HP ENVY Notebook
Intel Models 17–n100 17–n199
3D camera Models 17–r100 17–r199
(worldwide)
3D camera Models m7–r100 m7–r199 (North
America)

Maintenance and Service Guide

Product notice

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

Not all features are available in all editions of Windows 8. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows 8 functionality. See for http://www.microsoft.com details.

Software terms

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

For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

Safety warning notice

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

Table of contents

1 Product description

Category	Description
Product Name	HP ENVY Notebook
	HP ENVY m7 Notebook (for 3D camera in North America — supporting models 17–r100 — 17–r199)
	3D camera Models 17-r100 17-r199 (worldwide)
Processors	**6th generation Intel® Core™ i7 Processor**
	Intel Core i7-6700HQ (2.6 GHz, turbo up to 3.5 GHz), 1600 MHz/6 MB L3, Quad 45 W
	Intel Core i7-6500U (2.5 GHz, turbo up to 3.1 GHz), 1600 MHz/3 MB L3, Dual 15 W
	6th generation Intel Core i5 Processor
	Intel Core i5-6200U (2.3 GHz, turbo up to 2.8 GHz), 1600 MHz/3 MB L3, Dual 15 W
	5th generation Intel® Core™ i7 Processor
	Intel Core i7–5500U (2.4 GHz, SC turbo up to 3.0 GHz), 1600 MHz/4 MB L3, Dual 15 W (models with discrete graphics only)
	5th generation Intel Core i5 Processor
	Intel Core i5-5200U (2.2 GHz, SC turbo up to 2.7 GHz), 1600 MHz/3 MB L3, Dual 15 W
Chipset	Intel HM170 Express Chipset (C-2 step), (supports Intel SKL H processor 2-chip BGA)
	Integrated SoC (supports Intel SKL U processor 1-chip BGA)
	Intel Wildcat Point-LP PCH (supports Intel BDW U processor 1-chip BGA)
Graphics	**Internal graphics:**
	Intel HD Graphics 530 (supports SKL H)
	Intel HD Graphics 520 (supports SKL U)
	Intel HD Graphics 5500 (supports BDW U)
	Hybrid graphics:
	● VIDIA N16S-GT (GeForce 940M) with up to 2048 MB or 4096 MB of dedicated video memory (256 Mx16 DDR3 900 MHz x 4 PCs, 1 GHz bridge to 900 MHz)
	● NVIDIA N16P-GT (GeForce GTX 950M) with 4096 MB of dedicated video memory (256 Mx16 DDR3L 900 MHz x 8 PCs, 1 GHz downgraded to 900 MHz)
	Support HD Decode, DX11, and HDMI
	Supports Optimus
	Supports GPS (GPU Performance Scaling)
Panel	● **16:9 Ultra Wide Aspect Ratio** (43.9-cm 17.3in), FHD, WLED, SVA, Antiglare (1920×1080) flat 4.0 mm, typical brightness: UWVA, eDP300 nits (touch panel)
	Flush glass panel cover support - antiglare panel for touch screens
	Touch solution with flush glass, multitouch enabled
	3D camera touch and non-touch panels are different

Category	Description
	Support LVDS (co-layout with eDP1.2)
Memory	Two non-accessible/upgradable memory module slots
	DDR3L-1600 dual channel support
	Support for 16-GB of system RAM in the following configurations:
	● 16384-MB total system memory (8192×2)
	● 12288-MB total system memory (8192×1) + (4096×1)
	● 8192-MB total system memory (8192×1) or (4096×2)
	● 4096-MB total system memory (4096×1)
Hard drive	Supports **6.35-cm** (2.5-in) SATA hard drives in **9.5 mm** (.37 in) and **7.0 mm** (.28 in) thicknesses
	Accelerometer / HDD protection support
	Support for 2nd HDD
	Support for SATA HDD (Port1)
	Support for m.2 SSD (support storage function, assuming SSD >= 128 G, Port0)
	Single HDD configurations:
	Support for the following single hard drive configurations:
	● 2-TB, 5400-rpm, 9.5-mm
	● 1-TB, 5400-rpm, 9.5-mm
	● 750-GB, 5400-rpm, 9.5-mm
	SSHD configurations
	● 1-TB 5400-rpm 9.5–mm SSHD w/8 GB NAND
	Dual storage configurations:
	● 1-TB + 256 GB M.2 SATA SSD (TLC)
	● 4-TB: 2-TB (5400-rpm) x 2
	SSD configurations:
	, (available for i7 + GTX PCA)
	● 512 GB M.2 SATA SSD (TLC)
	● 128 GB M2 SATA-3 (TLC)
	● 128 GB M2 SATA-3 (TLC) value
Optical drive	Fixed, serial SATA, 9.5-mm tray load
	DVD+/-RW Double-Layer SuperMulti
	Blu-ray Disc R/RW with SuperMulti
	Supports zero power optical drive
	Supports M-disc
Webcam and microphone	**HP TrueVision HD**: HD camera (fixed, no tilt with activity LED, 1280×720 by 30 frames per second)
	Dual array digital microphones with appropriate software - beam forming, echo cancellation, noise suppression
	HP Noise Cancellation

Category	Description
	Supports Voice Recognition
	Intel RealSense 3D camera - activity LED, USB 3.0
	1080p by 30 frames per second
	4x depth resolution, 480x640
	85° diagnal field of view
	Dual array Digital Microphones with software
	Windows Hello
	Enable HP Noise Cancellation
	Supports Voice Recognition
Audio	Bang & Olufsen
	Quad speakers
	Subwoofer
Ethernet	Integrated 10/100/1000 network interface card (NIC)
Sensor	Accelerometer (for hard drive protection support)
Wireless networking	**Integrated Wireless options with dual antenna (M.2/PCIe):**
	• Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter
	• Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter
	• Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + Bluetooth 4.0 Combo Adapter
	• Igntel Dual Band Wireless-AC 7265BN 802.11 b/g/n 2x2 WiFi + Bluetooth 4.0 Combo Adapter
	• Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + Bluetooth 4.0 Combo Adapter
	Compatible with Miracast-certified devices
	Connected Standby support
External media cards	HP Multi-Format Digital Media Card Reader
	Supports SD/SDHC/SDXC
	Push-Push Insertion/Removal
Internal card expansion	One M.2 slot for WLAN
	One M.2 slot for SSD
Ports	HDMI version 1.4 supporting 1920 ×1200 @ 60 Hz
	Hot Plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video
	AC Smart Pin adapter plug
	Headphone/microphone combo jack
	RJ-45 (Ethernet)
	USB 3.0 ports (two on left side, two on right side)
Keyboard/pointing devices	Full size keyboard with numeric keypad
	Touchpad requirements:
	• Clickpad with image sensor

Category	Description
	• Multitouch gestures enabled (default on: 2-finger scroll, pinch, rotate, 2-finger click, 3-finger flick)
	• Support Windows 10 Modern Trackpad Gestures
	• Taps enabled as default
Power requirements	**AC adapters:**
	AC Adapter 65-W Smart nPFC, 3 pin, RC 4.5mm connector (models with discrete graphics only)
	AC Adapter 65-W EM Smart nPFC, 3 pin, RC 4.5mm connector (models with discrete graphics in India/China only)
	AC Adapter 90-W Smart nPFC, 3 pin, RC 4.5mm connector (models with discrete graphics only)
	AC Adapter 120-W 3 pin, 4.5 mm connector
	1 meter power cord
	Battery:
	4-cell, 41-Whr, 2.2Ah, li-ion battery
	6-cell battery - 62 Whr (2.8 Ah)
Security	Support for the following:
	• Security Lock
	• Fingerprint Reader (optional —m7 branding no support).) with software support (HP Simple Pass)
Operating system	**Preinstalled:**
	Microsoft Windows 10 Standard
	FreeDos 2.0 only support non-touch and non-3D Camera
Serviceability	• AC adapter
	• Battery
	• Optical drive

2   External component identification

Right side

Component			Description
(1)		Memory card reader	Reads optional memory cards that enable you to store, manage, share or access information.
			To insert a card:
			1. Hold the card label-side up, with connectors facing the computer.
			2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated.
			To remove a card:
			▲ Press in on the card, and then remove it from the memory card reader.
(2)		USB 3.0 charging (powered) port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub. Standard USB ports will not charge all USB devices or will charge using a low current. Some USB devices require power and require you to use a powered port.
			NOTE: USB charging ports can also charge select models of cell phones and MP3 players, even when the computer is off.
(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)		AC adapter light	● White: The AC adapter is connected and the battery is fully charged.

		• Amber: The AC adapter is connected and the battery is charging.
		• Off: The battery is not charging.
(7)	(power connector icon)	Power connector	Connects an AC adapter.

Left side

Component		Description
(1) (lock icon) 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) (SS USB icon)	USB 3.0 port (2)	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(3) (headset icon)	Audio-out (headphone)/Audio-in (microphone) 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 microphone-only devices. **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*. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).
(4) (drive icon)	Drive light	• Blinking white: The hard drive or optical drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(5) (power icon)	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 components.

Component		Description
		● Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(6)	Optical drive	Depending on your computer model, reads an optical disc or reads and writes to an optical disc.

Display 3D camera (select products only)

Component		Description
(1)	WLAN antennas* (2)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	IR camera sensor (select products only)	A sensor used with the 3D camera.
(3)	Webcam light	On: The webcam is in use.
(4)	3D camera (select products only)	A 3D camera captures 3D images and displays them on the computer screen. It includes additional hardware (a 3D camera sensor and a 3D laser projector) plus special software. To learn more about using a 3D camera, open the Intel RealSense app **Welcome to Intel RealSense**. To access the 3D camera apps, go to the **Intel RealSense Technology** app.
(5)	IR laser projector (select products only)	A laser projector used with the 3D camera
(6)	Internal microphones (2)	Records sound.

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

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

Display
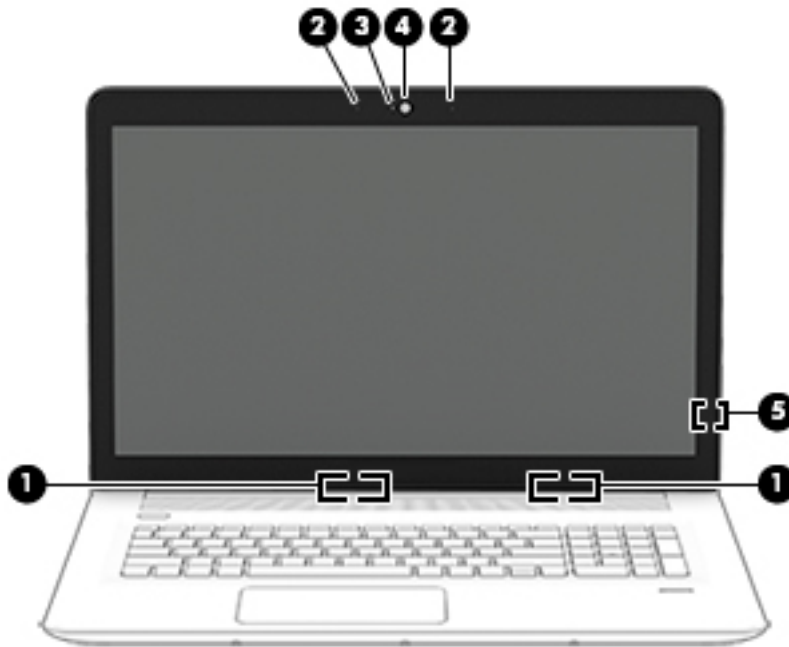
Component		Description
(1)	WLAN antennas* (2)	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2)	Internal microphones (2)	Record sound.
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
(5)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.
		NOTE: The internal display switch is not visible from the outside of the computer.

*The antennas are not visible from the outside of the computer. 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)	Mute light	• Amber: Computer sound is off.
		• Off: Computer sound is on.
(3)	Fingerprint reader light (select products only)	Allows a fingerprint logon to Windows, instead of a password.
		• White: The fingerprint was read
		• Amber: The fingerprint was not read
(4)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.

Buttons, speakers, and fingerprint reader (select products only)

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.

Component		Description
		CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.
		If the computer has stopped responding and Windows 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.
		▲ From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications. – or – From the Windows desktop, right-click the **Start** button, and then select **Power Options**.
(2)	Speakers (2)	Produce sound.
(3)	Fingerprint reader (select products only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key, action keys, or the spacebar.
(3)	Windows key	Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Use the Windows icon when the touch screen includes a flag icon. **NOTE:** Pressing the Windows key again will return you to the previous screen.
(4)	Action keys	Execute frequently used system functions. **NOTE:** On select models, the f5 action key turns the radiance backlight keyboard 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, it can be used like an external numeric keypad.

Bottom
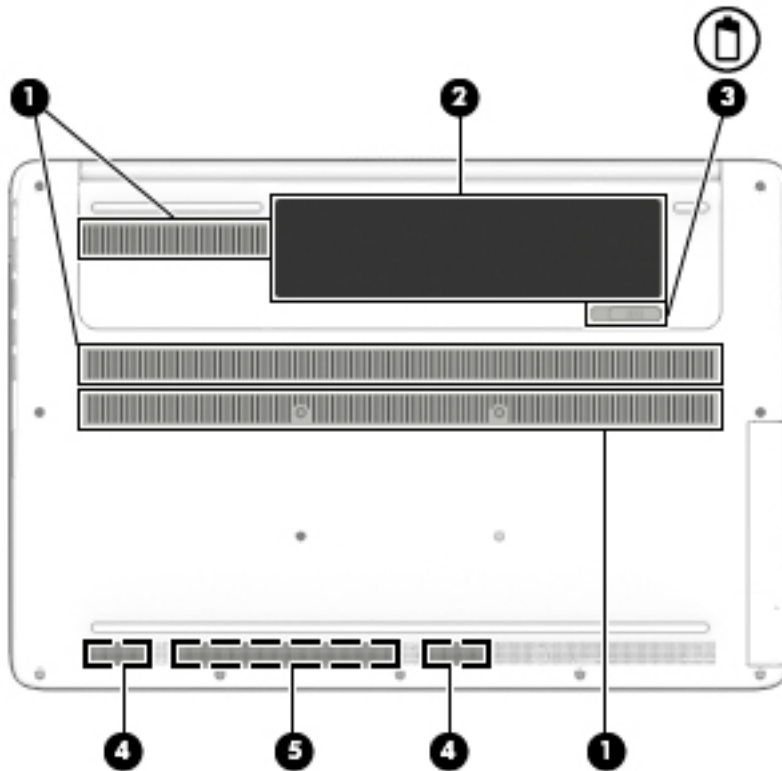
Component		Description
(1)	Vents (3)	Enable airflow to cool internal components.
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	Battery bay	Holds the battery.
(3)	Battery release latch	Releases the battery.
(4)	Speakers (2)	Produce sound.
(5)	HP Triple Bass Reflex Subwoofer	Provides superior bass sound.

3 Illustrated parts catalog

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.

Computer major components

Item	Component	Spare part number
(1)	**Display assembly** (includes webcam/microphone module and wireless antenna cables). For display components part numbers, see Display assembly subcomponents – touch screen on page 19 or see Display assembly subcomponents – non-touch screen on page 20.	
(2)	**Top cover with keyboard**	
	For use in the United States	813678–001
	For use in the United Kingdom	813678–031
	For use in Belgium	813678-A41
	For use in the Czech Republic and Slovakia	813678-FL1
	For use in Denmark, Finland, and Norway	813678-DH1
	For use in French Canada	813678-DB1
	For use in France	813678-051
	For use in Germany	813678-041
	For use in Italy	813678-061
	For use in the Netherlands	813678-B31
	For use in Portugal	813678-131
	For use in Russia	813678-251
	For use in Saudi Arabia	813678-171
	For use in Spain	813678-071
	For use in Slovenia	813678-BA1
	For use in Switzerland	813678-BG1
	For use in Turkey	813678-141
	For use in Latin America	813678-161
	For use in Japan	813678-291
	For use in South Korea	813678-AD1
	Black for use in the United States	818093-001
(3)	**TouchPad assembly**	818095-001
(4)	**Touchpad support bracket**	818091-001
	TouchPad cable	818087-001
(5)	**LID software board**	813897-001
	LID software board cable	823506-001
(6)	**Power connector cable kit**	813804-001
	Power connector	813797-001
(7)	**Speaker Kit** rear speaker	813806-001
(8)	**Speaker Kit** front speaker	813805-001
(9)	**Subwoofer**	813807-001

Item	Component	Spare part number
(10)	**USB board**	813794-001
	USB board cables	813793-001
(11)	**System board** (includes replacement thermal materials):	
	All system boards use the following part numbers:	
	xxxxxx-001: Without the Windows operating system	
	xxxxxx-501: Windows 8.1 Standard	
	xxxxxx-601: Windows 10	
	Intel Core i7-5500U processor 940M 2 GB	813681-xxx
	Intel Core i7-5200U discrete processor 940M 2 GB	813680-xxx
	Intel Core i7-5500U processor 950M 2 GB	813682–xxx
	Intel Core i5-6200U processor 940M 2 GB	829065-xx1
	Intel Core i7-6700HQ processor 950M 4 GB	829066-xx1
	Intel Core i7-6700HQ processor 950M 4 GB 3D camera	829068-xx1
	Intel Core i7-6700HQ processor 940M 4 GB 3D camera	829069-xx1
	Intel Core i7-6500U processor 940M 2 GB	829070-xx1
	Intel Core i7-6500U processor 940M 2 GB 3D camera	837769-xx1
(12)	**Memory module** (PC3L-1600)	
	8-GB	693374-005
	4-GB	691740-005
(13)	**RTC battery**	759981-001
(14)	**WLAN module**	
	Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter	784644-005
	Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + Bluetooth 4.0 Combo Adapter	792610-005
	Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + Bluetooth 4.0 Combo Adapter (non vPRO)	793840-005
	Intel Dual Band Wireless-N 7265BN 802.11 b/g/n 2x2 WiFi + Bluetooth 4.0 combo adaptor	793843-005
	Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter	806723-005
(15)	**Heat sink** (includes replacement thermal material):	
	Discrete 25 W	813799-001
	Discrete 40 W	813800-001
	Discrete 30 W	832355-001
	Thermal pad 3D camera	832359-001
(16)	**Fan** (includes cable)	813798-001
(17)	**Hard drive connector cable** (For a full list of Hard drive components, see Mass storage devices on page 18.):	813795-001

Item	Component	Spare part number
(18)	**Hard drive** (does not include hard drive bracket or hard drive connector cable):	
	NOTE: For hard drive spare part information, see Mass storage devices on page 18	
(19)	**Battery** (4-cell, 41-Wh, 2.8-Ah, Li-ion)	807231-001
	Battery (6-cell, 62-Wh, 2.8-Ah, Li-ion)	805095-001
(20)	**Base enclosure**	813783-001

Mass storage devices

Item	Component	Spare part number
(1)	**Optical Drive** DVD+/-RW Double-Layer SuperMulti	813784-001
	Optical Drive Blu-ray Disc R/RW with SuperMulti	813785-001
(2)	**Hard drive** (does not include hard drive bracket or hard drive connector cable):	
	750-GB, 5400-rpm, 9.5-mm	778190-005
	1.0-TB, 5400-rpm, 9.5-mm	778192-005
	1.0-TB hybrid, 5400-rpm, 9.5-mm	731999-005
	2.0-TB, 5400-rpm, 9.5-mm	801808-005
	Hard drive connector cable (not illustrated)	813795-001
	Hard Drive Hardware Kit (not illustrated)	813796-001
	Solid state drive (not illustrated).	
	256 GB M2 SATA-3 TLC	812708-001
	512 GB M2 SATA-3 TLC	814224-001
	512 GB M2 SATA-3 TLC	814224-001

Item	Component	Spare part number
	512 GB M2 SATA-3 TLC Value	820547-001
	HDMI to VGA Adapter (not illustrated).	701943-001

Display assembly subcomponents – touch screen
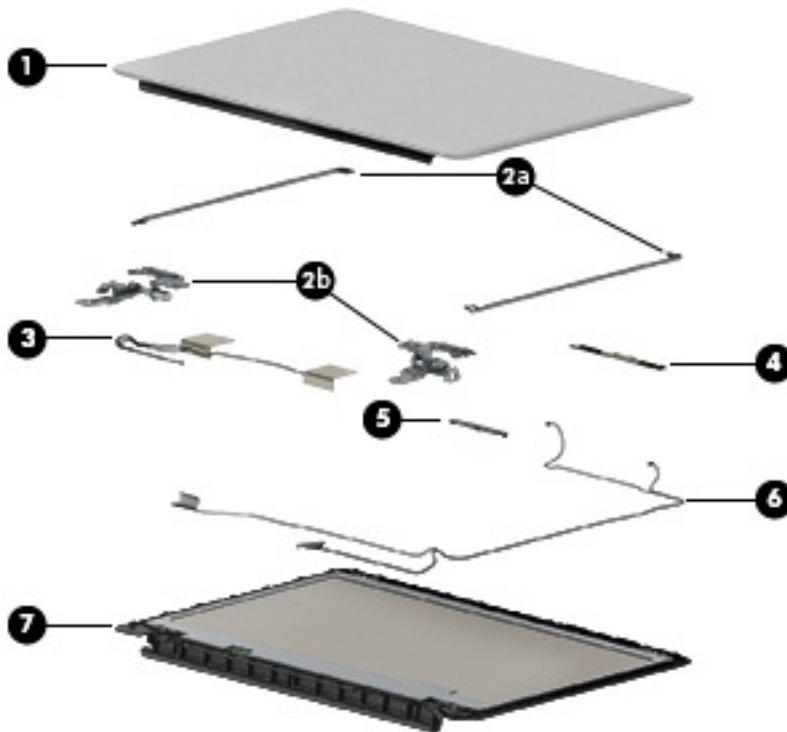
Item	Component	Spare part number
(1)	**Display enclosure**	813789-001
	Display enclosure 3D camera	832351–001
(2a)	**Brackets** (left and right, includes screw)	818092-001
(2b)	**Hinges** (left and right, includes screw covers)	813802-001
	Hinges 3D camera (left and right, includes screw covers)	832356-001
(3)	**Antennas** (includes wireless antenna cables and transceivers)	813787-001
(4)	**Touch control board**	818094-001
(5)	**Webcam module**	812715-001
	Webcam module 3D camera	832360-001
	Webcam module antennas	813787-001
(6)	**Display cable**	813792-001
	Display cable FHD 3D camera	832353-001

Item	Component	Spare part number
	Display cable 3D camera	832354-001
(7)	**Display Panel**	813803-001
	Display Panel FHD flat 3D camera	832357-001
	Bezel 3D camera	832352-001

Display assembly subcomponents – non-touch screen
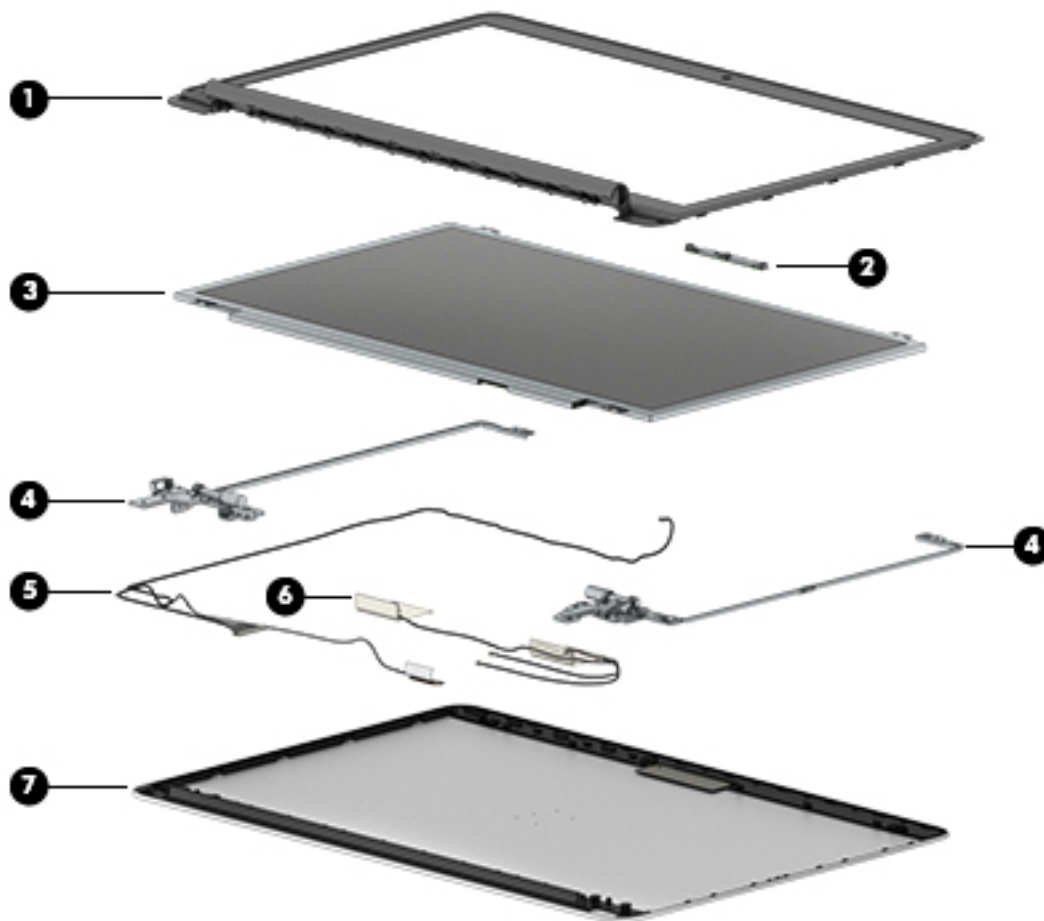
Item	Component	Spare part number
(1)	**Bezel**	813790-001
(2)	**Webcam module**	812714-001
(3)	**Raw display panel** (17.3; includes touch panel, touch board, bezel, rubber supports, display cable, webcam, and screws)	813808-001
(4)	**Hinges** (left and right, includes screw and brackets)	813801-001
(5)	**Antennas** (includes wireless antenna cables and transceivers)	813786-001
(6)	**Display/webcam cable**	813791-001

Item	Component	Spare part number
(7)	**Display enclosure**	813788-001
	Display enclosure 3D camera	832350-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
AC adapter, 65-W, non-PFC, 4.5 mm	710412-001
AC adapter, 65-W, non-PFC, 4.5 mm EM	714657-001
AC adapter, 90-W, non-PFC, 4.5 mm	710413-001
AC adapter 120–W PFC S-3P Slim 4.5 mm	710415-001
Power cord (3-pin, black, 1.00-m):	
For use in Denmark	755530-081
For use in Europe, the Middle East, and Africa	755530-021
For use in North America	755530-001
For use in the United Kingdom	755530-031
For use in Australia	755530-011
For use in Switzerland	755530-111
For use in Japan	755530-291
For use in People's Republic of China	755530-AA1
For use in People's Republic of China	755530-AA1
For use in South Korea	755530-AD1
For use in South Africa	755530-AR1
For use in India	755530-D61
Screw Kit	813683-001
HDMI to VGA Adapter	701943-001
Fingerprint reader board	818089-001
Fingerprint cable	818088-001
Microphone board 3D camera	832358-001

4 Removal and replacement procedures preliminary requirements

Tools required

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

- Flat-bladed screw driver
- Magnetic screw driver
- Phillips P0 and P1 screw drivers

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 parts. Apply pressure only at the points designated in the maintenance instructions.

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 a diskette drive or optical drive, be sure that a diskette or 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, an optical drive, or a diskette 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 Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

5 Removal and replacement procedures for Customer Self-Repair parts

⚠ **CAUTION:** 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.

📝 **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.

Component replacement procedures

📝 **NOTE:** Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

📝 **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.

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

There are as many as 3 screws that must be removed, replaced, or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Battery

Description	Spare part number
Battery (6-cell, 62-Wh, 2.8-Ah, Li-ion)	805095-001
Battery (4-cell, 41-Wh, 2.8-Ah, Li-ion)	807231-001

Before disassembling the computer, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

To remove the battery:

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

2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.

3. Rotate the battery upward **(3)**, and then remove the battery from the computer.
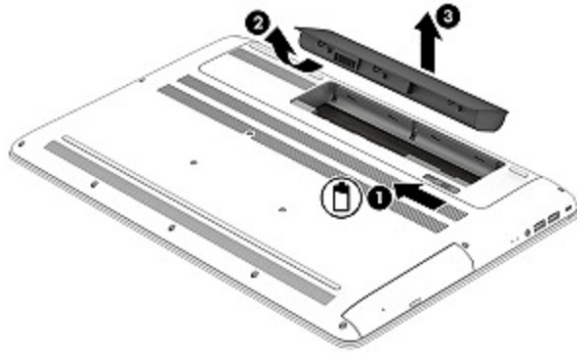
Optical drive

Description	Spare part number
Optical Drive DVD+/-RW Double-Layer SuperMulti	813784-001
Optical Drive Blu-ray Disc R/RW with SuperMulti	813785-001

Before removing the optical drive, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see).

To remove the optical drive:

1. Remove the screw covers **(1)** and then the Phillips PM2.5×7.0 screw **(2)** that secures the optical drive to the computer.

2. Remove the optical drive **(3)** by sliding it out of the optical drive bay.
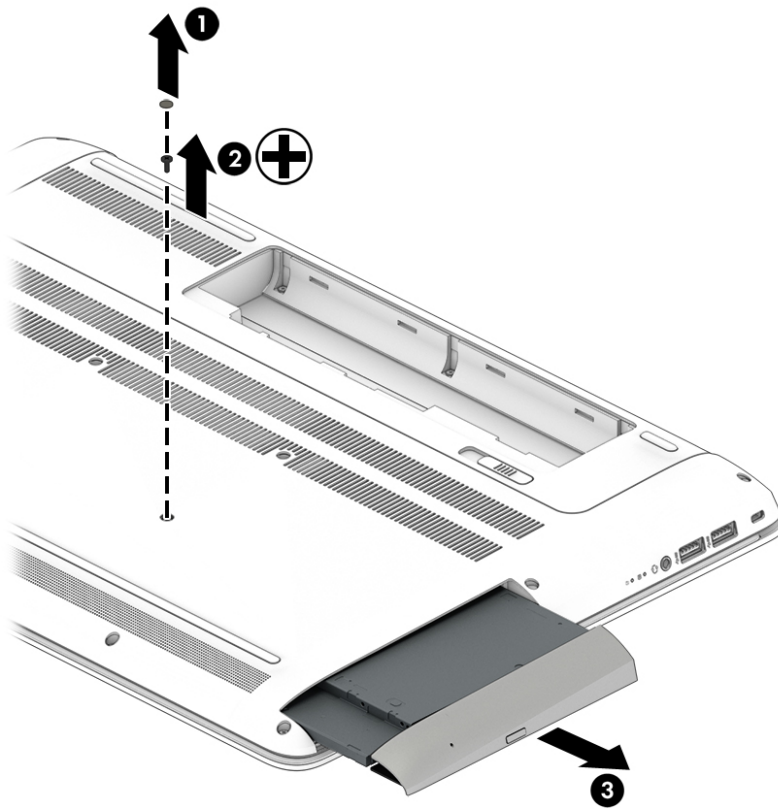
Reverse this procedure to reassemble and install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

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

📝 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.

Component replacement procedures

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

There are as many as 75 screws that must be removed, replaced, and/or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

📝 NOTE: To remove the non-touch screen display, you do not need to remove the system board, see Display assembly – non-touch screen on page 65. For the touch screen, the hinges are under the system board and it must be removed, see Display assembly – touch screen on page 60.

Bottom cover

| Description	Spare part number
Base enclosure	813783-001
Top cover with keyboard for use in the United States	813678-001
Top cover with keyboard for use in the United Kingdom	813678-031
For use in Belgium	813678-A41
For use in the Czech Republic and Slovakia	813678-FL1
For use in Denmark, Finland, and Norway	813678-DH1
For use in French Canada	813678-DB1
For use in France	813678-051
For use in Germany	813678-041
For use in Italy	813678-061
For use in the Netherlands	813678-B31
For use in Portugal	813678-131
For use in Russia	813678-251
For use in Saudi Arabia	813678-171
For use in Spain	813678-071
For use in Switzerland	813678-BG1
For use in Turkey	813678-141
For use in Japan	813678-291
For use in South Korea	813678-AD1
For use in Slovenia	813678-BA1
For use in Latin America	813678-161
For use in the United States black	818093-001

Before removing the bottom cover, 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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see).

5. Remove the optical drive (see).

Remove the bottom cover:

1. Remove the seven Phillips PM2.5×8.0 screws **(1)** and the two screws in the optical drive bay **(2)** that secure the bottom cover to the computer.
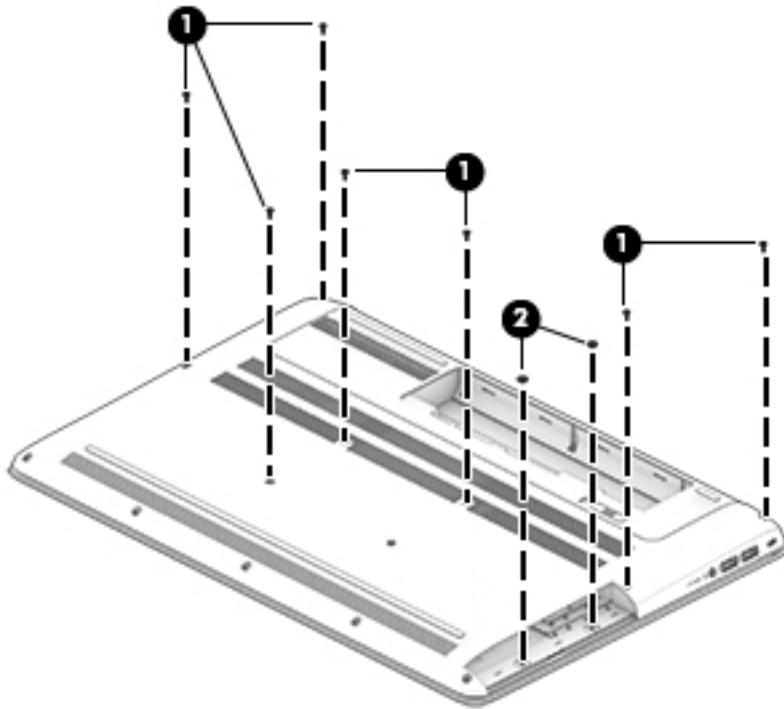
2. Remove the five Phillips PM2.5×4.0 screws **(1)** and the five screws from the battery bay **(2)** that secure the bottom cover to the computer.
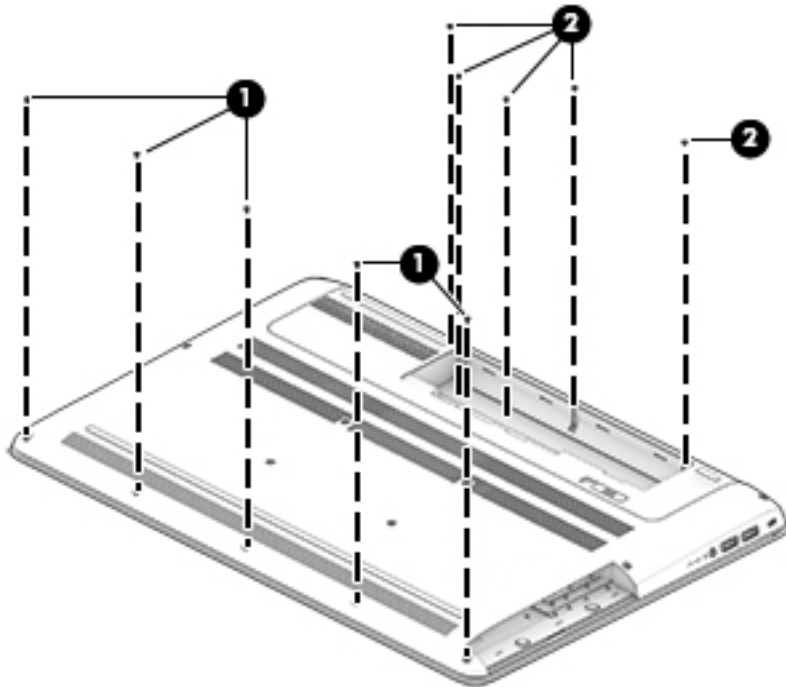
3. Remove the bottom cover by working your way around to disengage bottom cover near the battery bay **(1)** and then slide the cover **(2)** to remove it.
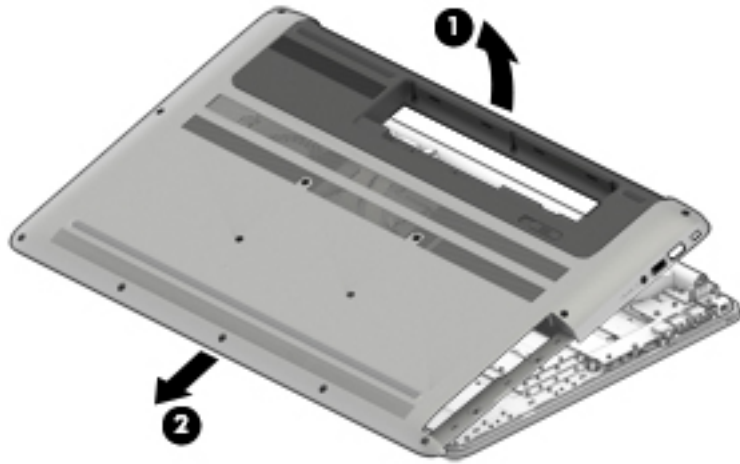
Reverse this procedure to install the bottom cover.

Hard drive

Description	Spare part number
750-GB, 5400-rpm, 9.5-mm	778190-005
1.0-TB, 5400-rpm, 9.5-mm	778192-005
1.0-TB hybrid, 5400-rpm, 9.5-mm	731999-005
2.0-TB, 5400-rpm, 9.5-mm	801808-005
Hard drive connector cable	813795-001
Hard Drive Hardware Kit	813796-001

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see).

5. Remove the optical drive (see).

6. Remove the bottom cover (see).

Remove the hard drive:

1. Disconnect the hard drive cable from the system board **(1)**.

2. Remove the four Phillips PM2.5×3.0 screws **(2)** that secure the hard drive assembly to the computer.

3. Lift up on the hard drive tab **(3)** to remove the hard drive assembly from the hard drive bay.
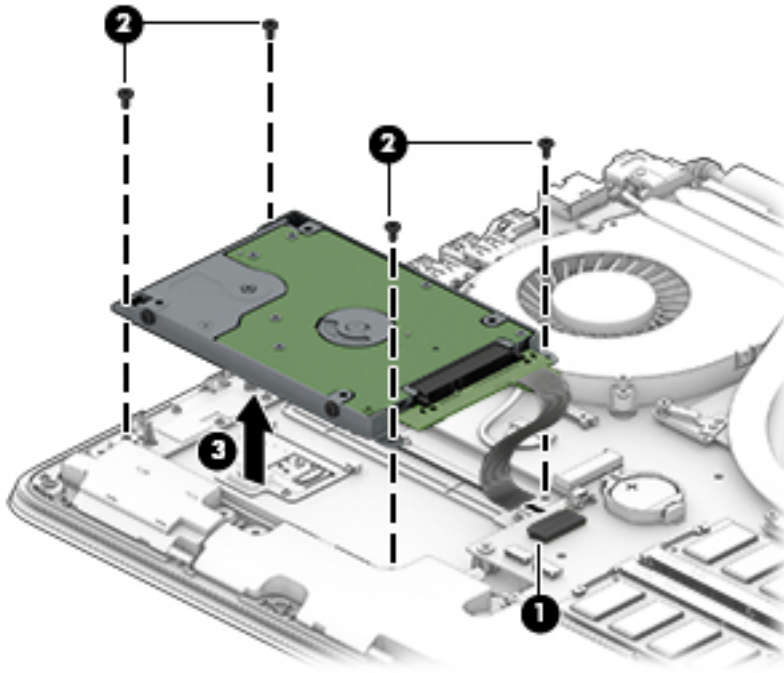
4. If it is necessary to disassemble the hard drive, perform the following steps:

   a. Remove the four Phillips PM2.5×3.0 screws **(1)** that secure the hard drive brackets to the hard drive.

   b. Disconnect the hard drive connector cable **(2)** from the hard drive.
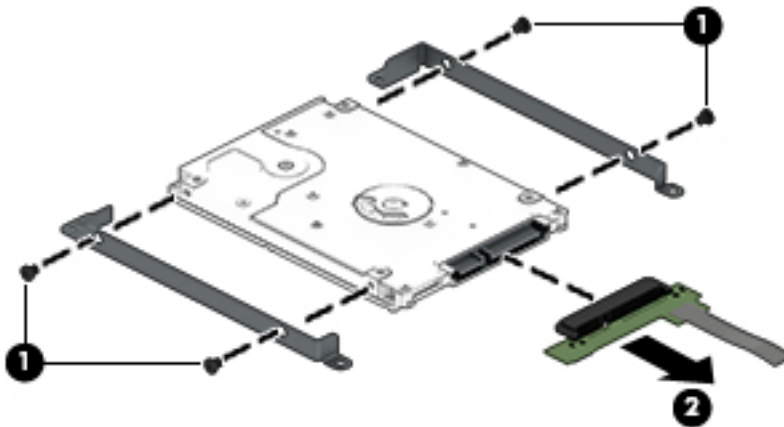
Reverse this procedure to install the RTC battery.

WLAN module

Description	Spare part number
Intel Dual Band Wireless-AC 3160 802.11 ac 1x1 WiFi + Bluetooth 4.0 Combo Adapter	784644-005
Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + Bluetooth 4.0 Combo Adapter	792610-005
Intel Dual Band Wireless-AC 7265 802.11 ac 2x2 WiFi + Bluetooth 4.0 Combo Adapter (non vPRO)	793840-005
Intel Dual Band Wireless-N 7265BN 802.11 b/g/n 2x2 WiFi + Bluetooth 4.0 combo adaptor	793843-005
Intel Dual Band Wireless-AC 3165 802.11 ac 1x1 WiFi + BT 4.0 Combo Adapter	806723-005

⚠ **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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see).

5. Remove the optical drive (see).

6. Remove the bottom cover (see).

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 PM2.0×2.5 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.
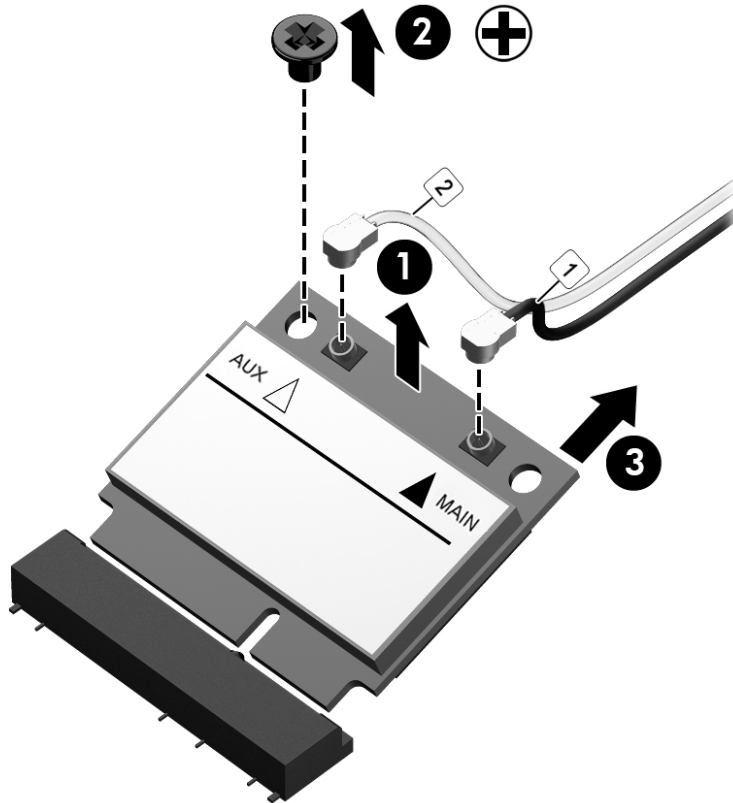
NOTE: If the WLAN antenna cables are not connected to the terminals on the WLAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.
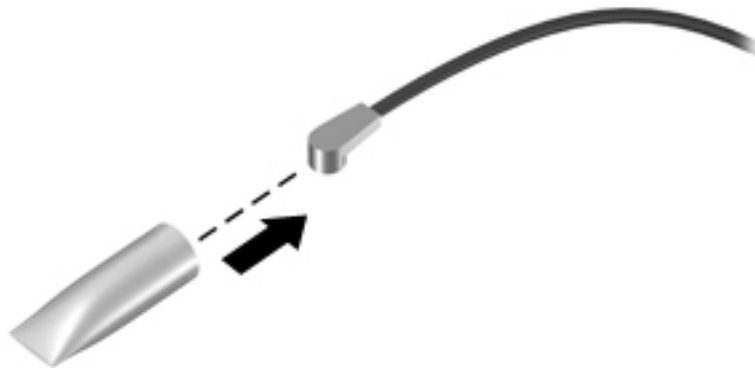
Reverse this procedure to install the WLAN module.

Memory module

Description	Spare part number
8-GB (PC3L-1600)	693374-005
4-GB (PC3L-1600)	691740-005

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 www.hp.com.
2. Click **Support & Drivers > click Drivers & Software**.
3. In the **Enter a product name/number box**, type the computer model information, and then click **Search**.
4. Click the link for the computer model.
5. Select the operating system, and then click **Next**.
6. Under **Step 2: Select a Download**, click the **BIOS** link.
7. Click the link for the most recent BIOS.
8. Click 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 unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see Battery on page 27).
5. Remove the optical drive (see Optical drive on page 28).
6. Remove the bottom cover (see Bottom cover on page 31).

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.

USB board

Description	Spare part number
USB board	813794-001
USB board cable	813793-001

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the USB board:

1. Disconnect the cable **(1)** from the USB board and lift the cable **(2)** from the routing channel.

2. Remove the two Phillips PM2.5×5.0 screws **(3)** that secure the USB board to the computer.
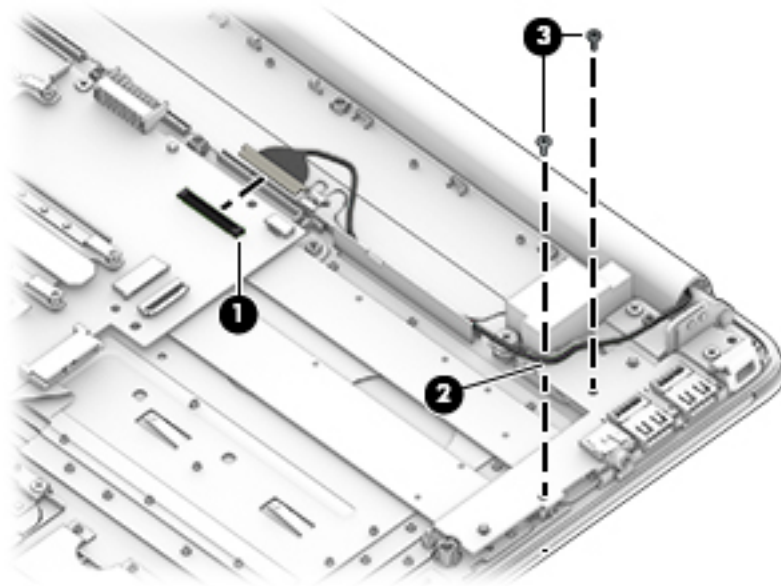
3. Lift the USB board **(1)**.

4. Lift the USB connectors **(2), (3)** and lift the board.
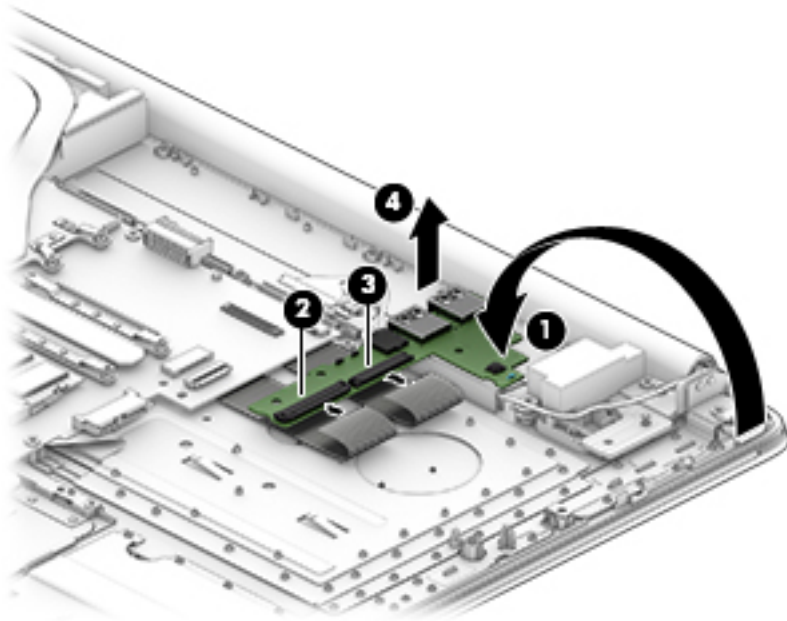
5. Remove the cables **(1), (2)** from the USB board.
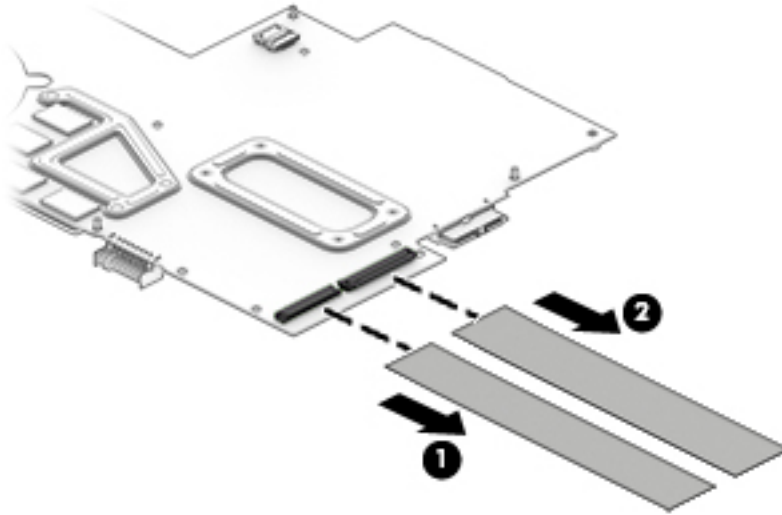
Reverse this procedure to install the USB board.

Fan

📝 **NOTE:** The fan spare part kit includes replacement thermal materials.

Description	Spare part number
Fan	813798-001

📝 **NOTE:** To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

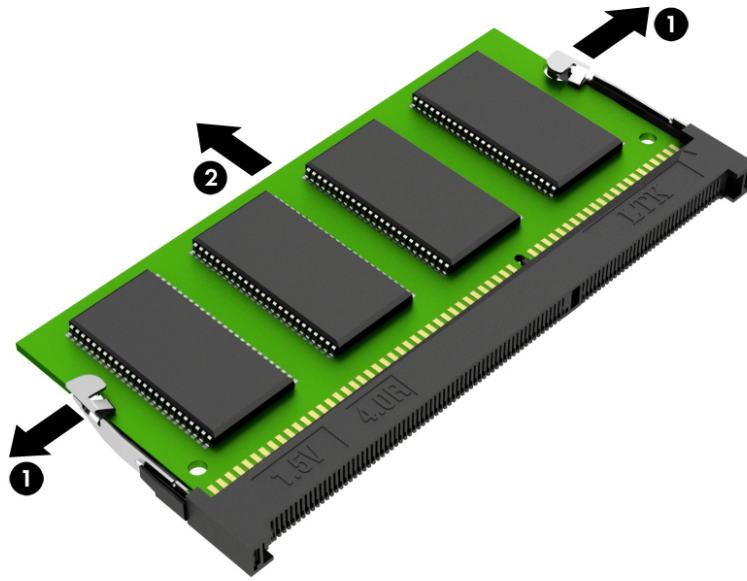Before removing the fan/heat sink assembly, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see).

5. Remove the optical drive (see).

6. Remove the bottom cover (see).

To remove the fan:

1. Position the computer upright and open it.

2. Remove the two Phillips PM3.0×3.0 screws **(1)** that secure the fan to the computer.

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

4. Remove the fan from the computer **(3)**.

Reverse this procedure to install the fan.

Heat sink

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

Description	Spare part number
Discrete 25 W	813799-001
Discrete 40 W	813800-001
Discrete 30 W	832355–001
Thermal pad 3D camera	832359-001

Before removing the heat sink, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the heat sink:

1. Following the sequence stamped into the heat sink, remove the seven Phillips PM 2.0×3.0 screws **(1)** that secure the heat sink to the system board.

2. Remove the heat sink **(2)**.
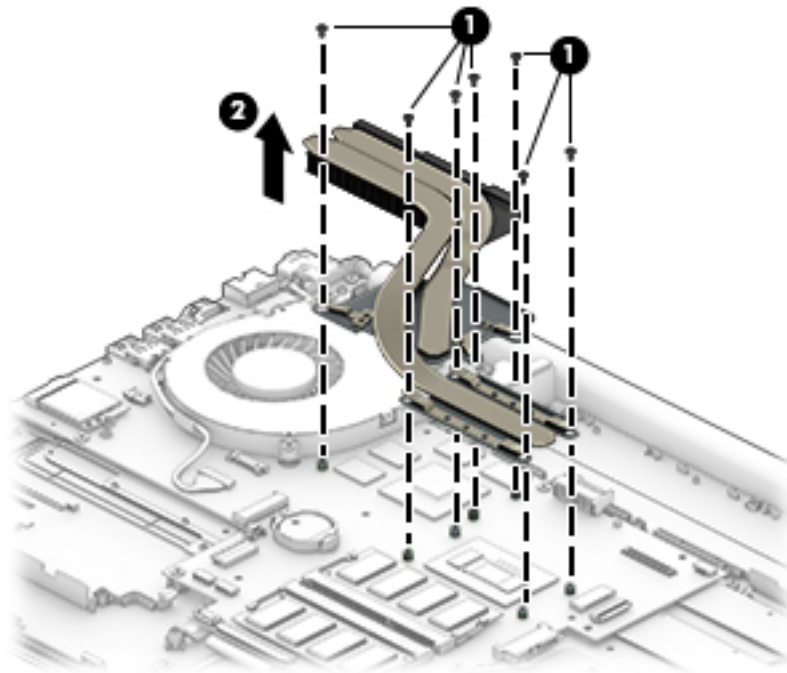
NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the heat sink, processor, and system board spare part kits. Thermal paste is used on the processor **(1), (2)** and the heat sink section **(3), (4)** that services it.

Reverse this procedure to install the heat sink.

RTC battery

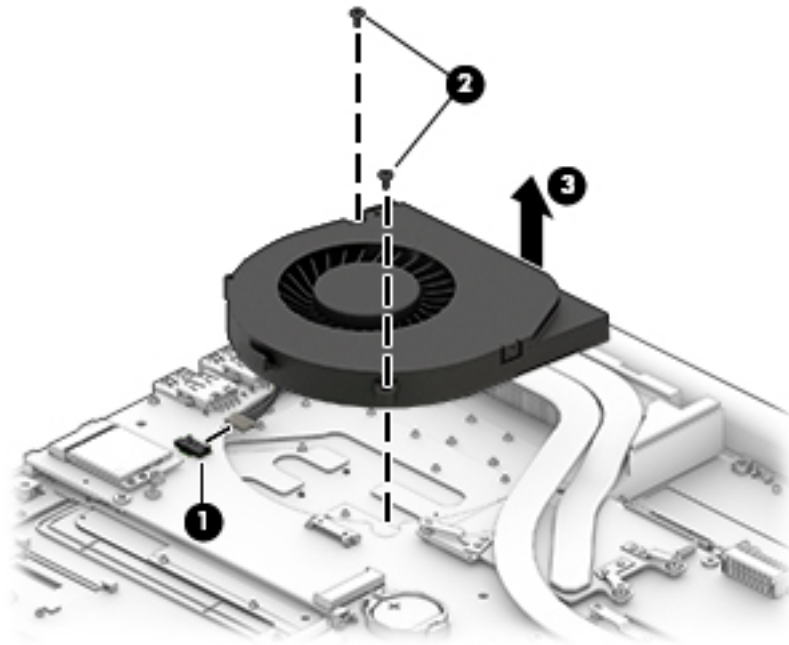| Description	Spare part number
RTC battery	759981-001

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the RTC battery:

▲   Carefully pry the disc cell RTC battery **(1)** from the system board, and then remove the battery **(2)**.
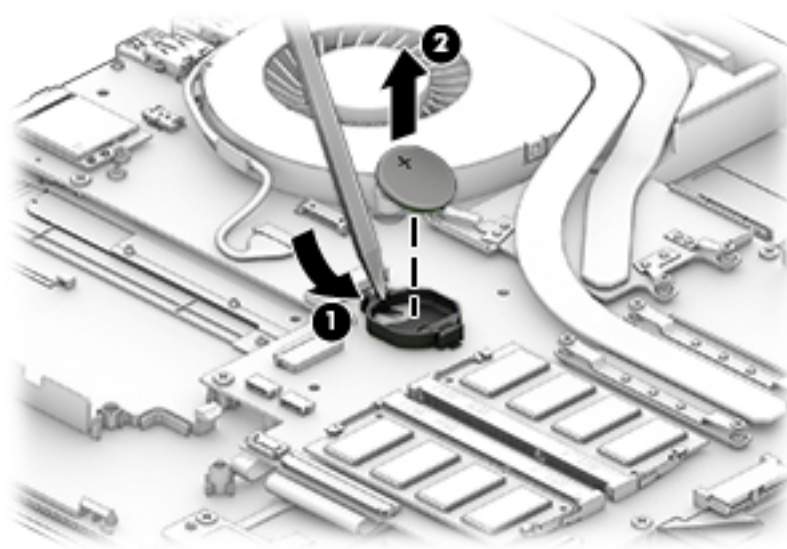
Reverse this procedure to install the RTC battery.

Speakers (front)

Description	Spare part number
Speaker Kit	813805-001

Before removing the speakers, follow these steps:

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the speakers:

1. Disconnect the speaker cable **(1)**.

2. Remove the three broadhead Phillips PM2.0×2.0 screws **(2)** that secure the speaker to the computer.

> **NOTE:** The speaker includes rubber isolators **(4)** around the screws. These isolators are crucial to the performance of the speakers.

3. Remove the speaker **(3)**.
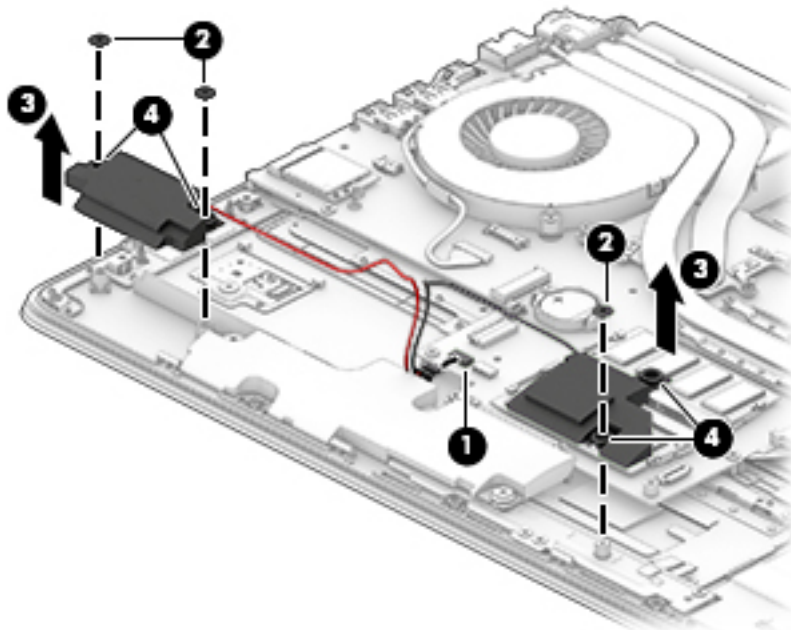
Reverse this procedure to install the speakers.

Subwoofer

Description	Spare part number
Subwoofer	813807-001

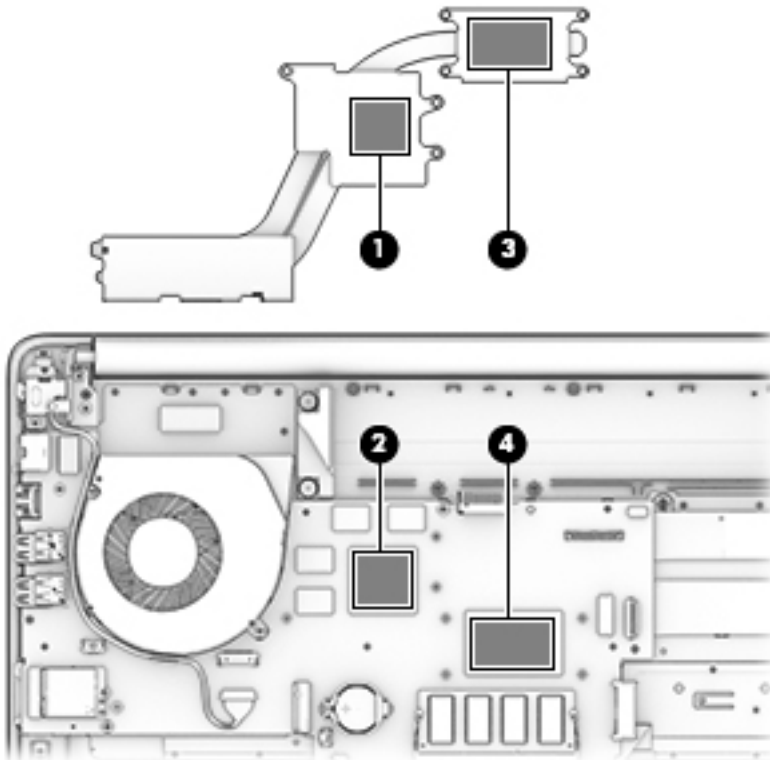Before removing the subwoofer, follow these steps:

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the subwoofer:

1. Remove the three Phillips PM2.5×5.0 screw **(1)** that secures the subwoofer to the computer.

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

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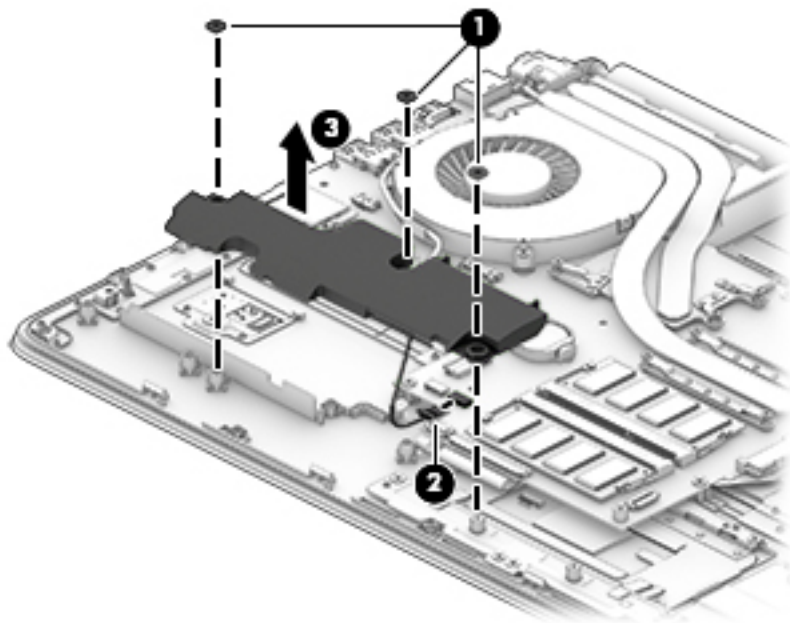
Reverse this procedure to install the subwoofer.

System board

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

Description	Spare part number
Intel Core i7-5500U processor 940M 2 GB	813681-xxx
Intel Core i7-5200U discrete processor 940M 2 GB	813680-xxx
Intel Core i7-5500U processor 950M 2 GB	813682–xxx
Intel Core i5-6200U processor 940M 2 GB	829065-xx1
Intel Core i7-6700HQ processor 950M 4 GB	829066-xx1
Intel Core i7-6700HQ processor 950M 4 GB 3D camera	829068-xx1
Intel Core i7-6700HQ processor 940M 4 GB 3D camera	829069-xx1
Intel Core i7-6500U processor 940M 2 GB	829070-xx1
Intel Core i7-6500U processor 940M 2 GB 3D camera	837769-xx1

Before removing the system 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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the front speakers (see Speakers (front) on page 47).

9. Remove the rear speakers (see Speaker (rear) on page 53).

10. Remove the USB board (see USB board on page 40).

11. Remove the fan (see Fan on page 42).

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:

- Memory module (see Memory module on page 38)

- Heat sink (see Heat sink on page 44)

- Fan (see Fan on page 42)

- WLAN module (see WLAN module on page 36)

Remove the system board:

1. When replacing the system board, be sure that the following cables are disconnected from the system board:

    (1): WLAN antenna

    (2): WLAN antenna routing

    (4): Front Speaker cable

    (5): Video cable

    (6): Rear speaker cable

    (7): Touchpad cable

    (8): Keyboard cable

    (9): Backlight keyboard cable
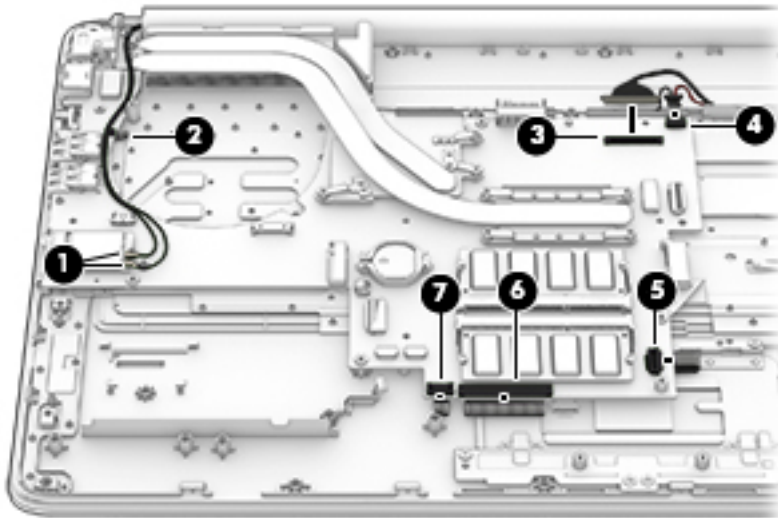
2. Remove the four Phillips PM2.5×3.0 screws that secure the system board to the computer **(1)**.

3. Remove the system board **(2)** from the computer.
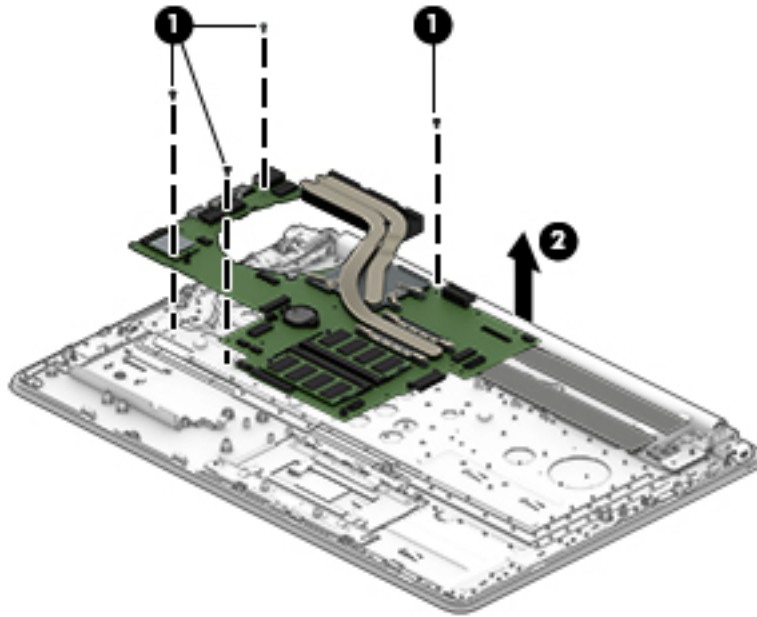
Reverse this procedure to install the system board.

Solid State Drive

Description	Spare part number
256 GB mSATA solid-state drive	812708-001
512 GB mSATA solid-state drive	814224-001
512 GB M2 SATA-3 TLC	814224-001
512 GB M2 SATA-3 TLC Value	820547-001

Before removing the speakers, follow these steps:

Before removing the Speakers, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see).

5. Remove the optical drive (see).

6. Remove the bottom cover (see).

● Memory module (see)

● Heat sink (see)

- Fan (see Fan on page 42)

- WLAN module (see WLAN module on page 36)

Remove the solid-state drive:

1. Turn the system board upside down.

2. Remove the Phillips.screw **(1)** that secures the solid-state drive to the system board. (The solid-state drive tilts up).

3. Remove the solid-state drive **(2)**.

Reverse this procedure to install the solid-state drive.

Speaker (rear)

Description	Spare part number
Speaker Kit	812705-001

Before removing the rear 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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

- Memory module (see Memory module on page 38)

- Heat sink (see Heat sink on page 44)

- Fan (see Fan on page 42)

- WLAN module (see WLAN module on page 36)

Remove the rear speaker:

1. Disconnect the rear speaker **(1)**.

2. Remove the broadhead Phillips PM2.0×2.0 screws **(2)** that secures the speaker to the computer.

> **NOTE:** The speaker includes rubber isolators **(4)** around the screws. These isolators are crucial to the performance of the speaker.

3. Remove the rear speaker **(3)**.

Reverse this procedure to install the rear speaker.

LID board

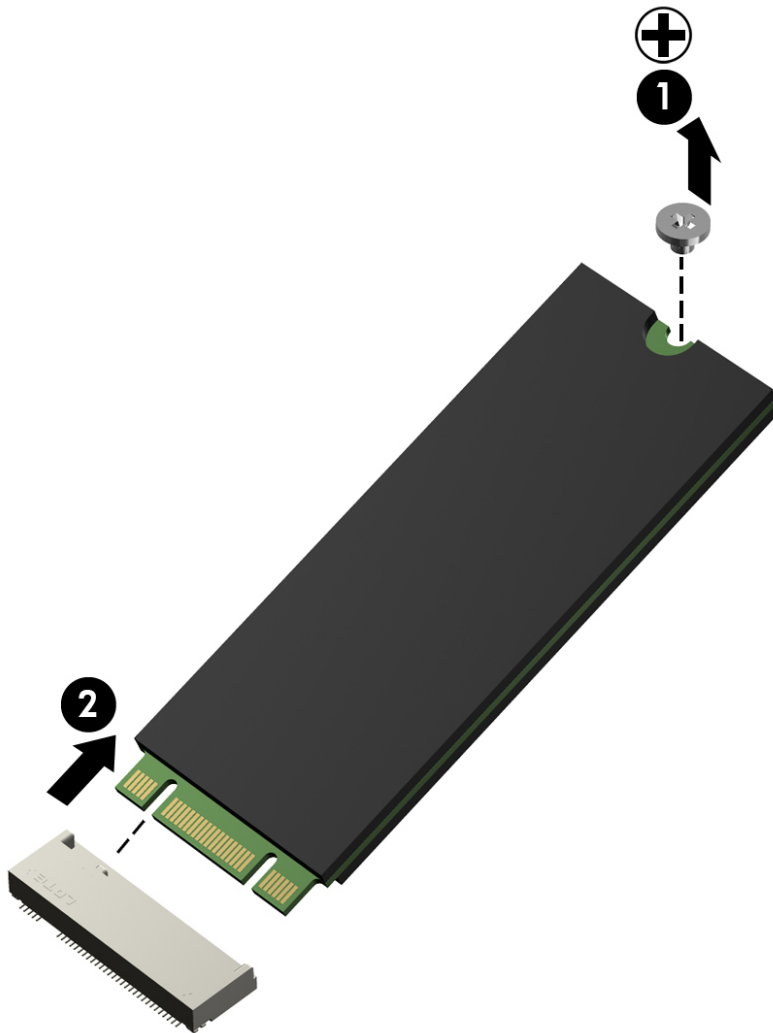| Description	Spare part number
LID board	813897-001
LID cable	823506-001

Before removing the LID 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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the front speaker (Speakers (front) on page 47).

9. Remove the system board (see System board on page 49).

Remove the LID board:

▲   Disconnect the LID board cable from the base enclosure.
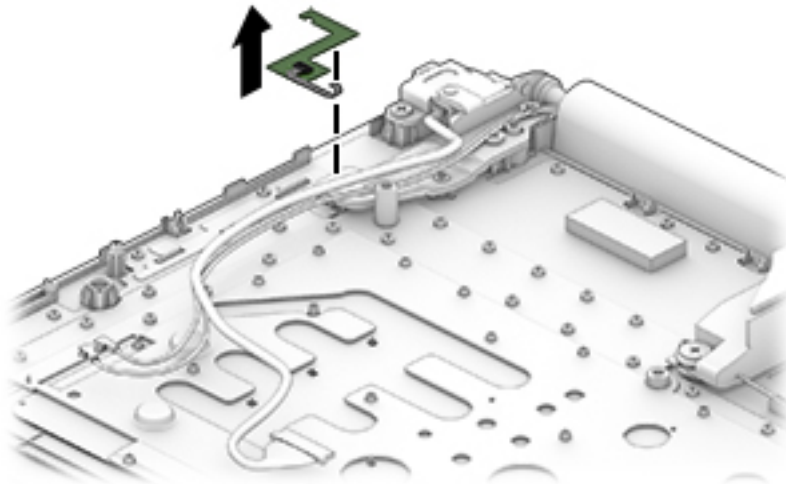
Reverse this procedure to install the LID board.

TouchPad assembly

Description	Spare part number
TouchPad assembly	818094-001
Touchpad cable	818087-001
Touchpad bracket	818091-001

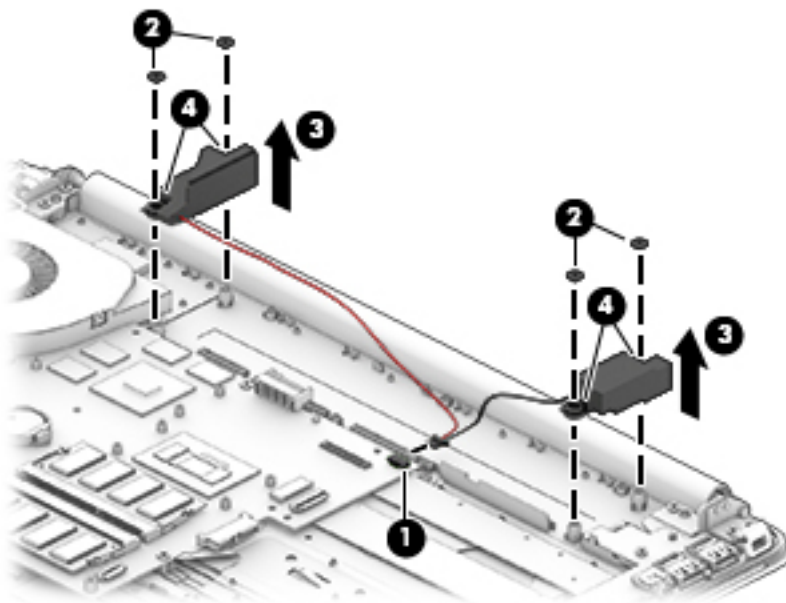Before removing the TouchPad, follow these steps:

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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the speakers (see Speakers (front) on page 47).

9. Remove the system board (see System board on page 49).

Remove the TouchPad:

1. Remove the seven Phillips PM2.0×3.0 screws **(1)** that secure the TouchPad bracket and TouchPad to the computer.

2. Remove the TouchPad bracket **(2)**, and the remove the TouchPad **(3)**.
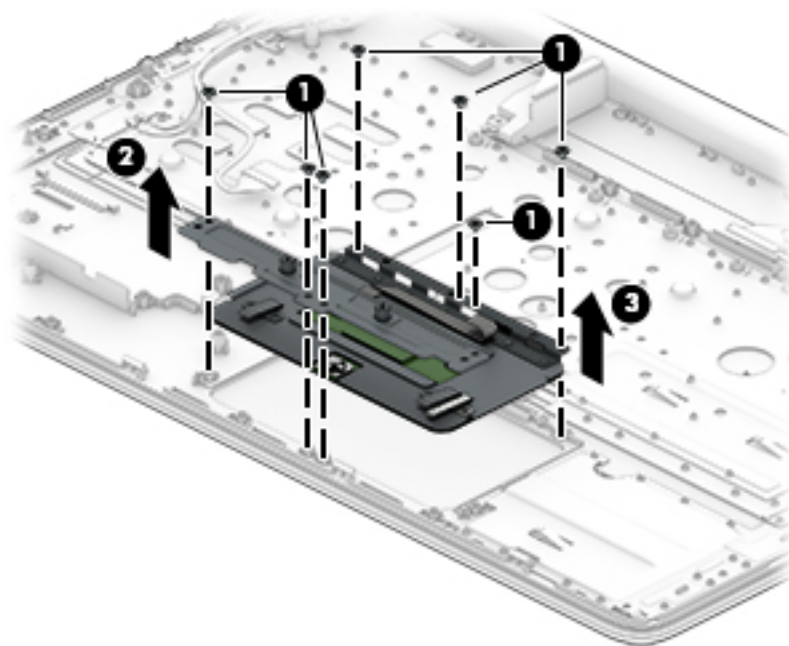
Reverse this procedure to install the TouchPad.

Fingerprint reader board (select products only)

Description	Spare part number
Fingerprint reader board	818089-001
Fingerprint reader cable	818088-001
Fingerprint reader bracket	818090-001

Before removing the Fingerprint reader board, follow these steps:

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

2. Disconnect all external devices connected to the computer.

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

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the speakers (see Speakers (front) on page 47).

9. Remove the system board (see System board on page 49).

Remove the fingerprint reader board and cable:

1. Disconnect the ZIF connector cable **(1)** that secures the fingerprint reader to the top cover.

2. Release the top cover shield **(2)** and **(3)**, and then remove the fingerprint reader board **(4)** by lifting the board.
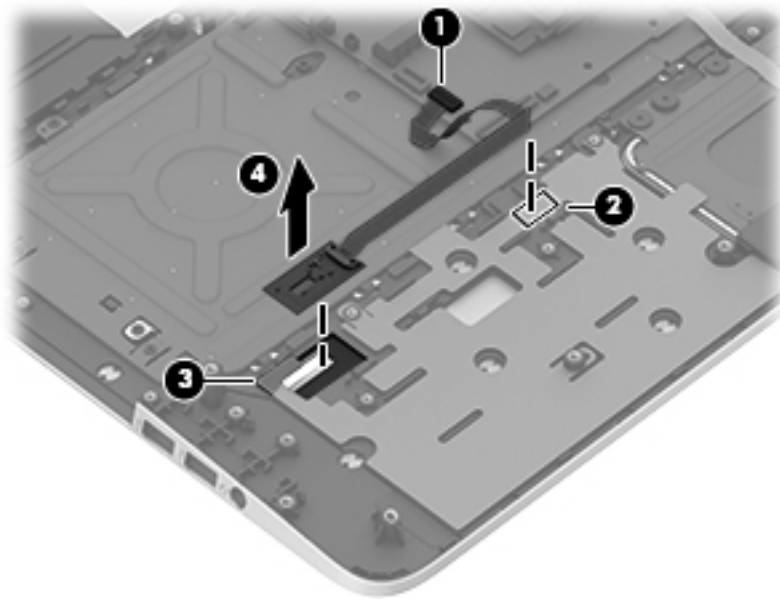
Reverse this procedure to install the fingerprint reader board and cable.

Power connector cable

Description	Spare part number
Power connector	813797-001
Power connector cable	813804-001

Before removing the power connector cable, 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 unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the speakers (see Speakers (front) on page 47).

9. Remove the system board (see System board on page 49).

Remove the power connector cable:

NOTE:

▲ Remove the power connector from the computer.
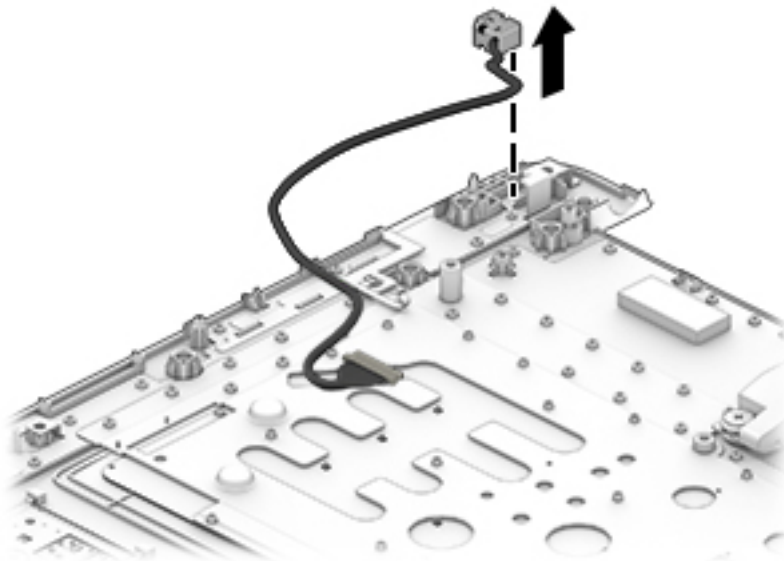
Reverse this procedure to install the power connector cable.

Display assembly – touch screen

Component	Spare part number
Display enclosure	813789-001
Display enclosure 3D camera	832351–001
Brackets (left and right, includes screw)	818092-001
Hinges (left and right, includes screw covers)	813802-001
Hinges 3D camera (left and right, includes screw covers)	832356-001
Antennas (includes wireless antenna cables and transceivers)	813787-001
Touch control board	818094-001
Webcam module	812715-001
Webcam module 3D camera	832360-001
Webcam module antennas	813787-001
Display cable	813792-001
Display cable FHD 3D camera	832353-001
Display cable 3D camera	832354-001
Display Panel	813803-001
Display Panel FHD flat 3D camera	832357-001
Bezel 3D camera	832352-001

To remove the display assembly and access the display assembly subcomponents, follow these steps:

📝 **NOTE:** To remove the touch screen, the hinges are under the system board and it must be removed. For the non-touch screen display, you do not need to remove the system board.

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

7. Remove the hard drive (see Hard drive on page 34).

8. Remove the speakers (see Speakers (front) on page 47).

9. Remove the system board (see System board on page 49).

Remove the display assembly:

1. Open the computer and position the computer with the display hanging over the edge of a tablet.

⚠ **CAUTION:** Be sure to support the display as you remove the screws to avoid the display falling and sustaining damage.

2. Remove the six Phillips PM2.5×4.0 screws **(1)** (three on each hinge) that secure the display assembly to the computer.

3. Separate the display from the computer **(2)**.
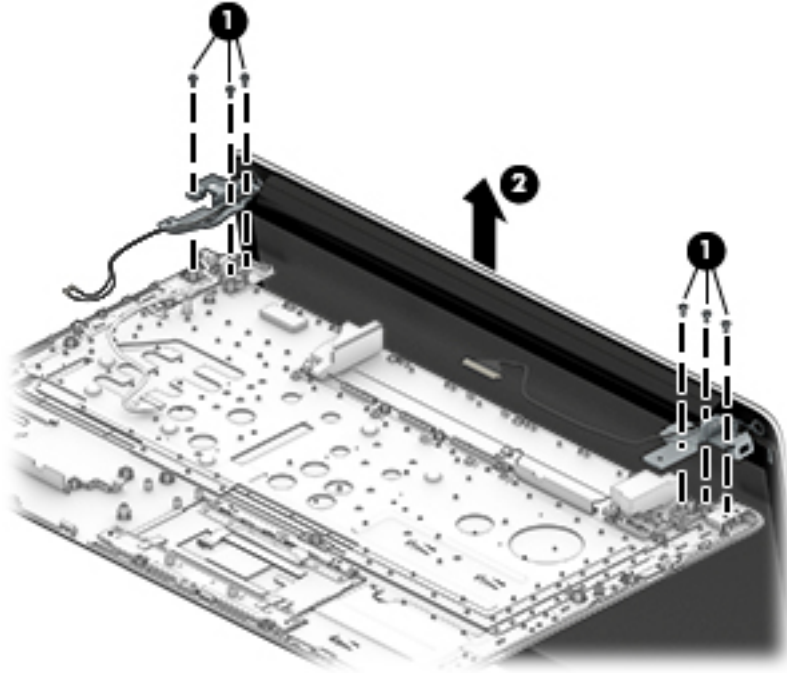
If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display rear cover:

   a. Remove the two screw covers **(1)** and two Phillips PM2.5×3.5 screws **(2)** that secure the display rear cover to the display.
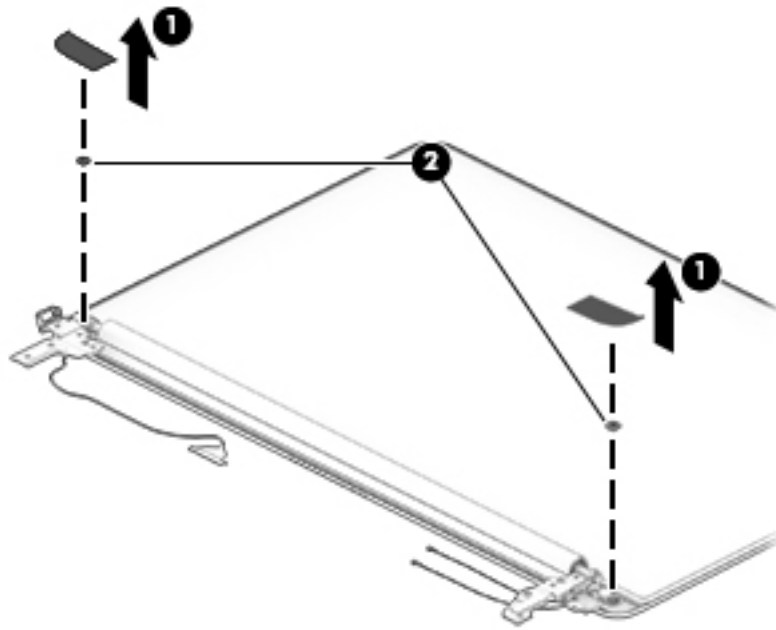
b. Work a plastic tool around the seam to separate the display rear cover from the display .

c. Remove the display rear cover.
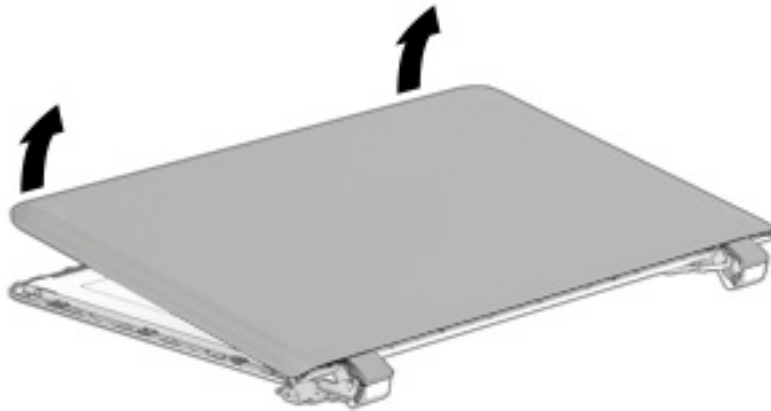
d. Rotate the hinges open as far as possible.

e. Lift the display hinge covers off the display.

f. Note the routing of the antenna cables and display cable for reassembly. The antenna cable is located on the bottom of the base enclosure.

2. To remove the webcam/microphone module:

    a. Position the back cover with the top edge toward you.

    b. Lift the tape from atop the webcam **(1)**.

    c. Disconnect the cable **(2)** from the webcam module.
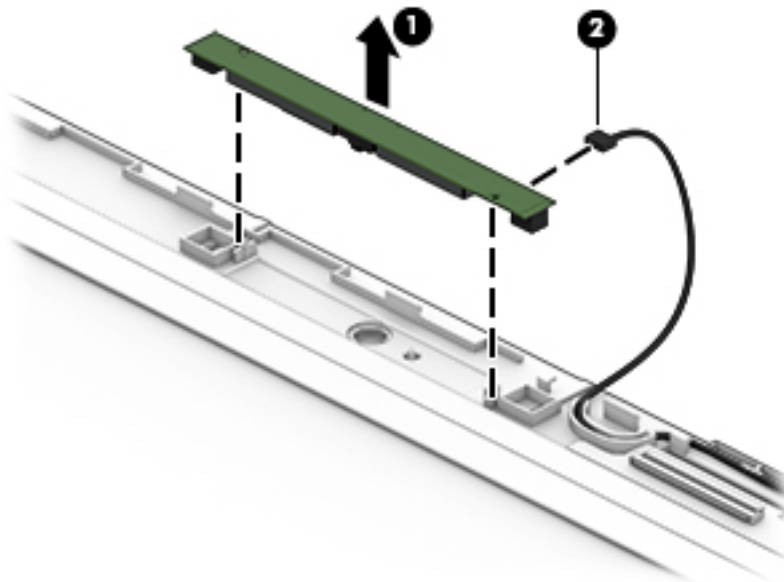
3. To remove the display/webcam cable:

    a. Disconnect the cable from the webcam module and touch control board **(1)**.

b. Remove the cable **(2)** from the channels in the back cover.
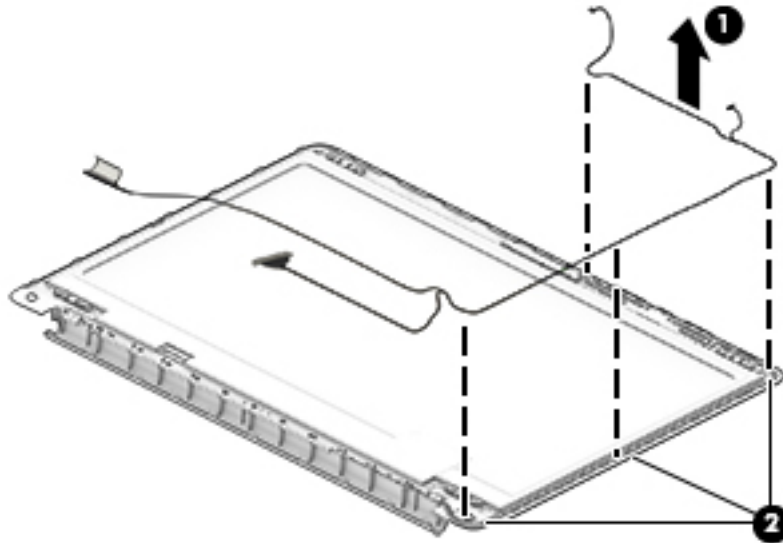
4. To remove the display hinges:

a. Remove the two Phillips PM2.5×2.0 screws **(1)** from the bottom of the hinges, and the two Phillips PM2.0×2.5 screws **(2)** from the top of the hinges that secure the display hinges to the display enclosure.

b. Remove the display hinges.
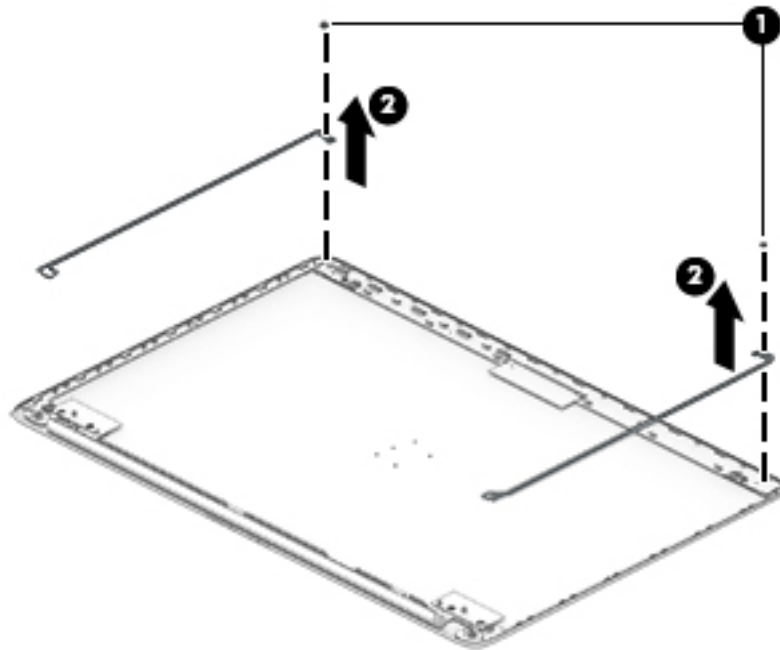
5. If replacing the display cover, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new cover.

Reverse this procedure to install the display assembly.

Display assembly – non-touch screen

Component	Spare part number
Bezel	813790-001
Webcam module	812714-001
Raw display panel (17.3; includes touch panel, touch board, bezel, rubber supports, display cable, webcam, and screws)	813808-001
Hinges (left and right, includes screw and brackets)	813801-001
Antennas (includes wireless antenna cables and transceivers)	813786-001
Display/webcam cable	813791-001
Display enclosure	813788-001
Display enclosure 3D camera	832350-001

To remove the display assembly and access the display assembly subcomponents, follow these steps:

NOTE: To remove the non-touch screen display, you do not need to remove the system board. For the touch screen, the hinges are under the system board and it must be removed.

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

2. Disconnect the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 27).

5. Remove the optical drive (see Optical drive on page 28).

6. Remove the bottom cover (see Bottom cover on page 31).

Remove the display assembly:

1. Open the computer and position the computer with the display hanging over the edge of a tablet.

   CAUTION: Be sure to support the display as you remove the screws to avoid the display falling and sustaining damage.

2. Remove the six Phillips PM2.5×4.0 screws **(1)** (three on each hinge) that secure the display assembly to the computer.

3. Remove the three broadhead Phillips PM2.5×2.5 screws **(2)** (two on the right hinge, one of the left hinge) that secure the display assembly to the computer.

4. Separate the display from the computer.
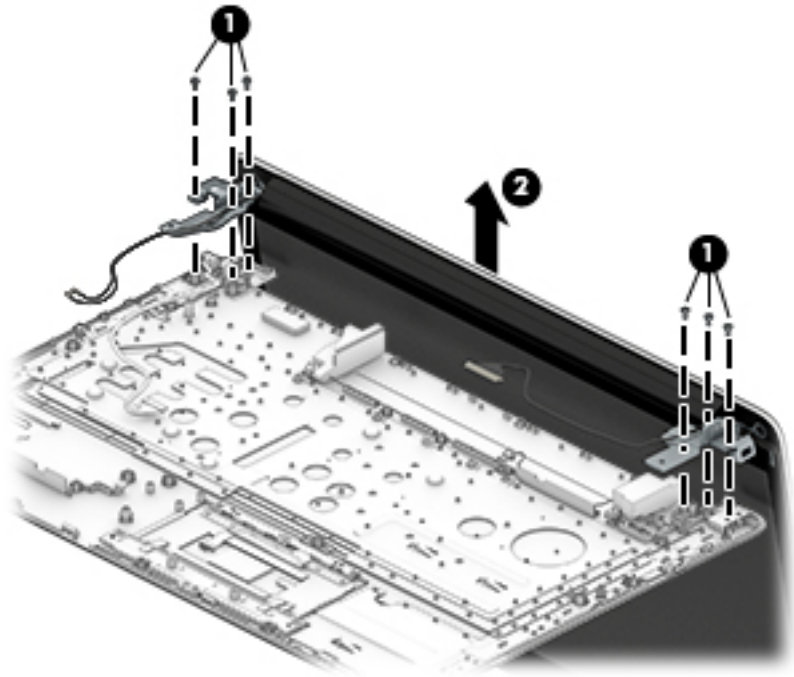
If it is necessary to replace any of the display assembly subcomponents:

1. Place the display on a flat surface with the panel toward you.

a. Remove the two screw covers **(1)** and two Phillips PM2.5×3.5 screws **(2)** that secure the display rear cover to the display.

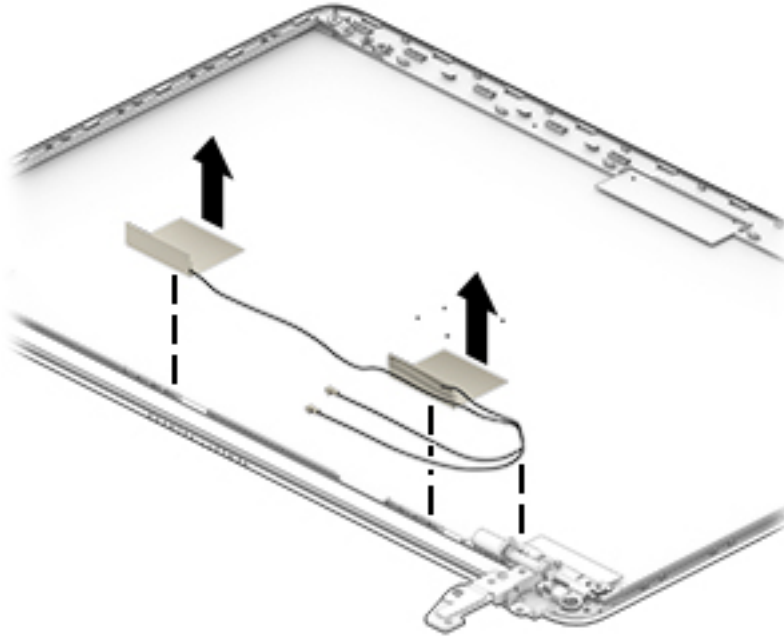**b.** Remove the display bezel **(2)**.
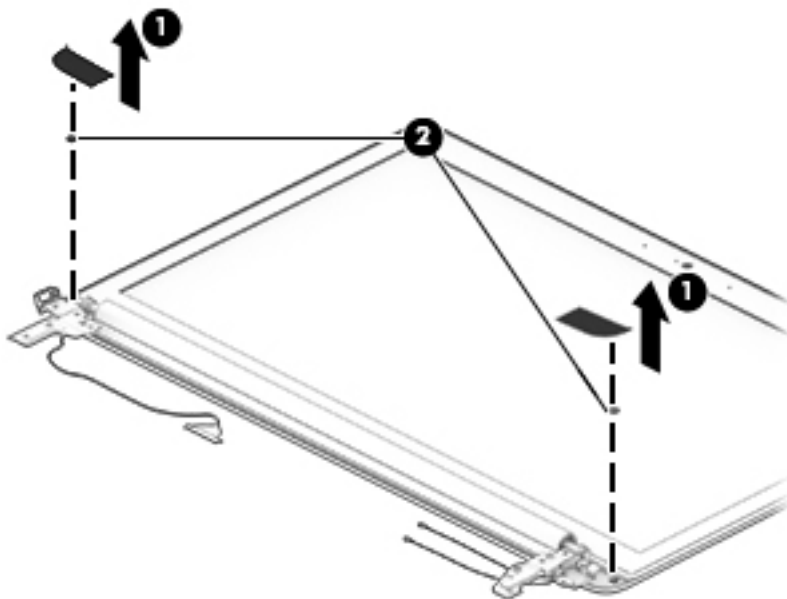
2. To remove the webcam/microphone module:

a. Position the display assembly with access to the top edge.

b. Lift the webcam/microphone module enough to gain access to the connector **(1)**. (The module is attached to the display enclosure with double-sided tape.)

c. Disconnect the cable **(2)** from the module.
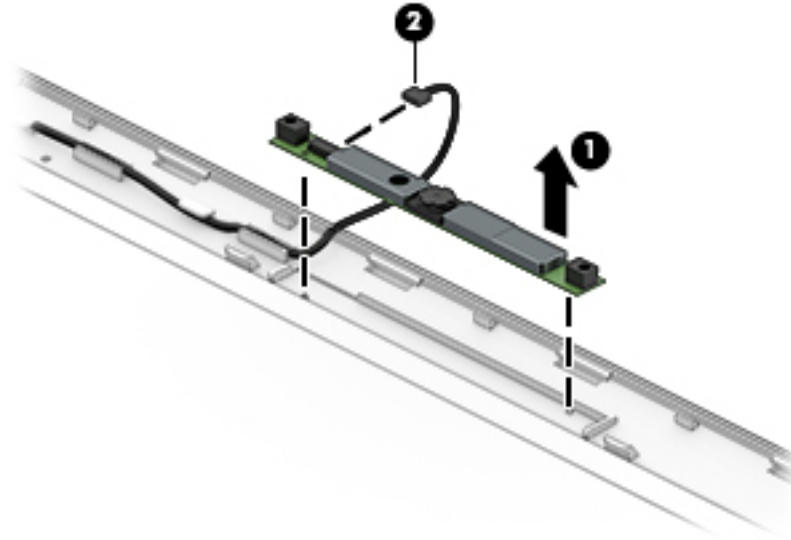
3. To remove the display panel:

   a. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the display panel to the enclosure.

   b. Rotate the display panel out of the enclosure **(2)** to gain access to the display cable connection on the back of the panel.
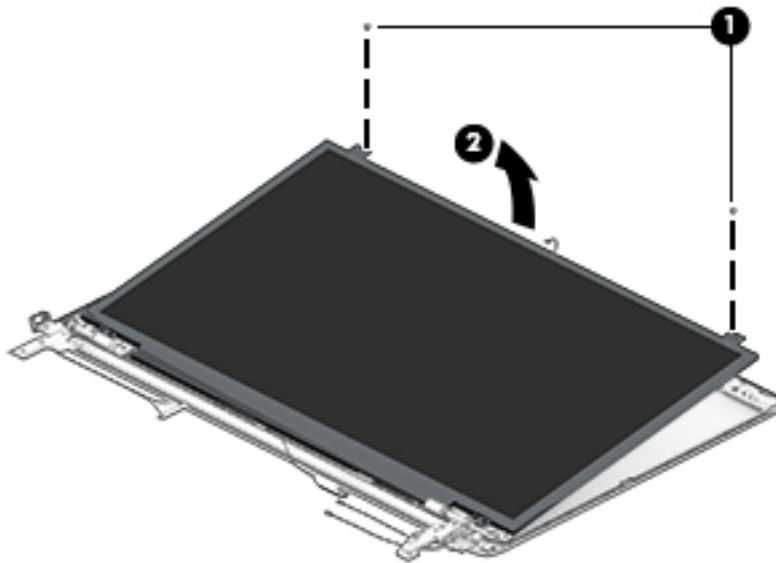
   c. On the back of the display panel, release the adhesive strip **(1)** that secures the display panel cable to the display panel, and then disconnect the cable **(2)**.

d. Remove the display panel from the computer **(3)**.
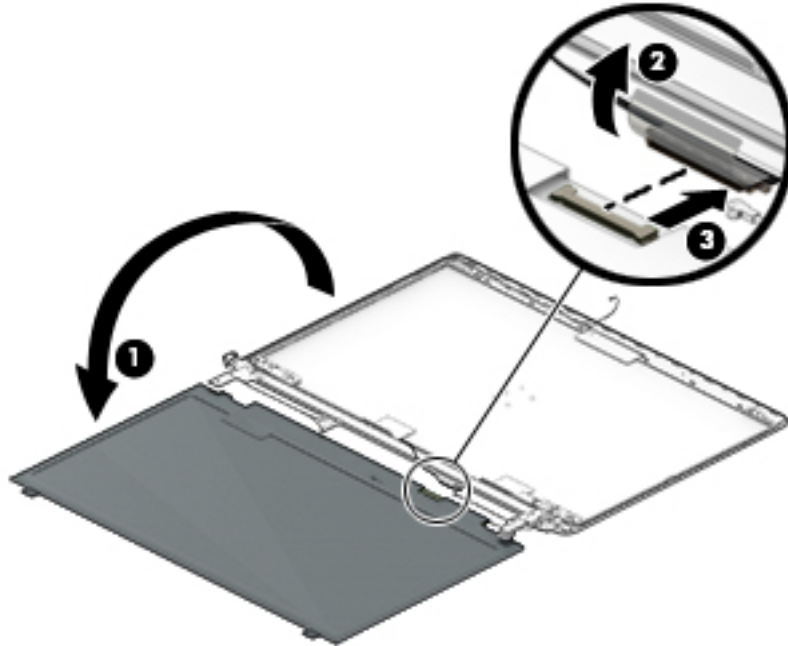
4. To remove the display hinges:

   a. Remove the eight Phillips PM2.5×3.5 screws **(1)** (four per hinge) that secure the hinges to the sides of the display enclosure.

   b. Remove the six broadhead Phillips PM2.0×3.0 screws **(2)** (three per hinge) that secure the hinges to the bottom of the display enclosure.

   c. Remove the display hinges.
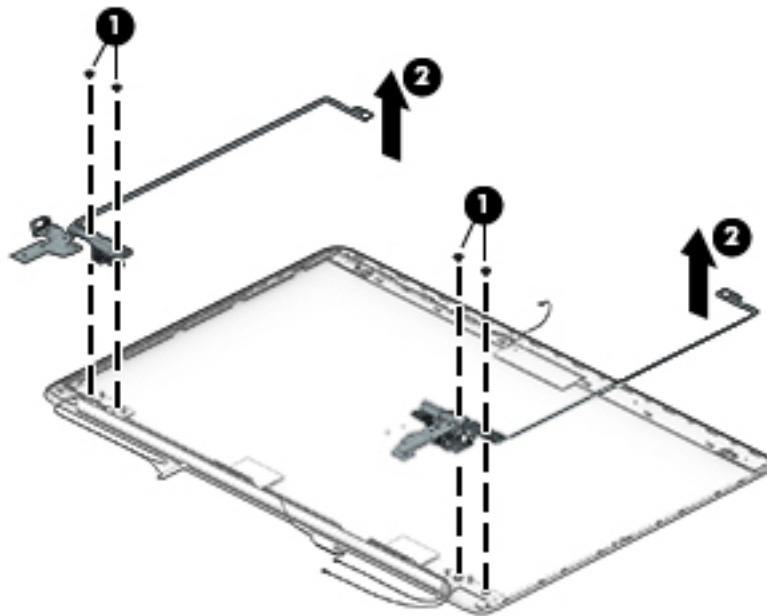
5. To remove the wireless antenna cables and transceivers, peel the transceivers from the top of the enclosure , release the wireless antenna cables from the clips built into the display enclosure , and then remove the cables and transceivers .
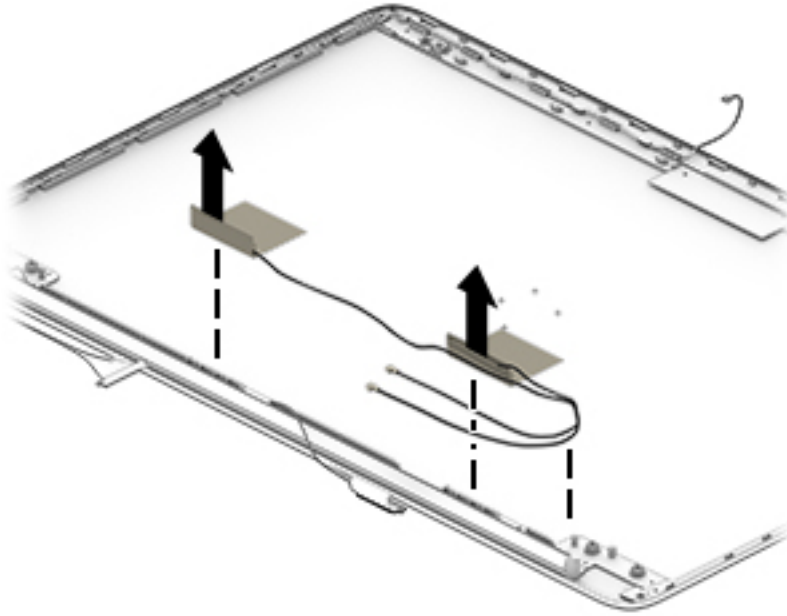
6. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(1)**, and then remove the cable from the display enclosure **(2)**.
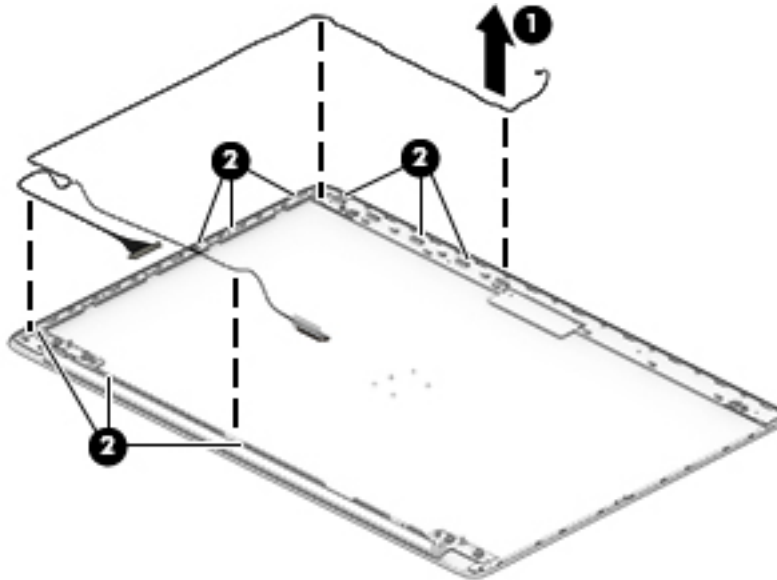
7. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

Reverse this procedure to install the display assembly.

7 Computer Setup (BIOS), TPM, and HP Sure Start – Windows 10

Using Computer Setup

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

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

Starting Computer Setup

NOTE: An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.

To start Computer Setup, follow these steps:

▲ Start Computer Setup.

- Computers or tablets with keyboards:

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

- Tablets without keyboards:

  ▲ Turn off the tablet. Press the power button in combination with the volume down button until the Startup menu is displayed, and then tap F10 to enter Computer Setup.

Navigating and selecting in Computer Setup

- To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to select the item.

  NOTE: On tablets without keyboards, you can use your finger to make selections.

- To scroll up and down, select the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.

- To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

- To exit Computer Setup menus without saving your changes:

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

  − or −

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

- To save your changes and exit Computer Setup menus:

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

  − or −

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

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

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

1. Start Computer Setup. See .

2. Select **Main**, and then select **Apply Factory Defaults and Exit**.

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

3. Follow the on-screen instructions.

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

   − or −

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

Your changes go into effect when the computer restarts.

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

Updating the BIOS

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

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

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

Determining the BIOS

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

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

1. Start Computer Setup. See .

2. Select **Main**, and then select **System Information**.

3. To exit Computer Setup without saving your changes, select the Exit icon in the lower-right corner of the screen, and then follow the on-screen instructions.

    – or –

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

To check for later BIOS versions, see .

Downloading a BIOS update

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

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

Do not shut down the computer or initiate Sleep.

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

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

    – or –

    Select the question mark icon in the taskbar.

2. Select **Updates**, and then select **Check for updates and messages**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

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

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

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

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

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

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

2. Select your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

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

Changing the boot order using the f9 prompt

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

1. Access the Boot Device Options menu:

   - Computers or tablets with keyboards:

     ▲ Turn on or restart the computer, and when the HP logo appears, press f9 to enter the Boot Device Options menu.

   - Tablets without keyboards:

     ▲ Turn off the tablet. Press the power button in combination with the volume down button until the Startup menu is displayed, and then tap F9 to enter the Boot Device Options menu.

2. Select a boot device, then press enter.

TPM BIOS settings (select products only)

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

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

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

To access TPM settings in Computer Setup:

1. Start Computer Setup. See .

2. Select **Security**, select **TPM Embedded Security**, and then follow the on-screen instructions.

Using HP Sure Start (select products only)

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

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

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

8 Using Setup Utility (BIOS) in Windows 8.1

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.

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.

BIOS version information (also known as *ROM date* and *System BIOS*) can be accessed from the Start screen by typing support, selecting the **HP Support Assistant** app, selecting **My computer**, and then selecting **System Information**, or by using Setup Utility (BIOS).

To use Setup Utility (BIOS):

1. Start Setup Utility (BIOS) (see).

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

3. Select **Exit**, select **Exit Discarding Changes**, and then follow the on-screen instructions.

To check for later BIOS versions, see .

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. From the Start screen, type `support`, and then select the **HP Support Assistant** app.

   – or –

   From the Windows desktop, click the question mark icon in the taskbar.

2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.

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. From the Start screen, type `file`, and then select **File Explorer**.

   – or –

   From the Windows desktop, right-click the **Start** button, 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.

9 Using Setup Utility (BIOS) in Windows 7

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.

Starting Setup Utility (BIOS)

▲ To start Setup Utility (BIOS), turn on or restart the computer, quickly press esc, and then press f10.

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

Updating the 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.

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

To use Setup Utility (BIOS):

1. Start Setup Utility (BIOS).

2. Use the arrow keys to select **Main**, and then make note of your current BIOS version.

3. To exit Setup Utility (BIOS) without saving your changes, use the tab key and the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

To check for later BIOS versions, see .

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 or Hibernation.

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

1. Select **Start**, type `hp support assistant`, and then select the **HP Support Assistant** program.

2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than 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.

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

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

1. Open Windows Explorer by selecting **Start > Computer**.

2. Double-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.

10 HP PC Hardware Diagnostics (UEFI) – Windows 10

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.

NOTE: To start BIOS on a convertible computer, your computer must be in notebook mode and you must use the keyboard attached to your tablet. The on-screen keyboard, which displays in tablet mode, cannot access BIOS.

To start HP PC Hardware Diagnostics UEFI:

1. Start BIOS:

    ● Computers or tablets with keyboards:

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

    ● Tablets without keyboards:

        ▲ Turn on or restart the tablet, and then quickly hold down the volume down button.

        – or –

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

2. Press or tap 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 80.

    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. On a tablet, press the volume down button to stop a diagnostic test.

NOTE: If you need to stop a diagnostic test on computers or tablets with a keyboard, press esc.

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

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, click the **Download** link, and then select **Run**.

Download any version of UEFI for a specific product:

1.   Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.

2.   Click **Drivers & Downloads**.

3.   In the text box, enter the product name, and then click **Go**.

     – or –

     Click **Find 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.

11 Using HP PC Hardware Diagnostics (UEFI) in Windows 8.1

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.

To start HP PC Hardware Diagnostics (UEFI):

1. Start Setup Utility:

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

2. Press or tap **f2**.

   The BIOS searches 3 places for the diagnostic tools, in the following order:

   a. Connected USB drive

   b. Hard drive

   c. BIOS

3. When the diagnostic tool opens, use the keyboard arrow keys to 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 or tap esc.

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

NOTE: Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

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

Option 1: HP PC Diagnostics homepage— Provides access to the latest UEFI version

1. Go to http://hp.com/go/techcenter/pcdiags.

2. Click the UEFI **Download** link, and then select **Run**.

Option 2: Support and Drivers pages—Provide downloads for a specific product for earlier and later versions

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

2. Point to **Support**, located at the top of the page, and then click **Download Drivers**.

3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

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

5. In the **Diagnostic** section, click **HP UEFI Support Environment**.

   – or –

   Click **Download**, and then select **Run**.

12 Backup and recovery – Windows 10

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 84. For information on the recovery options that are available using the recovery media, see Using Windows Tools on page 85.

- 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 86.

NOTE: If storage is 32 GB or less, 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 61*.

- 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 86.

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, 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 Recovering using HP Recovery Manager on page 86. If you have not already created recovery media, see Creating HP Recovery media (select products only) on page 84.

- 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 86.

- 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 Removing the HP Recovery partition (select products only) on page 88.

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 84.

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.

- 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 84.

- 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 Changing the computer boot order on page 88.

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 84.

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.

13 Backing up, restoring, and recovering in Windows 8.1

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

- Creating recovery media and backups

- Restoring and recovering your system

For additional information, refer to Help and Support.

▲ From the Start screen, type `help`, and then select **Help and Support**.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select models 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 models only) on page 89. For information on the recovery options that are available using the recovery media, see Recovering using HP Recovery Manager on page 91.

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

    For more information, see Using Windows tools on page 90.

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

Creating HP Recovery media (select models only)

IMPORTANT: If your computer does not list a Create recovery media option, you can obtain recovery media for your system 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.

HP Recovery Manager is a software program that allows you to create recovery media (using either a flash drive or a set of DVDs) 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:

1. From the Start screen, type `recovery`, 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 .

Using Windows tools

You can use Windows tools to create system restore points and create backups of personal information.

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

For more information and steps, see Help and Support.

▲ From the Start screen, type `help`, and then select **Help and Support**.

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 models.

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

  ▲ From the Start screen, type `help`, and then select **Help and Support**.

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

  ▲ From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Reinstall drivers and/or applications**, and then follow the on-screen instructions.

- On select models, if you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Reinstall drivers and/or applications option in HP Recovery Manager.

  For more information, see Recovering using HP Recovery Manager on page 91.

- 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 models only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 91. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 89.

- On select models, 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 91.

- On select models, 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 models only) on page 93.

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 models only). If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 89.

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 models only) on page 89.

- To use the Factory Reset option (select models only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 89.

- 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.

- Minimized Image Recovery (select models only)—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.

- 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 models only) allows System Recovery and, on select models, Minimized Image Recovery.

Using the HP Recovery partition (select models only)

The HP Recovery partition allows you to perform a system recovery or, on select models, minimized image 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:

1.   From the Start screen, type `recovery`, select **HP Recovery Manager**, and then select **HP Recovery Environment**.

     - or-

     Press f11 while the computer boots, or press and hold f11 as you press the power button.

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 Changing the computer boot order on page 92.

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:

1.   Insert the HP Recovery media.

2.   Start Computer Setup:

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

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 models 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 can no longer use the Windows Refresh option or the Windows option to remove everything and reinstall Windows. In addition, you will not be able to perform System Recovery or Minimized Image Recovery from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select models only) on page 89.

Follow these steps to remove the HP Recovery partition:

1.   From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

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

14 Backing up, restoring, and recovering in Windows 7

Your computer includes tools provided by the operating system and HP to help you safeguard your information and retrieve it if ever needed.

Creating backups

1. Use HP Recovery Manager to create recovery media immediately after you set up the working computer.

2. As you add hardware and software programs, create system restore points.

3. As you add photos, video, music, and other personal files, create a backup of your system and personal information.

Creating recovery media to recover the original system

After you successfully set up the computer, you should create recovery discs or a recovery flash drive using HP Recovery Manager. You will need these recovery discs or recovery flash drive to perform a system recovery should the hard drive become corrupted. A system recovery reinstalls the original operating system, and then configures the settings for the default programs.

What you need to know

- 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 flash drive or the number of blank DVD discs that will be required.

  Use DVD-R, DVD+R, DVD-R DL, DVD+R DL discs or a flash drive. Do not use rewriteable discs such as CD ±RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.

- If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.

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

- The creation process can take up to an hour or more. Do not interrupt the creation process.

- Store the recovery media in a safe location, separate from the computer.

- If necessary, you can exit the program before you have finished creating the recovery media. The next time you open HP Recovery Manager, you will be prompted to continue the process.

Creating the recovery media

1. Select **Start** and type `recovery` in the search field. Select **HP Recovery Manager** from the list. Allow the action to continue, if prompted.

2. Click **Recovery Media Creation**.

3. Follow the on-screen instructions to continue.

To recover, see Recovering the original system using HP Recovery Manager on page 97.

Creating system restore points

A system restore point is a snapshot of certain hard drive contents saved by Windows System Restore at a specific time. A restore point contains information such as registry settings that Windows uses. Restoring to a previous restore point allows you to reverse changes that have been made to the system since the restore point was created.

Restoring to an earlier system restore point does not affect data files saved or emails created since the last restore point, but it does affect software you may have installed.

For example, if you download a photo from a digital camera and then restore the computer to the state it was on the previous day, the photo remains on the computer.

However, if you install photo viewing software and then restore your computer to the state it was on the previous day, the software will be uninstalled, and you won't be able to use it.

What you need to know

- If you restore to a restore point and then change your mind, you can undo the restoration.

- You should create system restore points:

  ○ Before you add or change software or hardware

  ○ Periodically, whenever the computer is running normally

- System Restore also saves shadow copies of files that have been changed since the last restore point was created. For more information about using shadow copies to restore, see Help and Support.

Creating a system restore point

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **Create**, and follow the on-screen instructions.

To restore, see Restoring to a previous system restore point on page 97.

Backing up system and personal information

Your computer stores information that is important to you, such as files, emails, and photos, and you will want to keep that information even if you download a virus or the system stops working properly. How completely you are able to recover your files depends on how recent your backup is. As you add new software and data files, you should create backups on a regular basis.

Tips for a successful backup

- Number backup discs before inserting them into the optical drive.

- Store personal files in the Documents, Music, Pictures, and Videos libraries, and back up these folders periodically.

- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.

2. Copy the screen image:

   To copy only the active window, press alt+prt sc.

   To copy the entire screen, press prt sc.

3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.

4. Save and print the document.

What you need to know

- You can back up your information to an optional external hard drive, a flash drive, a network drive, or discs.

- Connect the computer to AC power during backups.

- Allow enough time for the backup. Depending on files sizes, it may take more than an hour.

- Verify the amount of free space on your backup storage device before you back up.

- You should back up:

  ◦ Before adding or changing software or hardware.

  ◦ Before the computer is repaired or restored.

  ◦ On a regular schedule to be sure you have recent copies of personal information.

  ◦ After you add many files—for example, if you saved videos from a birthday party.

  ◦ Before using antivirus software to remove a malicious program.

  ◦ After adding information that is hard to replace, such as pictures, videos, music, project files, or data records.

Creating a backup using Windows Backup and Restore

Windows allows you to back up files using Windows Backup and Restore. You can select the level you want to back up, from individual folders to drives. The backups are compressed to save space. To back up:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.

2. Follow the on-screen instructions to schedule and create a backup.

NOTE: Windows includes the User Account Control feature to improve the security of the computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. See Help and Support for more information.

To restore, see Restoring specific files using Windows Backup and Restore on page 97.

Restore and recovery

Restoring to a previous system restore point

Sometimes installing a software program causes your computer or Windows to behave unpredictably. Usually uninstalling the software fixes the problems. If uninstalling does not fix the problems, you can restore the computer to a previous system restore point (created at an earlier date and time).

To restore to a previous system restore point, when the computer was running correctly:

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **System Restore**, and follow the on-screen instructions.

Restoring specific files

If files are accidentally deleted from the hard disk and they can no longer be restored from the Recycle Bin, or if files become corrupt, restoring specific files is useful. Restoring specific files is also useful if you ever choose to recover the original system using HP Recovery Manager. You can only restore specific files that you have backed up before.

Restoring specific files using Windows Backup and Restore

Windows allows you to restore files that were backed up using Windows Backup and Restore:

1. Select **Start > Control Panel > System and Security > Backup and Restore**.

2. Follow the on-screen instructions to restore your backup.

> 📝 **NOTE:** Windows includes the User Account Control feature to improve the security of the computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. See Help and Support for more information.

Recovering the original system using HP Recovery Manager

HP Recovery Manager software allows you to repair or recover the computer to its original factory state.

What you need to know

- 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 disc provided by the manufacturer.

- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see Restoring to a previous system restore point on page 97) and partial restores (see Restoring specific files on page 97), try them before using HP Recovery Manager to recover your system.

- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

- If the recovery media do not work, you can obtain recovery discs for your system from the HP website.

- The Minimized Image Recovery option is recommended for advanced users only. All hardware-related drivers and software are re-installed, but other software applications are not. Do not interrupt the process until it is complete, otherwise the recovery will fail.

Recovering using HP Recovery partition (select models only)

The HP Recovery partition (select models only), allows you to restore your system without the need for recovery discs or a recovery flash drive. This type of recovery can only be used if the hard drive is still working.

To check for the presence of a recovery partition, select **Start**, right-click **Computer** then select **Manage > Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

NOTE: Recovery discs have been included if your computer did not ship with a recovery partition.

1. Access HP Recovery Manager in either of the following ways:

   - Select **Start** and type `recovery` in the search field. Select **HP Recovery Manager** from the list.

     – or –

   - Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen. Then press f11 while the "F11 (System Recovery)" message is displayed on the screen.

2. Click **System Recovery** in the **HP Recovery Manager** window.

3. Follow the on-screen instructions.

Recovering using the recovery media

1. If possible, back up all personal files.

2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

   – or –

   Insert the recovery flash drive into a USB port on your computer, and then restart the computer.

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

3. Press f9 at system bootup.

4. Select the optical drive or the flash drive.

5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.

2. Press esc while the computer is restarting, and then press f9 for boot options.

3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for a recovery flash drive:

1. Insert the flash drive into a USB port.

2. Restart the computer.

3. Press esc while the computer is restarting, and then press f9 for boot options.

4. Select the flash drive from the boot options window.

15 Ubuntu Linux – Backing up, restoring, and recovering

Recovery after a system failure is as good as your most recent backup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

Performing a system recovery

The Deja Dup Restore Tool allows you to repair or restore the computer to its original factory state. You can create an image restore DVD using an optional external DVD±RW optical drive. You can also create a restore image on a USB storage device.

⚠ **CAUTION:** Using Restore completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery tool reinstalls the original operating system and programs and drivers that were installed at the factory. Software, drivers, and updates not installed at the factory must be manually reinstalled. Personal files must be restored from a backup.

📝 **NOTE:** HP recommends that you create the image restore in the event of a system failure.

Creating the restore DVDs

The restore creation software creates a set of system restore discs using blank, writable DVDs (DVD-R or DVD+R). HP recommends using blank DVD+R discs from a manufacturer you trust, because these recovery DVDs are so important. You need approximately 3 blank DVD+R discs. The program states how many discs are needed at the beginning of the process.

To create restore DVDs:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup**.

2. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup Location**, and select the DVD from the drop-down list.

3. Select **Overview** from the panel on the left side of the window, and then click **Back Up Now**.

4. Follow the on-screen instructions.

Creating a restore image on a USB device

📝 **NOTE:** Be sure AC power is connected to the computer you begin.

Verify the exact amount of free space on your storage device before you begin the creation process. For most models, you will need at least 8 GB of free space on the storage device. However, depending on the drivers and software installed on your computer, you may need slightly more than 8 GB of space. **HP recommends that you use a 16 GB device or above for best results.**

📝 **IMPORTANT:** Remember to insert your USB device into the USB port on the computer before starting this procedure.

To create the restore image:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup**.

2. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup location**, and select the USB device from the drop-down list.

   NOTE: If the USB device is not listed in the drop-down list for Backup Location, select **Local Folder**, and then click the **Choose Folder** button. Select the USB device from the panel on the left side of the **Choose Folder** window, and click **OK**.

3. Select **Overview** from the panel on the left side of the window, and then click **Backup Now**.

4. Follow the on-screen instructions.

Performing recovery using the restore media

NOTE: The following procedure uses the F11 BIOS Recovery feature to perform the recovery.

1. If possible, back up all personal files.

2. Shut down the computer.

3. Be sure the restore DVD or USB device is connected to the computer.

4. Restart the computer.

5. Using the arrow keys, select **Recovery**, and then press enter.

6. Follow the on-screen instructions.

NOTE: If you are unable to boot (start up) your computer with the primary operating system, and you did not create a system recovery disc, you must purchase an *Ubuntu Operating System* DVD to reinstall the operating system. For additional information, refer to the *Worldwide Telephone Numbers* booklet for more information.

Backing up your information

You should back up your computer files on a regular schedule to maintain a current backup. You can manually back up your information to an optional external drive, a network drive, discs, or the Ubuntu One website. Back up your system at the following times:

- At regularly scheduled times

- Before the computer is repaired or restored

- Before you add or modify hardware or software

To back up your home directory files to the Ubuntu website using the Deja Dup Backup Tool:

NOTE: Before you back up your information, be sure you have designated a location to save the backup files.

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup** icon.

2. Select **Folders** from the panel on the left side of the window, and beneath **Folders to back up**, select the folders to back up.

3. Select **Storage** from the panel on the left side of the window, click the down-arrow next to **Backup Location**, and select **Ubuntu One** from the drop-down list.

4. Select **Overview** from the panel on the left side of the window, and then click **Back Up Now**.

NOTE: The first time you backup your files to Ubuntu One, you will need to create an account to sign into Ubuntu One. Enter your email address and password into the account sign-in boxes and follow the on-screen instructions to complete the sign-in process.

To restore backup files:

1. Click the **System menu** icon at the far right of the top panel, and then click **System Settings > Backup** icon.

2. Click **Restore**, select the location of the backup files and the folder name, and then click **Forward**.

3. Under **Restore from When?**, select the date of the files to be restored and click **Forward**.

4. Select the location and folder where the files are to be restored and click **Forward**.

5. Follow the on-line instructions.

6. Click **Restore** to start restoring the files, or click **Cancel** to cancel the operation.

NOTE: You may also back up to cloud storage services provided by various companies. For a small fee, they will keep your backup for you. A cloud service is recommended since it is an easy way to keep your backups off-site and safe from any disaster.

16 Specifications

Computer specifications

	Metric	U.S.
Dimensions (touch models)		
Depth	**261.1 mm**	10.28 in
Width	**41.95 cm**	17.3 in
Height (rear)	**2.67 cm**	1.1 in
	2.49 cm	1 in
Weight	**2.87 kg**	6.33 lbs
Touch	**2.34 kg**	5.16 lbs
Non-touch		
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W	
	19.5 V @ 4.62 A - 90 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.

43.9-cm (17.3-in) display specifications

	Metric	U.S.
Active diagonal size	43.9-cm	17.3-in
Thickness	6.0 mm or 4.0 mm	0.157 inch or 0.236 inch
Resolution	1920x1080 (FHD)	
	1920x1080 (HD)	
Surface treatment	AntiGlare	
Contrast ratio	300:1 (typical)	
Brightness	220 nits (typical)	
Viewing angle	SVA	
Backlight	WLED	
Companion standard	eDP	

Hard drive specifications

	2-TB*	1-TB*	750-GB*	500-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	7.0 mm or 9.5 mm
Length	100.4 mm	100.4 mm	100.4 mm	100.6 mm
Width	69.9 mm	69.9 mm	69.9 mm	70.1 mm
Weight	115.0 g	115.0 g	115.0 g	92.0 g
Interface type	SATA	SATA	SATA	SATA
Transfer rate				
Synchronous (maximum)	300 MB/sec	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)				
Single track	1.4 ms	1.4 ms	1.5 ms	3 ms
Average (read/write)	10 ms	10 ms	11 ms	13 ms
Maximum	12 ms	12 ms	14 ms	24 ms
Logical blocks	3,877,842,922	1,938,921,461	1,465,149,168	1,048,576,000
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm	5400 rpm
Operating temperature	**0℃** to **60℃** (32°F to 140°F)			

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

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

DVD±RW SuperMulti DL Drive specifications

Applicable disc	Read:	Write:
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 µm	
Access time	**CD**	**DVD**
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

17 Power cord set requirements

The wide-range input feature of the computer permits it to operate from any line voltage from 100 to 120 volts AC, or from 220 to 240 volts 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 and regions must meet the requirements of the country or 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 amps 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
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	COC	5
South Korea	EK	4

Country/region	Accredited agency	Applicable note number
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	4
The United Kingdom	BSI	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-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 SPT-3 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) or NEMA 6-15P (15 A, 250 V) configuration.

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 VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) 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 certification mark of the agency responsible for evaluation in the country or region where it will be used.

5. The flexible cord must be Type VCTF, 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.

18 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