slot, identifying   8
security, product description   5
serial number   17
serial number, computer   17
service labels, locating   17
serviceability, product description   5
slots
    memory card reader   7
    security cable   8
speaker
    removal   47, 53
    spare part numbers   47, 53
speakers
    identifying   13
    spare part numbers   21, 22
specifications
    computer   84
    display   85
    hard drive   85
SSD
    removal   42

spare part number   42
    spare part numbers   22, 42
supported discs, recovery   79
system board
    removal   57
    spare part numbers   22, 57
system recovery   80
system restore point
    creating   79
system restore point, creating   78

T
TouchPad
    buttons   11
TouchPad board
    removal   64
    spare part number   22, 64
Touchpad board cable
    spare part numbers   22
TouchPad zone, identifying   11
traveling with the computer   18

U
USB 2.0 port, identifying   8
USB 3.0 port, identifying   7, 8
USB board
    removal   49
    spare part number   22, 49
USB board cable
    spare part number   22

V
vents, identifying   16, 17
video, product description   3

W
Windows
    system restore point   78, 79
Windows key, identifying   14
Windows tools
    using   79
wireless certification label   18
wireless, product description   4
WLAN
    spare part number   22
WLAN antennas, identifying   9, 10
WLAN device   18
WLAN label   18
WLAN module
    removal   45
    spare part number   45