HP ENVY Rove 20 Mobile All-in-One PC

Maintenance and Service Guide

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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 http://www.microsoft.com for 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).

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1 Product description

Category	Description
Product Name	HP ENVY Rove 20 Mobile All-in-One PC
Processor	Intel® Core® i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W) Intel Core i3-4010U 1.70-GHz processor (dual core, ULV, 15 W)
Chipset	Intel processor controller hub (PCH), integrated on ULT processor package
Graphics	Intel HD Graphics 4400
Panel	20.0-in (1600×900), WLED, wide viewing angle, PCT ten-finger touch, 16:9 aspect ratio, typical brightness: 250 nits
Memory	2 memory slots Supports DDR3L-1600MHz Supports dual channel Supports up to 8-GB maximum system memory in the following configurations: • 8 GB (4 GB × 2) • 6 GB (4 GB + 2 GB) • 4 GB (4 GB × 1) or (2 GB × 2)
Hard drives	Supports serial ATA, 6.35-cm (2.5-in) hard drives in 9.5-mm (.37-in) and 7.0-mm (.28-in) thicknesses Supports Accelerometer / HDD protection Supports 750-GB and 1-TB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache Supports 750-GB and 1-TB 5400-rpm, 9.5-mm hard drives:
Optical drive	External USB optical drive as drop-in-box option only DVD±RW Double-Layer SuperMulti Combo Drive 12.7mm tray load SATA
Audio and video	HP TrueVision HD webcamera (fixed, integrated, with activity light, 1280×720 by 30 frames per second) Dual array digital microphones with appropriate beam-forming, echo-cancellation, noise-suppression software Supports Nuance Voice Recognition (Dragon Assistant), with minimum 61db microphone Beats Audio compliant
Sensors	Accelerometer
Ethernet	Integrated 10/100 network interface card (NIC) via USB dongle (100% attach)

Category	Description
Wireless	Integrated wireless local area network (WLAN) options by way of wireless module Two WLAN antennas built into display assembly Supports Intel Smart Connect Technology 4.0 Supports Wireless Display (WiDi/WiFi direct support) Supports the Broadcom BCM4352 802.11ac 2×2 Wi-Fi + BT 4.0 Combo Adapter
External media cards	HP multiformat Digital Media Reader Slot with push-push technology. Reads data from and writes data to digital memory cards such as Secure Digital (SD).
Power requirements	Support for the following AC adapters: • 65-W HP Smart AC adapter (non-PFC, EM, 4.5-mm) • 65-W AC adapter (non-PFC S-3P, 4.5-mm) Support for a 3-cell, 50-Wh, 4.52-Ah, Li-ion battery
Security	Intel AT-p Ready support Intel IPT support
Operating system	**Preinstalled:** • Windows 8 ML 64-bit • Windows 8 EM/SL 64-bit
Serviceability	**End user replaceable parts:** • AC adapter • External keyboard • External mouse • External optical drive • USB RJ45 adapter • Wireless receiver dongle for external keyboard and mouse

2 External component identification

Finding your hardware and software information

Locating hardware

To find out what hardware is installed on your computer:

1. From the Start screen, type c, and then select **Control Panel**.
2. Select **System and Security**, and then in the System area, click **Device Manager**.

   A list reveals all the devices installed on your computer.

Locating software

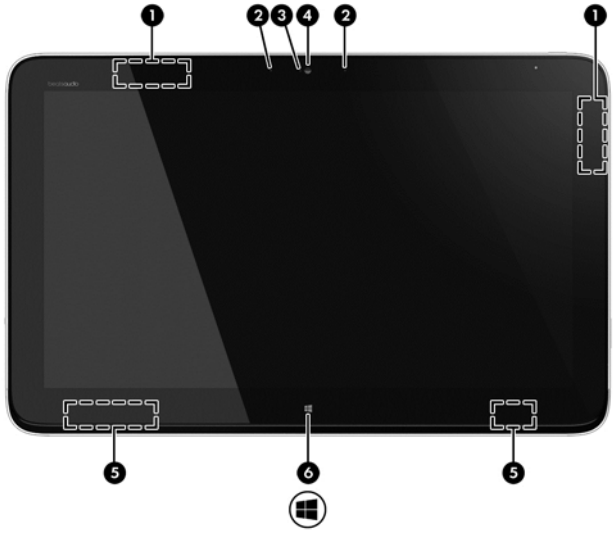
To find out what software is installed on your computer:

1. From the Start screen, right-click using the external wireless mouse.

   – or –

   Swipe down from the top edge of the computer screen.
2. Select the **All apps** icon.

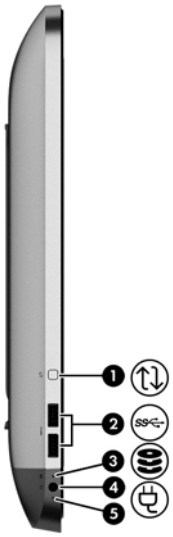
Front



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals. **NOTE:** To set up a WLAN and connect to the Internet, you need a broadband modem (either DSL or cable, purchased separately), high-speed Internet service purchased from an Internet service provider, and a wireless router (purchased separately).
(2)	Internal microphones (2)	Record audio, automatically filtering out the noise around you and cancelling echoes.
(3)	Webcam light	On: The webcam is on.
(4)	HP TrueVision HD Webcam	Records video, captures still photographs, and provides access to video conferences and online chat by means of streaming video. To use the webcam, from the Start screen, type c, and then select **CyberLink YouCam** from the list of applications.
(5)	Speakers (2)	Produce sound.
(6)	Windows button	Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows button again will return you to the previous screen.

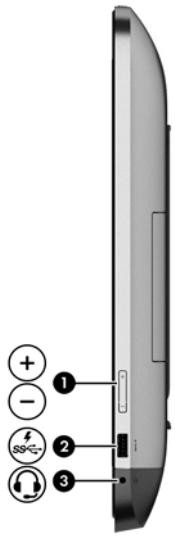
*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. These notices are located in Help and Support.

Left side



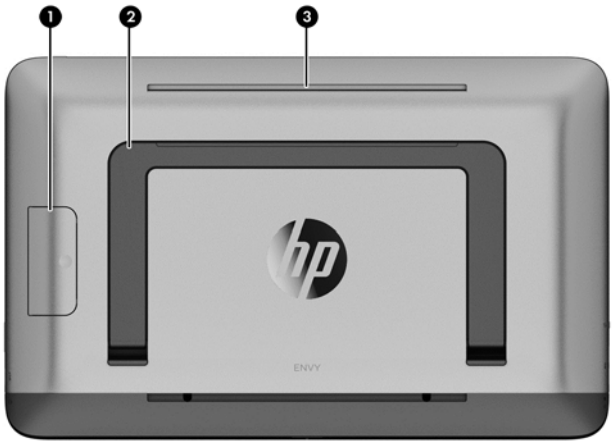
Item	Component	Description
(1)	Rotate button	Rotates the orientation of the display 90 degrees.
(2)	USB 3.0 ports (2)	Connect optional USB 1.0, USB 2.0, or USB 3.0 devices and provide enhanced USB power performance for USB 3.0 devices.
(3)	Hard drive light	Blinking: The hard drive is being used.
(4)	Power connector	Connects an AC adapter.
(5)	AC adapter light	• White: The AC adapter is connected and the battery is charged. • Amber: The AC adapter is connected and the battery is charging. • Off: The computer is using DC power.

Right side



Item	Component	Description
(1)	Volume control button	Controls speaker volume.
(2)	USB 3.0 charging (powered) port	Connects an optional USB device. USB charging ports allow you to charge connected USB devices. 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)	Audio-out (headphone) jack/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.

Back

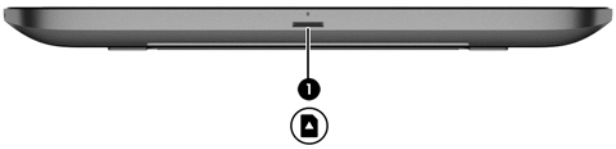


Item	Component	Description
(1)	Display stand release button	Releases the display stand.
(2)	Display stand	Allows the display to be positioned at different angles.
(3)	Vent	Enables airflow to cool internal components. **NOTE:** NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

Top

Item	Component	Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is in the Sleep state, press the button briefly to exit Sleep • When the computer is in Hibernation, press the button down briefly to exit Hibernation. **CAUTION:** Pressing and holding down the power button will cause unsaved information to be lost. If the computer has stopped responding and Windows® shutdown procedures aren't working, press and hold the power button for at least 5 seconds to turn off the computer. To learn more about your power settings, from the Start screen, type `p`. In the search box, type `power`, select **Settings**, and then select **Power options**.

Bottom

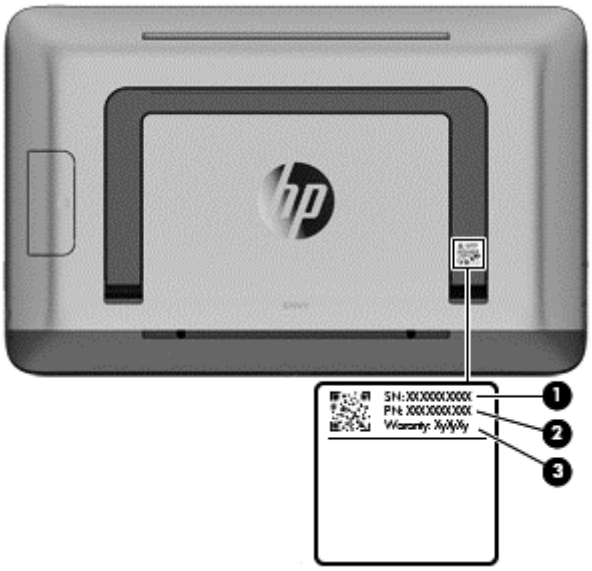


Item	Component	Description
(1)	Memory card reader	Reads data from and writes data to memory cards such as Secure Digital (SD).

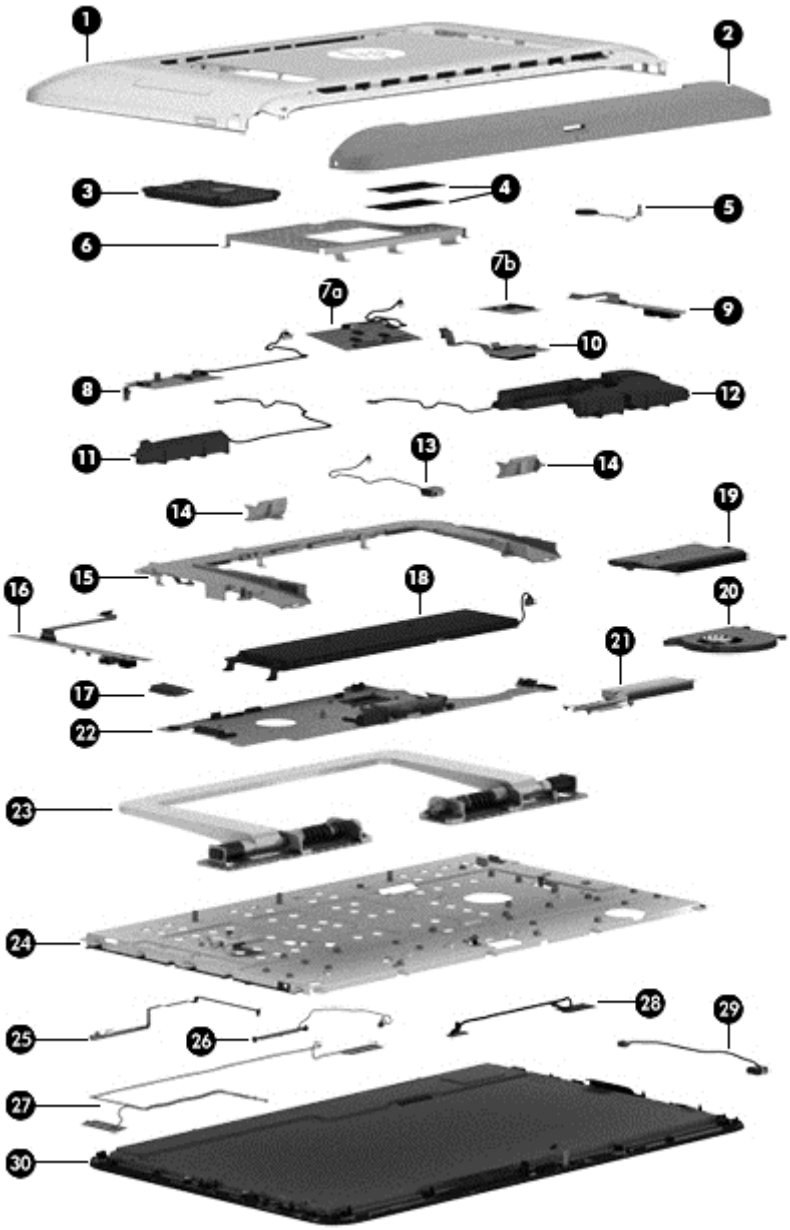
3 Illustrated parts catalog

Locating the serial number, product number, and model number

The serial number and product number of your computer are located on the left edge of the computer. The model number of your computer is located on the back of your computer. You may need the information when you travel internationally or when you contact support.



Computer major components

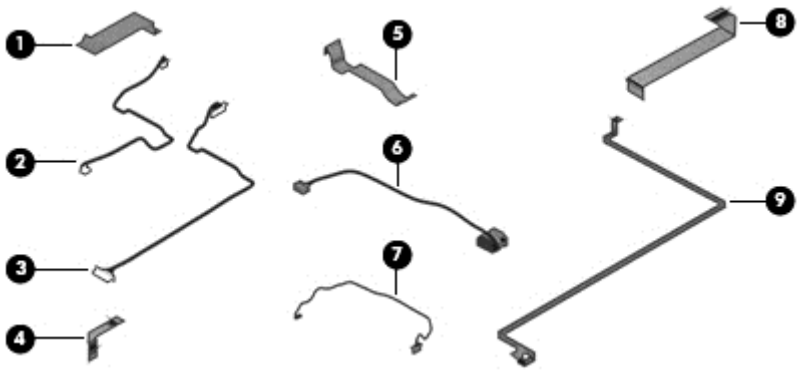


Item	Component	Spare part number
(1)	**Rear cover** (includes display stand release actuator)	728045-001
(2)	**Bottom cover** (includes 2 captive screws, secured by C-clips)	728046-001
	Rubber Kit (not illustrated, includes 2 bottom cover rubber screw covers and media card reader slot bezel)	728073-001
(3)	**1-TB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache** (does not include hard drive bracket, hard drive connector cable, or screws)	731999-005
	750-GB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache (does not include hard drive bracket, hard drive connector cable, or screws)	732001-001

Item	Component	Spare part number
	1-TB 5400-rpm, 9.5mm hard drive 2.5-in (does not include hard drive bracket, hard drive connector cable, or screws)	676521-005
	750-GB, 5400-rpm (does not include hard drive bracket, hard drive connector cable, or screws)	634250-005
	Hard Drive Hardware Kit (not illustrated, includes hard drive bracket, hard drive connector cable, and screws)	728053-001
(4)	**Memory modules** (2, PC3L, 12800, 1600-MHz):	
	4-GB	691740-005
	2-GB	691739-005
(5)	**RTC battery** (includes cable and double-sided adhesive)	728072-001
(6)	**Cover bracket**	728054-001
	Capacitor board, includes: **NOTE:** The capacitor board spare part kit does not include the X-axis capacitor board cable. The X-axis capacitor board cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.	728067-001
(7a)	X-axis capacitor board	
(7b)	Y-axis capacitor board (includes double-sided adhesive)	
(8)	**Converter board** **NOTE:** The converter board spare part kit does not include the converter board cable or ribbon cable. The converter board cable and ribbon cable are included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.	728066-001
(9)	**USB board** **NOTE:** The USB board spare part kit does not include the USB board ribbon cable. The USB board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.	728064-001
(10)	**Media card reader board**	728068-001
	Speaker Kit, includes:	728075-001
(11)	Right speaker (includes cable)	
(12)	Left speaker/subwoofer (includes cable and 3 rubber isolators)	
(13)	**USB connector cable** **NOTE:** The USB connector cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.	
(14)	**Display stand covers (2)**	728057-001
(15)	**Display stand recess**	728058-001
(16)	**Audio/USB board** **NOTE:** The audio/USB board spare part kit does not include the audio/USB board ribbon cable. The audio/USB board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.	728065-001
(17)	**Broadcom BCM4352 802.11ac 2×2 Wi-Fi + BT 4.0 Combo Adapter**	724935-005

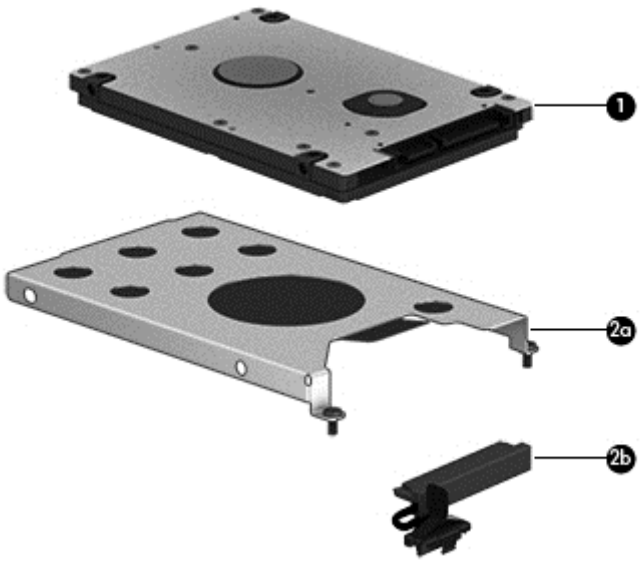
Item	Component	Spare part number
(18)	**Battery** (3-cell, 50-Wh, 4.52-Ah, Li-ion)	722298-001
(19)	**Air flow channel**	728052-001
(20)	**Fan** (includes cable and mylar shroud)	728050-001
(21)	**Heat sink** (includes replacement thermal material):	728051-001
(22)	**System board** (includes replacement thermal material):	
	System board equipped with an Intel Core i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	737670-501
	System board equipped with an Intel Core i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system	737670-001
	System board equipped with an Intel Core i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	728077-501
	System board equipped with an Intel Core i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system	728077-001
(23)	**Display stand**	728056-001
(24)	**Middle frame** (includes display assembly pads, display stand release assembly, and X-axis capacitor board riser)	728055-001 753182-001
(25)	**Power button board** (includes ribbon cable)	728063-001
(26)	**Webcam/microphone module** (includes double-sided adhesive and grounding tape)	728078-001
(27)	**Antenna Kit** (includes left and right wireless antenna cables and transceivers)	728044-001
(28)	**Display panel cable**	728047-001
(29)	**Power connector cable**	728049-001
(30)	**Display assembly** (20.0-inch, AG, HD; includes capacitor board cables, rotation sensor module and cable, and Windows button board and cable)	728070-001 753183-001

Cable Kit



Item	Component	Spare part number
	Cable Kit, includes:	728048-001
(1)	USB board ribbon cable	
(2)	X-axis capacitor board cable	
(3)	Converter board cable	
(4)	Converter board ribbon cable	
(5)	Media card reader board ribbon cable	
(6)	USB connector cable	
(7)	Webcam/microphone module cable	
(8)	Audio/USB board ribbon cable	
(9)	Capacitor board ribbon cable	

Mass storage device



Item	Component	Spare part number
(1)	**1-TB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache** (2.5-in, SATA, does not include hard drive bracket, hard drive connector cable, or screws):	731999-005
	Hard Drive Hardware Kit, includes:	728053-001
(2a)	Hard drive bracket	
(2b)	Hard drive connector cable	
	Hard drive bracket screw (not illustrated)	

Miscellaneous parts

Component	Spare part number
AC adapter:	
65-W HP Smart AC adapter (non-PFC, EM, 4.5-mm)	714657-001
65-W AC adapter (non-PFC S-3P, 4.5-mm)	710412-001
Power cord (3-pin, black, 1.83-m):	
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Denmark	490371-081
For use in Europe	490371-021
For use in India	490371-D61
For use in Israel	490371-BB1
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in Switzerland	490371-111
For use in the United Kingdom and Singapore	490371-031
RJ45-USB adapter dongle	539614-001
Screw Kit	728074-001
Wireless keyboard:	
For use in Belgium	728059-181
For use in Canada	728059-DB1
For use in Denmark, Finland, and Norway	728059-DH1
For use in France	728059-051
For use in Germany	728059-041
For use in India	728059-D61
For use in Israel	728059-BB1
For use in Italy	728059-061
For use in Japan	728059-291
For use in Latin America	728059-161
For use in the Netherlands	728059-L31
For use in Portugal	728059-131
For use in Russia	728059-251
For use in Saudi Arabia	728059-171
For use in Spain	728059-071

Component	Spare part number
For use in Switzerland	728059-111
For use in the United Kingdom and Singapore	728059-031
For use in the United States	728059-001
Wireless mouse	728061-001

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)
490371-061	Power cord for use in Italy (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-BB1	Power cord for use in Israel (3-pin, black, 1.83-m)
490371-D01	Power cord for use in Argentina (3-pin, black, 1.83-m)
490371-D61	Power cord for use in India (3-pin, black, 1.83-m)
539614-001	RJ45-USB adapter dongle
634250-005	750-GB, 5400-rpm, 9.5-mm hybrid drive (does not include hard drive bracket, hard drive connector cable, or screws)
659940-001	External DVD±RW Double-Layer with SuperMulti Drive
676521-005	750-GB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache (2.5-in, SATA, does not include hard drive bracket, hard drive connector cable, or screws):
691739-005	2-GB memory module (PC3L, 12800, 1600-MHz)
691740-005	4-GB memory module (PC3L, 12800, 1600-MHz)
710412-001	65-W AC adapter (non-PFC S-3P, 4.5-mm)
714657-001	65-W HP Smart AC adapter (non-PFC, EM, 4.5-mm)
722298-001	3-cell, 50-Wh, 4.52-Ah, Li-ion battery
724935-005	Broadcom BCM4352 802.11ac 2×2 Wi-Fi + BT 4.0 Combo Adapter
728044-001	Antenna Kit (includes left and right wireless antenna cables and transceivers)
728045-001	Rear cover (includes display stand release actuator)
728046-001	Bottom cover (includes 2 captive screws, secured by C-clips)
728047-001	Display panel cable

Spare part number	Description
728048-001	Cable Kit See Cable Kit on page 12 for more Cable Kit information.
728049-001	Power connector cable
728050-001	Fan (includes cable and mylar shroud)
728051-001	Heat sink (includes replacement thermal material)
728052-001	Air flow channel
728053-001	Hard Drive Hardware Kit (includes hard drive bracket, hard drive connector cable, and screws) **NOTE:** See Mass storage device on page 13 for more Hard Drive Hardware Kit information.
728054-001	Cover bracket
728055-001	Middle frame (includes display assembly pads, display stand release assembly, and X-axis capacitor board riser)
728056-001	Display stand
728057-001	Display stand covers (includes left and right display stand covers)
728058-001	Display stand recess
728059-001	Wireless keyboard for use in the United States
728059-031	Wireless keyboard for use in the United Kingdom and Singapore
728059-041	Wireless keyboard for use in France
728059-051	Wireless keyboard for use in Germany
728059-061	Wireless keyboard for use in Italy
728059-071	Wireless keyboard for use in Spain
728059-111	Wireless keyboard for use in Switzerland
728059-131	Wireless keyboard for use in Portugal
728059-161	Wireless keyboard for use in Latin America
728059-171	Wireless keyboard for use in Saudi Arabia
728059-181	Wireless keyboard for use in Belgium
728059-251	Wireless keyboard for use in Russia
728059-291	Wireless keyboard for use in Japan
728059-BB1	Wireless keyboard for use in Israel
728059-D61	Wireless keyboard for use in India
728059-DB1	Wireless keyboard for use in Canada
728059-DH1	Wireless keyboard for use in Denmark, Finland, and Norway
728059-L31	Wireless keyboard for use in the Netherlands
728061-001	Wireless mouse
728063-001	Power button board (includes ribbon cable)
728064-001	USB board

Spare part number	Description
728065-001	Audio/USB board
728066-001	Converter board
728067-001	Capacitor board (include X-axis capacitor board, Y-axis capacitor board, and double-sided adhesive)
728068-001	Media card reader board
728070-001	20.0-inch, AG, HD display assembly (includes capacitor board cables, rotation sensor module and cable, and Windows button board and cable)
728072-001	RTC battery (includes cable and double-sided adhesive)
728073-001	Rubber Kit (includes 2 bottom cover rubber screw covers)
728074-001	Screw Kit
728075-001	Speaker Kit (includes left speaker/subwoofer and right speaker, cables, and 3 rubber isolators)
728077-001	System board equipped with an Intel i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system (includes replacement thermal material)
728077-501	System board equipped with an Intel i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (includes replacement thermal material)
728078-001	Webcam/microphone module (includes double-sided adhesive and grounding tape)
731999-005	1-TB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache (2.5-in, SATA, does not include hard drive bracket, hard drive connector cable, or screws)
732001-001	750-GB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache (2.5-in, SATA, does not include hard drive bracket, hard drive connector cable, or screws)
737670-001	System board equipped with an Intel i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system (includes replacement thermal material)
737670-501	System board equipped with an Intel i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system (includes replacement thermal material)
753182-001	Middle frame (includes display assembly pads, display stand release assembly, and X-axis capacitor board riser)
753183-001	20.0-inch, AG, HD display assembly (includes capacitor board cables, rotation sensor module and cable, and Windows button board and cable)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

- Flat-bladed screw driver
- Magnetic screw driver
- Phillips P1 screw driver
- Phillips P0 screw driver
- Phillips P00 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.

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

Component replacement procedures

⚠ **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.

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

There are as many as 82 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

Description	Spare part number
Bottom cover (includes 2 captive screws, secured by C-clips)	728046-001

Before disassembling the computer, follow these steps:

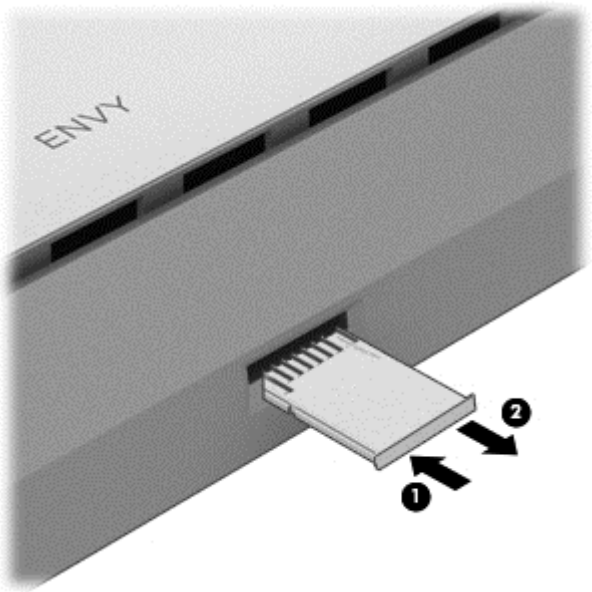
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.

Remove the bottom cover:

⚠ **CAUTION:** Before positioning the computer with the display screen facing down, make sure the work surface is clear of tools, screws, and any other foreign objects. Failure to follow this caution can result in damage to the display screen.

1. Position the computer with the display screen facing down and the bottom edge toward you.
2. Press in on the media card reader slot bezel **(1)** to release the bezel from the slot, and then press in on the bezel **(2)** a second time to remove the bezel from the slot.

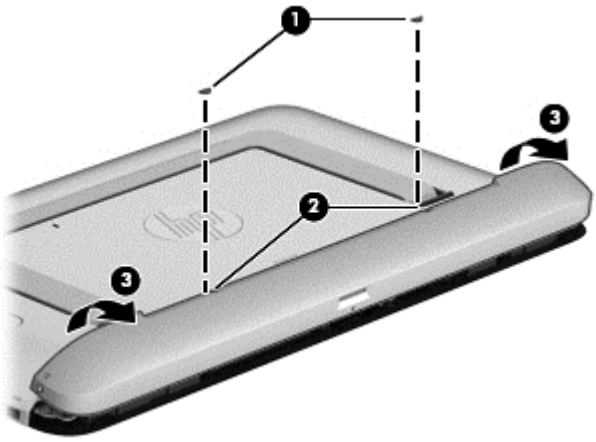
   The media card reader slot bezel is included in the Rubber Kit, spare part number 728073-001.



3. Remove the two rubber screw covers **(1)**.

   The rubber screw covers are included in the Rubber Kit, spare part number 728073-001.
4. Loosen the two Phillips PM2.5×5.0 captive screws **(2)** that secure the bottom cover to the computer.

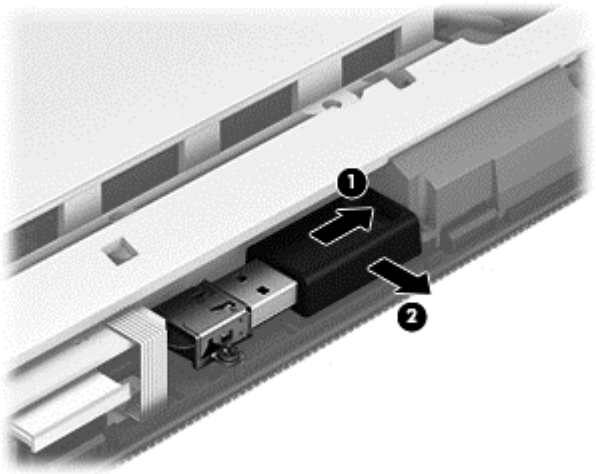
5. Lift up on the top edge of the bottom cover **(3)**, and then swing it up and forward until it detaches from the computer.



6. Remove the bottom cover.

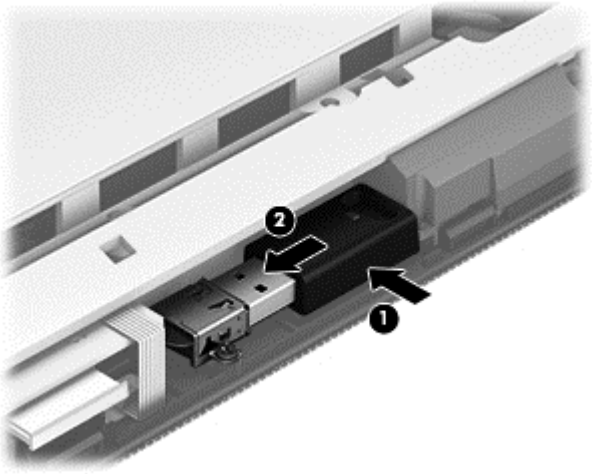
After the bottom cover is removed, the internal USB connector is accessible. If it is necessary to remove or replace the wireless receiver dongle, follow these steps:

1. Disconnect the dongle **(1)** from the internal USB connector.
2. Remove the dongle **(2)** from the tablet.



3. Insert the replacement dongle **(1)** into the cavity next to the internal USB connector.

4. Connect the dongle **(2)** to the internal USB connector.



Reverse this procedure to install the bottom cover.

Rear cover

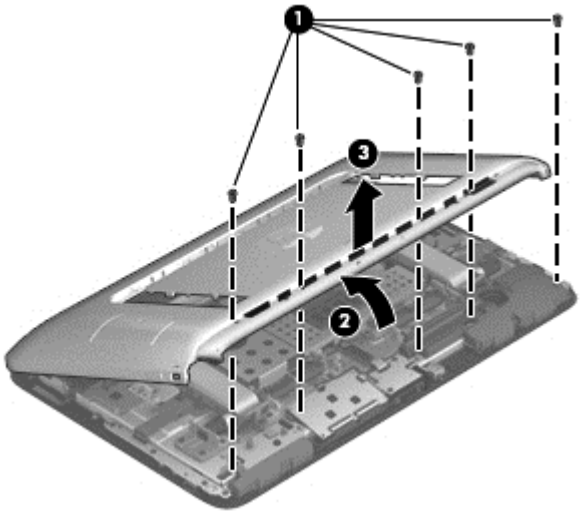
Description	Spare part number
Rear cover (includes display stand release actuator)	728045-001

Before removing the rear 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 bottom cover (see Bottom cover on page 23).

Remove the rear cover:

1. Remove the five Phillips PM3.0×6.5 screws **(1)** that secure the rear cover to the computer.
2. Lift up on the bottom edge of the rear cover **(2)**, and then swing it up and back until it detaches from the computer.
3. Remove the rear cover **(3)**.



Reverse this procedure to install the rear cover.

Hard drive

NOTE: The hard drive spare part kit does not include the hard drive bracket, hard drive connector cable, or screws. These components are available in the Hard Drive Hardware Kit, spare part number 728053-001.

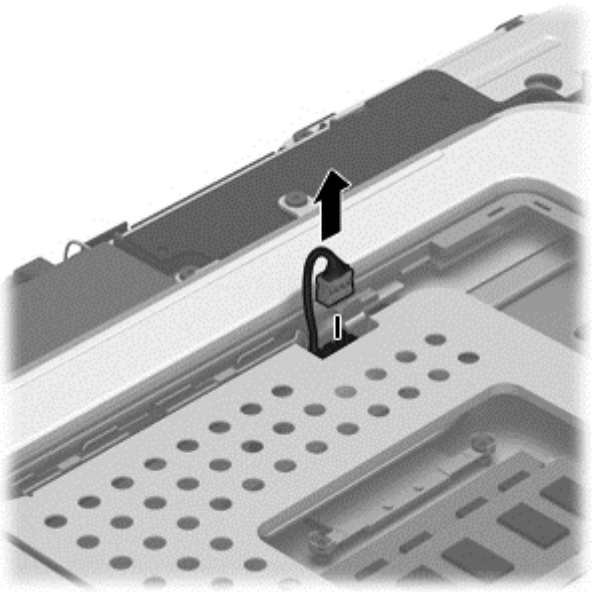
Description	Spare part number
1-TB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache	731999-005
750-GB, 5400-rpm, 9.5-mm hybrid drive with 8-GB NAND cache	732001-001
1-TB 5400-rpm, 9.5-mm hard drive	676521-005
750-GB, 5400-rpm 9.5-mm	634250-005

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).

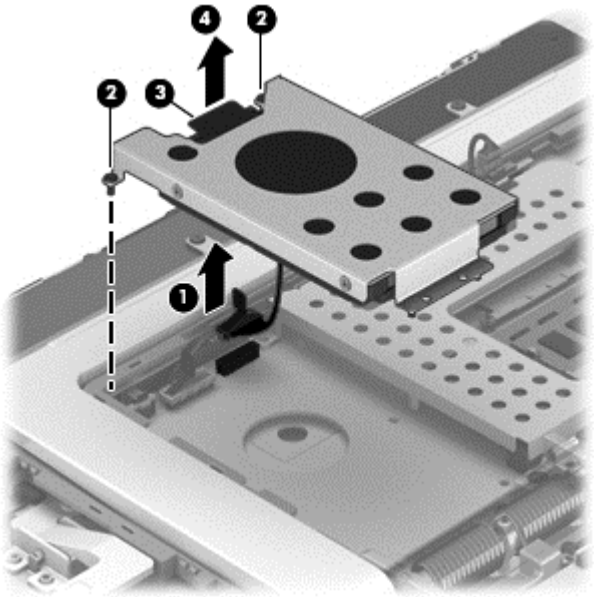
Remove the hard drive:

1. Disconnect the battery cable from the system board.



2. Disconnect the hard drive connector cable **(1)** from the system board.
3. Loosen the two Phillips PM2.5×6.5 screws **(2)** that secure the hard drive to the computer.

4. Lift up on the hard drive tab **(3)** to remove the hard drive **(4)** from the hard drive bay.



5. If it is necessary to disassemble the hard drive, perform the following steps:

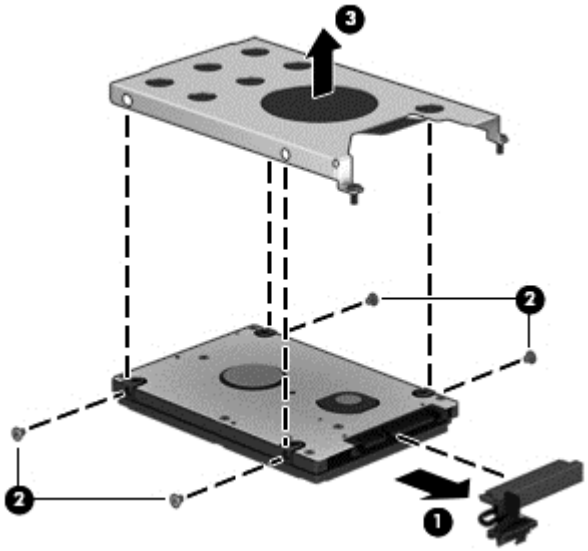
   a. Position the hard drive with the connector toward you.

   b. Disconnect the hard drive connector cable **(1)** from the hard drive.

   c. Remove the four Phillips PM3.0×3.5 screws **(2)** that secure the hard drive bracket to the hard drive.

   d. Remove the hard drive bracket **(3)** from the hard drive.

      The hard drive bracket, hard drive connector cable, and screws are available in the Hard Drive Hardware Kit, spare part number 728053-001.



Reverse this procedure to reassemble and install the hard drive.

Memory module

Description	Spare part number
4-GB (PC3L, 12800, 1600-MHz)	691740-005
2-GB (PC3L, 12800, 1600-MHz)	691739-005

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.

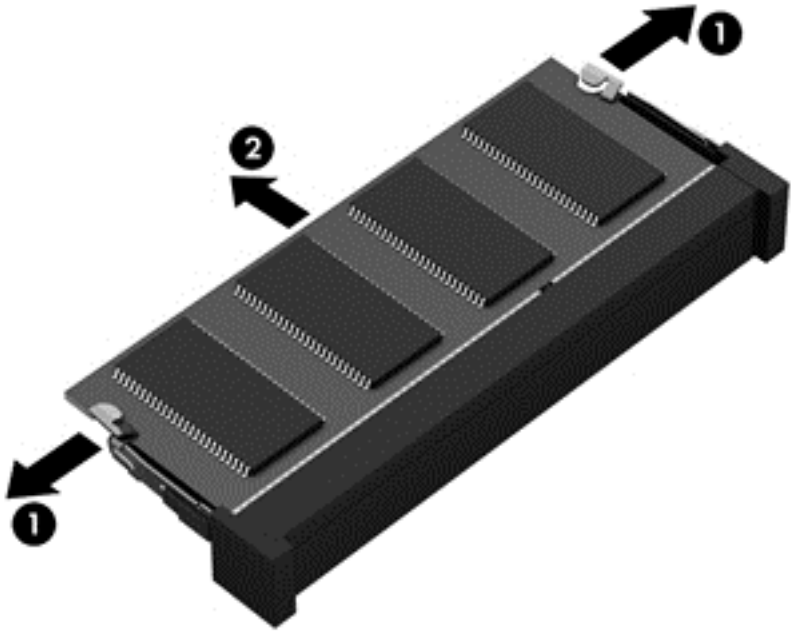
Before removing a memory module, follow these steps:

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).

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.

Y-axis capacitor board

Description	Spare part number
Y-axis capacitor board (includes double-sided adhesive)	728067-001

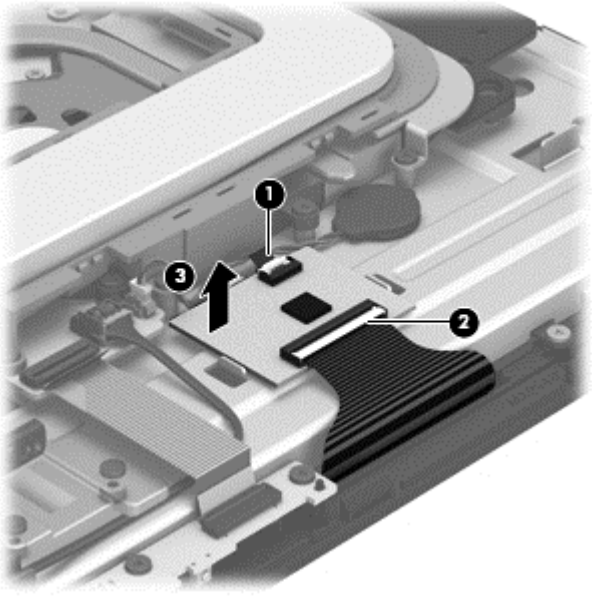
Before removing the Y-axis capacitor board, follow these steps:

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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).

Remove the Y-axis capacitor board:

1. Release the ZIF connector **(1)** to which the capacitor board ribbon cable is attached, and then disconnect the capacitor board ribbon cable from the Y-axis capacitor board.
2. Release the ZIF connector **(2)** to which the display panel ribbon cable is attached, and then disconnect the display panel ribbon cable from the Y-axis capacitor board.

3. Detach the Y-axis capacitor board **(3)** from the middle frame. (The Y-axis capacitor board is attached to the middle frame with double-sided adhesive.)



4. Remove the Y-axis capacitor board.

Reverse this procedure to install the Y-axis capacitor board.

RTC battery

Description	Spare part number
RTC battery (includes cable and double-sided adhesive)	728072-001

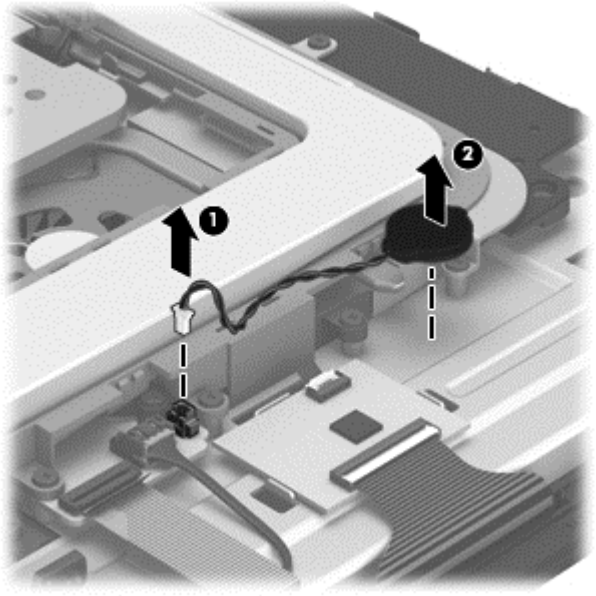
Before removing the RTC battery, follow these steps:

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the Y-axis capacitor board (see Y-axis capacitor board on page 30).

Remove the RTC battery:

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

2. Detach the RTC battery **(2)** from the middle frame. (The RTC battery is attached to the middle frame with double-sided adhesive.)



3. Remove the RTC battery.

Reverse this procedure to install the RTC battery.

USB board

NOTE: The USB board spare part kit does not include the USB board ribbon cable. The USB board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

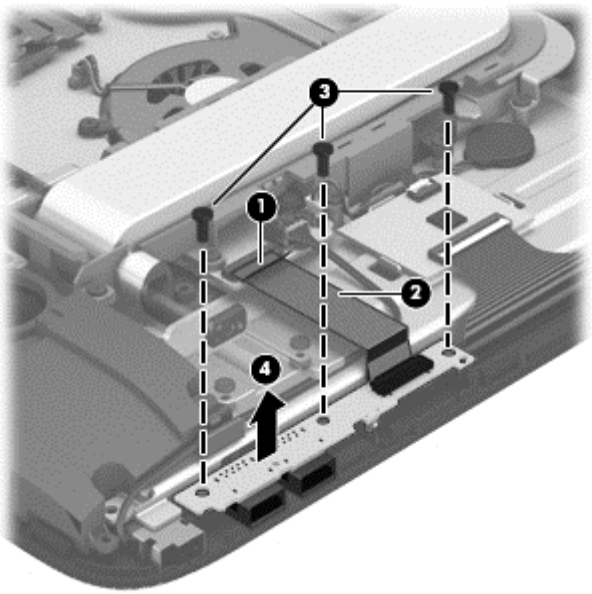
Description	Spare part number
USB board	728064-001

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).

Remove the USB board:

1. Release the ZIF connector **(1)** to which the USB board ribbon cable is attached, and then disconnect the USB board ribbon cable from the system board.
2. Detach the USB board ribbon cable **(2)** from the middle frame. (The USB board ribbon cable is attached to the middle frame with double-sided adhesive.)
3. Remove the three Phillips PM3.0×6.5 screws **(3)** that secure the USB board to the display assembly.
4. Remove the USB board **(4)** and cable.



Reverse this procedure to install the USB board.

X-axis capacitor board

NOTE: The X-axis capacitor board spare part kit does not include the X-axis capacitor board cable. The X-axis capacitor board cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

Description	Spare part number
X-axis capacitor board	728067-001

Before removing the X-axis capacitor board, follow these steps:

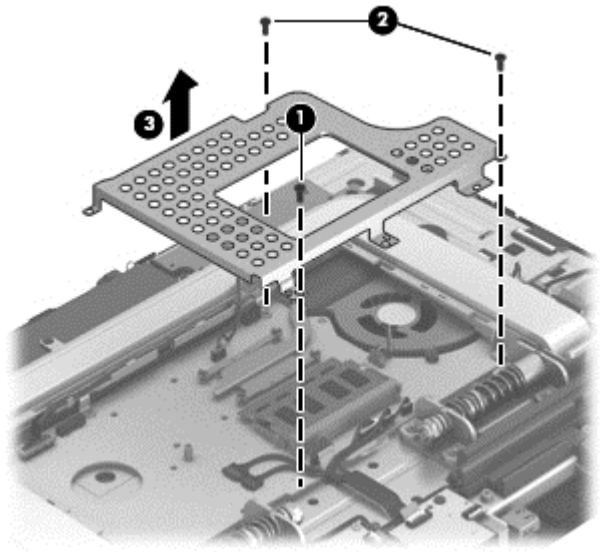
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see Bottom cover on page 23).

5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).

Remove the X-axis capacitor board:

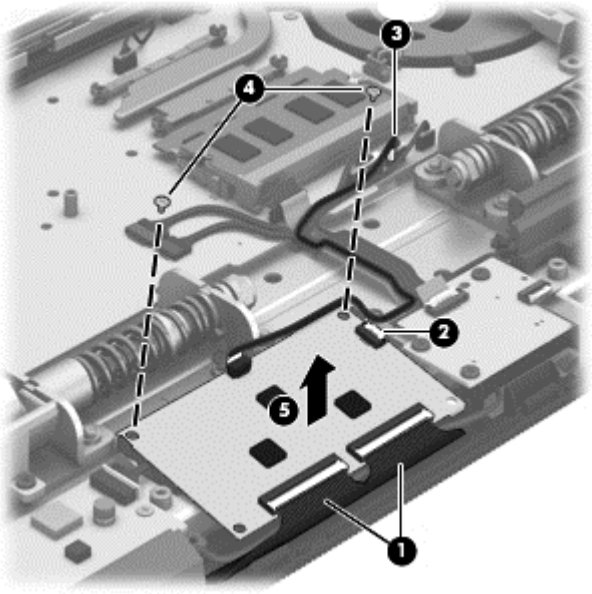
1. Remove the Phillips PM3.0×4.5 screw **(1)** and the two Phillips PM3.0×6.5 screws **(2)** that secure the cover bracket to the computer.
2. Remove the cover bracket **(3)**.

   The cover bracket is available using spare part number 728054-001.



3. Release the two ZIF connectors **(1)** to which the two display panel ribbon cables are attached, and then disconnect the two display panel ribbon cables from the X-axis capacitor board.
4. Release the ZIF connector **(2)** to which the capacitor board ribbon cable is attached, and then disconnect the capacitor board ribbon cable from the X-axis capacitor board.
5. Disconnect the X-axis capacitor board cable **(3)** from the system board.
6. Release the X-axis capacitor board cable from the clips **(4)** built into the middle frame.
7. Remove the two Phillips PM2.5×3.0 screws **(5)** that secure the X-axis capacitor board to the middle frame.

8. Remove the X-axis capacitor board **(6)** and cable.



Reverse this procedure to install the X-axis capacitor board.

Converter board

NOTE: The converter board spare part kit does not include the converter board cable or converter board ribbon cable. The converter board cable and converter board ribbon cable are included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

Description	Spare part number
Converter board	728067-001

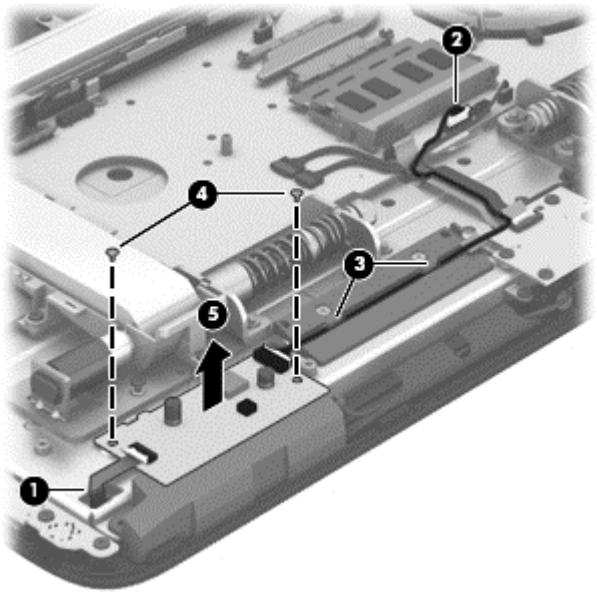
Before removing the converter board, follow these steps:

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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the cover bracket (see X-axis capacitor board on page 33).

Remove the converter board:

1. Disconnect the converter board ribbon cable **(1)** from the low insertion force (LIF) connector on the display assembly.
2. Disconnect the converter board cable **(2)** from the system board.
3. Release the converter board cable from the clips **(3)** built into the middle frame.

4. Release the converter board cable from the clips **(4)** built into the X-axis capacitor board riser.
5. Remove the two Phillips PM3.0×4.5 screws **(5)** that secure the converter board to the middle frame.
6. Remove the converter board **(6)** and cables.



Reverse this procedure to install the converter board.

Media card reader board

NOTE: The media card reader board spare part kit does not include the media card reader board ribbon cable. The media card reader board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

Description	Spare part number
Media card reader board	728068-001

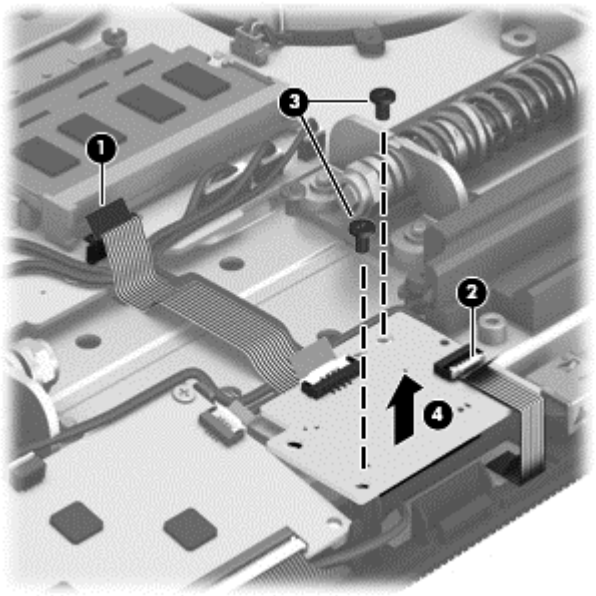
Before removing the media card reader board, follow these steps:

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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the cover bracket (see X-axis capacitor board on page 33).

Remove the media card reader board:

1. Release the ZIF connector **(1)** to which the media card reader board ribbon cable is attached, and then disconnect the media card reader board ribbon cable from the system board.
2. Release the media card reader board ribbon cable from the clips **(2)** built into the middle frame.
3. Release the ZIF connector **(3)** to which the Windows button ribbon cable is attached, and then disconnect the Windows button ribbon cable from the media card reader board.
4. Remove the two Phillips PM3.0×4.5 screws **(4)** that secure the media card reader board to the middle frame and display assembly.

5. Remove the media card reader board **(5)** and cable.



Reverse this procedure to install the media card reader board.

USB connector cable

NOTE: The USB connector cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

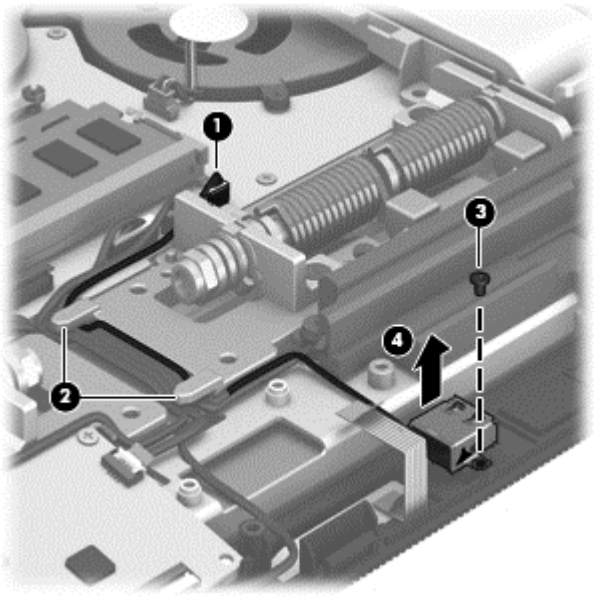
Before removing the USB connector cable, follow these steps:

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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the cover bracket (see X-axis capacitor board on page 33).
8. Remove the X-axis capacitor board (see X-axis capacitor board on page 33).
9. Remove the converter board (see Converter board on page 35).
10. Remove the media card reader board (see Media card reader board on page 37).

Remove the USB connector cable:

1. Disconnect the USB connector cable **(1)** from the system board.
2. Release the USB connector cable **(2)** from the clips built into the middle frame.
3. Remove the Phillips PM2.5×3.0 screw **(3)** that secures the USB connector cable to the display assembly.

4. Remove the USB connector cable **(4)**.



Reverse this procedure to install the USB connector cable.

Speakers

Description	Spare part number
Speaker Kit (includes right speaker, left speaker/subwoofer, cables, and 3 rubber isolators)	728075-001

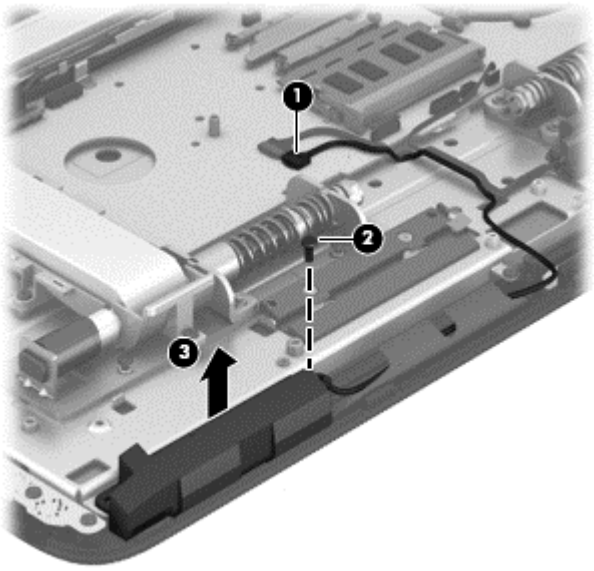
Before removing the speakers, follow these steps:

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the X-axis capacitor board (see X-axis capacitor board on page 33).
8. Remove the converter board (see Converter board on page 35).
9. Remove the media card reader board (see Media card reader board on page 37).

Remove the speakers:

1. Disconnect the right speaker cable **(1)** from the system board.
2. Release the right speaker cable from the clips **(2)** built into the middle frame.
3. Remove the Phillips PM3.0×6.5 screw **(3)** that secures the right speaker to the middle frame.

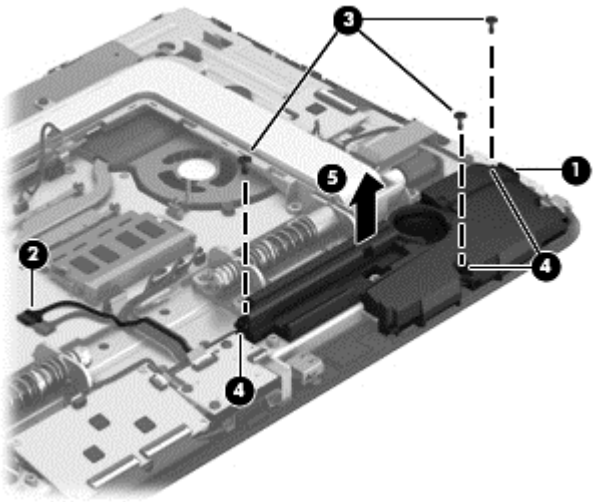
4. Remove the right speaker **(4)** and cable.



5. Release the power connector cable from the clip **(1)** built into the left speaker/subwoofer.
6. Disconnect the left speaker/subwoofer cable **(2)** from the system board.
7. Release the left speaker/subwoofer cable from the clips **(3)** built into the middle frame.
8. Remove the three Phillips PM3.0×6.5 screws **(4)** that secure the left speaker/subwoofer to the middle frame.

NOTE: The left speaker/subwoofer includes three rubber isolators that are installed in the screw holes **(5)**. These isolators are crucial to the performance of the subwoofer.

9. Remove the left speaker/subwoofer **(6)** and cable.



Reverse this procedure to install the speakers.

Display stand recess

Description	Spare part number
Display stand recess	728058-001

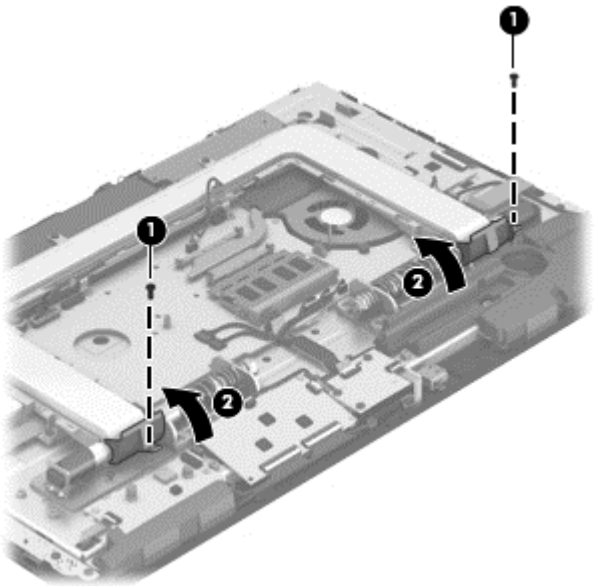
Before removing the display stand recess, follow these steps:

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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).

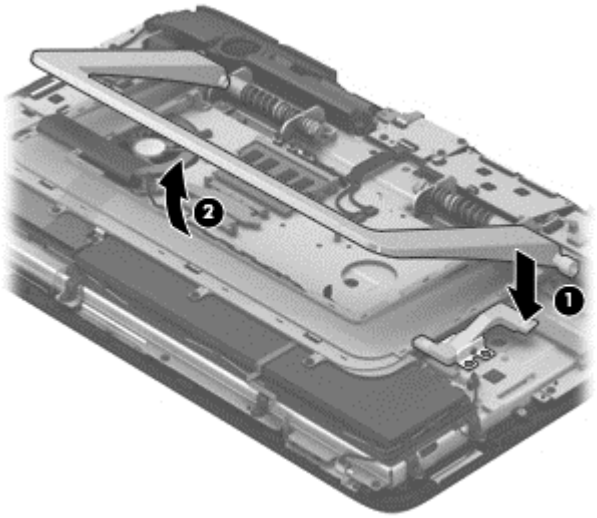
Remove the display stand recess:

1. Remove the two Phillips PM3.0×4.5 screws **(1)** that secure the display stand cover to the middle frame.
2. Remove the left **(2)** and right display stand covers **(3)**.

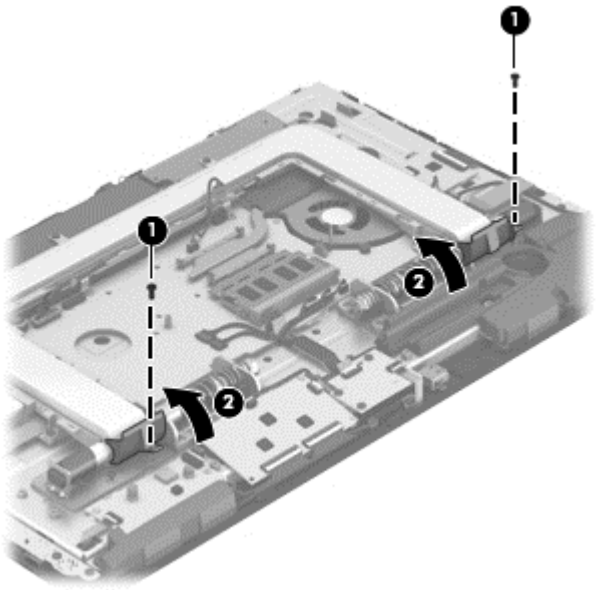
   The display stand covers are available using spare part number 728057-001.



3. Press down on the display stand release actuator **(1)**. (The display stand **(2)** releases to the open position.)



4. Disconnect the display panel cable **(1)** from the system board.
5. Release the display panel cable from the clips **(2)** built into the display stand recess.
6. Remove the eleven Phillips PM3.0×6.5 screws **(3)** that secure the display stand recess to the middle frame.
7. Remove the display stand recess **(4)**.



Reverse this procedure to install the display stand covers and display stand recess.

Power button board

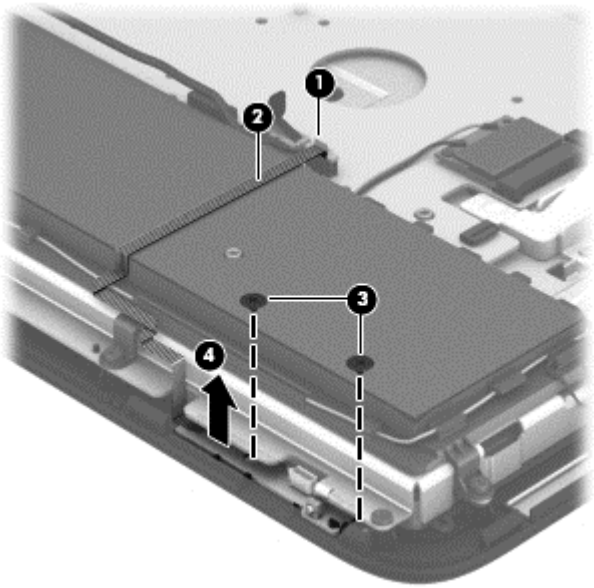
Description	Spare part number
Power button board (includes ribbon cable)	728063-001

Before removing 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the power button board:

1. Release the ZIF connector **(1)** to which the power button board ribbon cable is attached, and then disconnect the power button board ribbon cable from the system board.
2. Detach the power button board ribbon cable **(2)** from the battery. (The power button board ribbon cable is attached to the battery with double-sided adhesive.)
3. Remove the two Phillips PM2.0×2.5 broad head screws **(3)** that secure the power button board to the display assembly.
4. Remove the power button board **(4)** and cable.



Reverse this procedure to install the power button board.

Battery

Description	Spare part number
3.70-V, 3850-mAh, Li-ion battery (includes cable)	724536-001

Before removing the battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

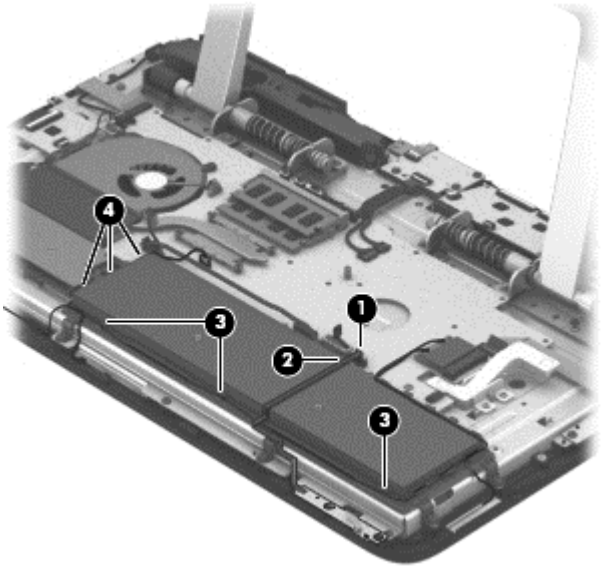
⚠ **WARNING!** To reduce potential safety issues, use only the battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

⚠ **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.

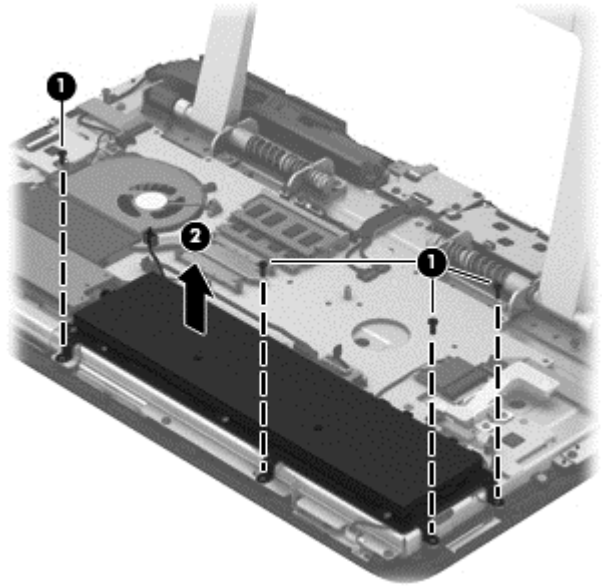
Remove the battery:

1. Release the ZIF connector **(1)** to which the power button board ribbon cable is attached, and then disconnect the power button board ribbon cable from the system board.
2. Detach the power button board ribbon cable **(2)** from the battery. (The power button board ribbon cable is attached to the battery with double-sided adhesive.)
3. Release the wireless antenna cables from the routing clips **(3)** and channels built into the battery.

4. Release the webcam/microphone module cable from the clips **(4)** built into the battery.



5. Remove the four Phillips PM3.0×6.5 screws **(1)** that secure the battery to the computer.
6. Remove the battery **(2)**.



Reverse this procedure to install the battery.

Webcam/microphone module

NOTE: The webcam/microphone module spare part kit does not include the webcam/microphone module cable. The webcam/microphone module cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

Description	Spare part number
Webcam/microphone module (includes double-sided adhesive and grounding tape)	728078-001

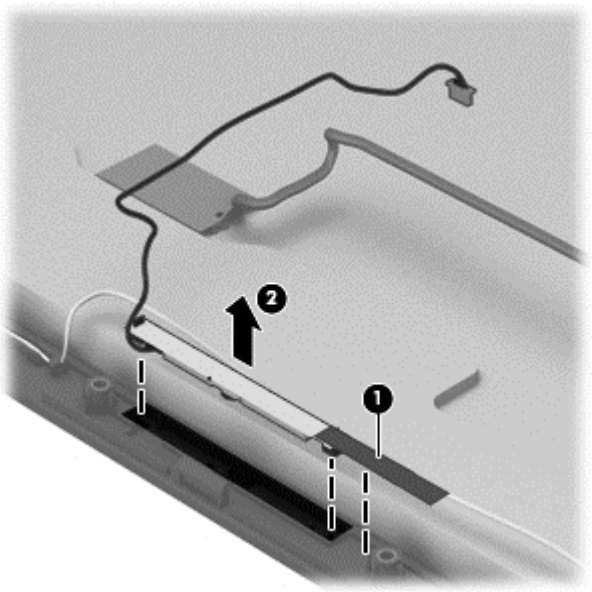
Before removing the webcam/microphone module, follow these steps:

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 Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).
10. Remove the battery (see Battery on page 44).

Remove the webcam/microphone module:

1. Release the grounding tape **(1)** that secures the webcamera/microphone module to the display assembly.

2. Detach and release the webcamera/microphone module **(2)** from the display assembly. (The webcamera/microphone module is attached to the display assembly with double-sided tape.)



Reverse this procedure to install the webcam/microphone module.

Audio/USB board

NOTE: The audio/USB board spare part kit does not include the audio/USB board ribbon cable. The audio/USB board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

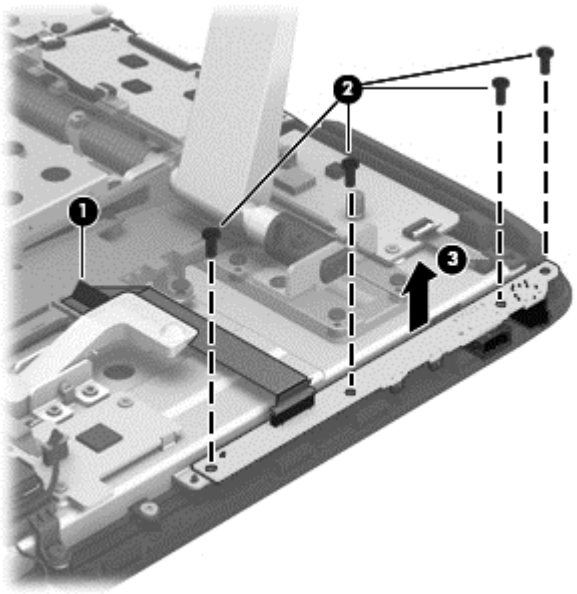
Description	Spare part number
Audio/USB board	728065-001

Before removing the audio/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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the audio/USB board:

1. Release the ZIF connector **(1)** to which the audio/USB board ribbon cable is attached, and then disconnect the audio/USB board ribbon cable from the system board.
2. Remove the four Phillips PM3.0×6.5 screws **(2)** that secure the audio/USB board to the middle frame and display assembly.
3. Remove the audio/USB board **(3)** and ribbon cable.



Reverse this procedure to install the audio/USB board.

WLAN module

Description	Spare part number
Broadcom BCM4352 802.11ac 2×2 Wi-Fi + BT 4.0 Combo Adapter	724935-005

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

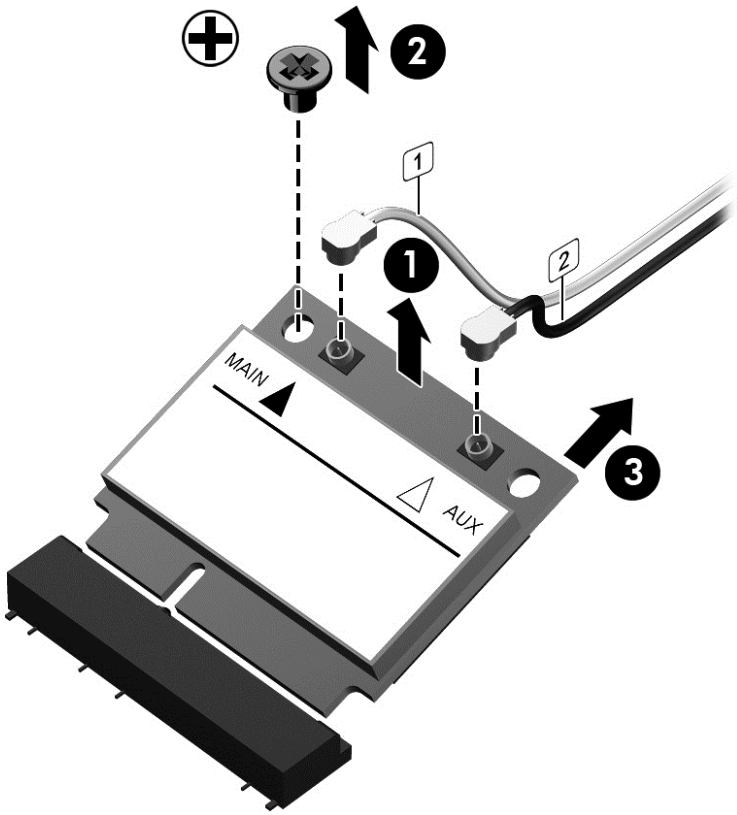
Remove the WLAN module:

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

   NOTE: The #1/black WLAN antenna cable is connected to the WLAN module Main terminal. The #2/gray WLAN antenna cable is connected to the WLAN module Aux terminal.

2. Remove the Phillips PM2.0×3.5 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.



Reverse this procedure to install the WLAN module.

Air flow channel

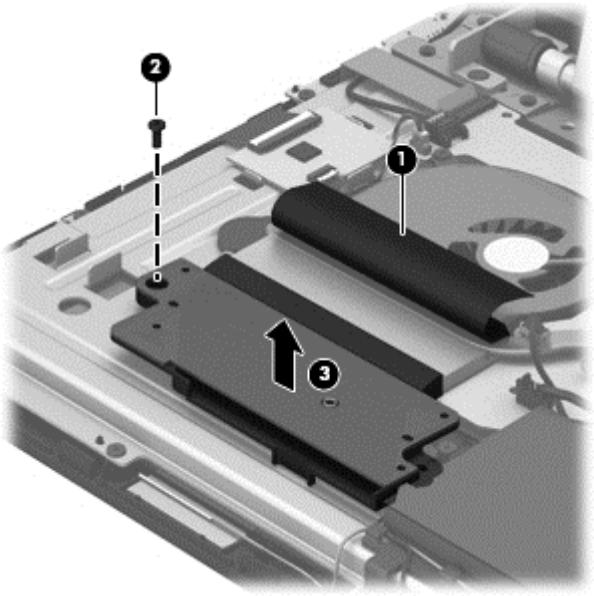
Description	Spare part number
Air flow channel	728052-001

Before removing the air flow channel, 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the air flow channel:

1. Detach the mylar shroud **(1)** that connects the air flow channel to the fan.
2. Remove the Phillips PM3.0×6.5 screw **(2)** that secures the air flow channel to the middle frame.
3. Remove the air flow channel **(3)**.



Reverse this procedure to install the air flow channel.

Display panel cable

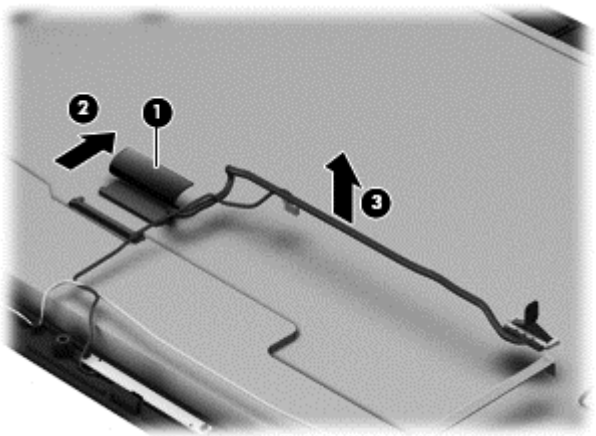
Description	Spare part number
Display panel cable	728047-001
Rear-facing webcam (includes cable)	731533-001

Before removing the display panel 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).
10. Remove the air flow channel (see Air flow channel on page 51).

Remove the display panel cable:

1. Release the adhesive strip **(1)** that secures the display panel cable to the display assembly.
2. Disconnect the display panel cable **(2)** from the display panel.
3. Remove the display panel cable **(3)**.



4. Remove the display panel cable.

Reverse this procedure to install the display panel cable.

Fan

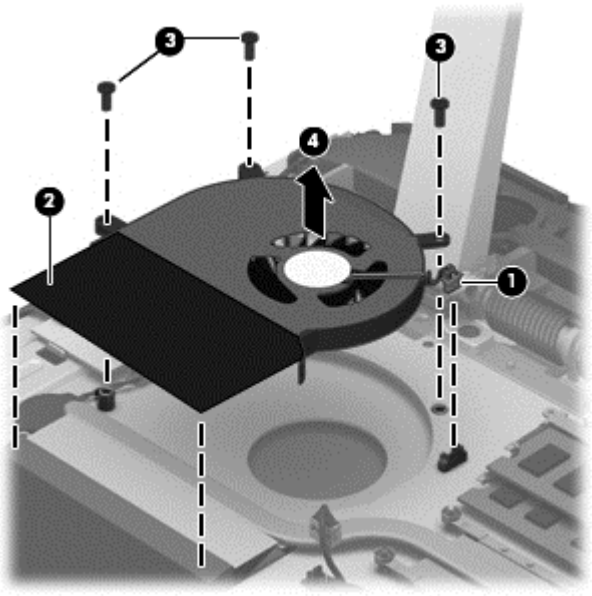
Description	Spare part number
Fan (includes cable and mylar shroud)	728050-001

Before removing the fan, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the fan:

1. Disconnect the fan cable **(1)** from the system board.
2. Detach the mylar shroud **(2)** that connects the fan to the air flow channel.
3. Remove the three Phillips PM3.0×6.5 screws **(3)** that secure the fan to the middle frame.
4. Remove the fan **(4)**.



Reverse this procedure to install the fan.

System board

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

Description	Spare part number
System board equipped with an Intel i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	737670-501
System board equipped with an Intel i5-4200U 1.60-GHz processor (turbo up to 2.60-GHz; dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system	737670-001
System board equipped with an Intel i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 8 Standard operating system	728077-501
System board equipped with an Intel i3-4010U 1.70-GHz processor (dual core, ULV, 15 W), a graphics subsystem with UMA memory, and the Windows 7/Linux operating system	728077-001

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).
10. Remove the fan (see Fan on page 53).

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 29)
- WLAN module (see WLAN module on page 49)
- Heat sink (see Heat sink on page 56)

Remove the system board:

1. Disconnect the following cables from the system board:

   (1) USB board ribbon cable

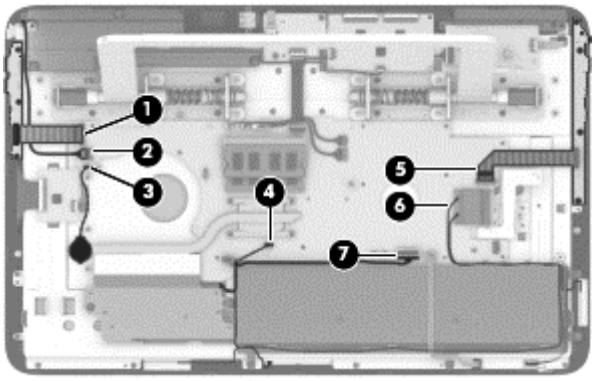
   (2) Power connector cable

   (3) RTC battery cable

   (4) Webcam/microphone module cable

   (5) Wireless antenna cables

   (6) Audio/USB board ribbon cable



2. Disconnect the following cables from the system board:

   (1) USB connector cable

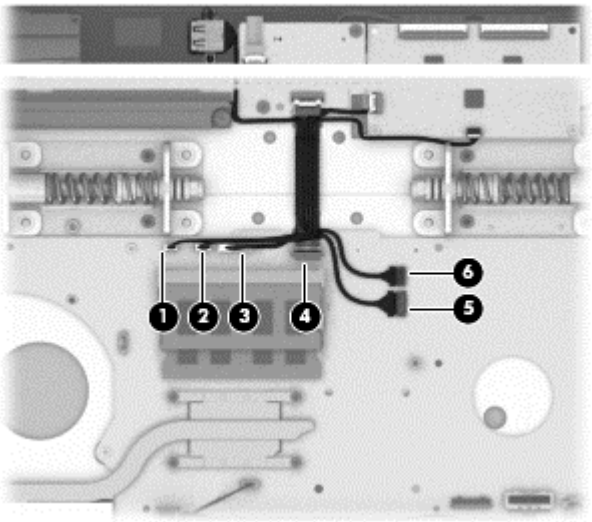
   (2) X-axis capacitor board cable

   (3) Converter board cable

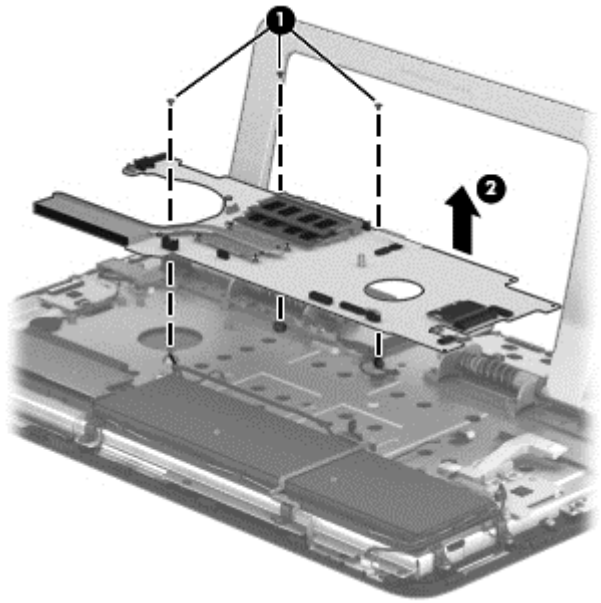
   (4) Media card reader board cable

   (5) Left speaker/subwoofer cable

   (6) Right speaker cable



3. Remove the three Phillips PM3.0×4.5 screws **(1)** that secure the system board to the middle frame.
4. Remove the system board **(2)**.



Reverse this procedure to install the system board.

Heat sink

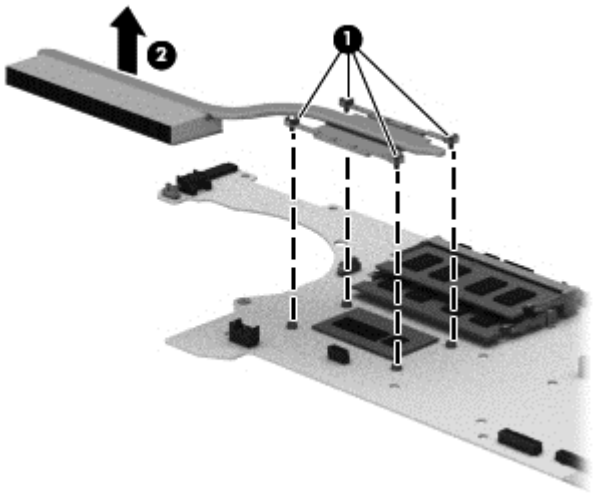
Description	Spare part number
Heat sink (includes replacement thermal material)	728051-001

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).
10. Remove the fan (see Fan on page 53).
11. Remove the system board (see System board on page 54).

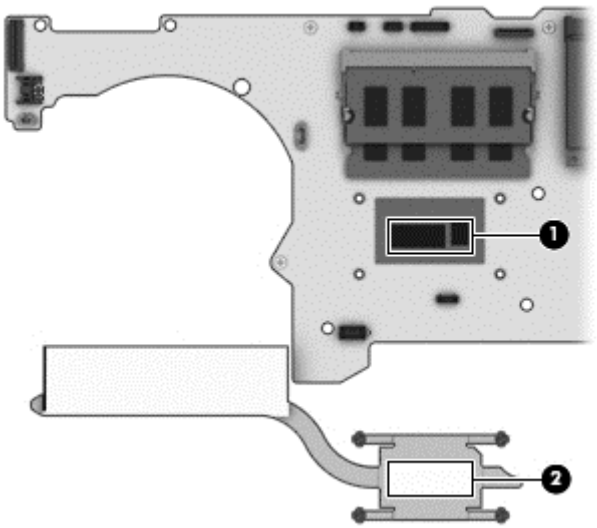
Remove the heat sink:

1. Loosen the four Phillips PM2.0×4.0 captive screws **(1)** that secure the heat sink to the system board.
2. Remove the heat sink **(2)**.



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

Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it



Reverse this procedure to install the heat sink.

Display stand

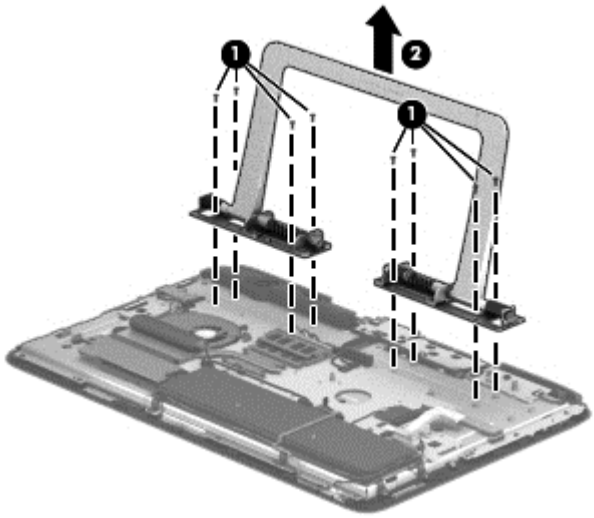
Description	Spare part number
Display stand	728056-001

Before removing the display stand, 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the display stand:

1. Remove the eight Phillips PM3.0×4.5 screws **(1)** that secure the display stand to the middle frame.
2. Remove the display stand **(2)**.



Reverse this procedure to install the display stand.

Wireless antenna

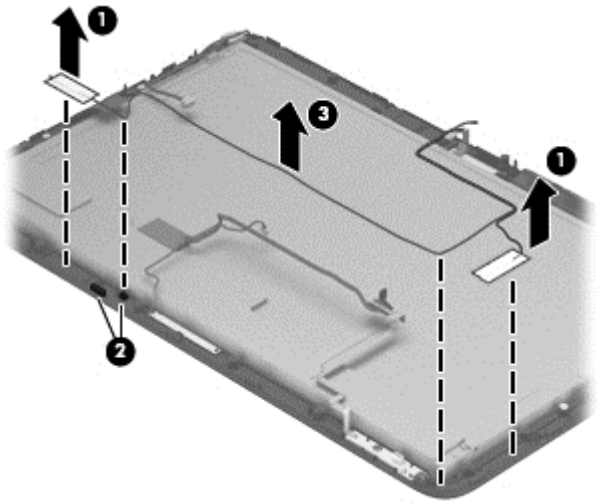
Description	Spare part number
Antenna Kit (includes left and right wireless antenna cables and transceivers)	728044-001

Before removing the wireless antenna, 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 rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the cover bracket (see X-axis capacitor board on page 33).
9. Remove the display stand recess (see Display stand recess on page 41).

Remove the wireless antenna:

1. Release the wireless antenna transceivers **(1)** from the surfaces of the middle frame and the display assembly. (The wireless antenna transceivers are attached to the middle frame and the display assembly with double-sided tape.)
2. Release the wireless antenna cables from the clips **(2)** built into the display assembly.
3. Remove the wireless antenna cables and transceivers **(3)**.



Reverse this procedure to install the wireless antenna.

Middle frame

Description	Spare part number
Middle frame (includes display assembly pads, display stand release assembly, and X-axis capacitor board riser)	728055-001 753182-001

Before removing the middle frame, follow these steps:

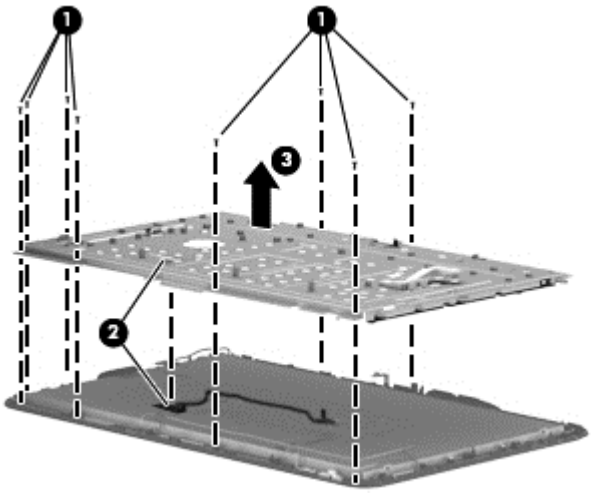
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the Y-axis capacitor board (see Y-axis capacitor board on page 30).
9. Remove the RTC battery (see RTC battery on page 31).
10. Remove the USB board (see USB board on page 32).
11. Remove the cover bracket (see X-axis capacitor board on page 33).
12. Remove the X-axis capacitor board (see X-axis capacitor board on page 33).
13. Remove the converter board (see Converter board on page 35).
14. Remove the media card reader board (see Media card reader board on page 37).
15. Remove the USB connector cable (see USB connector cable on page 38).
16. Remove the speakers (see Speakers on page 39).
17. Remove the display stand recess (see Display stand recess on page 41).
18. Remove the battery (see Battery on page 44).
19. Remove the audio/USB board (see Audio/USB board on page 47).
20. Remove the air flow channel (see Air flow channel on page 51).
21. Remove the fan (see Fan on page 53).
22. Remove the system board (see System board on page 54).
23. Remove the display stand (see Display stand on page 58).

Remove the middle frame:

1. Remove the eight Phillips PM3.0×6.5 screws **(1)** that secure the middle frame to the display assembly.

NOTE: When removing the middle frame, make sure the display panel cable **(2)** routes cleanly through the opening in the middle frame.

2. Remove the middle frame **(3)**.



3. If it is necessary to replace the capacitor board ribbon cable, turn the middle frame upside down.
4. Release both ends of the capacitor board ribbon cable from the openings **(1)** in the middle frame.
5. Release the capacitor board ribbon cable from the **(2)** the middle frame. (The capacitor board ribbon cable is attached to the middle frame with double-sided adhesive.)
6. Remove the capacitor board ribbon cable **(3)**.

   The capacitor board ribbon cable is included in the Cable Kit, spare part number 728048-001. See Cable Kit on page 12 for more Cable Kit information.

Reverse this procedure to install the middle frame and the capacitor board ribbon cable.

Power connector cable

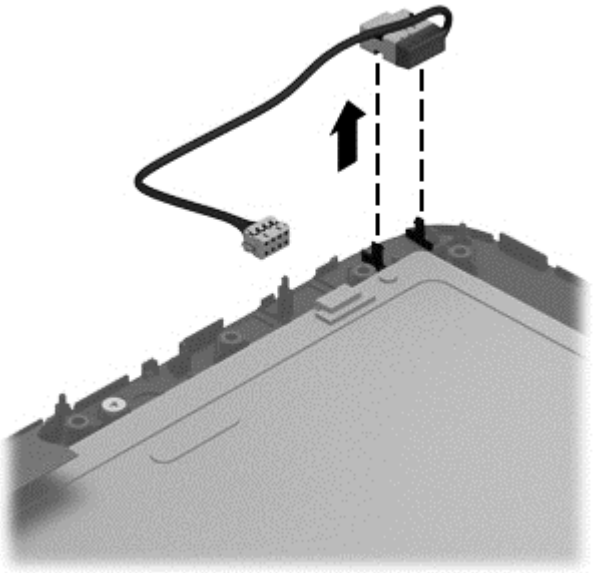
Description	Spare part number
Power connector cable	728049-001

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 bottom cover (see Bottom cover on page 23).
5. Remove the rear cover (see Rear cover on page 26).
6. Disconnect the battery cable (see Hard drive on page 27).
7. Remove the hard drive (see Hard drive on page 27).
8. Remove the Y-axis capacitor board (see Y-axis capacitor board on page 30).
9. Remove the RTC battery (see RTC battery on page 31).
10. Remove the USB board (see USB board on page 32).
11. Remove the cover bracket (see X-axis capacitor board on page 33).
12. Remove the X-axis capacitor board (see X-axis capacitor board on page 33).
13. Remove the converter board (see Converter board on page 35).
14. Remove the media card reader board (see Media card reader board on page 37).
15. Remove the USB connector cable (see USB connector cable on page 38).
16. Remove the speakers (see Speakers on page 39).
17. Remove the display stand recess (see Display stand recess on page 41).
18. Remove the battery (see Battery on page 44).
19. Remove the audio/USB board (see Audio/USB board on page 47).
20. Remove the air flow channel (see Air flow channel on page 51).
21. Remove the fan (see Fan on page 53).
22. Remove the system board (see System board on page 54).
23. Remove the display stand (see Display stand on page 58).
24. Remove the middle frame (see Middle frame on page 59).

Remove the power connector cable:

▲ Remove the power connector cable.



Reverse this procedure to install the power connector cable.

5 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.

Information about how to navigate in Setup Utility (BIOS) is located at the bottom of the screen.

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 64).
2. Use the arrow keys to select **Main**.
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. Click **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 `e`, 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 HP PC Hardware Diagnostics (UEFI) 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 66.

   b. Hard drive

   c. BIOS

2. Click the type of diagnostic test you want to run, and then follow the on-screen instructions.

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

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

NOTE: The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.

1. Go to http://www.hp.com.
2. Click **Support & Drivers**, and then click the **Drivers & Software** tab.
3. Enter the product name in the text box, and then click **Search**.
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**.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	**50.6 cm**	19.9 in
Depth	**3.4 cm**	1.4 in
Height	**32.1 cm**	12.63 in
Weight	**4.52 kg**	9.97 lbs
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 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.

Hard drive specifications

	1-TB*
Dimensions	
Height	9.5 mm
Length	100.4 mm
Width	69.9 mm
Weight	110 g
Interface type	SATA
Transfer rate	
Synchronous (maximum)	1.1 GB/sec
Security	ATA security
Seek times (typical read, including setting)	
Single track	1.5 ms
Average (read/write)	11/13 ms
Maximum	22 ms
Logical blocks	1,953,525,168
Disk rotational speed	5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)
*1 TB = 1 trillion bytes when referring to hard drive storage capacity. Actual accessible capacity is less.	
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.	

7 Backing up, restoring, and recovering

Your computer includes tools provided by HP and Windows to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state or even back to the original factory state, all with simple steps.

This chapter provides information about the following processes:

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

NOTE: This chapter describes an overview of backing up, restoring and recovering options. For more details about the tools provided, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

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 70.

2. As you add hardware and software programs, create 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 system restore point contains information that Windows uses, such as registry settings. Windows creates a system restore point for you automatically during a Windows update and during other system maintenance (such as a software update, security scanning, or system diagnostics). You can also manually create a system restore point at any time. For more information and steps for creating specific system restore points, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.

3. As you add photos, video, music, and other personal files, create a backup of your personal information. Windows File History can be set to regularly and automatically back up files from libraries, desktop, contacts, and favorites. If files are accidentally deleted from the hard drive and they can no longer be restored from the Recycle Bin, or if files become corrupted, you can restore the files that you backed up using File History. Restoring files is also useful if you ever

choose to reset the computer by reinstalling Windows or choose to recover using HP Recovery Manager.

NOTE: File History is not enabled by default, so you must turn it on.

For more information and steps for enabling Windows File History, see Help and Support. From the Start screen, type `h`, 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 the HP website. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. 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:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

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 Recovering using HP Recovery Manager on page 73.

Restore and recovery

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

- If you need to restore your personal files and data, you can use Windows File History to restore your information from the backups you created. For more information and steps for using File History, see Help and Support. From the Start screen, type `h`, 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 restore the system to a previous state without losing any personal information, Windows System Restore is an option. System Restore allows you to restore without the requirements of Windows Refresh or a reinstallation. Windows creates system restore points automatically during a Windows update and other system maintenance events. Even if you did not manually create a restore point, you can choose to restore to an automatically created restore point. For more information and steps for using Windows System Restore, see Help and Support. From the Start screen, type `h`, and then select **Help and Support**.
- If you want a quick and easy way to recover the system without losing your personal information, settings, or apps that came preinstalled on your computer or were purchased from the Windows Store, consider using Windows Refresh. This option does not require backing up data to another drive. See Using Windows Refresh for quick and easy recovery on page 72.
- If you want to reset your computer to its original state, Windows provides an easy way to remove all personal data, apps, and settings, and reinstall Windows.

  For more information, see Remove everything and reinstall Windows on page 72.
- 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 Recovering using HP Recovery Manager on page 73.
- 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 Recovering using HP Recovery Manager on page 73. If you have not already created recovery media, see Creating HP Recovery media on page 70.
- 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 Recovering using HP Recovery Manager on page 73.
- 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 Removing the HP Recovery partition on page 74.

Using Windows Refresh for quick and easy recovery

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

IMPORTANT: Refresh removes any traditional applications that were not originally installed on the system at the factory. Any Windows 8 apps that came preinstalled on your computer and any that were purchased from the Windows Store will be saved.

NOTE: During Refresh, a list of removed traditional applications will be saved so that you have a quick way to see what you might need to reinstall. See Help and Support for instructions on reinstalling traditional applications. From the Start screen, type h, and then select **Help and Support**.

NOTE: You may be prompted for your permission or password when using Refresh. See Help and Support for more information. From the Start screen, type h, and then select **Help and Support**.

To start Refresh:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Scroll the right-side choices down to display **Refresh your PC without affecting your files**.
5. Under **Refresh your PC without affecting your files**, select **Get started**, and then follow the on-screen instructions.

Remove everything and reinstall Windows

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, apps, and settings from your computer, and reinstalls Windows.

IMPORTANT: This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the f11 key or from the Start screen.

To use the f11 key:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. Press f11 while the computer boots.

   – or –

   Press and hold f11 as you press the power button.
2. Choose your keyboard layout.
3. Select **Troubleshoot** from the boot options menu.
4. Select **Reset your PC**, and then follow the on-screen instructions.

To use the Start screen:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. From the Start screen, point to the upper-right or lower-right corner of the screen to reveal the charms.
2. Click **Settings**.
3. Click **Change PC settings** in the bottom-right corner of the screen, and then select **General** from the PC settings screen.
4. Scroll the right-side choices down to display **Remove everything and reinstall Windows**.
5. Under **Remove everything and reinstall Windows**, select **Get started**, and then follow the on-screen instructions.

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 70.

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

- System Recovery—Reinstalls the original operating system, and then 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 70.
- 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 70.
- If the HP Recovery media does not work, you can obtain recovery media for your system from the HP website. For U.S. support, go to http://www.hp.com/go/contactHP. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html.

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:

IMPORTANT: For tablets, connect to the keyboard dock before beginning these steps (select models only).

1. Press f11 while the computer boots.

   – or –

   Press and hold f11 as you press the power button.
2. Choose your keyboard layout.
3. Select **Troubleshoot** from the boot options menu.
4. 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 first HP Recovery disc you created into the optical drive on your computer or into an optional external optical drive, and then restart the computer.

   – or –

   Insert the HP Recovery USB flash drive you created 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 Changing the computer boot order on page 74.
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

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, the Windows option to remove everything and reinstall Windows, or the HP Recovery Manager option. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media on page 70.

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.

8 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.

9 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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