



HP Classmate Notebook

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 on 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 computer, do not place the computer directly on your lap or obstruct the computer air vents. Use the computer 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 computer 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 Classmate Notebook
Processors	Intel® Celeron® N2806 processor (1.46 GHz/533 MHz, 2.5 W, dual core)
Chipset	Intel Valleyview_M_SOC Celeron Processor
Graphics	Integrated UMA
Panel	25.7 cm (10.1-inch) HD, 1366×768 anti glare (3.6 mm) non-touch
Memory	One memory module slot with up to 2 GB maximum memory, single channel DDR3L, 1066/1333 MHz SODIMM Supports the following configurations: <ul style="list-style-type: none">• 2 GB (2048 × 1)
Primary storage	Supports 7-mm, 2.5-in, SATA 2.0 hard drives Supports the following drives: <ul style="list-style-type: none">• 320-GB, 5400-rpm
Webcam/microphone/audio	Integrated HD camera, 1.0 MP Built-in speakers (2)
Ethernet	Realtek RTL8105E-VL 10/100 Ethernet
Wireless	Integrated WLAN by way of wireless module: LiteOn/AzureWave 802.11 b/g/n 1x1 + BT 4.0 combo
External media card	Digital Media Reader Slot Supports SDHC
Ports	Headphone/Microphone/Thermal probe combo jack RJ-45 (Ethernet) USB 3.0 (1) USB 2.0 (1) HDMI DC-in jack
Keyboard/pointing devices	Integrated QWERTY keyboard with hot key 83 UK/84 US keys Multi languages supported Touchpad
Power requirements	40-W AC adapter Automatic voltage adjustment between 100 and 240VAC 50/60Hz Supports 2 pin and 3 pin power cord







Category	Description
	3-cell, 34-Wh, 3.4 Ah, polymer battery
Security	Security lock TPM 1.2 (Infineon; soldered down)
Operating system	<p>Preinstalled:</p> <p>Windows 8.1 Professional 64-bit</p> <p>Windows 8.1 Emerging Markets (EM) 64-bit, MSNA</p> <p>Windows 8.1 Single-language (EM)</p> <p>Windows 8.1 Small Screen Language</p> <hr/> <p>Restore Media (DRDVD):</p> <p>Windows 8.1 64-bit (drivers only)</p> <p>NOTE: Portable optical drive required to use restore media.</p> <hr/> <p>Restore Media (SRDVD):</p> <p>Windows 8.1 64-bit (drivers only)</p> <p>NOTE: Portable optical drive required to use restore media.</p> <hr/> <p>Web-only support:</p> <p>Windows 8.1 Professional 64</p> <p>Windows 8.1 Enterprise 64</p> <hr/> <p>Certified:</p> <p>Microsoft WHQL</p>
Serviceability	<p>End-user replaceable parts:</p> <p>None</p>

2 External component identification

Front






Component	Description
(1)	Internal microphone Record sound.
(2)	Webcam Records video and captures photographs.
(3) 	Power button <ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.</p> <p>If the computer has stopped responding and Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p>

Component	Description
	<p>To learn more about your power settings in Windows 8, see your power options. From the Start screen, type <code>power</code>, select Power and sleep settings, and then select Power and sleep from the list of applications.</p>
<p>(4)  Power light</p>	<ul style="list-style-type: none"> • On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
<p>(5)  Hard drive light</p>	<p>Blinking white: The hard drive is being accessed.</p>
<p>(6)  Wireless light</p>	<p>White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.</p>
<p>(7) AC adapter/Battery light</p>	<ul style="list-style-type: none"> • White: The computer is connected to external power and the battery is charged from 90 to 99 percent. • Amber: The computer is connected to external power and the battery is charged from 0 to 89 percent. • Off: The battery is fully charged.
<p>(8) Touchpad</p>	<p>Moves the pointer and selects or activates items on the screen.</p>
<p>(9)  Windows key</p>	<p>Returns you to the Start screen from an open app or the Windows desktop.</p> <p>NOTE: Pressing the Windows key again will return you to the previous screen.</p>
<p>(10) Caps lock key</p>	<p>Switches the keys to all capital letters.</p>
<p>(11)  Wireless button</p>	<p>Turns the wireless feature on or off but does not establish a wireless connection.</p>
<p>(12)  Volume mute button</p>	<p>Mutes and restores speaker sound.</p>
<p>For wireless regulatory notices, see the section of the <i>Regulatory, Safety, and Environmental Notices</i> that applies to your country or region. To access this guide, from the Start screen, type <code>support</code>, and then select the HP Support Assistant app.</p>	


Left



Component	Description
(13)  Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.
(14)  USB 3.0 port, identifying	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(15)  HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed HDMI device.
(16) Memory card reader	Reads optional memory cards that store, manage, share, or access information.



Right



Component	Description
(17) USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(18)  Audio-out (headphone) jack	<p>Connects optional powered stereo speakers, headphones, earbuds, or a headset.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety, and Environmental Notices</i>. To access this guide, from the Start screen, type <code>support</code>, and then select the HP Support Assistant app.</p> <p>NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>

Rear



Component	Description
(19) 	Power connector Connects an AC adapter.
(20) 	RJ-45 (network) jack/lights Connects a network cable. <ul style="list-style-type: none"><li data-bbox="943 1199 1345 1220">• Green (right): The network is connected.<li data-bbox="943 1245 1425 1266">• Amber (left): Activity is occurring on the network.

Service tag


When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag.




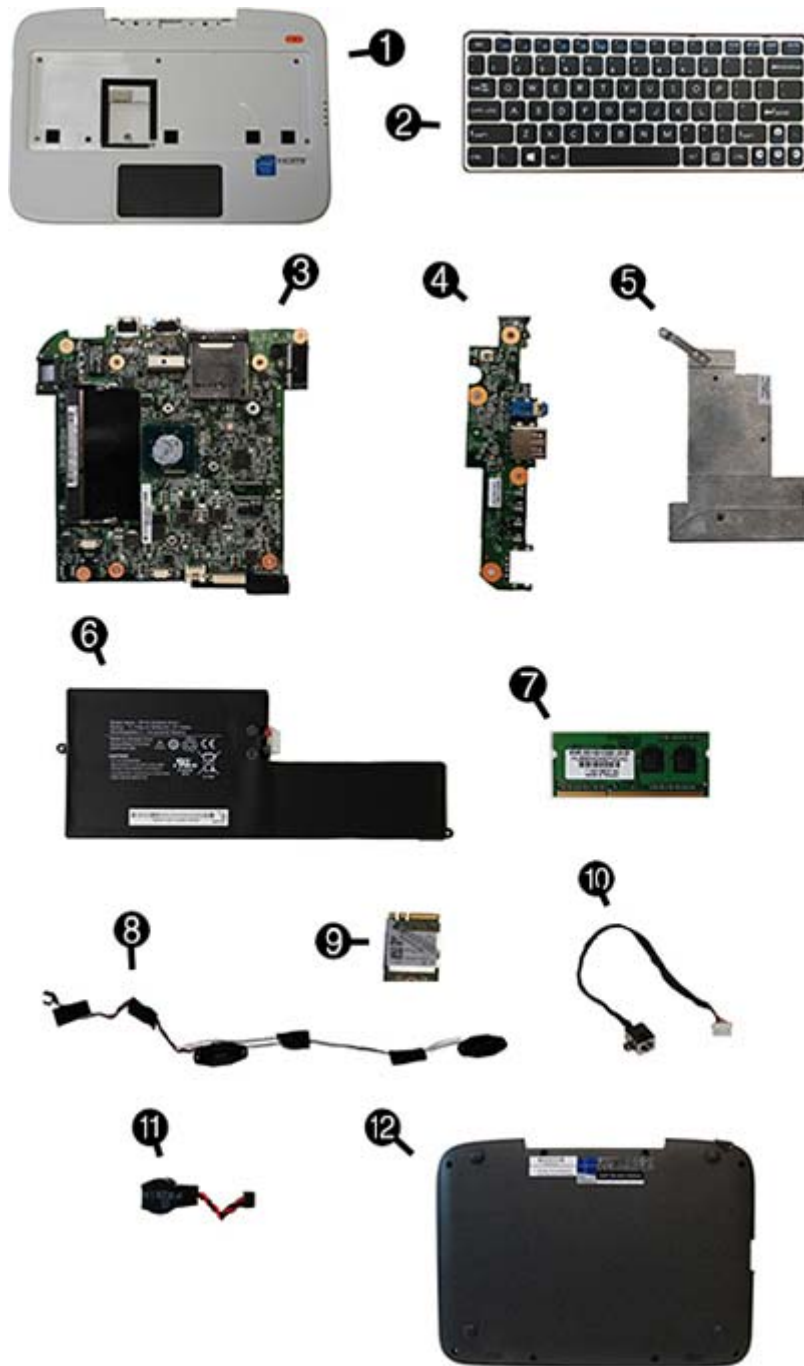
- Serial **(1)**. This is an alphanumeric identifier that is unique to each product.
- Product name **(2)**. This is the product name affixed to the front of the computer.
- Warranty period **(3)**. This number describes the duration (in years) of the warranty period for the computer.

3 Illustrated parts catalog

Computer major components

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

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Service tag on page 8](#) for details.



Item	Description	Spare part number
Whole unit replacement		
	Latin America	762412-001
	The United Kingdom	762411-001
	The United States	762410-001
(1)	Top cover (includes touchpad and handle kit)	764406-001
(2)	Keyboard (includes cable)	

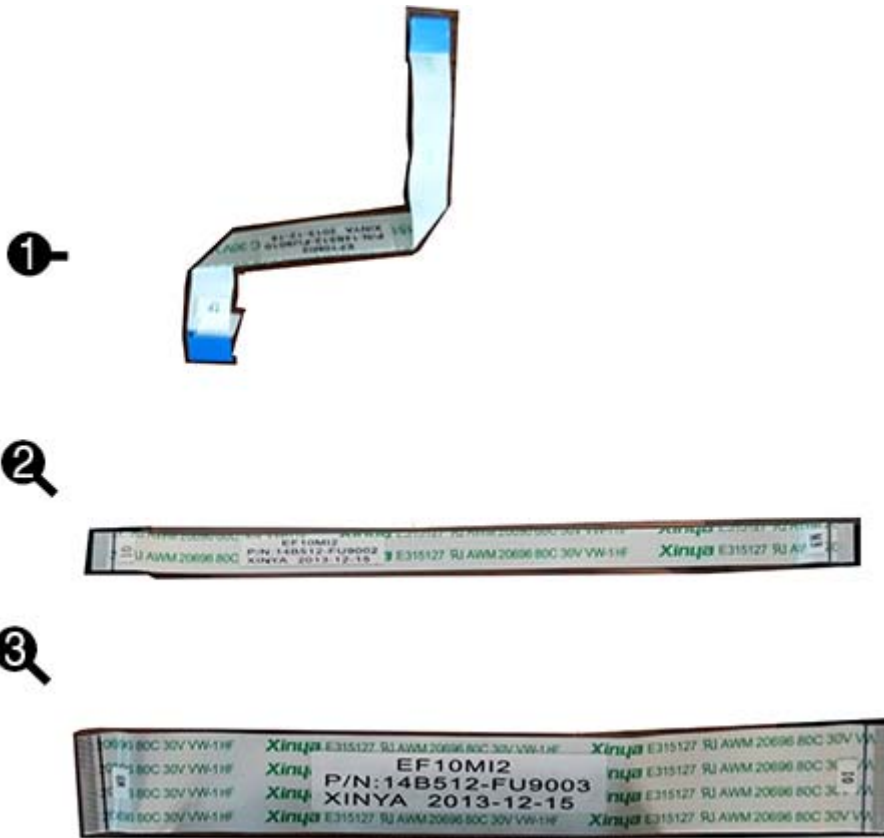
Item	Description	Spare part number
	For use in the United States	778823-001
	For use in Latin America	778823-161
(3)	System board with Celeron N2806 processor (includes replacement thermal material)	778814-001
(4)	I/O board	764413-001
(5)	Heat sink (includes replacement thermal material)	764414-001
(6)	Battery	
	3-cell, 34-Wh, 3.4 Ah, polymer battery	786031-001
(7)	Memory modules (PC3L-12800, 1600-MHz, DDR3L)	
	2-GB	691739-005
(8)	Speaker assembly	764411-001
(9)	WLAN module (LiteOn/AzureWave 802.11 b/g/n 1x1 + BT 4.0 combo)	788292-001
(10)	Power connector and cable	764410-001
(11)	RTC battery	764403-001
(12)	Base enclosure	764415-001

Display components



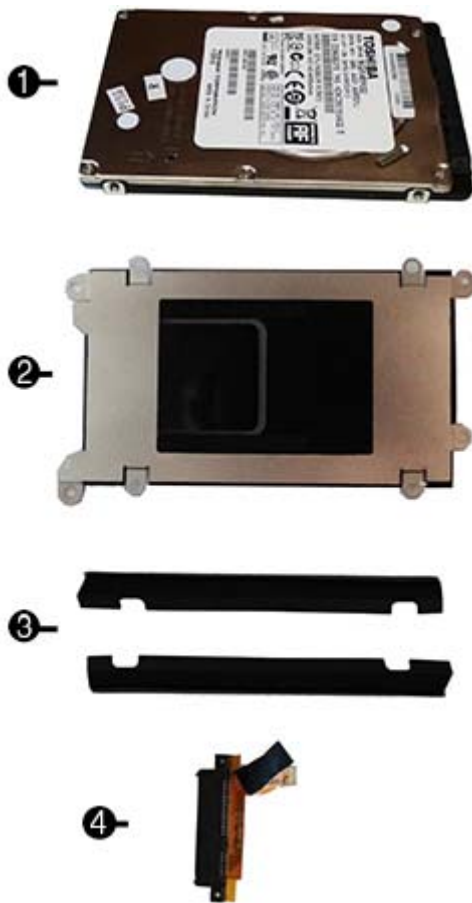
Item	Description	Spare part number
(1)	Display panel (raw)	778821-001
(2)	Display bezel	778822-001
(3)	Display Hinge Kit (includes left and right hinges)	764405-001
(4)	Webcam module	778819-001
(5)	Display hinge cover	764416-001
(6)	Display rear cover	778818-001
(7)	Display panel frame	778820-001

Cable Kit



Item	Description	Spare part number
	Cable Kit	764412-001
(1)	Touchpad cable	
(2)	Narrow flat ribbon cable	
(3)	Wide flat ribbon cable	

Hard drive components



	Description	Spare part number
(1)	Hard drives	
	320-GB, 5400-rpm, 7 mm	786030-001
	Hard Drive Hardware Kit, includes:	764408-001
(2)	Hard drive bracket	
(3)	Rubber rails	
	Sponge (not illustrated)	
	Screws (not illustrated)	
(4)	Hard drive connector cable	764409-001

Miscellaneous parts

Description	Spare part number
AC adapter, 40-W	778816-001
Power cord	778815-001
Rubber Kit (includes all rubber covers and pads)	764417-001
Screw Kit	780744-001

Sequential part number listing

Spare part number	Description
691739-005	2-GB memory module (PC3L-12800, 1600-MHz, DDR3L)
762410-001	Whole unit replacement – The United States
762411-001	Whole unit replacement – The United Kingdom
762412-001	Whole unit replacement – Latin America
764403-001	RTC battery
764405-001	Display Hinge Kit (includes left and right hinges)
764406-001	Top cover (includes touchpad and handle kit)
764408-001	Hard Drive Hardware Kit (includes hard drive bracket, rubber rails, sponge, and screws)
764409-001	Hard drive connector cable
764410-001	Power connector and cable
764411-001	Speaker assembly
764412-001	Cable Kit (see Cable Kit on page 13 for more Cable Kit spare part information)
764413-001	I/O board
764414-001	Heat sink (includes replacement thermal material)
764415-001	Base enclosure
764416-001	Display hinge cover
764417-001	Rubber Kit (includes all rubber covers and pads)
778814-001	System board with Celeron N2806 processor (includes replacement thermal material)
778815-001	Power cord
778816-001	40-W AC adapter
778818-001	Display rear cover
778819-001	Webcam module
778820-001	Display panel frame
778822-001	Display bezel

Spare part number	Description
778823-001	Keyboard for use in the United States
778823-161	Keyboard for use in Latin America
778821-001	Display panel (raw)
780744-001	Screw Kit
786030-001	320-GB, 5400-rpm, 7 mm, hard drive
786031-001	3-cell, 37 WHr, 3.4 Ah Li-ion battery
788292-001	802.11b/g/n 1x1 WiFi Adapter + Bluetooth 4.0

4 Removal and replacement procedures preliminary requirements


Tools required

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


- Flat-bladed screwdriver
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver

Service considerations

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

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

Plastic parts

 **CAUTION:** Using excessive force during disassembly and reassembly can damage plastic parts. 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 a 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, and 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.

Use nonmagnetic tools.

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			
Event	Relative humidity		
	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, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and 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 $\pm 10\%$ 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 strips must be worn in contact with the skin.


The following grounding equipment is recommended to prevent electrostatic damage:

- Antistatic tapes
- 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 plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

5 Removal and replacement procedures for Authorized Service Provider parts

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

Component replacement procedures

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

 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See [Service tag on page 8](#) for details.

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

There are as many as 58 screws and 6 nuts that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Bottom cover

Description	Spare part number
Bottom cover	746415-001

Before removing the bottom cover, follow these steps:

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

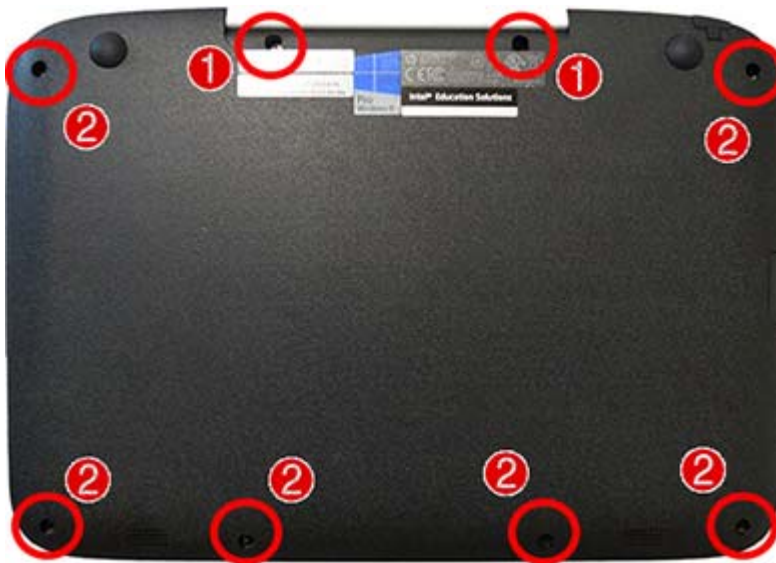
Remove the bottom cover:

1. Position the computer upside-down.


2. Remove the 8 rubber screw covers from atop the screws. The screw covers are different sizes based on location, so be sure to make note of each screw covers location for replacement.



3. Remove the 2 Phillips M2.5×8.0 screws and 6 Phillips M2.5×6.0 screws that secure the bottom cover to the computer.



4. Starting at the card reader slot, pry around the seams of the bottom cover to disengage it from the computer.

 **NOTE:** The bottom cover may be secured very tightly to the computer and may require significant force to remove.

Reverse this procedure to install the bottom cover.

Memory module

Description	Spare part number
2-GB (PC3L-10600, 1333-MHz, DDR3L)	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 the memory module, follow these steps:

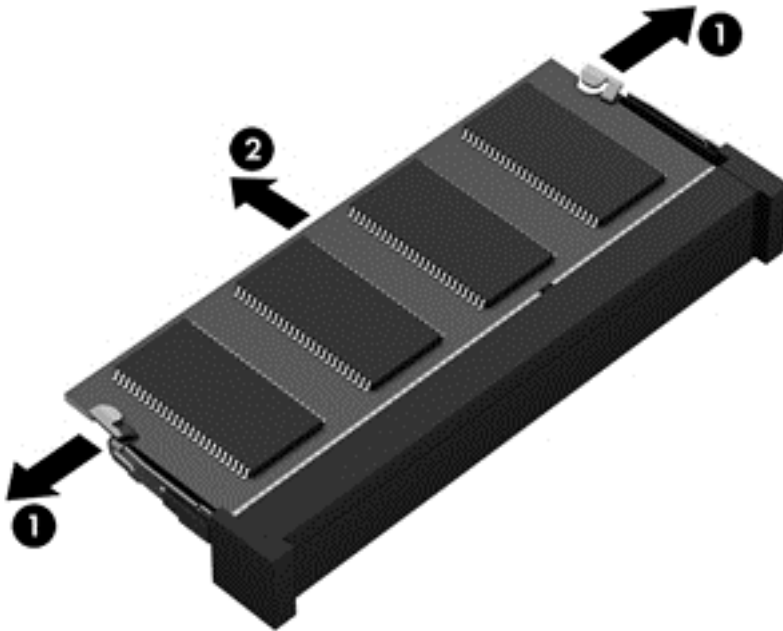
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.



Remove the memory module:

1. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The edge of the module opposite the slot rises away from the computer.)
2. Remove the memory module **(2)** by pulling the module away from the slot at an angle.

 **NOTE:** Memory modules are designed with a notch to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install a memory module.

WLAN/Bluetooth combo card

The computer uses a card that provides both WLAN and Bluetooth functionality.

Description	Spare part number
LiteOn/AzureWave 802.11 b/g/n 1x1 + BT 4.0 combo	788292-001


Before removing the WLAN module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.




Remove the WLAN module:

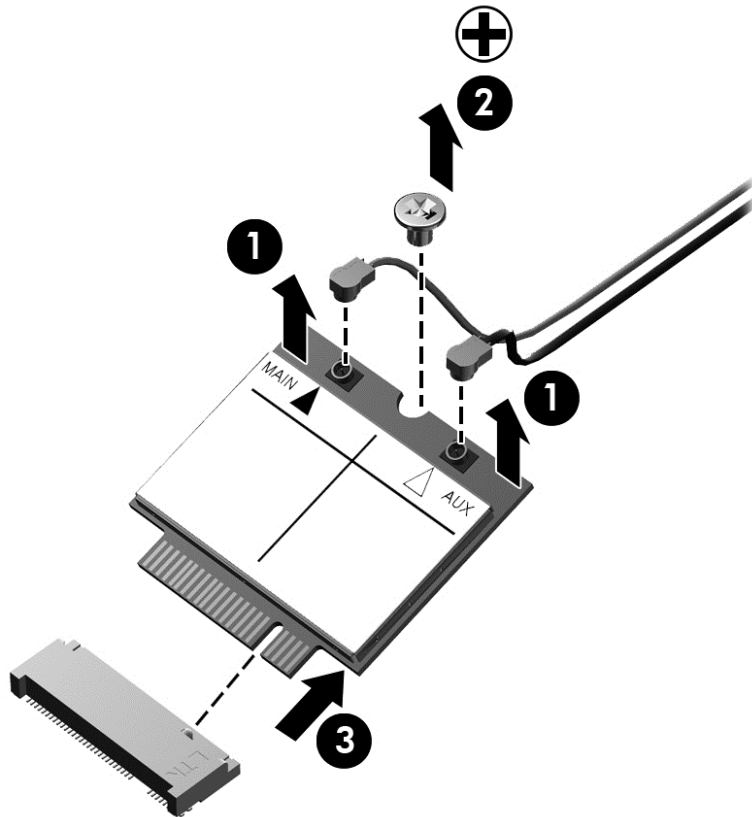
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.


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

2. Remove the Phillips PM2.0×4.0 screw **(2)** that secures the WLAN module to the computer.

3. Remove the WLAN module (3) by pulling the module away from the slot.

 **NOTE:** WLAN modules are designed with a notch to prevent incorrect insertion.



 **NOTE:** If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

Keyboard

Description	Spare part number
Keyboard for use in the United States	778823-001
Keyboard for use in Latin America	778823-161

Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.



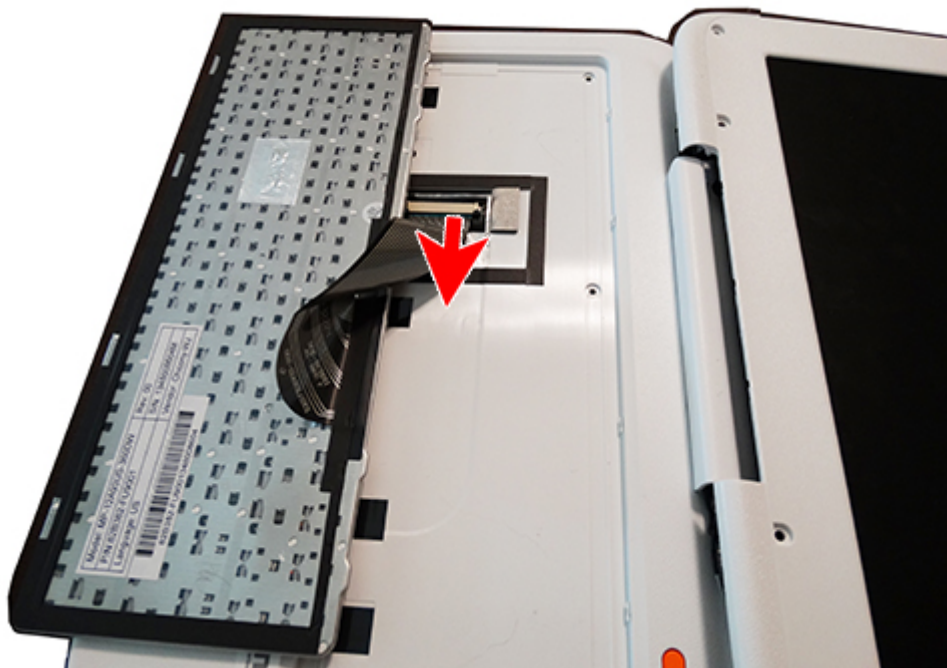
Remove the keyboard:

1. Position the computer upright and open as far as possible.
2. Using a small, thin tool, press the 4 latches **(1)** at the top of the keyboard upward to disengage the keyboard from the computer.

3. Lift the top of the keyboard upward **(2)**, and place the keyboard on the palm rest.



4. Disconnect the keyboard cable from the system board.



5. The touchpad cable also connects to the system board under the keyboard. This connector is located on the bottom of the system board along with the keyboard connector. Disconnect the touchpad cable if you need remove the system board.



Reverse this procedure to install the keyboard.

Speaker assembly

Description	Spare part number
Speaker assembly	764411-001

Before removing the speaker assembly, follow these steps:

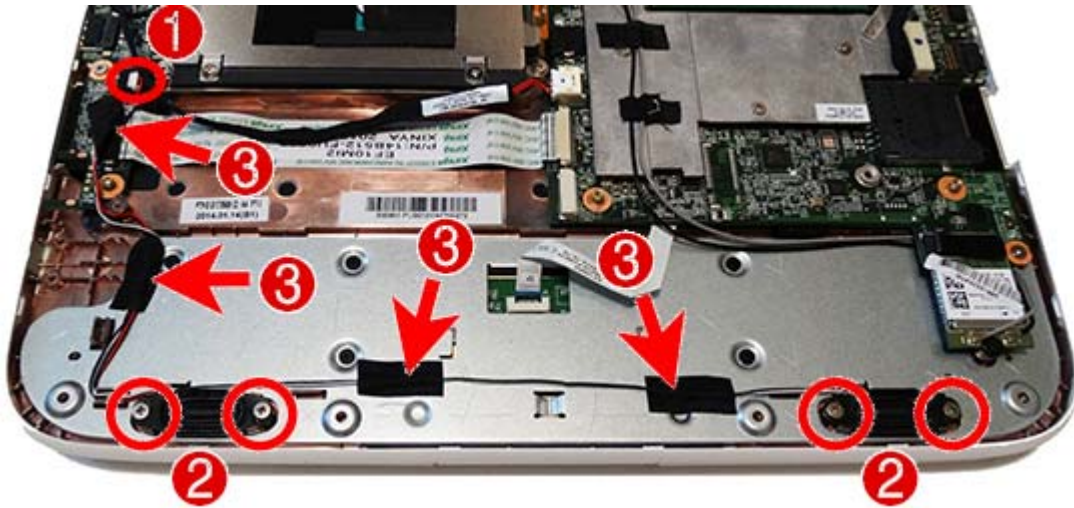
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.



Remove the speaker assembly:

1. Disconnect the speaker cable from the system board **(1)**.
2. Remove the 2 Phillips PM2.0×3.0 screws **(2)** that secure each speaker to the computer.

3. Lift the pieces of tape that secure the speaker cable to the computer **(3)**, and then remove the speakers.



Reverse this procedure to install the speaker assembly.

Heat sink

All heat sink spare part kits include replacement thermal material.

Description	Spare part number
Heat sink	764414-001

Before removing the heat sink assembly, follow these steps:

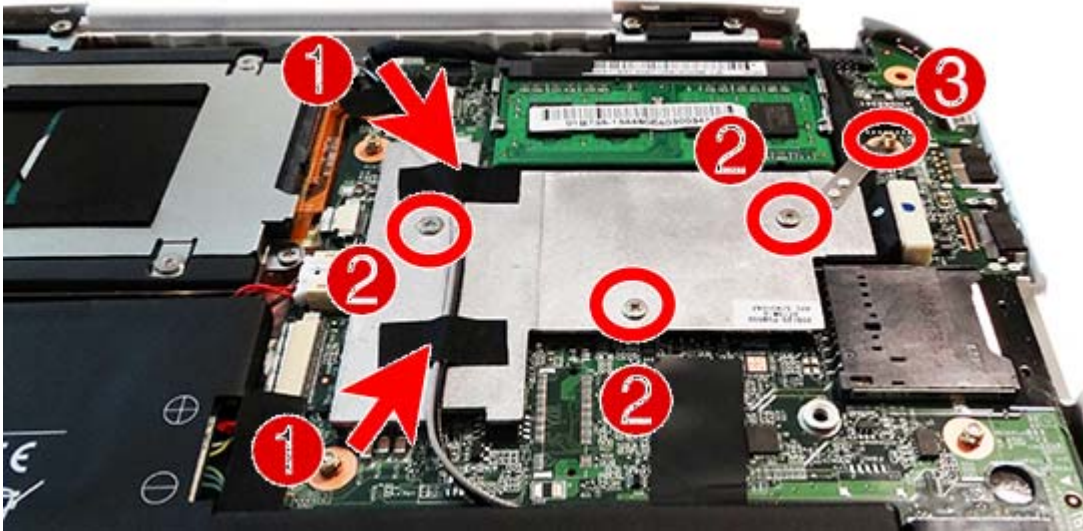
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.




Remove the heat sink assembly:

1. Remove the tape **(1)** that secures the antenna cables atop the heat sink, and remove the antenna cables from the heat sink.
2. In the order indicated on the heat sink, remove the 3 Phillips PM2.0×3.0 screws **(2)** that secure the heat sink to the system board.
3. Remove the nut **(3)** that secures the heat sink to the system board.

4. Lift the heat sink off the system board.



 **NOTE:** Thoroughly clean thermal material from the surfaces of the system board components and the heat sink each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.

Reverse this procedure to install the heat sink assembly.

Power cable

Description	Spare part number
Power cable	764410-001

Before removing the power cable, follow these steps:

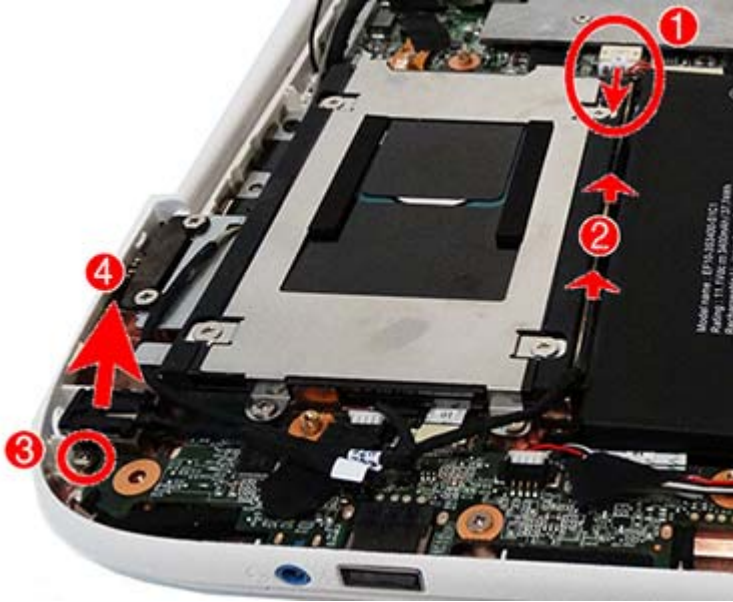
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.



Remove the power cable:

1. Disconnect the cable from the system board **(1)**, and lift the cable from between the hard drive and the battery **(2)**.
2. Remove the Phillips PM1.0×3.0 screw **(3)** that secures the power cable to the computer.

3. Lift the power cable from the computer (4).



Reverse this procedure to install the power cable.

Hard drive

Description	Spare part number
320-GB, 5400-rpm, 7 mm hard drive	786030-001
Hard Drive Hardware Kit (includes hard drive bracket, rubber rails, sponge, and screws)	764408-001
Hard drive connector cable	764409-001

Before removing the hard drive, follow these steps:

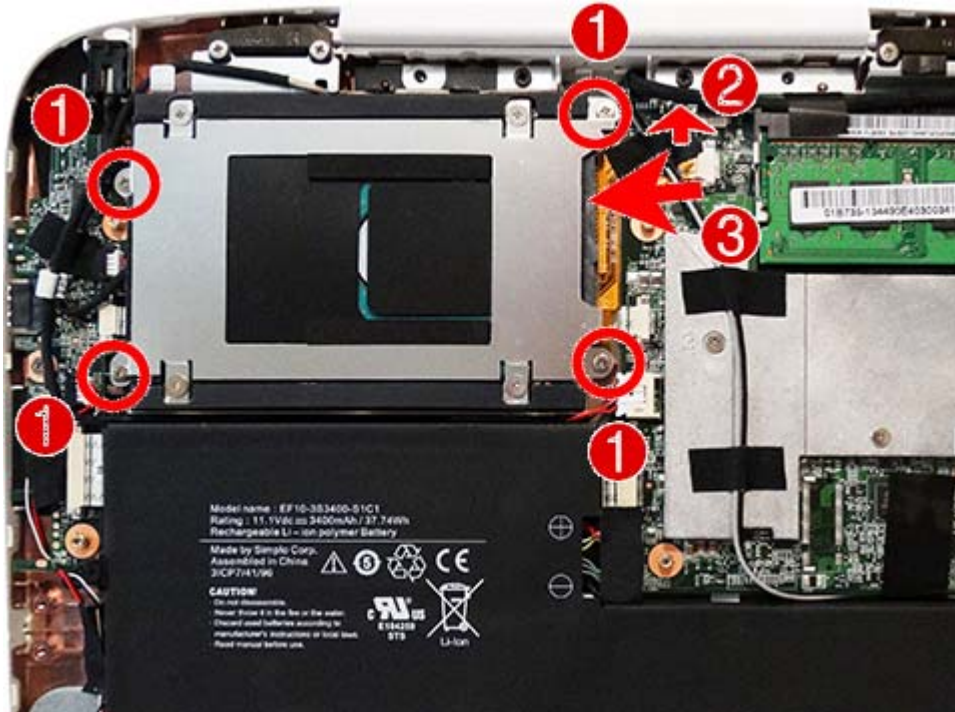
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.




To remove a hard drive:

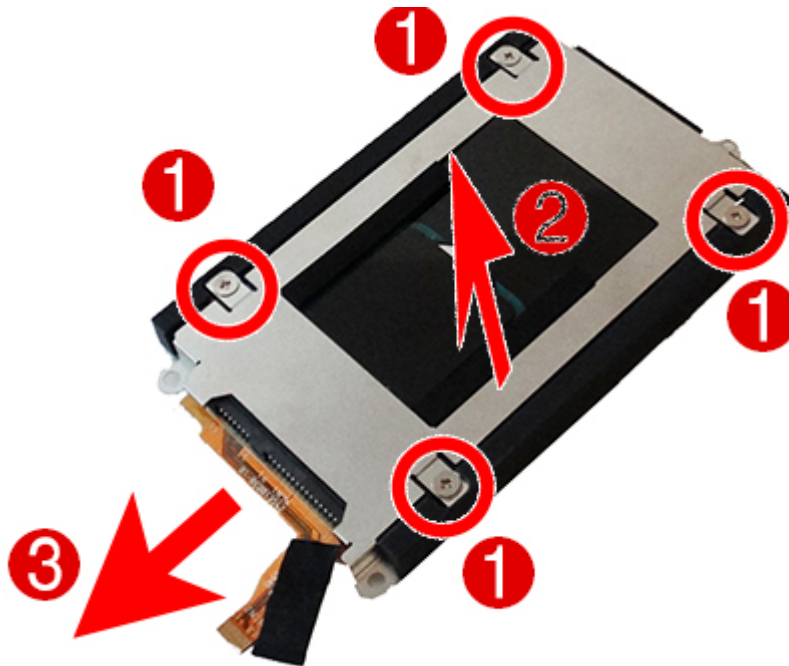
1. Remove the 4 Phillips PM2.0×3.0 screws **(1)** that secure the hard drive to the chassis.
2. Remove the Mylar tape from atop the system board connector **(2)**.
3. Disconnect the cable from the system board connector **(3)**.

4. Remove the hard drive from the computer.



5. To remove the hard drive cover from the hard drive, remove the 4 Phillips PM2.5×3.0 screws (1) that secure the cover to the drive, and then lift the cover off the drive (2).
6. Pull the hard drive cable to disconnect it from the drive (3).

 **NOTE:** You must remove the bracket before you can remove the cable.



7. To remove the rubber rails from the hard drive, pull each rail off to disengage the adhesive that secures the rail to the drive.



Reverse this procedure to install a hard drive.

Battery

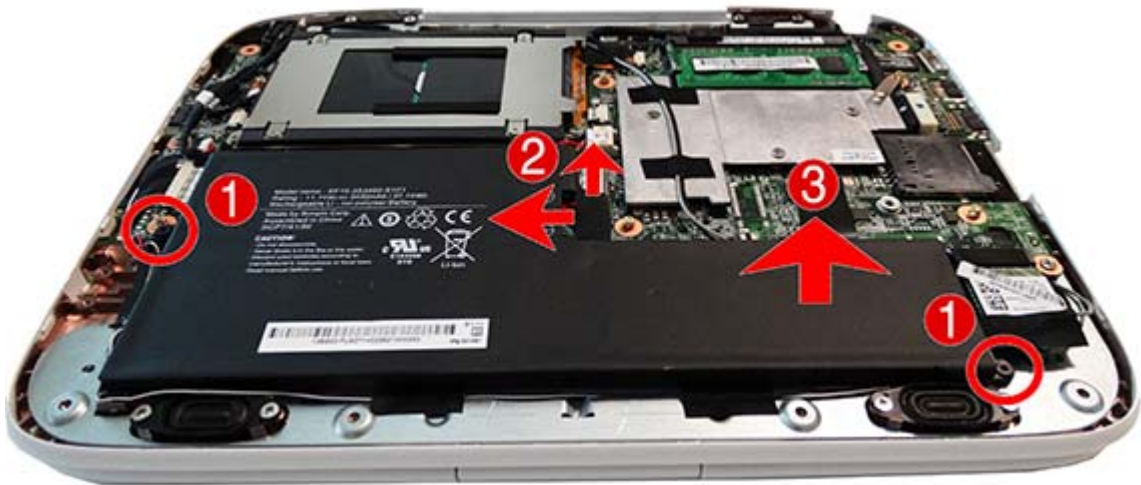
Description	Spare part number
3-cell, 34-Wh, 3.4 Ah, polymer battery	786031-001

Before removing the battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).

Remove the battery:

1. Remove the 2 Phillips M2.0×6.0 screws (1) that secure the battery to the computer.
2. Lift the tape from atop the battery connector, and then disconnect the cable from the system board connector (2).
3. Remove the battery from the computer (3).



Reverse this procedure to install the battery.

I/O board

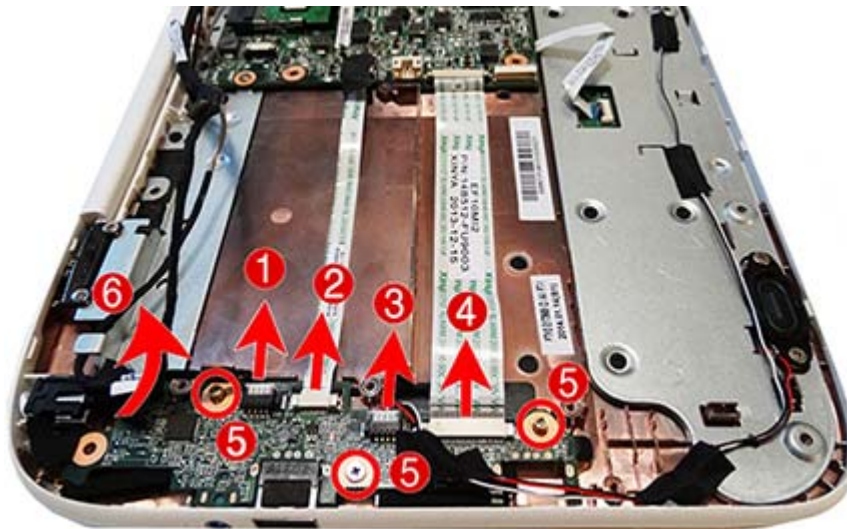
Description	Spare part number
I/O board	764413-001

Before removing the I/O board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 40](#)).
6. Remove the hard drive (see [Hard drive on page 37](#)).

Remove the I/O board:

1. Disconnect the following cables from the I/O board:
 - (1): Display cable
 - (2): Narrow ribbon cable
 - (3): Speaker cable
 - (4): Wide ribbon cable
2. Remove the Phillips PM2.0×5.5 screw (5) that secures the board to the computer.
3. Lift the inside of the board upward and pull it into the computer to disengage the connectors from the side of the computer (6), and then remove the I/O board from the computer.



Reverse this procedure to install the I/O board.

System board



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

Description	Spare part number
System board with Celeron N2806 processor (includes replacement thermal material)	778814-001

Before removing the system board, follow these steps:

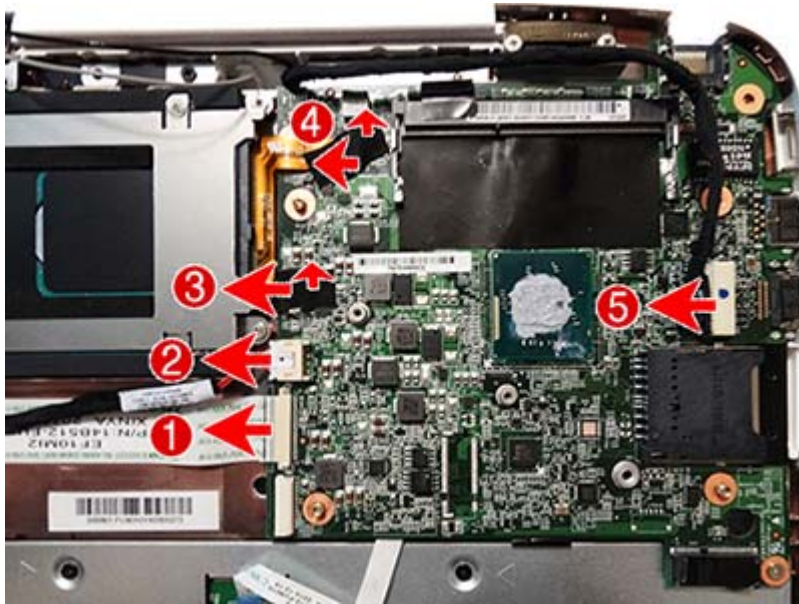
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 40](#)).
6. Remove the hard drive (see [Hard drive on page 37](#)).
7. Remove the keyboard (see [Keyboard on page 28](#)) and disconnect the touchpad cable from the connector located under the keyboard.

When replacing the system board, be sure to remove the following components from the defective system board and install on the replacement system board:

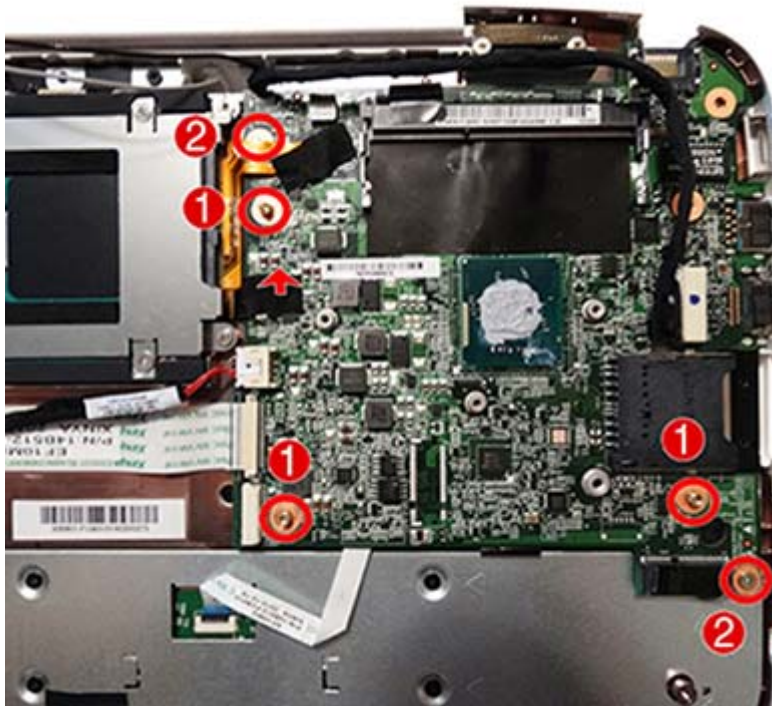
- Memory module (see [Memory module on page 24](#))
- WLAN/Bluetooth module (see [WLAN/Bluetooth combo card on page 26](#))
- Heat sink (see [Heat sink on page 33](#))

Remove the system board:

1. Disconnect the following cables from the system board:
 - (1): Wide flat ribbon cable
 - (2): Power connector cable
 - (3): Thin flat ribbon cable (after removing tape on top)
 - (4): Hard drive cable (after removing tape on top)
 - (5): Display cable



2. Remove the 3 nuts **(1)** and 2 Phillips PM2.0×5.5 screws **(2)** that secure the system board to the computer.
3. Pull the system board away from the side of the computer to release the connectors, and then remove it from the computer.



Reverse this procedure to install the system board.

RTC battery

Description	Spare part number
RTC battery	764403-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Remove the battery (see [Battery on page 40](#)).
6. Remove the hard drive (see [Hard drive on page 37](#)).
7. Remove the keyboard (see [Keyboard on page 28](#)) and disconnect the touchpad cable from the connector located under the keyboard.
8. Remove the system board (see [System board on page 42](#)).

Remove the RTC battery:

1. Position the system board upside-down.
2. Disconnect the cable from the system board connector **(1)**.
3. Lift the Mylar tape that secures the cable to the system board **(2)**.

4. Lift the battery to disengage it from the adhesive that secures it to the system board (3).



Reverse this procedure to install the RTC battery.

Display assembly

For a list of individual display spare parts, see [Display components on page 12](#).

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the bottom cover (see [Bottom cover on page 22](#)).
5. Disconnect the battery cable from the system board.

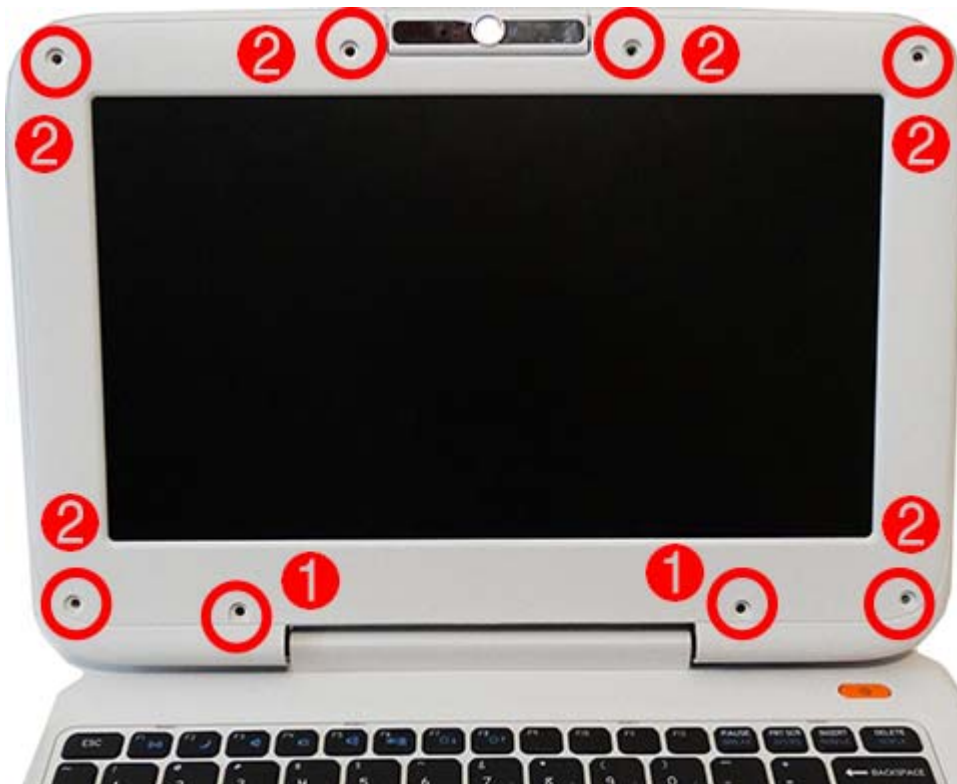


Remove the display assembly:

1. Remove the following:
 - (1): 2 round rubber screw covers near the webcam
 - (2): 2 rubber screw covers near the hinge cover
 - (3): 4 round rubber bumpers in the corners of the display



2. Remove the 2 Phillips PM2.5×5.0 screws **(1)** and the 6 Phillips PM2.5×4.0 screws **(2)** that secure the display rear cover to the display bezel.

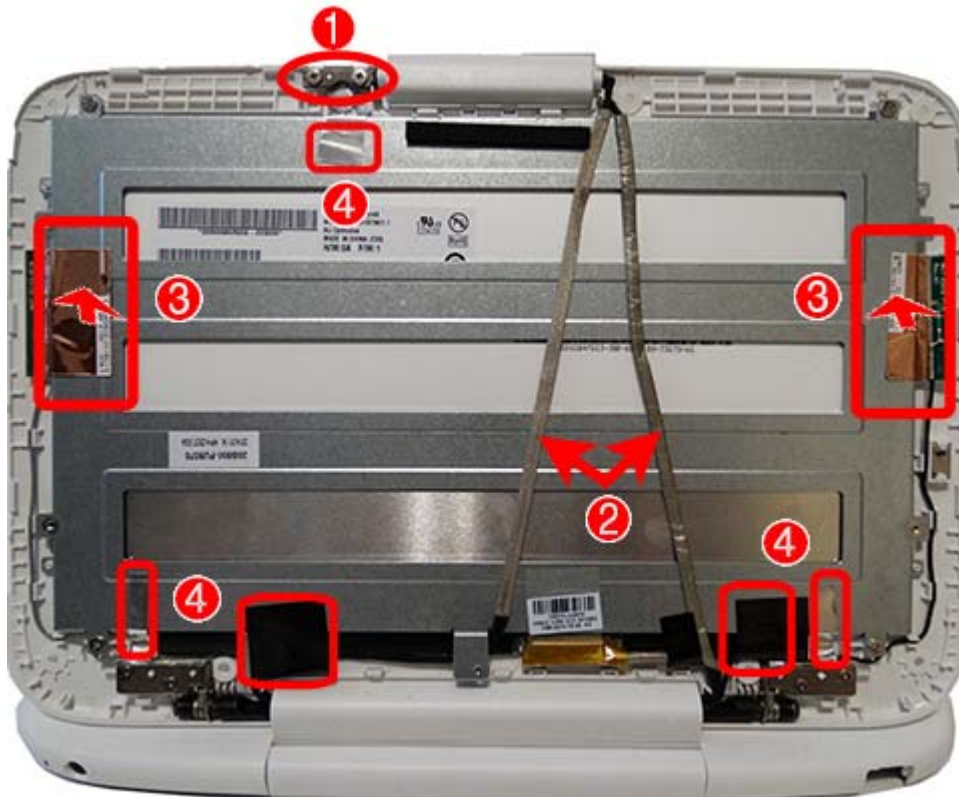


3. Rotate the top of the display enclosure downward and remove it from the display.
The display enclosure is available using spare part number 778818-001.



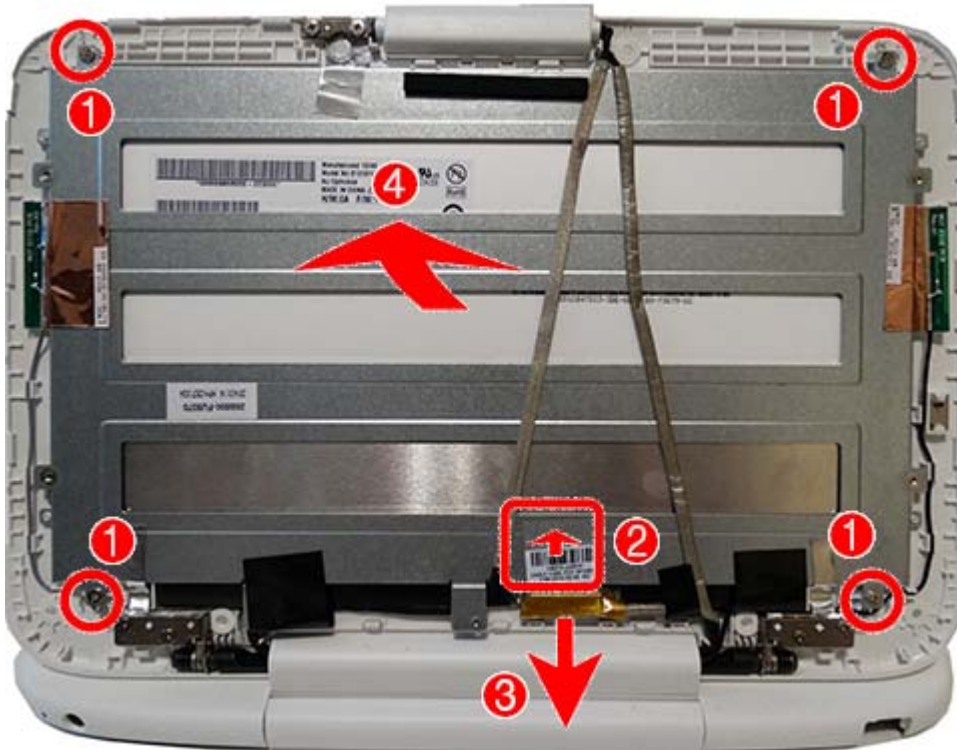
4. If you need to remove the display panel, first move the webcam by removing the 2 Phillips PM2.0×3.0 screws **(1)** that secure the webcam to the display, lift the webcam cables to disengage the adhesive that secures them to the display **(2)**, and lay the connected webcam aside.
5. Lift the tape that secures the wireless transceivers to the sides of the display **(3)**.

6. Lift the various pieces of tape that secure the display panel to the display (4).



7. Remove the 4 Phillips PM2.5×4.0 screws (1) that secure the display panel to the bezel.
8. Lift the tape over the display panel connector (2) and disconnect the cable from the panel (3).

9. Remove the display panel from the bezel (4).



10. Remove the four Phillips PM2.0×3.0 screws that secure the panel to the frame, and then lift the panel from the frame.

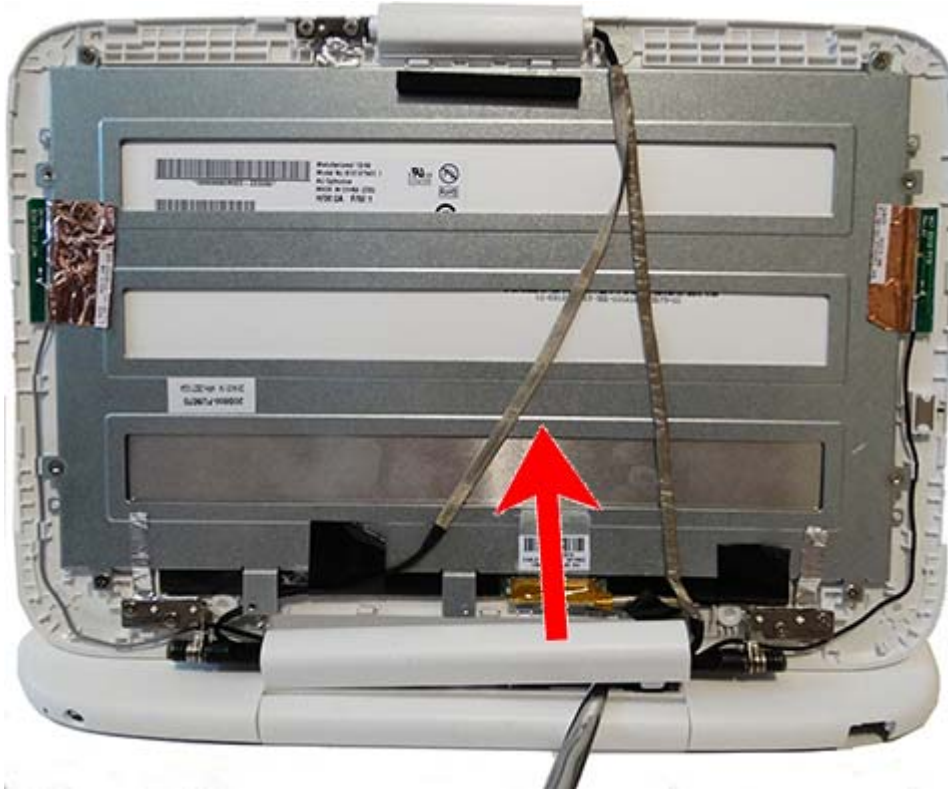
The display panel is available using spare part number 778821-001.

The display panel frame is available using spare part number 778820-001.



11. Removing the remaining components requires removing the display assembly from the computer. To remove the display assembly, first remove the display hinge cover by prying the cover off with a thin tool.

The display hinge cover is available using spare part number 764416-001.



12. To remove the display assembly, remove the 4 Phillips PM2.0×3.0 screws (1) that secure the display to the hinges, and then rotate the hinges upward (2) to allow enough room to remove the display from the hinges.

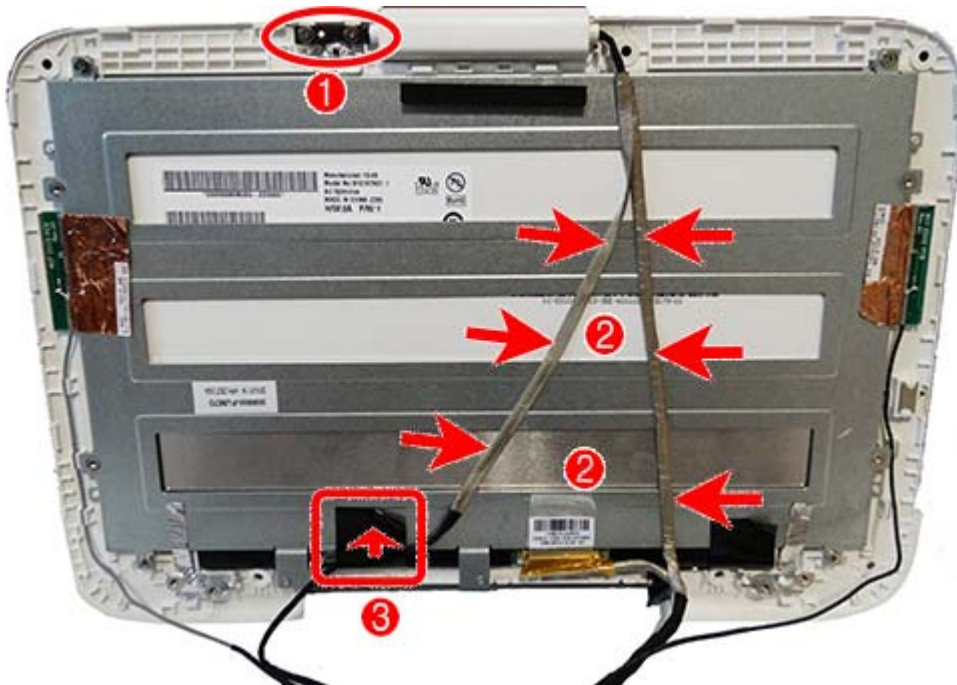


13. Separate the display from the hinges, and then route the cables through the hole in the computer.



14. If you need to remove the webcam, remove the 2 Phillips PM2.0×3.0 screws (1) that secure the webcam to the bezel.
15. Lift the webcam cable from the display to disengage the adhesive (2), lift the tape that secures the cables to the display (3), and then remove the webcam.

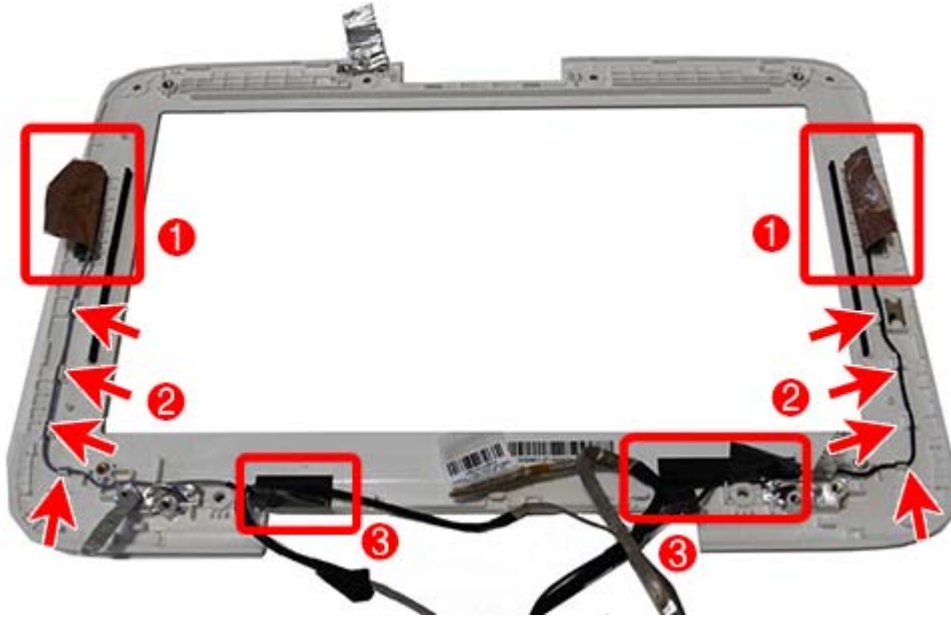
The webcam module is available using spare part number 778819-001.



16. If you need to replace the bezel or antennas, remove the display panel from the bezel (see step 8), and then remove the antennas from the bezel as follows:

- a. Lift the tape that secures the transceivers to the sides of the bezel **(1)**.
- b. Remove the cables from the routing channels built into the bezel **(2)**.
- c. Lift the tape that secures the antennas to the bezel **(3)**.

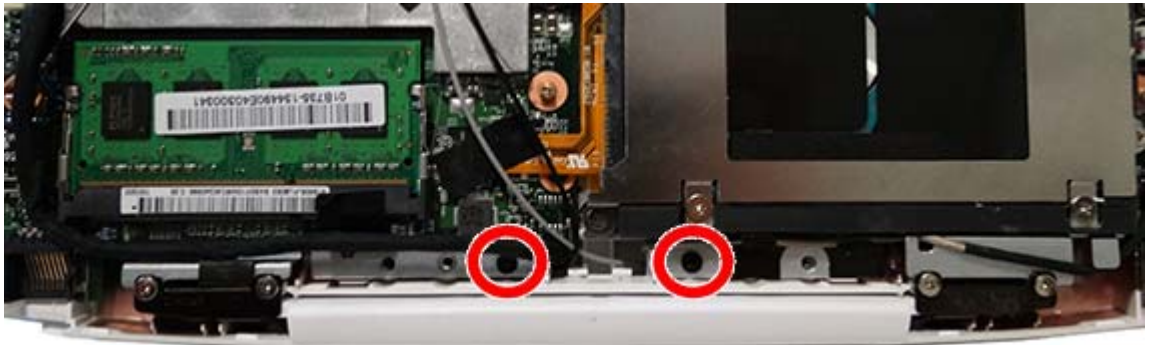
The bezel is available using spare part number 778822-001.



CAUTION: When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

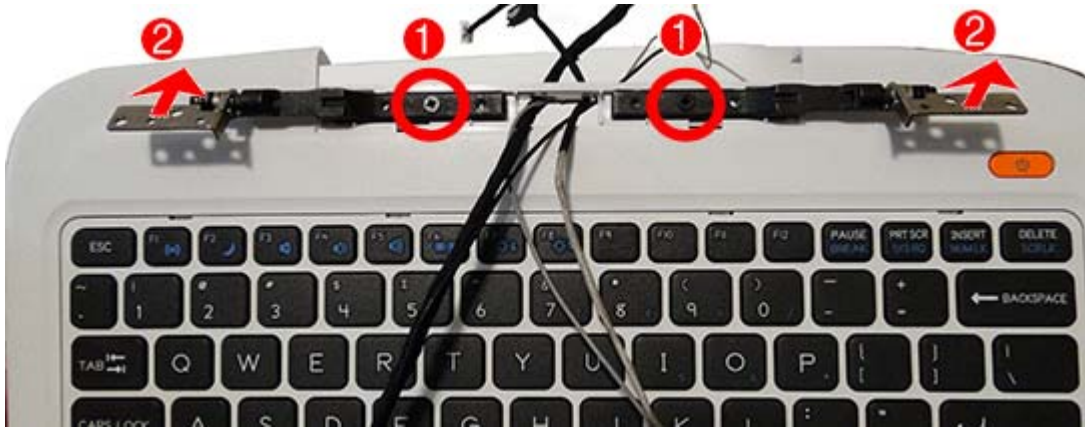
Failure to properly route the antennas can result in degradation of the computer's wireless performance.

17. If you need to remove the hinges, on the bottom of the computer, remove the 2 Phillips PM2.5×5.0 screws that secure the hinges to the computer.



18. On the top of the computer, remove the 2 Phillips PM2.5×5.0 screws (1) that secure the hinges to the computer, and then lift the hinges from the computer (2).

Display hinges are available in the Display Hinge Kit using spare part number 764405-001.




Reverse this procedure to reassemble and install the display assembly.

6 Backing up, restoring, and recovering

Your computer includes tools provided by 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 a Microsoft recovery drive (select models only)
- Using Microsoft's Refresh your PC or Remove everything and reinstall Windows options to address issues with your computer
- Backing up data using File History


 **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 `help`, and then select **Help and Support**.

Creating a Microsoft recovery drive (select models only)

After you successfully set up the computer, create a Microsoft recovery drive. The MS recovery drive backs up the recovery partition on the computer and ensure access to the Refresh your PC and Remove everything and reinstall Windows options even if the recovery partition on the computer has been corrupted or removed.

 **NOTE:** On select models, a recovery drive can be created on a USB flash drive (purchased separately). A micro USB to USB adapter cable (purchased separately) with a micro USB male (B-type) connector and a USB female (A-type) connector is also required.


1. On the Start screen, type `create recovery drive`, and then select **Create a recovery drive**.


 **IMPORTANT:** Be sure that the check box labeled **Copy the recovery partition from the PC to the recovery drive** is selected.


2. Select **Next**, and then follow the on-screen instructions.
3. After you have created the recovery drive, a prompt is displayed asking if you want to remove the recovery partition. If you select **No** and later reconsider, you must complete the entire process again before the prompt will be displayed a second time.

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 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 `help`, 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 `help`, and then select **Help and Support**.

To start Refresh:

1. On the Start screen, type `recover`, and then select **Refresh your PC without affecting your files**.
2. Select **Get started**, and then follow the on-screen instructions.

Removing everything and reinstalling 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 from the Start screen:


1. On the Start screen, type `recover`, and then select **Remove everything and reinstall Windows**.
2. Select **Get started**, and then follow the on-screen instructions.

Backing up data using File History

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

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.

File History is not enabled by default, so you must turn it on as follows:

 **NOTE:** To enable File History and backup, you must connect using an optional external USB optical drive or an optional external hard drive.

- ▲ On the Start screen, type `file history`, select **File History settings**, and then follow the on-screen instructions.

7 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Length	262.8 cm	10.35 in
Depth	213 mm	7.68 in
Height (front to rear)	26.7 to 28.5 mm	1.05 to 1.12 in
Weight		
SATA flash/webcam/2cell battery	1.3 kg	2.9 lbs
Input power		
Input	100 to 240 VAC	
Output	40W	
DC output	19V	
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		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	40 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 grms	
Nonoperating	1.50 grms	

25.7-cm (10.1-in) display specifications

	Metric	U.S.
Active diagonal size	256.5 mm	10.1-cm
Resolution	1280x800	
Active area	8.75x4.91 in (222.22.x124.81 mm)	
PPI	150	
Surface treatment	Anti-glare	
Contrast ratio	600:1 (typical)	
Refresh rate	60 Hz	
Brightness	400 nits (typical)	
Viewing angle	UWVA 85/85/85/85	
Backlight	LED	
Pixel resolution		
Pitch	0.1695mm x0.1695 mm	
Format	1280 x 800 (WXGA)	
Configuration	RGB Stripe	

Hard drive specifications

	500-GB*	320-GB*
Dimensions		
Height	9.5 mm	9.5 mm
Width	70 mm	70 mm
Weight	101 g	101 g
Interface type	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec
Security	ATA security	ATA security
Seek times (typical read, including setting)		
Single track	3 ms	3 ms
Average	13 ms	13 ms
Maximum	24 ms	24 ms
Logical blocks	1,048,576,000	625,141,400
Disc rotational speed	7200 rpm or 5400 rpm	5400 rpm
Operating temperature		
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.		
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.		

Specification information in Device Manager

Device Manager allows you to view and control the hardware attached to the computer, as well as provides hardware specification information.

You can also add hardware or modify device configurations using Device Manager.

After you open Device Manager, drill-down to a device and double-click it to access its properties.

To access Device Manager in Windows 8:

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

A list display all the devices installed in your computer.

8 Statement of Volatility

The purpose of this document is to provide general information regarding non-volatile memory in industry-standards based HP Business Notebook PC systems and provide general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.

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

Following system shutdown and removal of all power sources from an HP Business Notebook PC system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. The steps below will remove personal data from the notebook PC, including the nonvolatile memory found in Intel-based and AMD-based system boards. Some of these steps are disclosed in the Maintenance & Service Guides available for HP PC products available on the product support pages at www.hp.com.

1. Follow steps (a) through (i) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.
 - a. Enter BIOS (F10) Setup by powering on the system and pressing **F10** when prompted near the bottom of the display, or press the **ESC** key to display the start up menu, then press **F10** . If the system has a BIOS administrator password, enter the password at the prompt.
 - b. Select the **File** menu, then **Restore Defaults**.
 - c. Select the **System Configuration** menu, then **Restore Security Defaults**.
 - d. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select the tag that has been set. Press the spacebar once to clear the tag, then press **Enter** to return to the prior menu.
 - e. If a DriveLock password is set, select the **Security** menu, scroll down to **DriveLock**, then select **DriveLock password**. Select the desired hard drive. Click **Disable protection**, enter the existing master DriveLock password, then press **Enter** to confirm and return to the prior menu. Repeat this procedure if more than one hard drive has a DriveLock password.
 - f. If an Automatic DriveLock password is set, select the **Security** menu, scroll down to **Automatic DriveLock**, then select the desired hard drive and disable protection. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.
 - g. Select the **File** menu, then **Reset BIOS Security to factory default**. Click **yes** at the warning message.
 - h. Select the **File** menu, then **Save Changes and Exit**.
 - i. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint sensor, one or two prompts will appear. One to clear the TPM and the other to Reset Fingerprint Sensor; press **F1** to accept or **F2** to reject.

If the HP notebook model number ends in a 'p' or 'w' and includes Intel® Centrino with VPro™, reboot the PC and enter BIOS Setup by pressing **F10** when prompted. Select **System**

Configuration, then **AMT Options**. Then select **Unconfigure AMT** on next boot. Select **Save** then **Yes**. Select the **File** menu, and then select **Save Changes and Exit**. Reboot the system and confirm that you want to unconfigure AMT.

- j. If the optional Intel® Anti-Theft Technology (AT) was activated, contact the provider to deactivate it.
 - k. If the optional Absolute® Software Computrace® management and tracking service was activated on the notebook PC, contact the provider to deactivate it.
 - l. Remove all power and system batteries for at least 24 hours.
2. Remove and retain the storage drive or clear the contents of the drive.

a. Hard Disk Drive (HDD)

Clear the HDD contents by using the HP Disk Sanitizer® utility or a third party application that, ideally, is U.S. Department of Defense (DOD) 5220.22-M approved.

To run HP Disk Sanitizer, enter BIOS Setup by powering on the system and pressing **F10** when prompted near the bottom of the display, or press **ESC** to display the start up menu, then press **F10**. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Disk Sanitizer** and select the desired drive. For a higher level of protection, select **Optimum**.



NOTE: This process will take a long time, and the amount of time varies based on the hard drive capacity.

b. Solid State Drive (SSD)

Clear the SSD contents by using the BIOS Setup Secure Erase command option, or by using a third party utility designed to erase data from an SSD. To run Secure Erase, enter BIOS Setup by powering on the system and pressing **F10** when prompted near the bottom of the display. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Secure Erase** and select the desired hard drive.

Non-volatile memory usage

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
Real Time Clock (RTC) battery backed-up CMOS configuration memory (CMOS)	256 Bytes	No	Yes	Stores system date and time and limited keyboard controller data.	Using the F10 Setup utility or changing the Microsoft® Windows® date & time.	This memory is not write-protected. HP recommends password protecting the F10 Setup utility.
Controller (NIC) EEPROM	64 Kbytes (not customer accessible)	No	Yes	Store NIC configuration and NIC firmware.	Using a utility from the NIC vendor that can be run from DOS.	A utility is required to write data to this memory and is available from NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC nonfunctional.
Keyboard ROM	64 Kbytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, & battery management).	Programmed at the factory. Code is updated when the system BIOS is updated.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmable (not customer accessible)	No	Yes	Stores memory module information.	Programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a PC. The specific write protection method varies by memory vendor.
System BIOS	4 to 5 MBytes	Yes	Yes	Store system BIOS code and PC configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the F10 setup utility or a custom utility.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
Intel Management Engine Firmware (present only in models ending in a 'p' or 'w' or with Intel Centrino Pro technology)	1.5 or 5MByte	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The	The Intel chipset is configured to enforce HW protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by

					third party data store contents can populated by a remote management console or local applications registered by an administrator to have access to the space.	Intel can be applied using this utility.
Bluetooth flash	2Mbit	No	Yes	Stores Bluetooth configuration and firmware.	Programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility is required for writing data to this memory and is made available through newer versions of the driver if the flash requires an upgrade.
802.11 WLAN EEPROM	4kb to 8kb	No	Yes	Stores configuration and calibration data.	Programmed at the factory. Tools for writing data to this memory are not made public.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Web camera	64K bit	No	Yes	Store Web Cam configuration and firmware.	Using a utility from the device manufacturer that can be run from Windows.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader	512kByte Flash	Yes	Yes	Stores fingerprint templates.	By enrolling in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

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

- a. Turn on or restart the computer and press **F10** when prompted near the bottom of the display.
- b. Select **File**, then select **Restore defaults**.
- c. Follow the on-screen instructions.
- d. Select **File**, save changes and exit, then press **Enter**.

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

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

3. Does the “Firmware Hub for System BIOS” contain the BIOS program? Is this chip writable, and if so how?

The Firmware Hub does contain the BIOS program and is writable. A utility is required to perform the write function.

4. In some PC systems, the Firmware Hub for System BIOS is a flash memory chip so that updates can be written by the customer. Is this true for these BIOS chips?

Yes, they are flash memory chips.

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

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

6. Does resetting the CMOS configuration memory return the PC back to factory defaults?

The process of resetting the CMOS will return certain system settings to factory default but will not reset many of the system data and configuration defaults to their factory settings. To return these system data and configuration defaults to factory settings, refer to question and answer 1 and follow the instructions for returning the BIOS settings to factory defaults.

9 Power cord set requirements

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

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

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

Requirements for all countries and regions

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 A and a nominal voltage rating of 125 or 250 V ac, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1

Country/region	Accredited agency	Applicable note number
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type H05VV-F, 3-conductor, 0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75mm² or 1.25mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.
5. The flexible cord must be Type H05VV-F 3X0.75mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.
6. The flexible cord must be Type HVCTF 3X1.25mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.
7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3X0.75/1.00mm² conductor size, with plug BS 1363/A with BSI or ASTA marks.

10 Recycling

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

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

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