HP OMEN Notebook PC 15

Maintenance and Service Guide
IMPORTANT! This document is intended for
HP authorized service providers only.

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Product notice

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

Not all features are available in all editions 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.

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).

Table of contents

1 Product description

Category	Description
Product Name	HP OMEN Notebook PC 15
Processor	**4th generation Intel® Core™ i7 processors**
	Intel Core i7-4710HQ (2.5 GHz, turbo up to 3.5 GHz) 1600 MHz/6 MB Cache, 47W
Chipset	Intel HM87 Express Chipset
Graphics	**Internal graphics**
	Intel HD Graphics 4600
	NVIDIA Discrete PCI Express x8 Graphics
	NVIDIA GeForce GTX 860M (N15P-GX) with 2048MB of dedicated video memory
	NVIDIA GeForce GTX 860M (N15P-GX) with 4096MB of dedicated video memory
	Supports BD playback with HD Decode, DX11 support, and HDMI
Panel	15.6-in (1920×1080), antiglare, full high-definition (FHD), UWVA at 72% Color Gamut, white light-emitting diode (WLED); 16:9 ultra wide aspect ratio; typical brightness: 300 nits
	Flush glass design
	Touchscreen, multi-touch enabled
Memory	No SODIMM slots - not customer accessible / upgradeable
	DDR3L-1600MHz Dual Channel Support
	Supports up to 16 GB maximum system memory in the following configurations:
	• 16 GB
	• 8 GB
Storage	Single M.2 SSD configuration as storage:
	• 512 GB, MLC, PCIe, M.2.2280
	• 256 GB, MLC, PCIe, M.2.2260
	• 128 GB, TLC, SATA, M.2.2280
Audio and video	HP TrueVision HD camera, fixed (no tilt) with activity light, 1920×1080 by 30 frames per second
	Dual array digital microphones with appropriate software - beam forming, echo cancellation, noise suppression
	Beats Audio
	Dual speakers
	Supports voice recognition
Wireless networking	Integrated Wireless options with dual antennas (NGFF/PCIe)
	Compatible with Miracast-certified devices
	Supports the following adapters:
	• Intel Dual Band Wireless-AC 7260(non v-Pro) 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapte

Category	Description
	● Intel Wireless 7260BN 802.11 bgn 2x2 WiFi + BT 4.0 Combo Adapter
External media cards	HP Multi-Format Digital Media Card Reader
	Push-Push Insertion/Removal.
	Supports SD, SDHC, SDXC.
Internal cards	One NGFF Slot (2230) for WLAN
	One NGFF Slot (2260/2280) for SSD
Ports	HDMI v1.4b supporting up to 2560×1600 @ 60Hz / 4096×2304 @ 24Hz
	One mini Display Port v1.2 supporting Max. 3840×2160 @ 60 Hz resolution
	Headphone/microphone combo jack
	USB 3.0 ports (4)
	Support HP USB Boost (Sleep and Charge) on all four USB 3.0 ports
	AC Smart Pin adapter plug
Keyboard/pointing devices	Full size Dura Coat island-style keyboard
	Touchpad requirements:
	● Multitouch gestures enabled
	● Supports Windows 8 modern trackpad gestures
	● Taps enabled as default
Power requirements	Supports the following AC adapters:
	● 120-W HP Smart AC adapter (4.5 mm barrel connector)
	1.8 meter power cord
	Supports a 4-cell, 58-Wh, 3.82-Ah, Li-ion battery
Security	Trust Platfom Module (TPM) support
Operating system	**Preinstalled**
	Windows 8.1
	Windows 8.1 (CPPP) (China only)
Serviceability	**End user replaceable parts**
	AC adapter

2 Getting to know your computer

Finding your hardware and software information

Locating hardware

To find out what hardware is installed on your computer:

1. From the Start screen, type `control panel`, and then select **Control Panel**.

2. Select **System and Security**, select **System**, and then click **Device Manager** in the left column.

    A list displays all the devices installed on your computer.

–or–

1. From the Start screen, type `hp performance advisor`, and then select **HP Performance Advisor**.

    –or–

    From the Windows desktop, click the **HP OMEN Central Ops** icon on the taskbar, and then click **HP Performance Advisor**.

2. Select **Your Computer**, and then select **Device Information**.

    A list displays all the devices installed on your computer.

To find information about system hardware components and the system BIOS version number:

▲ Press fn+esc.

–or–

▲ From the Start screen, type `hp performance advisor`, select **HP Performance Advisor**, and then select **Your Computer**.

Locating software

To find out what software is installed on your computer:

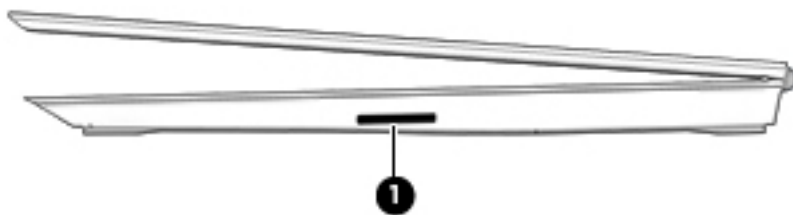▲ From the Start screen, click the down arrow in the lower-left corner of the screen.

Display

Component		Description
(1)	WLAN antennas*	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.
		To use the webcam, from the Start screen, type `camera`, and then select **Camera** from the list of applications.
(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.

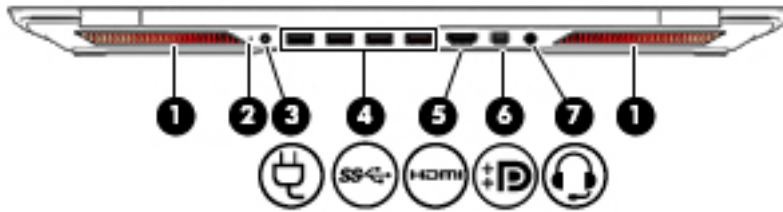*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access this guide, from the Start screen, type `support`, and then select the **HP Support Assistant** app.

Right side

Component		Description
(1)	Memory card reader	Reads optional memory cards that store, manage, share, or access information.
		To insert a card:
		Hold the card label-side up, with connectors facing the slot, insert the card into the slot, and then press in on the card until it is firmly seated.
		To remove a card:
		Press in on the card it until it pops out.

Rear

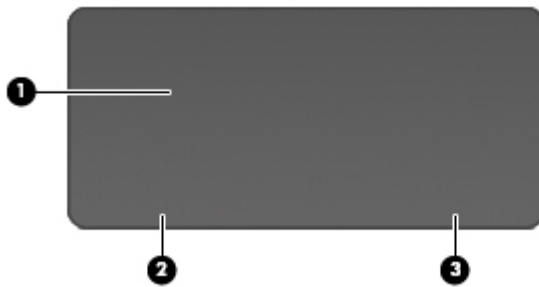| Component		Description
(1)	Vents (2)	Enable airflow to cool internal components.
		NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	AC adapter light	• On: The AC adapter is connected and the battery is charged.
		• Off: The computer is using battery power.
(3)	Power connector	Connects an AC adapter.
(4)	USB 3.0 ports (4)	Connect optional USB devices, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
		NOTE: Your computer does not include a RJ-45 (network) jack. To connect to a wired network, you must use a USB Ethernet adapter (purchased separately).
(5)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(6)	Mini DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.
		NOTE: You can connect up to 2 optional display devices with a Mini DisplayPort splitter (purchased separately).
(7)	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*. To access this guide, from the Start screen, type `support`, and then select the **HP Support Assistant** app.
		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).

Top

Touchpad

Component		Description
(1)	Touchpad zone	Reads your finger gestures to move the pointer or activate items on the screen. **TIP:** You can disable the touchpad or change the touchpad sensitivity and click speed.
(2)	Left touchpad button	Functions like the left button on an external mouse.
(3)	Right touchpad button	Functions like the right button on an external mouse.

Lights

Component		Description
(1)	Power light	● On: The computer is on.
		● Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components.
		● Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(3)	Mute light	● Amber: Computer sound is off.
		● Off: Computer sound is on.
(4)	Wireless light	● Off: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.
		● Amber: All wireless devices are off.

Buttons and speakers

Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer.
		• When the computer is on, press the button briefly to initiate Sleep.
		• When the computer is in the Sleep state, press the button briefly to exit Sleep.
		• When the computer is in Hibernation, press the button briefly to exit Hibernation.
		CAUTION: Pressing and holding down the power button 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 10 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.
(2)	Speakers (2)	Produce sound.

Keys

Component		Description
(1)	Programmable gaming keys	Allow you to create up to 30 different gaming key combinations when used alone or with the fn, ctrl, alt, or shift keys.
(2)	esc key	Displays system information when pressed in combination with the fn key.
(3)	fn key	Executes frequently used system functions when pressed in combination with one of the action keys or the esc key.
(4)	Windows key	Returns you to the Start screen from an open app or the Windows desktop.
		NOTE: Pressing the Windows key again will return you to the previous screen.
		TIP: You can disable the Windows key in HP OMEN Control.
(5)	Action keys	Execute frequently used system functions when pressed in combination with the fn key.
		NOTE: On select models, the fn+f5 action key turns the keyboard backlight feature off or on.
(6)	Windows application key	Displays options for a selected object.
		TIP: You can disable the Windows application key in HP OMEN Control.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

IMPORTANT: All labels described in this section will be located in one of 3 places depending on your computer model: affixed to the bottom of the computer, located in the battery bay, or under the service door.

TIP: You can also press fn+esc for system information.

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

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

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

- Microsoft® Certificate of Authenticity label (select models only prior to Windows 8)—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. HP platforms preinstalled with Windows 8 or Windows 8.1 do not have the physical label, but have a Digital Product Key electronically installed.

  NOTE: This Digital Product Key is automatically recognized and activated by Microsoft Operating Systems on a reinstall of the Windows 8 or Windows 8.1 operating system with HP-approved recovery methods.

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

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

3 Illustrated parts catalog

Computer major components
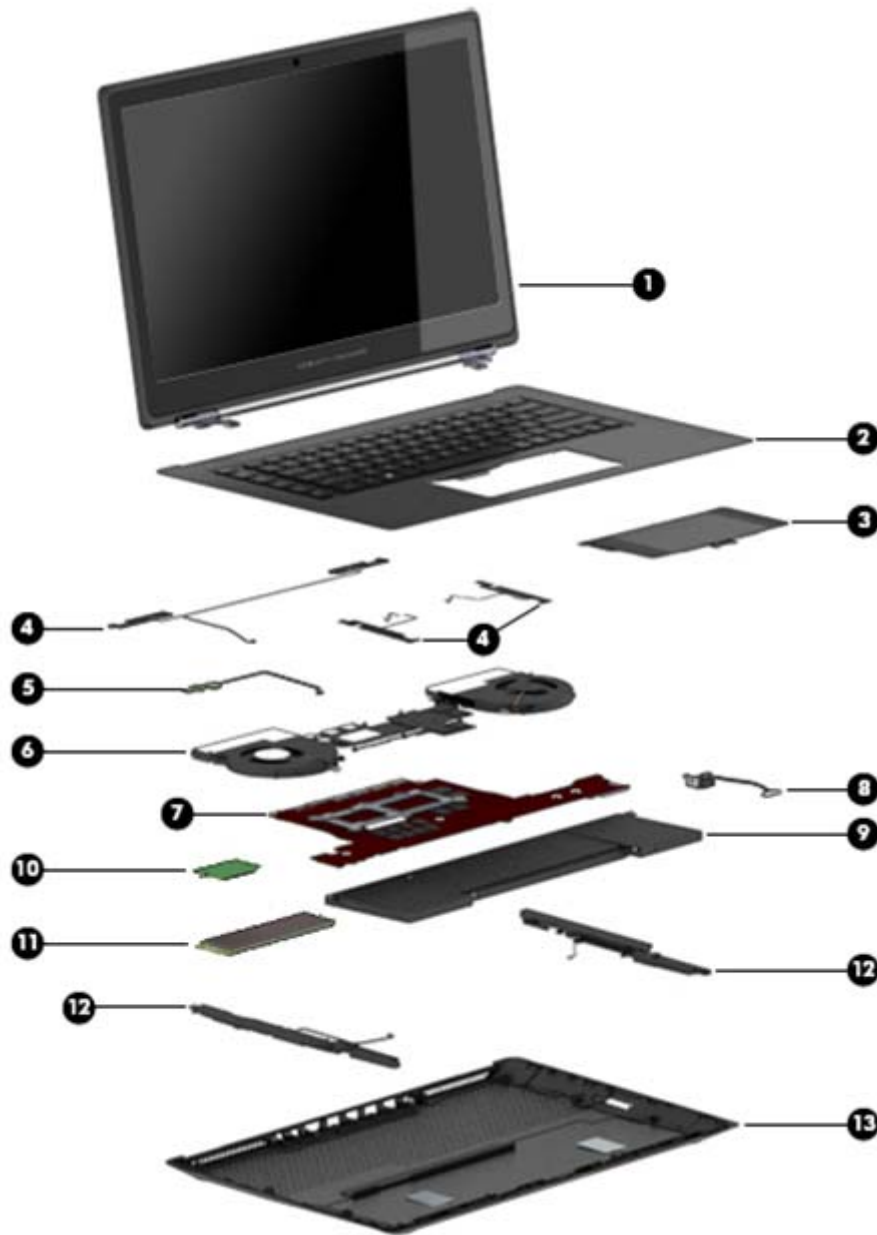
Item	Component	Spare part number
(1)	**Display assembly**: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly subcomponents on page 15.	
(2)	**Keyboard/top cover** (includes top cover, keyboard, keyboard support bracket, and screws):	
	For use in Belgium	788603-A41
	For use in Canada	788603-DB1
	For use in the Czech Republic and Slovakia	788603-FL1
	For use in Denmark, Finland, and Norway	788603-DH1
	For use in France	788603-051
	For use in Germany	788603-041
	For use in Greece	788603-151
	For use in Italy	788603-061
	For use in Japan	788603-291
	For use in Latin America	788603-161
	For use in the Netherlands	788603-B31
	For use in the Portugal	788603-131
	For use in the Russia	788603-251
	For use in the Saudi Arabia	788603-171
	For use in South Korea	788603-AD1
	For use in Spain	788603-071
	For use in Switzerland	788603-BG1
	For use in the Turkey	788603-141
	For use in the United Kingdom and Sinapore	788603-031
	For use in the United States	788603-001
(3)	**TouchPad** (includes cable)	788607-001
(4)	**Light modules** (includes left, right, and rear modules and cables)	788604-001
(5)	**Power button board** (includes cable)	788605-001
(6)	**Heat sink and fans**	788600-001
(7)	**System board equipped with an Intel Core I7-4710 processor, a graphics subsystem with discrete memory, and on-board system memory** (includes thermal grease and thermal pads)	
	Includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system	788615-001
	Includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788615-501
	Includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788615-601
	Includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system	788616-001

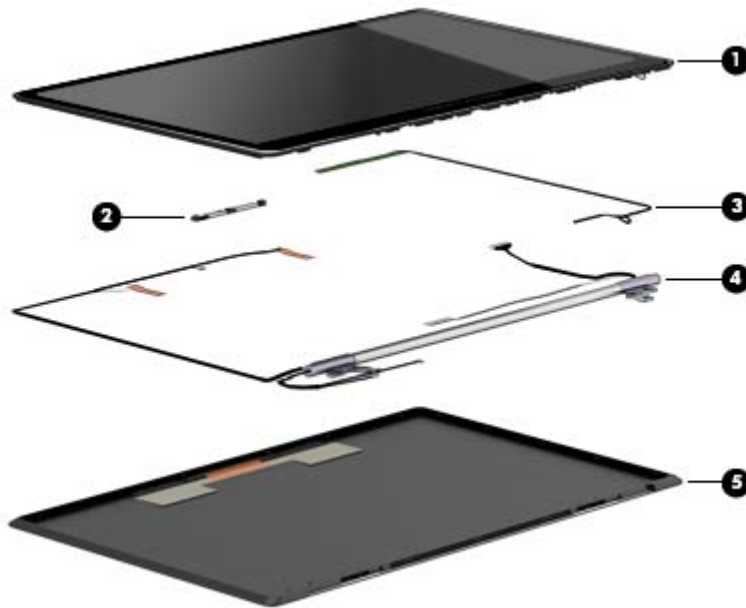| Item	Component	Spare part number
	Includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788616-501
	Includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788616-601
	Includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models without the Windows operating system	788614-001
	Includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788614-501
	Includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788614-601
(8)	**Power connector cable** (includes cable, bracket, and screws)	788599-001
(9)	**Battery**, 4-cell, 58-Wh, 3.82-Ah, Li-ion	778978-006
(10)	**WLAN modules:**	
	Intel Wireless 7260BN 802.11 bgn 2x2 WiFi + BT 4.0 Combo Adapter	784640-006
	Intel Dual Band Wireless-AC 7260(non v-Pro) 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter	784645-006
(11)	**Solid-state drive (SSD), M.2**	
	512 GB, MLC, M.2.2260, PCIe	788613-001
	256 GB, MLC, M.2.2280, PCIe	788612-001
	128 GB, TLC, M.2.2280, SATA	788611-001
(12)	**Speaker Kit** (includes left and right speakers)	788610-001
(13)	**Base enclosure** (includes rubber feet)	788598-001

Miscellaneous parts

Component	Spare part number
120-W HP Smart AC adapter (PFC, 4.5-mm)	710415-001
HP RJ45-to-USB adapter	539614-001
HP HDMI-to-VGA adapter	701943-001
Screw Kit	788609-001
Power cord (3-pin, black, 1.00-m):	
For use in Australia	490371-011
For use in Denmark	490371-081
For use in Europe	490371-021
For use in Japan	490371-291
For use in North America	490371-001
For use in the People's Republic of China	490371-AA1

Component	Spare part number
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in the United Kingdom and Singapore	490371-031

Display assembly subcomponents

Item	Component	Spare part number
(1)	**Display Panel Kit** (includes bezel, touch glass, and panel)	788608-001
	NOTE: Must be assembled in a clean room.	
(2)	**Webcam/microphone module**	788620-001
(3)	**Touch control board**	788606-001
(4)	**Display Hinge Kit** (includes left/right hinges, LVDS cable, touch control cable, and left and right antennas)	
	NOTE: The display hinge kit is spared with the display enclosure (788597-001).	
(5)	**Display enclosure** (includes the display hinge kit)	788597-001
	NOTE: The display enclosure spare part kit also includes the display hinge kit with left/right hinges, LVDS cable, touch control cable, and left and right antennas.	

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in North America (3-pin, black, 1.83-m)
490371-011	Power cord for use in Australia (3-pin, black, 1.83-m)
490371-021	Power cord for use in Europe (3-pin, black, 1.83-m)
490371-031	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-081	Power cord for use in Denmark (3-pin, black, 1.83-m)
490371-111	Power cord for use in Switzerland (3-pin, black, 1.83-m)
490371-291	Power cord for use in Japan (3-pin, black, 1.83-m)
490371-AA1	Power cord for use in the People's Republic of China (3-pin, black, 1.83-m)
490371-AD1	Power cord for use in South Korea (3-pin, black, 1.83-m)
539614-001	HP RJ-45-to-USB adapter
701943-001	HP HDMI-to-VGA adapter
710415-001	120-W HP Smart AC adapter (PFC, 4.5-mm)
778978-006	4-cell, 58-Wh, 3.82-Ah, Li-ion battery
784640-006	Intel Wireless 7260BN 802.11 bgn 2x2 WiFi + BT 4.0 Combo Adapter
784645-006	Intel Dual Band Wireless-AC 7260(non v-Pro) 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter
788597-001	Display enclosure (includes the display hinge kit with left/right hinges, LVDS cable, touch control cable, and left and right antennas)
788598-001	Base enclosure (includes rubber feet)
788599-001	Power connector cable (includes cable, bracket, and screws)
788600-001	Heat sink
788603-001	Keyboard/top cover in purple finish for use in the United States (includes top cover, keyboard, keyboard support bracket, and screws)
788603-031	Keyboard/top cover in purple finish for use in the United Kingdom and Singapore (includes top cover, keyboard, keyboard support bracket, and screws)
788603-041	Keyboard/top cover in purple finish for use in the Germany (includes top cover, keyboard, keyboard support bracket, and screws)
788603-051	Keyboard/top cover for use in France (includes top cover, keyboard, keyboard support bracket, and screws)
788603-061	Keyboard/top cover for use in Italy (includes top cover, keyboard, keyboard support bracket, and screws)
788603-071	Keyboard/top cover for use in Spain (includes top cover, keyboard, keyboard support bracket, and screws)
788603-131	Keyboard/top cover for use in Portugal (includes top cover, keyboard, keyboard support bracket, and screws)
788603-141	Keyboard/top cover for use in Turkey (includes top cover, keyboard, keyboard support bracket, and screws)
788603-151	Keyboard/top cover for use in Greece (includes top cover, keyboard, keyboard support bracket, and screws)

Spare part number	Description
788603-161	Keyboard/top cover for use in Latin America (includes top cover, keyboard, keyboard support bracket, and screws)
788603-171	Keyboard/top cover for use in Saudi Arabia (includes top cover, keyboard, keyboard support bracket, and screws)
788603-251	Keyboard/top cover for use in Russia (includes top cover, keyboard, keyboard support bracket, and screws)
788603-291	Keyboard/top cover for use in Japan (includes top cover, keyboard, keyboard support bracket, and screws)
788603-A41	Keyboard/top cover for use in Belgium (includes top cover, keyboard, keyboard support bracket, and screws)
788603-AD1	Keyboard/top cover for use in South Korea (includes top cover, keyboard, keyboard support bracket, and screws)
788603-B31	Keyboard/top cover for use in the Netherlands (includes top cover, keyboard, keyboard support bracket, and screws)
788603-BG1	Keyboard/top cover for use in Switzerland (includes top cover, keyboard, keyboard support bracket, and screws)
788603-DB1	Keyboard/top cover for use in Canada (includes top cover, keyboard, keyboard support bracket, and screws)
788603-DH1	Keyboard/top cover for use in Denmark, Finland, and Norway (includes top cover, keyboard, keyboard support bracket, and screws)
788603-FL1	Keyboard/top cover for use in the Czech Republic and Slovakia (includes top cover, keyboard, keyboard support bracket, and screws)
788604-001	Light modules (includes left, right, and rear modules and cables)
788605-001	Power button board (includes cable)
788606-001	Touch control board
788607-001	TouchPad (includes cable)
788608-001	Display Panel Kit (includes bezel, touch glass, and panel) **NOTE:** Must be assembled in a clean room.
788609-001	Screw Kit
788610-001	Speaker Kit (includes left and right speakers)
788611-001	128 GB solid-state drive (SSD), M.2.2280, TLC, SATA
788612-001	256 GB solid-state drive (SSD), M.2.2260, MLC, PCIe
788613-001	512 GB solid-state drive (SSD), M.2.2280, MLC, PCIe
788614-001	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models without the Windows operating system (includes thermal grease and thermal pads)
788614-501	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Standard (includes thermal grease and thermal pads)
788614-601	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Professional (includes thermal grease and thermal pads)

Spare part number	Description
788615-001	System board equipped with an Intel Core I7-4710 processor; includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system (includes thermal grease and thermal pads)
788615-501	System board equipped with an Intel Core I7-4710 processor; includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard (includes thermal grease and thermal pads)
788615-601	System board equipped with an Intel Core I7-4710 processor; includes 16-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional (includes thermal grease and thermal pads)
788616-001	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system (includes thermal grease and thermal pads)
788616-501	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard (includes thermal grease and thermal pads)
788616-601	System board equipped with an Intel Core I7-4710 processor; includes 8-GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional (includes thermal grease and thermal pads)
788620-001	Webcam/microphone module

4 Removal and replacement 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 screw driver

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.

Grounding guidelines

Electrostatic discharge

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 non-conductive 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 computerop 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 Authorized Service Provider parts

Computer replacement procedures

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

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

NOTE: Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 11 for details.

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

There are as many as 42 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.

Bottom cover

Before replacing 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.

Remove the bottom cover:

1. Close and position the computer upside down with the front toward you.

2. Pry up to remove the rubber strips from the bottom of the computer.

> **NOTE:** You cannot replace the removed rubber strips. You must use new rubber strips when reassembling the computer. All spare part kits that require removal of the bottom cover include replacement rubber strips.
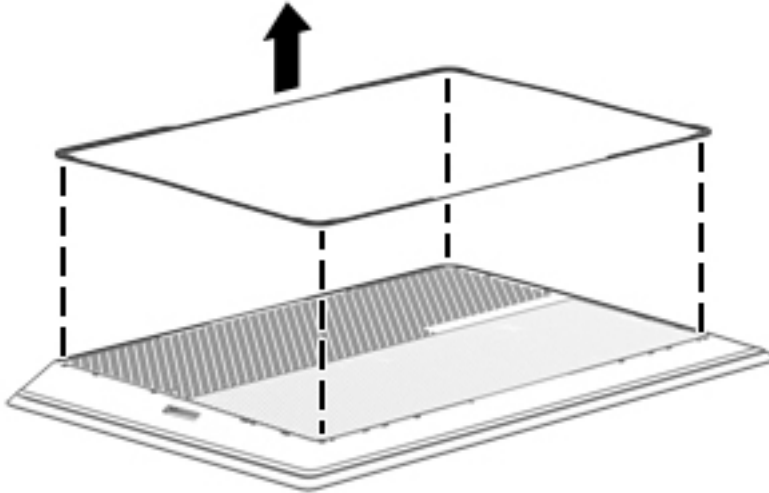
3. Remove the 11 Phillips PM2.0×5.0 screws that secure the bottom cover to the computer.
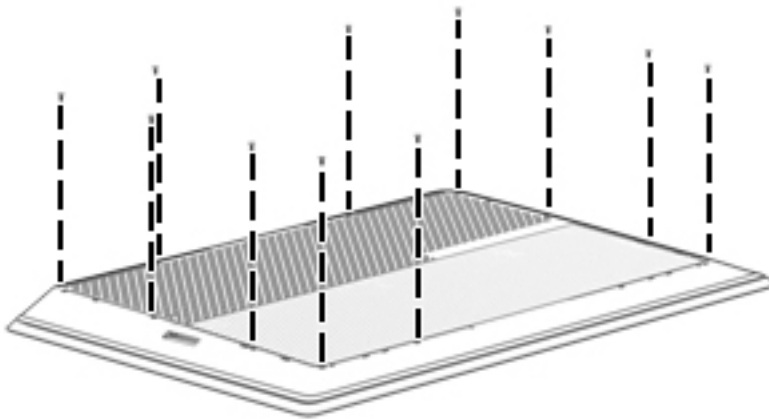
**4.** Lift the bottom cover off the computer.

Disconnecting the battery

IMPORTANT: Be sure to disconnect or remove the battery before removing any components from the computer.

Before disconnecting the battery, follow these steps:

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

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

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 23).

Disconnect the battery:

▲ Pull to disconnect the battery cable from the system board connector.
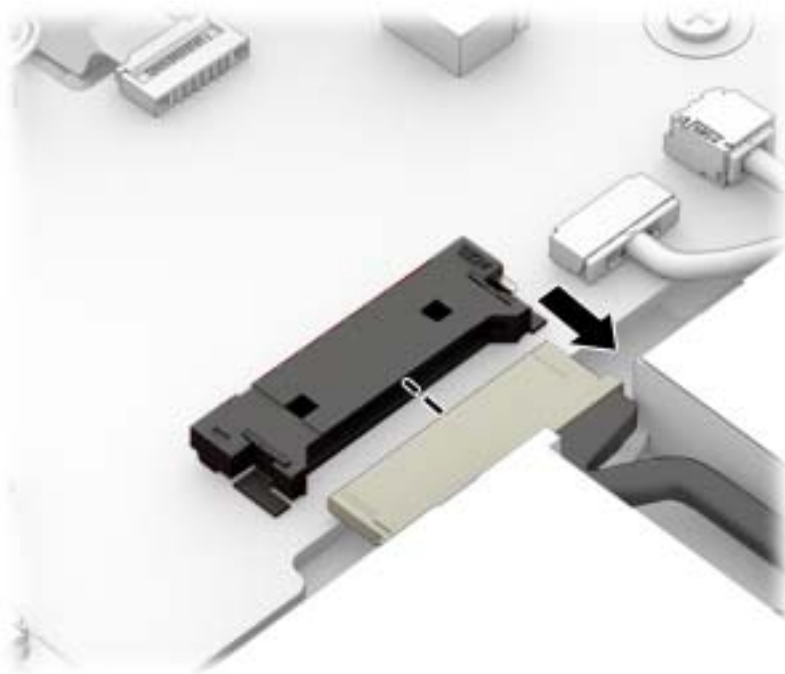
Reverse this procedure to connect the battery.

WLAN module

Component	Spare part number
Intel Wireless 7260BN 802.11 bgn 2x2 WiFi + BT 4.0 Combo Adapter	784640-006
Intel Dual Band Wireless-AC 7260(non v-Pro) 802.11 AC 2x2 WiFi + BT 4.0 Combo Adapter	784645-006

Before replacing 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 bottom cover (see).

5. Disconnect the battery (see).

Remove the WLAN module:

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

2. Remove the Phillips PM2.0×3.0 screw **(2)** that secures the WLAN module to the system board.

3. Remove the WLAN module **(3)** by pulling the module away from the slot.
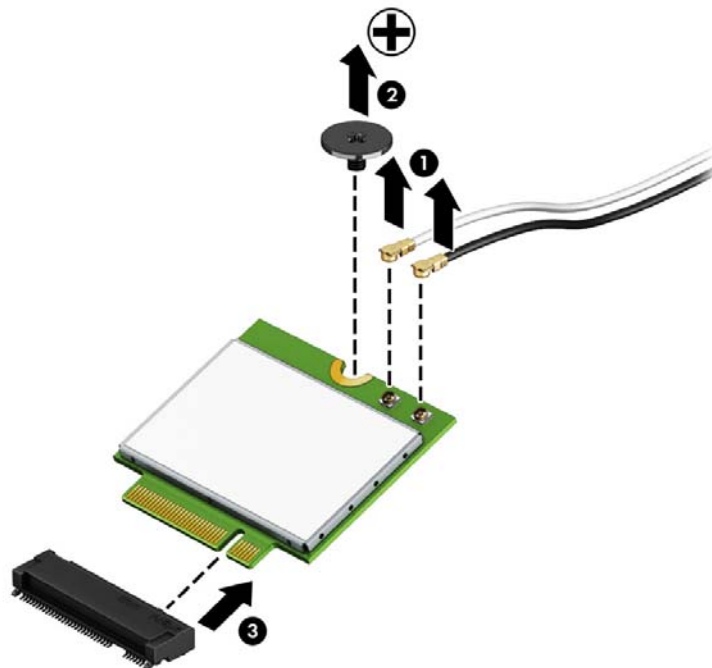
NOTE: If the WLAN antenna cable is not connected to the terminal on the WLAN module, a protective sleeve should be installed on the antenna connector, as shown in the following illustration.

Reverse this procedure to install the WLAN module.

Solid-state drive (M.2)

Description	Spare part number
128 GB solid-state drive (SSD), M.2.2280, TLC, SATA	788611-001
256 GB solid-state drive (SSD), M.2.2260, MLC, PCIe	788612-001
512 GB solid-state drive (SSD), M.2.2280, MLC, PCIe	788613-001

Before removing the solid-state 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 bottom cover (see Bottom cover on page 23).

5. Disconnect the battery (see Disconnecting the battery on page 25).

Remove the solid-state drive:

1. Remove the Phillips PM2.0×3.5 screw **(1)** that secures the solid-state drive to the system board.

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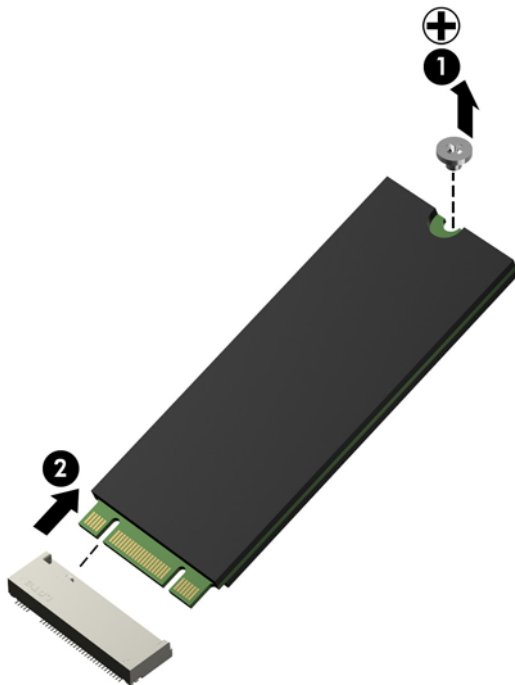
Reverse this procedure to install the solid-state drive.

Heat sink and fans

📝 **NOTE:** The heat sink and fans are spared together.

Component	Spare part number
Heat sink and fans (includes replacement thermal material)	788600-001

Before replacing the heat sink and fans, 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 bottom cover (see Bottom cover on page 23).

5. Disconnect the battery (see Disconnecting the battery on page 25).

Remove the heat sink and fans:

1. Disconnect the cables from the system board for the left **(1)** and right **(2)** fans.

2. Remove the two Phillips PM2.0×3.5 screws **(3)** that secure each fan to the computer.

3. Loosen the six captive Phillips screws **(4)** on the heat sink.

4. Lift the fans and heat sink straight up and out of the computer **(5)**.
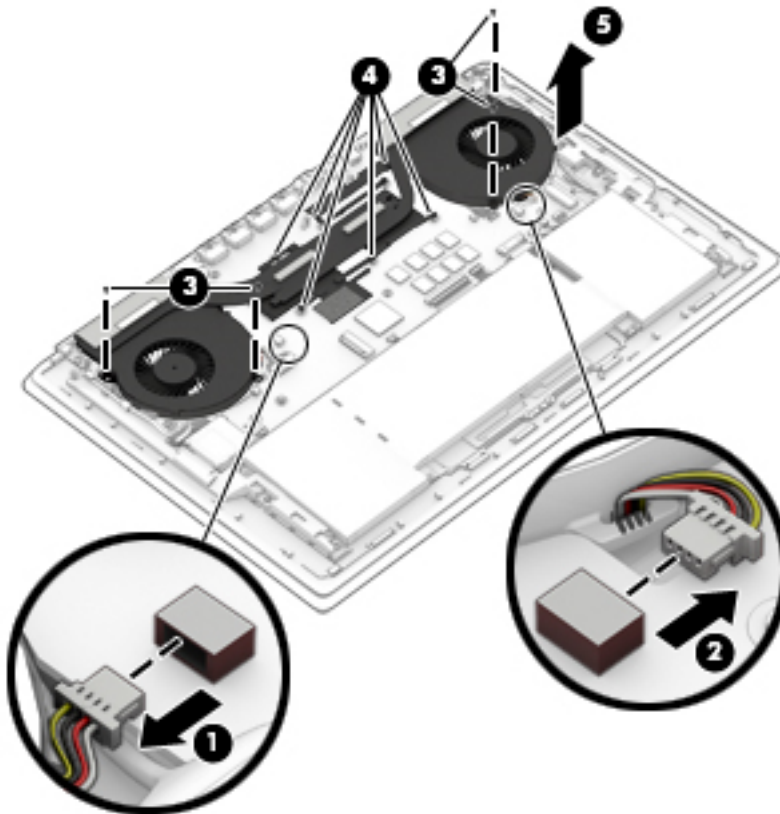
5. Use the following image to determine where thermal material must be installed on the heat sink and system board.

(1)-(6) show locations on the system board that require thermal material. **(7)-(12)** show locations on the heat sink that require thermal material.
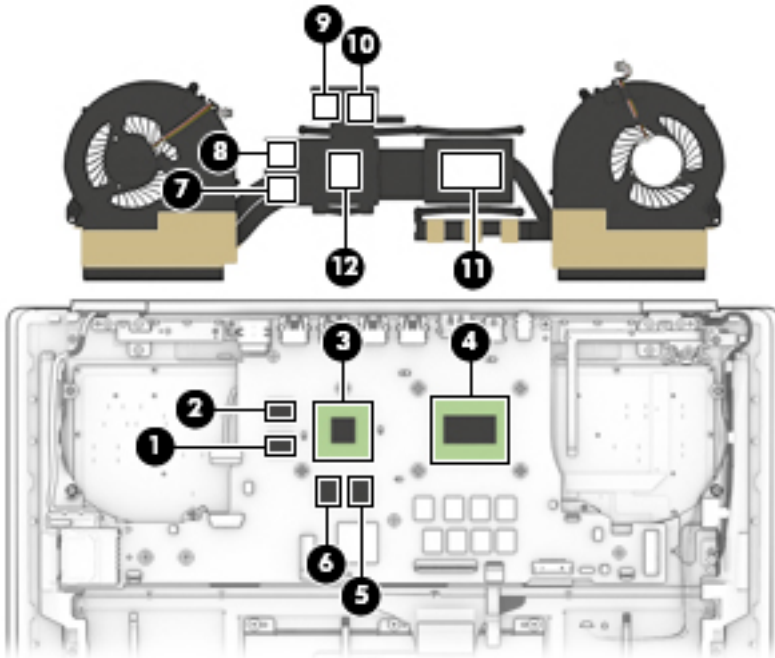
Reverse this procedure to install the heat sink and fans.
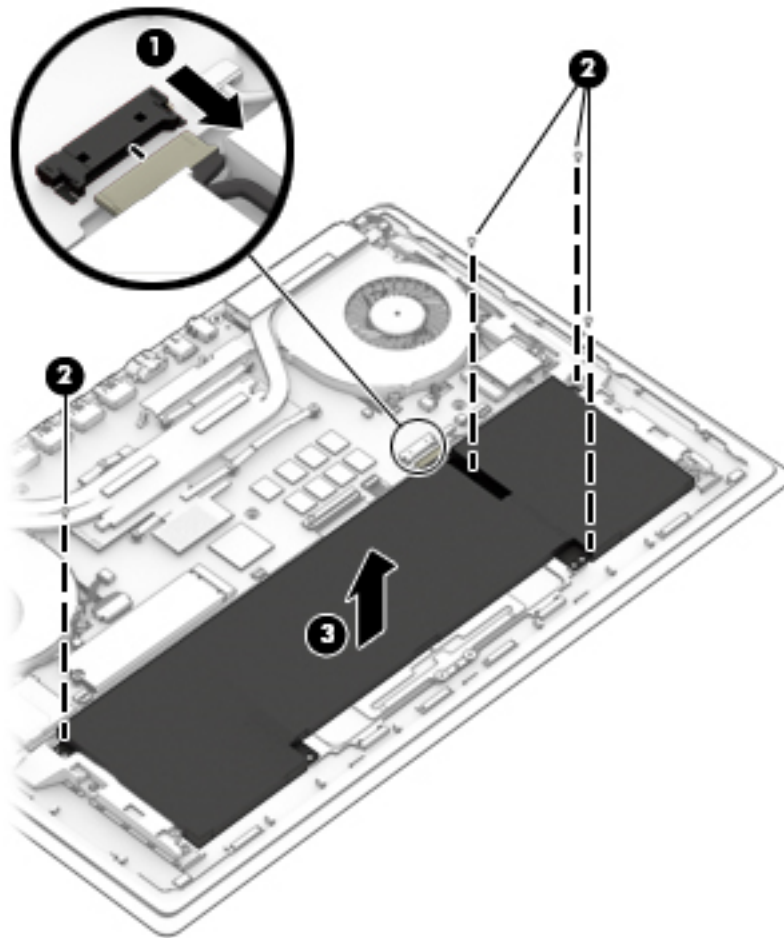
Battery

IMPORTANT: Be sure to disconnect or remove the battery before removing any components from the computer.

Component	Spare part number
Battery, 4-cell, 58-Wh, 3.82-Ah, Li-ion	778978-006

Before replacing the battery, follow these steps:

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

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

3. Disconnect all external devices from the computer.

4. Remove the bottom cover (see Bottom cover on page 23).

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

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

Remove the battery:

1. Disconnect the battery cable from the system board **(1)** .

2. Remove the four Phillips PM2.0×4.0 screws **(2)** that secure the battery to the computer.

3. Lift the battery **(3)** from the computer.
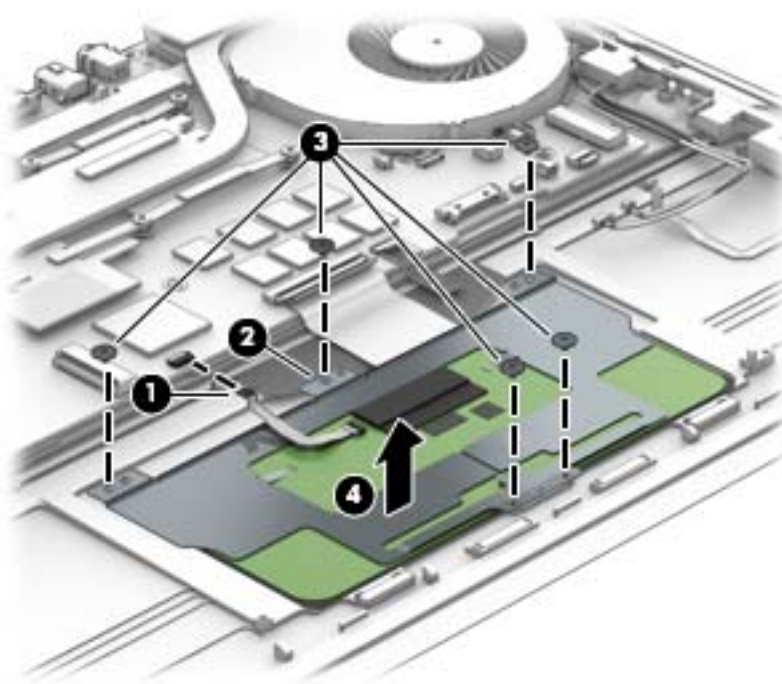
Reverse this procedure to install the battery.

TouchPad

Component	Spare part number
TouchPad (includes cable)	788607-001

Before replacing 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

Remove the TouchPad:

1. Disconnect the TouchPad cable from the system board **(1)**.

2. Remove the Mylar from atop the middle screw of the touchpad **(2)**.

3. Remove the five Phillips PM1.5×2.0 broad head screws **(3)** that secure the TouchPad to the computer.

4. Remove the TouchPad **(4)**.

Reverse this procedure to install the TouchPad.

System board

| Component	Spare part number
System board equipped with an Intel Core i7-4710 processor (includes thermal grease and thermal pads)	
Includes 16 GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system	788615-001
Includes 16 GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788615-501
Includes 16 GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788615-601
Includes 8 GB of system memory and 4 GB of discrete graphics memory for use in models without the Windows operating system	788616-001
Includes 8 GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788616-501
Includes 8 GB of system memory and 4 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788616-601
Includes 8 GB of system memory and 2 GB of discrete graphics memory for use in models without the Windows operating system	788614-001
Includes 8 GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Standard	788614-501
Includes 8 GB of system memory and 2 GB of discrete graphics memory for use in models with Windows 8.1 Professional	788614-601

Before replacing 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the WLAN module (see WLAN module on page 26).

7. Remove the SSD module (see Solid-state drive (M.2) on page 28).

8. Remove the heat sink and fans (see Heat sink and fans on page 29).

Remove the system board:

1. Disconnect the following cables from the system board.

    (1): Display cable

    (2): Left speaker cable

    (3): Power connector cable

    (4): Left light assembly

    (5): TouchPad cable

(6): Keyboard cable

(7): Touch control cable

(8): Webcam cable

(9): Right speaker cable

(10): Right light assembly

(11): Power button board cable

(12): Light module cable
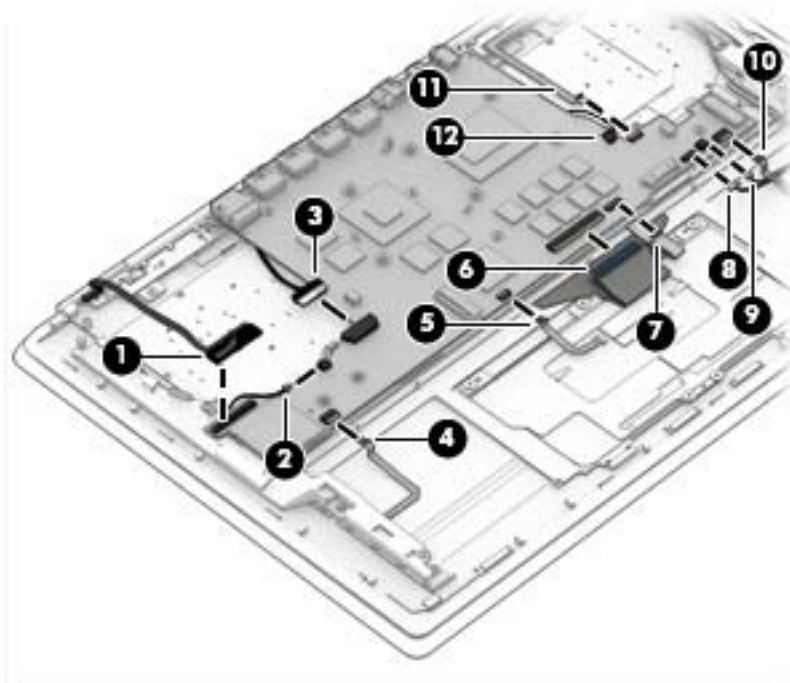
2.   Remove the three Phillips PM2.0×3.0 screws **(1)** that secure the system board to the computer.

3.   Remove the bolthead screw **(2)** that secures the system board to the computer.

4. Lift the system board **(3)** out of the computer.
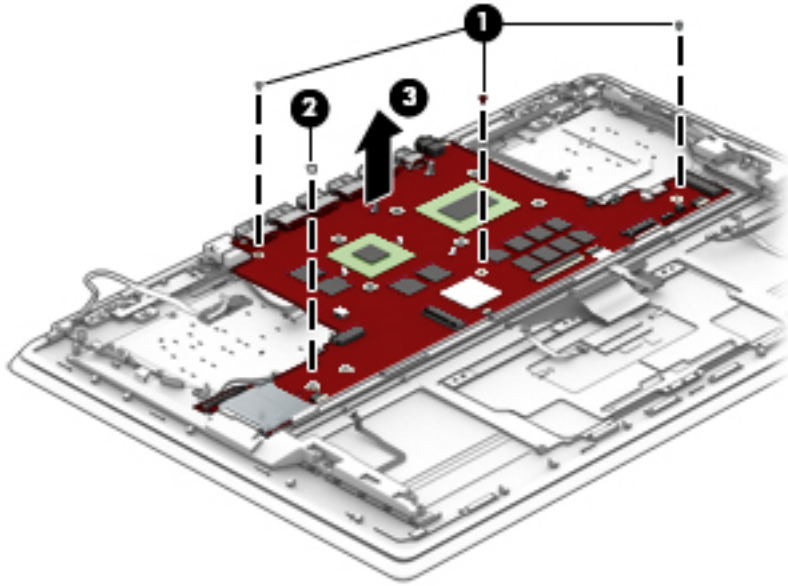
Reverse this procedure to install the system board.

Power button board

Component	Spare part number
Power button board (includes cable)	788605-001

Before replacing the power button 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the heat sink and fans (see Heat sink and fans on page 29).

7. Remove the system board (see System board on page 34).

Remove the power button board:

1. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the power button board to the keyboard/top cover.

2. Remove the power button board **(2)**.
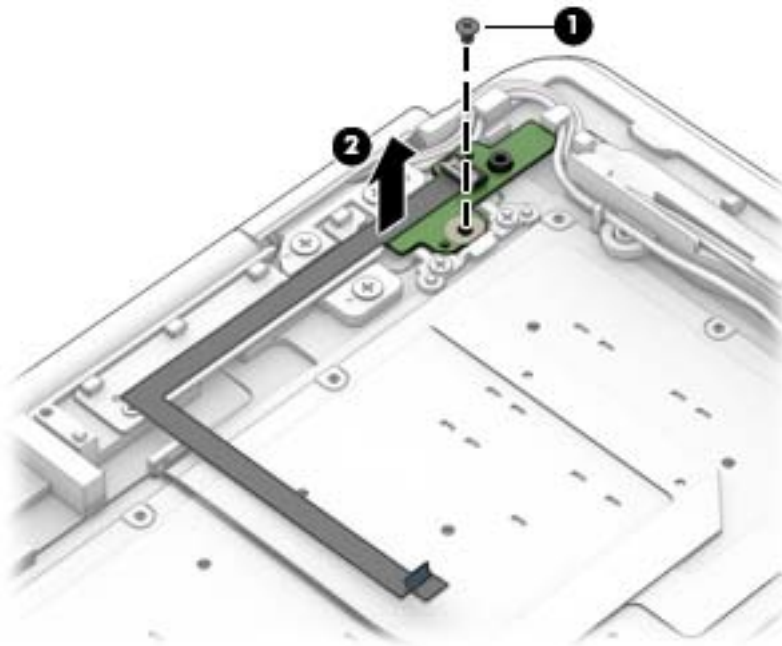
Reverse this procedure to install the power button board.

Power connector cable

Component	Spare part number
Power connector cable (includes cable, bracket, and screws)	788599-001

Before replacing 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the heat sink and fans (see Heat sink and fans on page 29).

7. Remove the system board (see System board on page 34).

Remove the power connector cable:

1. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the bracket over the power connector.

2. Lift the bracket from atop the power connector **(2)**.

3. Remove the power connector and cable **(3)** from the computer.
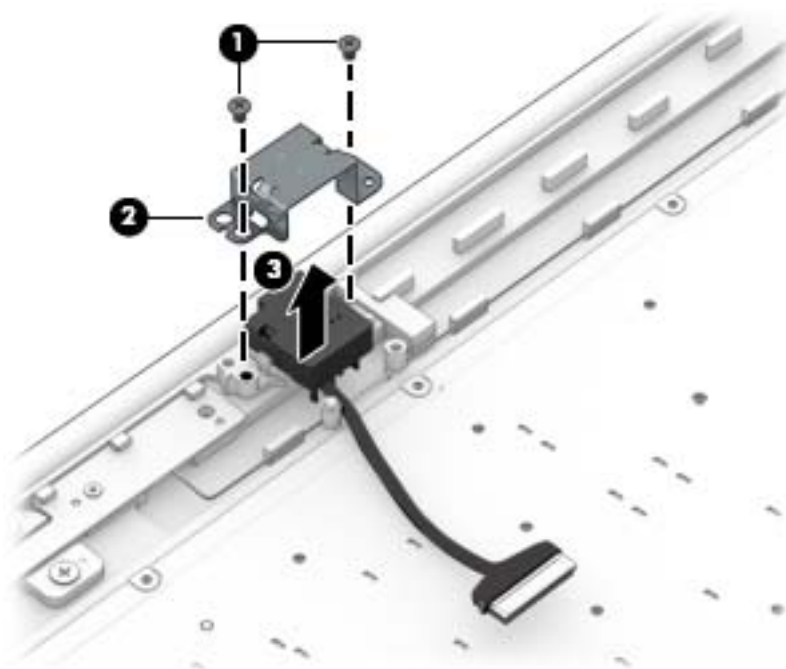
Reverse this procedure to install the power connector cable.

Speakers

Component	Spare part number
Speaker Kit (includes left and right speakers)	788610-001

Before replacing 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the heat sink and fans (see Heat sink and fans on page 29).

7. Remove the system board (see System board on page 34).

Remove the speakers:

1. Remove the two Phillips PM2.0×3.5 screws **(1)** that secure the speakers to the computer.

2. Lift the speakers **(2)** and cables from the computer.
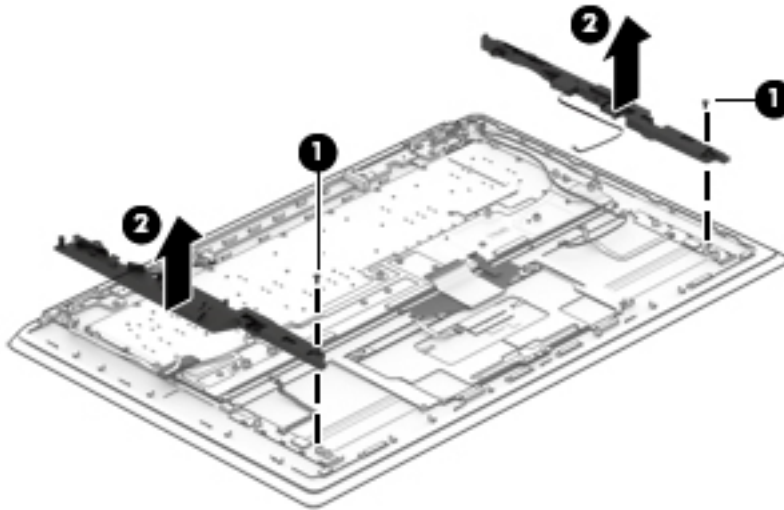
Reverse this procedure to install the speakers.

Light modules

Component	Spare part number
Light modules (includes left, right, and rear modules and cables)	788604-001

Light modules are located under each speaker and at left and right near the rear of the computer. The two modules at the rear are wired together and secured with screws. The left and right modules under the speakers are secured with adhesive.

Before replacing the light modules, 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the heat sink and fans (see Heat sink and fans on page 29).

7. Remove the speakers (see Speakers on page 39).

8. Remove the system board (see System board on page 34).

9. Remove the power button board (see Power button board on page 37).

Remove the light modules:

1. Remove the three Phillips PM2.0×3.0 screws **(1)** that secure the rear modules to the computer.

2. Remove the wire that connects the rear modules together from the clips in the computer **(2)**.

3. Remove the modules by lifting the rear modules **(3)** and prying up to disengage the adhesive from the left and right modules **(3)**.
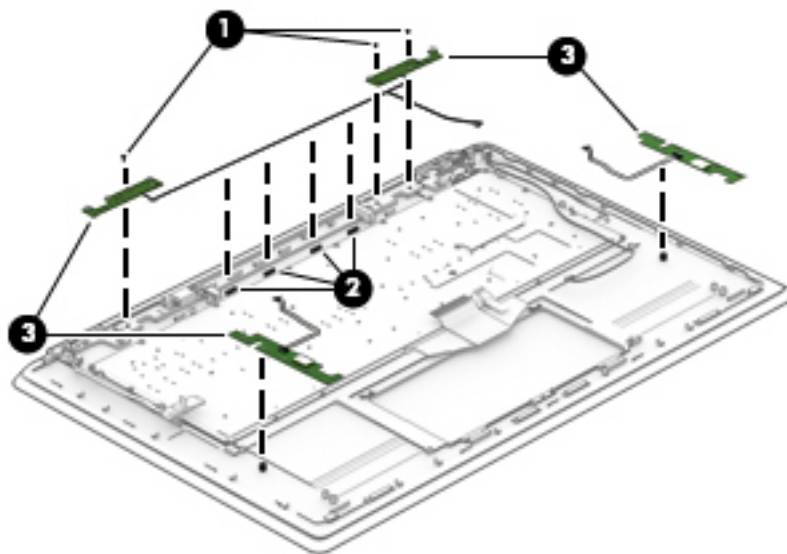
Reverse this procedure to install the light modules.

Display assembly

Before replacing the display assembly, 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 bottom cover (see Bottom cover on page 23).

5. Remove the battery (see Battery on page 31).

6. Remove the power button board (see Power button board on page 37).

7. Disconnect the light boards (see Light modules on page 40).

Remove the display assembly:

1. Position the computer on its side with the display slightly open.

2. Remove the six Phillips PM2.5×3.0 screws **(1)** that secure the display assembly to the computer.

3. Separate the display assembly from the computer **(2)**.
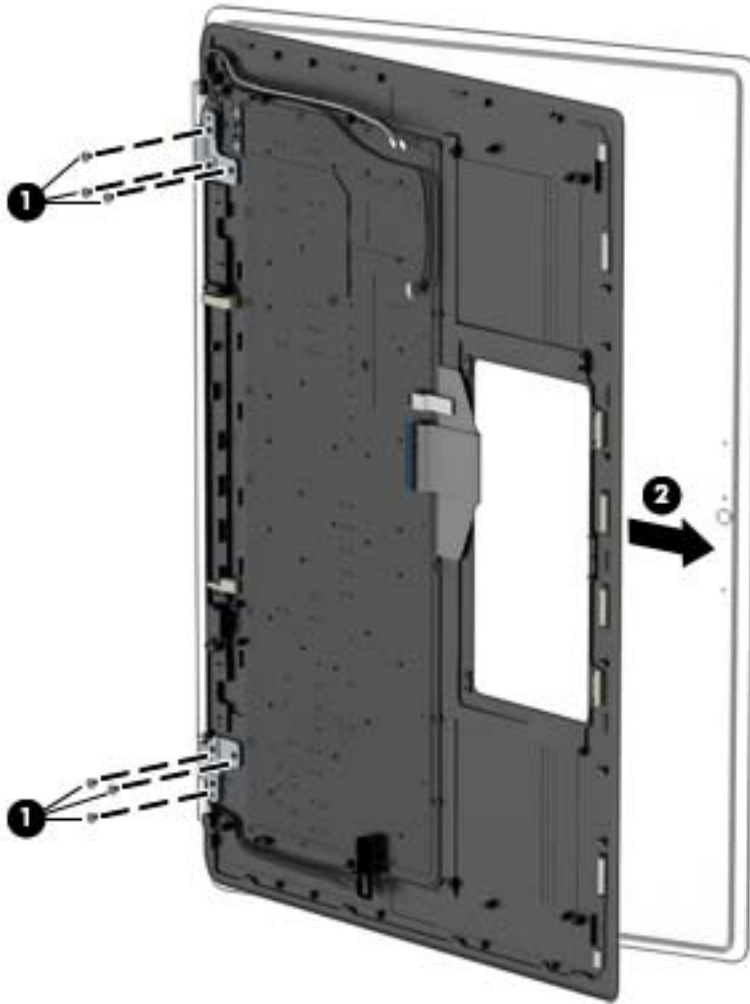
4. To separate the display from the display enclosure:

    a. Insert a plastic tool **(1)** in the slot between the display and the enclosure and slide around the entire display to disengage the display from the enclosure.

       ⚠ **CAUTION:** Be sure to use a tool that will not damage the display.

b. Remove the display from the enclosure **(2)**.

The display enclosure is available using spare part number 788597-001.

📝 **NOTE:** The display enclosure spare part kit also includes the display hinge kit.

The Display Panel Kit is available using spare part number 788608-001.

📝 **NOTE:** The Display Panel Kit must be assembled in a clean room.
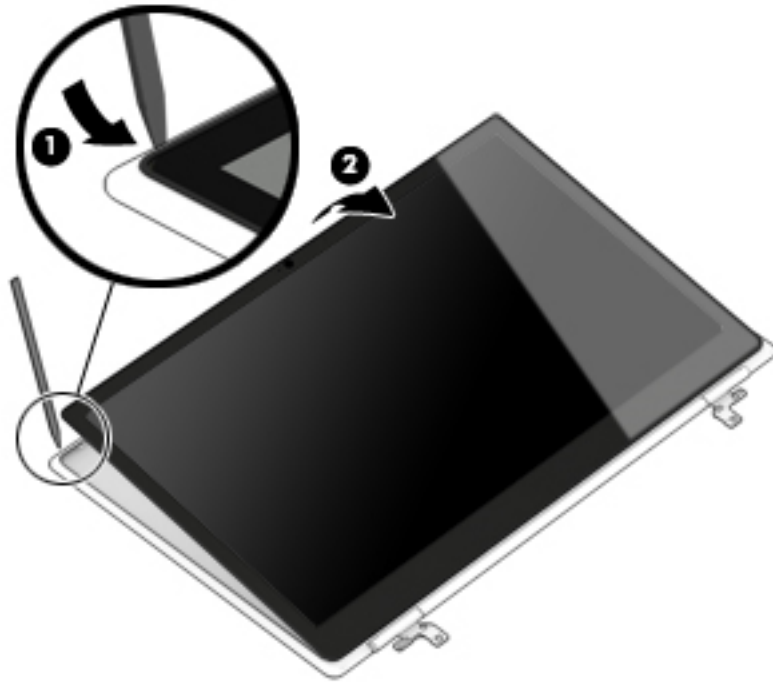
5. To disconnect the display cable from the display panel:

a. Rotate the display downward so it lays flat **(1)**.

b. Lift the tape from atop the connector on the back of the display panel **(2)**, and then disconnect the display cable from the connector **(3)**.

c. Remove the display cable, noting its routing path for reinstallation **(4)**.
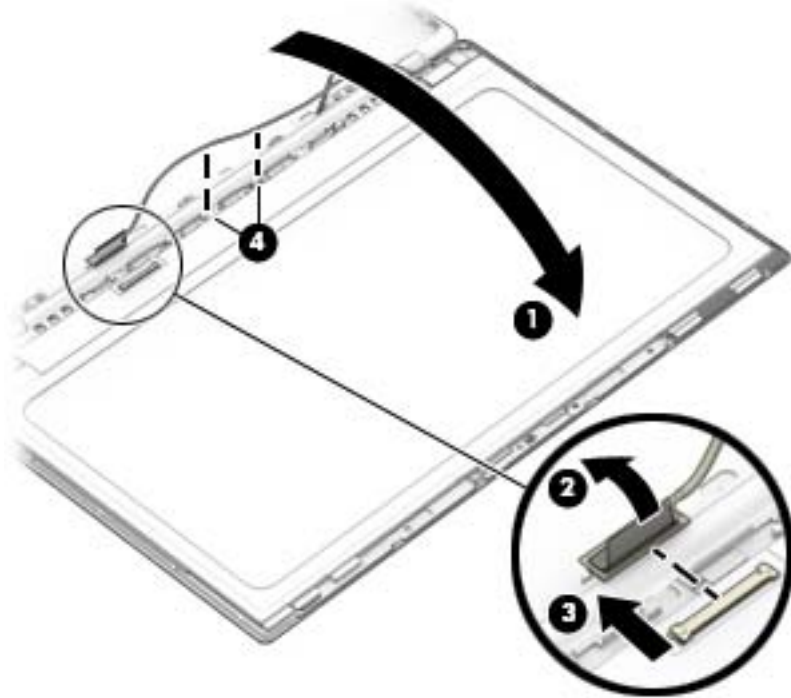
6. To remove the touch control board from the top of the display:

   a. Disconnect the cables from the two connectors on the top of the board **(1)**.

   b. Pry up on the touch control module to release the adhesive strip **(2)** that secures the module to the display, and the remove the module.

   c. Disconnect the cable from the module **(3)**.

d. Note the cable routing path for reinstallation **(4)**.

The touch control board is available using spare part number 788606-001.
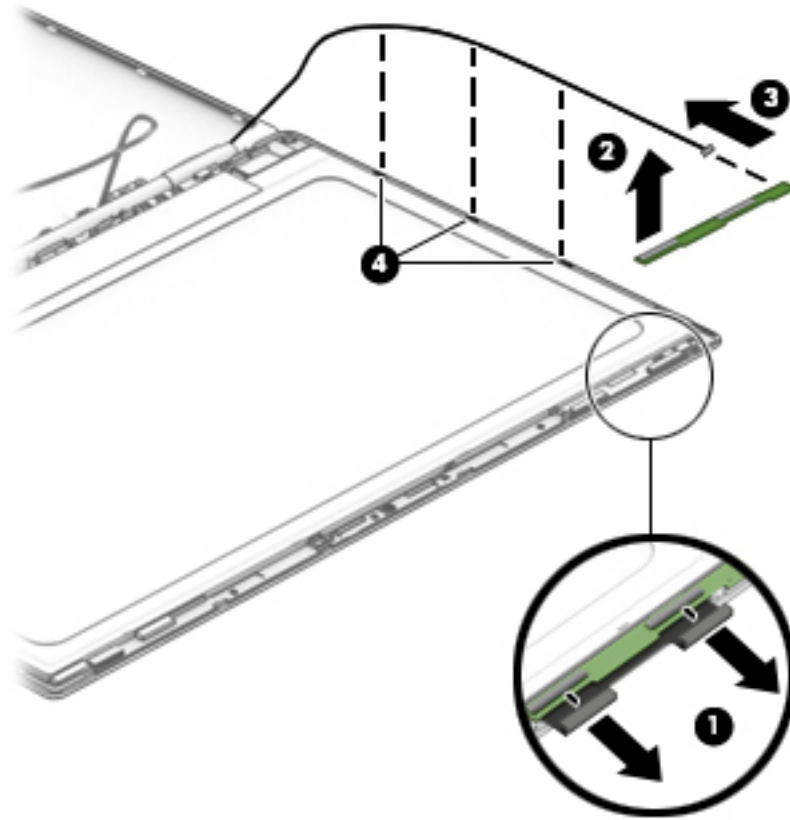
7. To replace the webcam module :

a. Disconnect the cable from the webcam module **(1)**.

b. Use a tool to pry up on the webcam to release the adhesive strip **(2)** that secures the webcam module to the display.

c. Lift the webcam module from the display **(3)**.

The webcam is available using spare part number 788620-001.
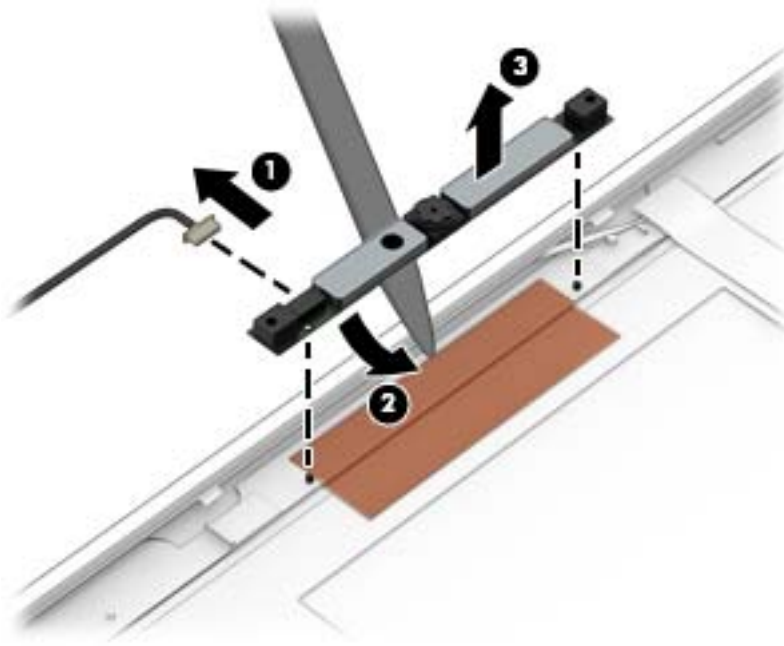
Reverse this procedure to reassemble and install the display assembly.

6 Specifications

Computer specifications

Dimensions	Metric	U.S.
Width	**382.9 mm**	15.08 in
Depth	**247.5 mm**	9.74 in
Height – front	**15.5 mm**	0.61 in
Height – rear	**19.9 mm**	0.78 in
Weight	**2.27 kg**	5.00 lbs
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.

Solid-state drive specifications

Dimensions	128 GB*	256 GB*	512 GB*
Length	80 mm	60 mm	80 mm
Width	22 mm	22 mm	22 mm
Interface type	SATA-3	PCIe	PCIe
Form factor	M.2 2280	M.2 2260	M.2 2280
Data transfer rate (4k sector random / 128k sequential)			
Sequential Read	up to 520 MB/s	up to 750 MB/s	up to 1170 MB/s
Random Read	up to 92K IOPS	up to 100K IOPS	up to 122K IOPS
Sequential Write	up to 140 MB/s	up to 600 MB/s	up to 970 MB/s
Random Write	up to 35K IOPS	up to 60K IOPS	up to 72K IOPS
Operating temperature	**0°C to 70°C** (32°F to 158°F)		

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

15.6-inch display specifications

Dimensions	Metric	U.S.
Height	**20.77 cm**	8.175 in
Width	**37.78 cm**	14.875 in
Diagonal	**39.62 cm**	15.6 in
Number of colors	Up to 16.8 million	
Contrast ratio	500:1 (typical)	
Brightness	300 nits	
Pixel resolution		
Format	1920×1080	
Configuration	RGB vertical stripe	
Color Gamut	72%	
Backlight	WLED	
Screen type	Antiglare	

7 Using Setup Utility (BIOS) and HP PC Hardware Diagnostics (UEFI)

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 the BIOS may be available on the HP website.

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

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

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

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

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 49).

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 arrow keys to select **Exit**, select **Exit Discarding Changes**, and then press **enter**.

4. Select **Yes**.

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.

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

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, 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.

   If the update is more recent than your BIOS, 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. From the Start screen, type `file`, 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 on your hard drive 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.

Using HP PC Hardware Diagnostics (UEFI)

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

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

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

a. Connected USB drive

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

b. Hard drive

c. BIOS

2. 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 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 page—Provides 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**.

8 Backing up, restoring, and recovering

This chapter provides information about the following processes:

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

Creating recovery media and backups

1. After you successfully set up the computer, create HP Recovery media. 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.

    HP Recovery media you create will provide the following recovery options:

    - System Recovery—Reinstalls the original operating system and the programs that were installed at the factory.
    - Minimized Image Recovery—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.

    See Creating HP Recovery media on page 52.

2. Use the Windows tools to create system restore points and create backups of personal information. For more information and steps, see Help and Support. From the Start screen, type `help`, and then select **Help and Support**.

Creating HP Recovery media

HP Recovery Manager is a software program that offers a way 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 the software programs 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 HP 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 blank USB flash drive or the number of blank DVD discs 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, or you can obtain recovery discs for your computer 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. 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.

- 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.

- 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, and the remaining discs will be burned.

To create HP Recovery media:

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

2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see .

Restore and recovery

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

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information and steps, 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 Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

  From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.

- 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 (select models only) 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 Drivers and Applications Reinstall option in HP Recovery Manager.

  For more information, see .

- If you want to recover the computer's original factory partitioning and content, you can choose the System Recovery option from the HP Recovery partition (select models only) or use the HP Recovery media that you have created. For more information, see . If you have not already created recovery media, see .

- If you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media to restore the factory image to the replacement drive. For more information, see .

- If you wish to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see .

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 created or by using the HP Recovery partition (select models only). If you have not already created recovery media, see Creating HP Recovery media on page 52.

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

- 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 Minimized Image Recovery.

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 media provided by the manufacturer.

- 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 on page 52.

- To use the Factory Reset option, you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media on page 52.

- 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 wish to retain.

Using the HP Recovery partition (select models only)

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

To start HP Recovery Manager from the HP Recovery partition:

1. 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 that you created, and then restart the computer.

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

3.   Follow the on-screen instructions.

Changing the computer boot order

If 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 for an optical drive or a USB flash drive.

To change the boot order:

1.   Insert the HP Recovery media you created.

2.   Restart the computer, quickly press esc, and then press f9 for boot options.

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

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 .

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.

9 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 all countries 113

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

Country/region	Accredited agency	Applicable note number
South Korea	EK	4
Sweden	CEMKO	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.

10 Recycling

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

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

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