

HP 2000 Notebook PC Compaq Presario CQ58 Notebook PC

Maintenance and Service Guide

SUMMARY

This guide is a troubleshooting reference used for maintaining and servicing the computer. It provides comprehensive information on identifying computer features, components, and spare parts; troubleshooting computer problems; and performing computer disassembly procedures.

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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	AMD
		UMA
	HP Pavilion G6 Notebook PC	√
Processors		
	AMD C60 1.333 GHz/1.0 GHz, 1 MB L2 cache, 10666 MHz), Dual 9 W	√
	AMD E300 (1.3 GHz, 1 MB L2 cache, 10666 MHz), Dual 18 W	√
Chipset	AMD A50M FCH	√
Graphics	AMD Radeon HD 6290	√
	AMD Radeon HD 6310	√
Panel	39.6-cm (15.6-in) HD LED BrightView (1366 x 768)	√
	16:9 wide aspect ratio	√
Memory	1 customer-accessible/upgradable SODIMM slots:	
	<ul style="list-style-type: none"> • DDR3-10666 MHz Single Channel Support (DDR3L-1600/DDR3-1333 downgrade to 1066) 	√
	Supports up to 4GB of system memory in the following configurations:	
	<ul style="list-style-type: none"> • 4096 MB (4096 MB × 1) 	√
	<ul style="list-style-type: none"> • 2048 MB (2048 MB × 1) 	√
Hard drives	Supports the following 7.0/9.5 mm, 6.35-cm (2.5 in) SATA hard drives:	
	<ul style="list-style-type: none"> • 320 GB, 5400 rpm 	√
Optical drives	12.7 mm (0.50-in) fixed SATA tray load	√
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	√
	Supports Zero-Power ODD	√
Webcam	HP TrueVision HD camera (1280x720 by 30 frames per second), fixed angle, with activity light and single digital microphone	√
Audio	High-definition audio supports:	√
	Microsoft® premium requirements with HP Altec Lansing speakers (2)	
	SRS Premium Sound technology	
Ethernet	Integrated 10/100 network interface card (NIC)	√

Category	Description	AMD
		UMA
	Integrated wireless local area network (WLAN) options by way of wireless module and 1 wireless antennas built into display assembly	✓
	Supports the following WLAN formats: (802.11b/g/n)	
External media card	Digital Media Slot supporting SD, SDHC, SDXC (UHS104 compliant), and MMC	✓
Internal card	One half-size Mini Card slot for WLAN	✓
Ports	Audio-in (digital microphone)	✓
	Audio-out (stereo headphone)	✓
	Hot plug/unplug with auto-detect for correct output to wide-aspect vs. standard aspect video	✓
	RJ-45 (Ethernet)	✓
	Three USB 2.0 ports	✓
	VGA (Dsub 15-pin) supporting the following: <ul style="list-style-type: none"> • 2048 x 1536 external resolution @ 75 Hz • 2048 x 1536 external resolution @ 85 Hz 	✓
	AC Smart Pin adapter	✓
Keyboard/pointing devices	39.62-cm (15.6-in), full-size, textured keyboard	✓
	TouchPad with 2 buttons (multitouch gestures, 2-finger scrolling, pinch zoom, and taps enabled as default)	✓
Power requirements	6-cell, 2.22 Ah, 47 Wh battery	✓
	Batteries support fast charge	✓
	65 W AC Smart adapter with localized cable plug support (1 M power cord)	✓
Security	Security Lock	✓
Operating system	Preinstalled:	
	Windows 8® Standard (64 bit)	✓
Serviceability	End-user replaceable parts:	
	AC adapter	✓
	Battery (system)	✓
	Hard drive	✓
	Memory module	✓

Category	Description	AMD
		UMA
	Optical drive	√
	WLAN cards	√

2 External component identification

Finding your hardware and software information

Locating hardware

To find out what hardware is installed on your computer:

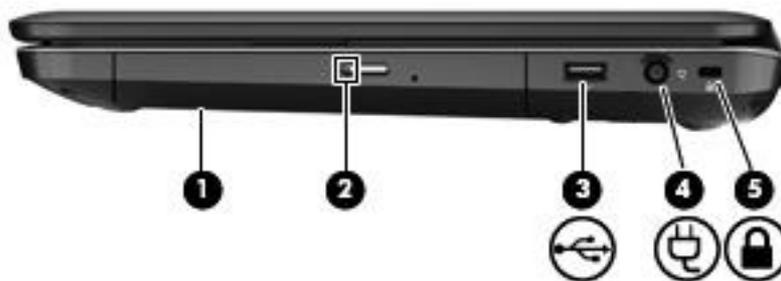
1. From the Start screen, type **c**, and then select **Control Panel**.
2. Select **System and Security**, and then in the System area, click **Device Manager**.

A list displays all the devices installed in your computer.

Locating software

- ▲ To find out what software is installed on your computer, from the Start screen, right-click using the mouse or swipe from the top of the TouchPad to display the apps and then select the **All apps** icon.

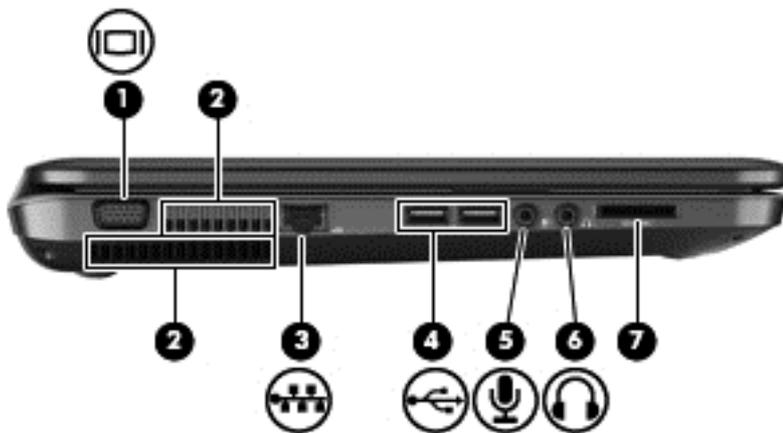
Right side



Component	Description
(1)	Optical drive Reads and writes to an optical disc.
(2)	Optical drive light Optical drive eject button <ul style="list-style-type: none">• Green or Amber: The optical drive is being accessed.• Off: The optical drive is idle. Optical drive eject button releases the disc tray.
(3) 	USB 2.0 port Connects an optional USB device.

Component	Description
(4)  Power connector	Connects an AC adapter.
(5)  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.

Left side



Component	Description
(1)  External monitor port	Connects an external VGA monitor or projector.
(2) Vents (2)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)  RJ-45 (network) jack	Connects a network cable.
(4)  USB 2.0 (2)	Connects an optional USB device.
(5)  Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.

Component	Description
(6)  Audio-out (headphone) jack	<p>Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable.</p> <p>WARNING! To reduce the risk of personal injury, adjust the volume before using headphones, earbuds, or a headset. For additional safety information, see the <i>Regulatory, Safety and Environmental Notices</i>.</p> <p>NOTE: When a device is connected to a headphone jack, the computer speakers are disabled.</p>
(7) Digital Media slot	<p>Supports the following digital media card formats:</p> <ul style="list-style-type: none"> Secure Digital High Capacity (SDHC) Memory Card Secure Digital (SD) Memory Card Secure Digital Extended Capacity (SDxC) Memory Card MultiMediaCard (MMC)

Front



Component	Description
Speakers (2)	Produce sound.

Display

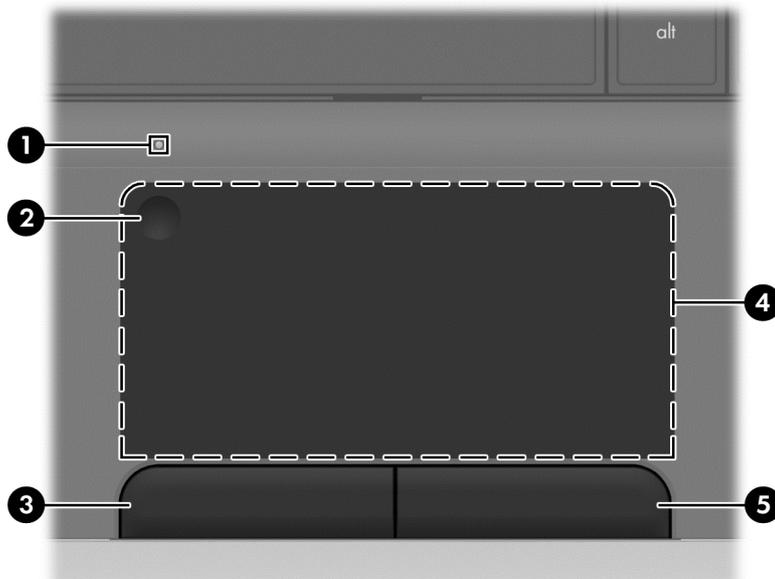


Component	Description
(1) WLAN antennas (1)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(2) Internal microphone (1)	Records sound.
(3) Webcam	Records video, captures still photographs, and allows video conferences and online chat by means of streaming video. To use the webcam, from the Start screen type, <i>c</i> , and then select CyberLink YouCam from the list of apps.
(4) Webcam light	On: The webcam is in use.

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

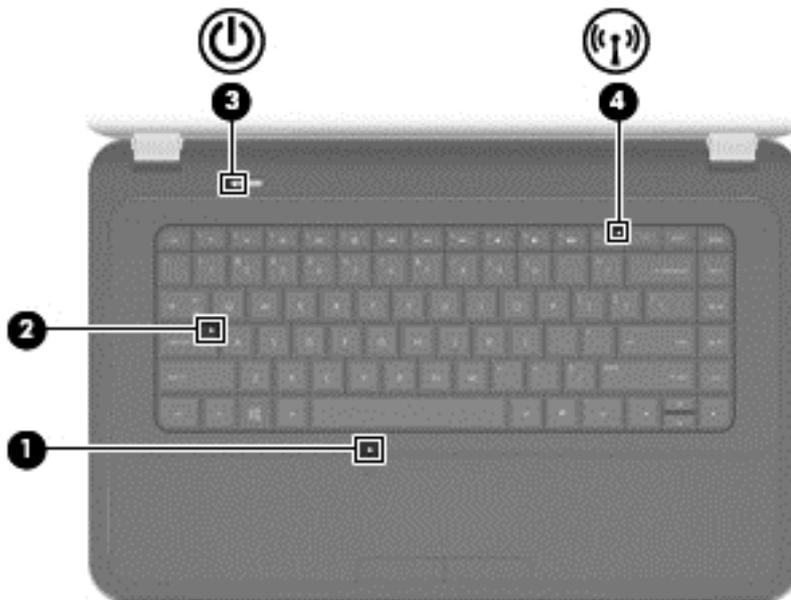
Top

TouchPad



Component	Description
(1) TouchPad light	<ul style="list-style-type: none">• Amber: The TouchPad is off.• Off: The TouchPad is on .
(2) TouchPad on/off button	Turns the TouchPad on or off.
(3) Left TouchPad button	Functions like the left button on an external mouse.
(4) TouchPad zone	Moves the on-screen pointer and selects or activates items on the screen. NOTE: The TouchPad also supports Edge-swipe gestures.
(5) Right TouchPad button	Functions like the right button on an external mouse.

Lights



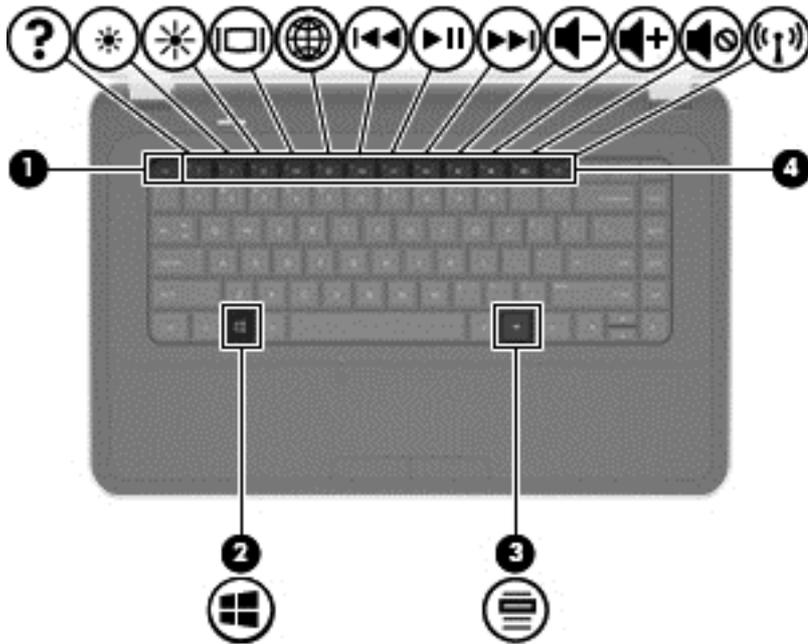
Component	Description
(1) TouchPad light	<ul style="list-style-type: none">Amber: The TouchPad is off.Off: The TouchPad is on.
(2) Caps lock light	White: Caps lock is on, which switches the keys to all capital letters.
(3)  Power light	<ul style="list-style-type: none">White: The computer is on.Blinking white: The computer is in the Sleep state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components.Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power.
(4)  Wireless light	<ul style="list-style-type: none">White: An integrated wireless device, such as a wireless local area network (WLAN) device, is on.Amber: All wireless devices are off.

Button



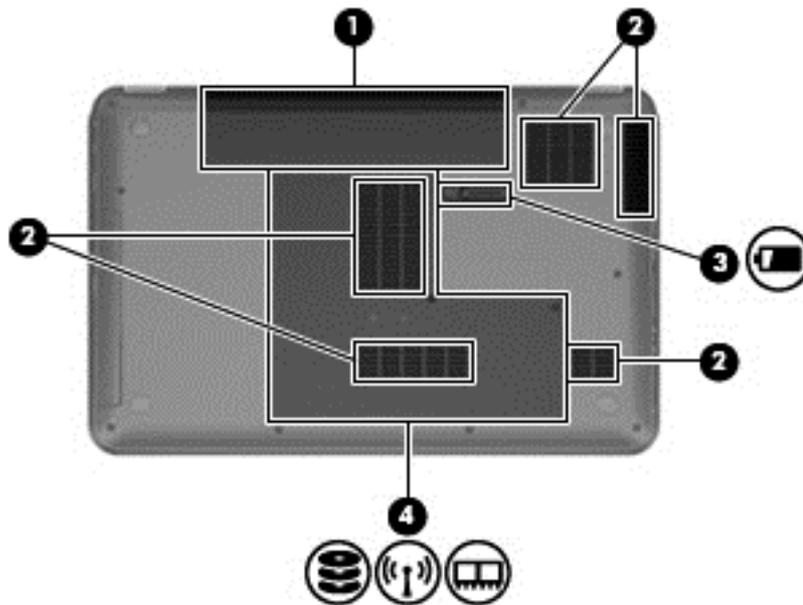
Component	Description
	<p data-bbox="427 873 549 900">Power button</p> <ul data-bbox="868 873 1422 1157" style="list-style-type: none"><li data-bbox="868 873 1422 926">• When the computer is off, press the button to turn on the computer.<li data-bbox="868 947 1422 999">• When the computer is on, press the button briefly to initiate Sleep (disabled by default).<li data-bbox="868 1020 1422 1073">• When the computer is in the Sleep state, press the button briefly to exit Sleep.<li data-bbox="868 1094 1422 1146">• When the computer is in Hibernation, press the button briefly to exit Hibernation. <p data-bbox="868 1178 1422 1230">CAUTION: Pressing and holding the power button will result in the loss of unsaved information.</p> <p data-bbox="868 1251 1422 1367">If the computer has stopped responding and Microsoft® Windows® shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p data-bbox="868 1388 1251 1415">To learn more about your power settings:</p> <ol data-bbox="868 1436 1422 1507" style="list-style-type: none"><li data-bbox="868 1436 1422 1463">1. From the Start screen, type <code>power</code>.<li data-bbox="868 1484 1422 1507">2. Select Settings, and then select Power options.

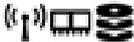
Keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2)  Windows logo key	Displays the Windows Start menu.
(3)  Windows applications key	Displays a shortcut menu for items beneath the cursor.
(4) Action keys	Execute frequently used system functions.

Bottom

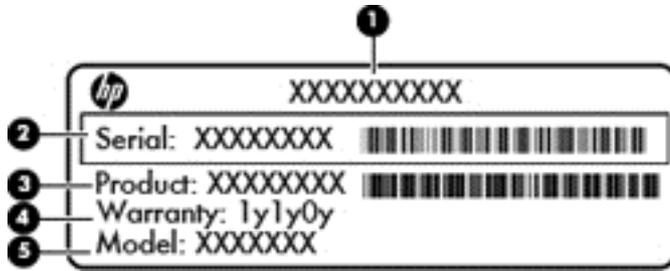


Component		Description
(1)	Battery bay	Holds the battery.
(2)	Vents (5)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	 Battery release latch	Releases the battery from the battery bay.
(4)	 Wireless compartment, memory module compartment, solid-state drive (SSD)/hard drive bay. Also allows access to keyboard, and optical disk drive (ODD).	The service door provides access to the keyboard, ODD, SSD/hard drive bay, wireless compartment and memory module compartment. 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 computer functionality, and then contact customer support through Help and Support.

3 Illustrated parts catalog

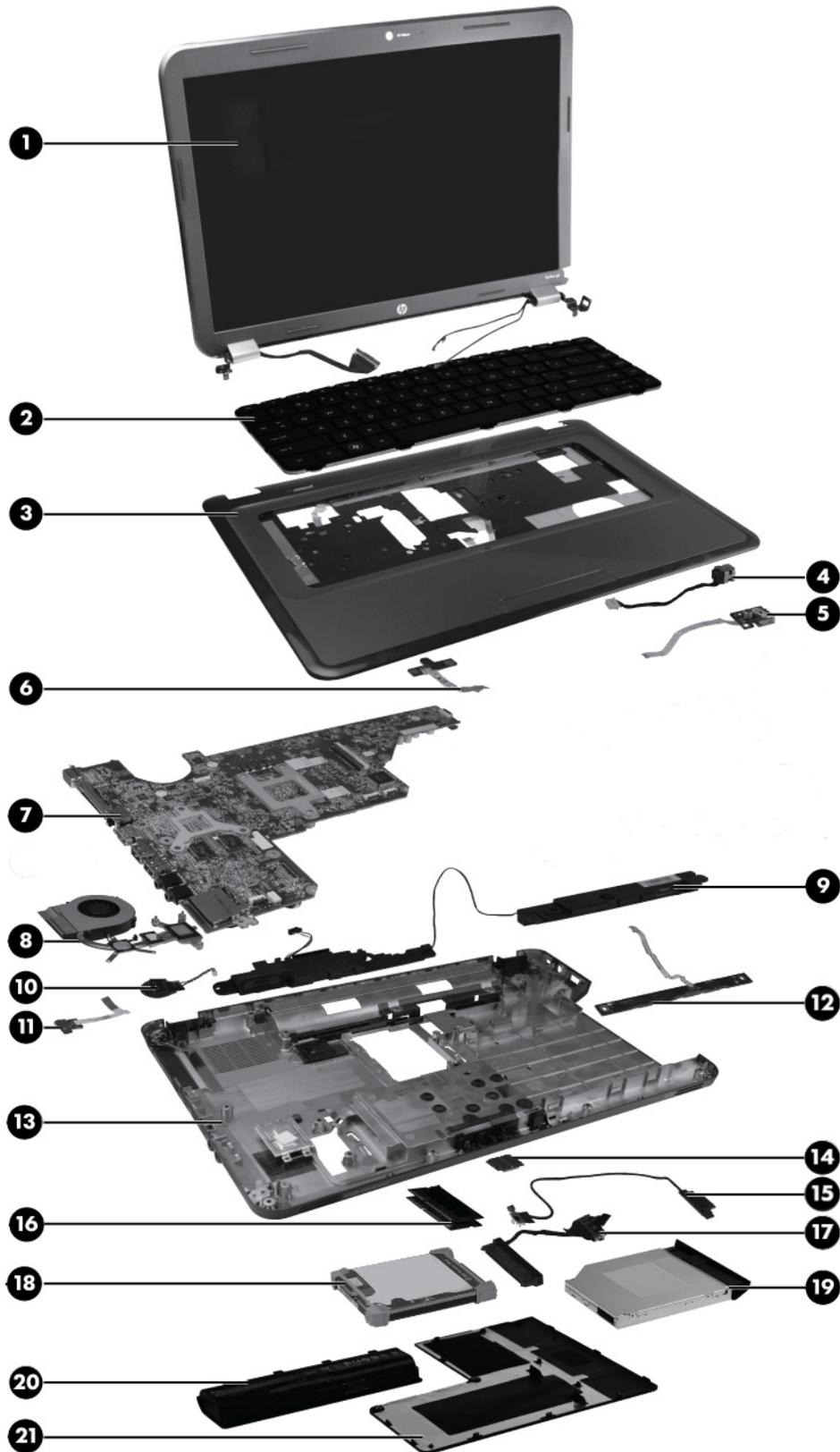
Serial number location

When ordering parts or requesting information, provide the computer serial number and model number located in the battery bay of the computer.



Component	Description
(1) Product name	The name affixed to the front of the computer.
(2) Serial number (s/n)	An alphanumeric identifier that is unique to each product.
(3) Product number (p/n)	This number provides specific information about the product's hardware components. The product number helps a service technician to determine what components and parts are needed.
(4) Warranty period	The duration of the warranty period for the computer.
(5) Model description (select models only)	An alphanumeric identifier used to locate documents, drivers, and support for the computer.

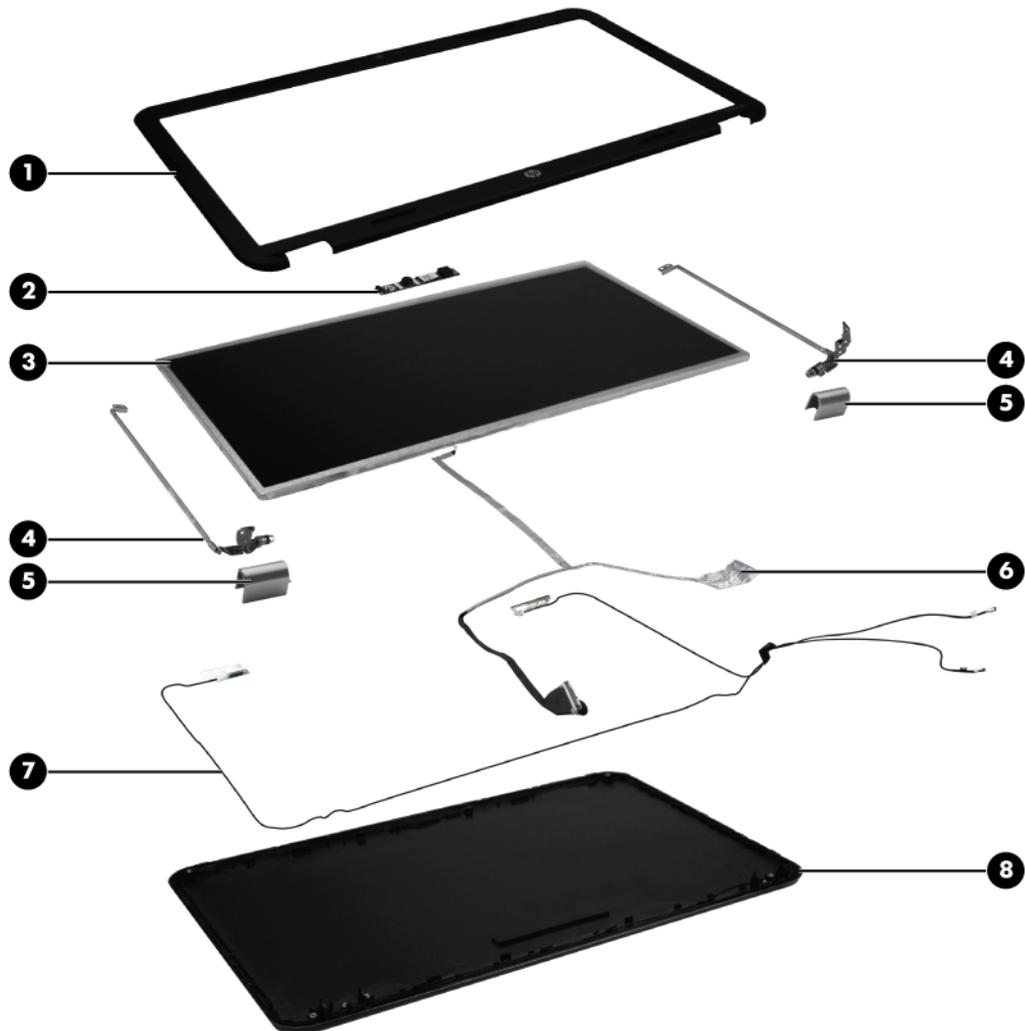
Computer major components



Item	Description	Spare part number
(1)	39.6-cm (15.6-in) HD, LED, BrightView (1366 x 768) display assembly: NOTE: For more information on the display assembly internal component spare part information, see Display assembly components on page 17 .	
	• For use in charcoal grey computer models	639512-001
	• For use in Pacific blue Compaq computer models only	701769-001
	• For use in black HP computer models only	707798-001
(2)	Keyboard (includes keyboard cable):	
	• For use in the United States, Black (Windows 8)	698694-001
	• For use in Canada (French), Black (Windows 8)	698694-DB1
(3)	Top cover (includes TouchPad board):	
	• For use in charcoal grey HP computer models	701883-001
	• For use in Pacific blue Compaq computer models	701884-001
	• For use in charcoal grey computer models	639532-001
(4)	Power connector (includes cable)	640891-001
(5)	USB board	640883-001
(6)	Power button board	640884-001
(7)	System board (includes replacement thermal material):	
	• For use in AMD E300 UMA computer models	701764-501
	• For use in AMD C60 UMA computer models	701765-501
(8)	Fan/heat sink assembly (includes replacement thermal material):	
	• For use in AMD A50M UMA computer models	657145-001
(9)	Speaker assembly (includes cable)	639573-001
(10)	RTC battery (includes mounting adhesive)	449137-001
(11)	Optical drive activity board	640883-001
(12)	TouchPad button board	640885-001
(13)	Base enclosure	701881-001
(14)	WLAN module	
	• Ralink RT5390R 802.11 b/g/n 1x1 WiFi	691415-001
(15)	Optical drive cable	640886-001
(16)	Memory modules (1333 MHz, DDR3)	
	• 4 GB PC3 10600 1333 MHz shared	641369-001
	• 2 GB PC3 10600 1333 MHz shared	652972-001
(17)	Hard drive connector cable	644525-001

Item	Description	Spare part number
(18)	Hard drive	
	Supports the following 9.5 mm / 7.0 mm, 6.35 cm (2.5 in) SATA hard drives:	
	<ul style="list-style-type: none"> • 320 GB, 7200 rpm 	634862-001
	<ul style="list-style-type: none"> • Hard Drive Hardware Kit (not illustrated, includes bracket and screws). 	640878-001
(19)	Optical drive (select models only) (includes optical drive bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	660833-001
(20)	Battery	
	<ul style="list-style-type: none"> • 6-cell Li-Ion, 2.20 Ah, 47 Wh 	593553-001
(21)	Service door (included in plastics kit)	640889-001
	Rubber Kit (not illustrated, includes bumper and rubber feet)	639572-001

Display assembly components



Item	Description	Spare part number
(1)	Display bezel	
	<ul style="list-style-type: none"> • Black 	639509-001
	<ul style="list-style-type: none"> • For use in Compaq computer models 	701766-001
	<ul style="list-style-type: none"> • For use in HP computer models 	701882-001
(2)	Webcam module (high definition)	708150-001
(3)	39.6-cm (15.6-in) high-definition, BrightView LED display panel	641663-001
(4)	Display hinges	639511-001
(5)	Display hinge covers	640887-001
(6)	Display cable	639510-001
(7)	Wireless antenna (includes wireless antenna transceivers and cable)	639499-001

Item	Description	Spare part number
		701878-001
(8)	Display back cover (includes logo):	
	<ul style="list-style-type: none"> • For use in charcoal grey computer models 	639501-001
	<ul style="list-style-type: none"> • For use in Pacific blue Compaq computer models 	701880-001
	<ul style="list-style-type: none"> • For use in black HP computer models 	701879-001
	Display Screw Kit (not illustrated)	640881-001
	Display Rubber Kit (not illustrated, includes display bumper strips)	640882-001

Mass storage devices



Item	Description	Spare part number
(1)	Hard drive	
	Supports the following 9.5 mm, 6.3 cm (2.5 in) SATA hard drives:	
	<ul style="list-style-type: none">• 320 GB, 7200 rpm	634862-001
	Hard Drive Hardware Kit (not illustrated, includes bracket and screws)	640878-001
(2)	Optical drive (select models only), (12.7 mm, SATA, fixed, includes bezel and bracket)	
	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	660833-001

Miscellaneous parts

Description	Spare part number
AC adapters	
<ul style="list-style-type: none">65 W AC adapter	609939-001
Power cord, AC, 3 wire, black, 1.83-m	490371-001
Thermal pads kit	634366-001
Screw kit	640879-001
<ul style="list-style-type: none">Phillips 2.0 x 2.0 (pan head) screwPhillips 3.0 x 1.5 screwPhillips 3.0 x 2.0 screwPhillips 3.0 x 3.0 screwPhillips 4.0 x 2.0 (captive) screwPhillips 6.0 x 2.5 screwPhillips 10.0 x 2.0 (captive) screw	

Sequential part number listing

Spare part number	Description
449137-001	RTC battery (includes mounting adhesive)
490371-001	Power cord, AC, 3 wire, black, 1.83-m
593553-001	Battery, 6-cell, 2.20 Ah, 47 Wh
609939-001	65 W AC adapter
634366-001	Thermal pads kit
634862-001	320 GB, 7200 rpm, 7.0 mm, 6.35 cm (2.5 in) SATA hard drive
639499-001	Wireless antenna (includes wireless antenna transceivers and cable)
639501-001	Display back cover (includes logo) for use in Charcoal Grey computer models
639509-001	Display bezel, Black
639510-001	Display cable
639511-001	Display hinges
639512-001	39.6 cm (15.6 in) HD LED BrightView (1366 x 768) display assembly for use in Charcoal Grey computer models
639532-001	Top cover (includes TouchPad board) for use in Charcoal Grey computer models
639572-001	Rubber Kit (includes bumper and rubber feet)
639573-001	Speaker assembly (includes cable)
640878-001	Hard Drive Hardware Kit (includes bracket and screws)
640879-001	Screw Kit
640881-001	Display Screw Kit
640882-001	Display Rubber Kit, Black (includes display bumper strips)
640883-001	USB board
640884-001	Power button board
640885-001	TouchPad button board (includes bracket and cable)
640886-001	Optical drive board
640887-001	Display hinge covers
640889-001	Plastics Kit (includes service door)
640891-001	Power connector (includes cable)
641369-001	4 GB memory PC3 12800 1600 Mhz Shared
641663-001	39.6 cm (15.6-in) high-definition, BrightView LED display panel
644525-001	Hard drive connector board
652972-001	2 GB memory PC3 12800 1600 Mhz Shared

Spare part number	Description
657145-001	Fan/heat sink assembly (includes replacement thermal material) for use in AMD A50M UMA computer models
660833-001	DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive
691415-001	WLAN 802.11 BGN RA HMC 1x1
698694-001	Keyboard for use in the United States
698694-DB1	Keyboard for use in Canada
701764-501	System board E300 UMA Windows 8 standard
701765-501	System board C60 UMA Windows 8 Standard
701766-001	Display bezel (Compaq)
701769-001	Display (Compaq)
701878-001	Antenna
701879-001	Back cover charcoal gray HP
701880-001	Back cover Pacific blue Compaq
701881-001	Base enclosure
701882-001	Display bezel HP
701883-001	Top cover charcoal gray HP
701884-001	Top cover Pacific blue Compaq
707798-001	Display
708150-001	Webcam
708151-001	Display cable

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

The following tools are needed to complete the removal and replacement procedures:

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

Service considerations

Before disassembly or assembly procedures, review and adhere to all service considerations.

 **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

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 might have occurred.

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

CAUTION: To prevent damage to the computer when 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 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 plastic	Bags	1,500 V
Carbon-loaded plastic	Floor mats	7,500 V
Metallized laminate	Floor mats	5,000 V

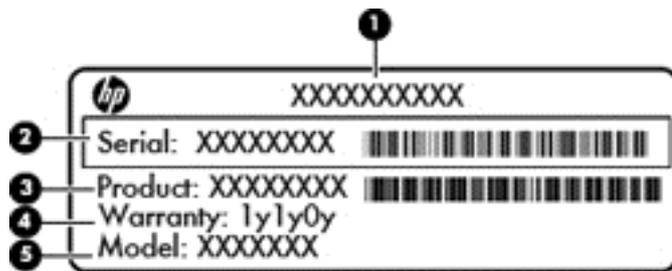
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 78 screws, in 8 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Serial number

The serial number label, located in the battery bay of the computer, provides important information that you may need when contacting technical support.



(1) Product name

(4) Warranty period

(2) Serial number

(5) Model description

(3) Product number

Computer feet

Description	Spare part number
Rubber Feet Kit	639572-001

The computer feet are adhesive-backed rubber pads. The feet attach to the base enclosure in the locations illustrated below.



Battery

Description	Spare part number
6 cell, 2.20 Ah, 47 Wh	593553-001

Before disassembling the computer:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn on the computer, 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 disconnecting the power cord from the AC outlet and then disconnecting the AC adapter from the computer.

Remove the battery:

1. Turn the computer upside down on a flat surface.
2. Slide the battery release latch **(1)** to release the battery.
3. Pivot the battery **(2)** upward and lift it out of the computer **(3)**.



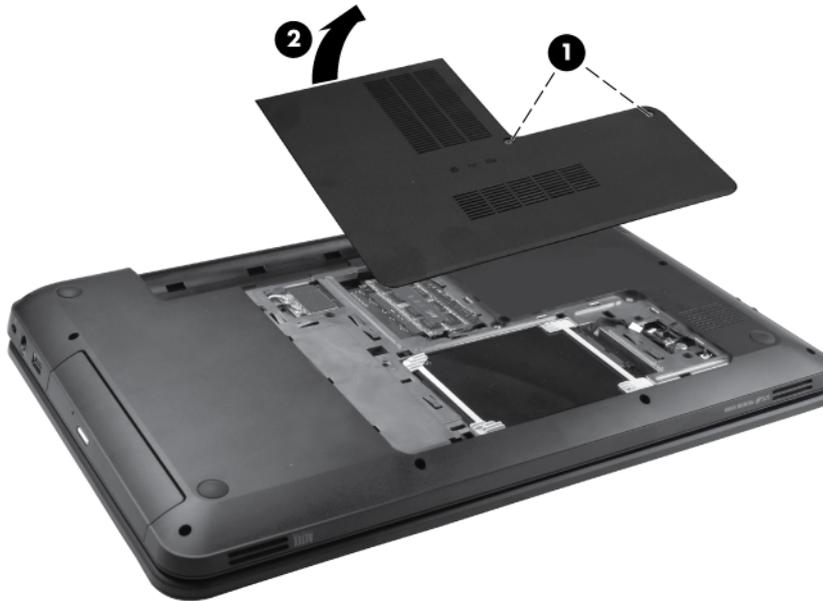
To insert the battery, insert the rear edge of the battery into the battery bay and pivot the front edge downward until the battery is seated. The battery release latch automatically locks the battery into place.

Service door

Description	Spare part number
Plastics Kit (contains only the service door)	640889-001

Before removing the service door, remove the battery (see [Battery on page 30](#)).

1. Position the computer upside down, with the front toward you.
2. Loosen the two Phillips 4.0 x 2.0 captive screws **(1)** that secure the service door to the computer.
3. Remove the service door **(2)**.



Reverse this procedure to install the service door.

Hard drive

 **NOTE:** The hard drive spare part kit includes a hard drive bracket and hard drive connector. The hard drive bracket and hard drive connector, as well as the hard drive bracket screws, are also available in the Hard Drive Hardware Kit.

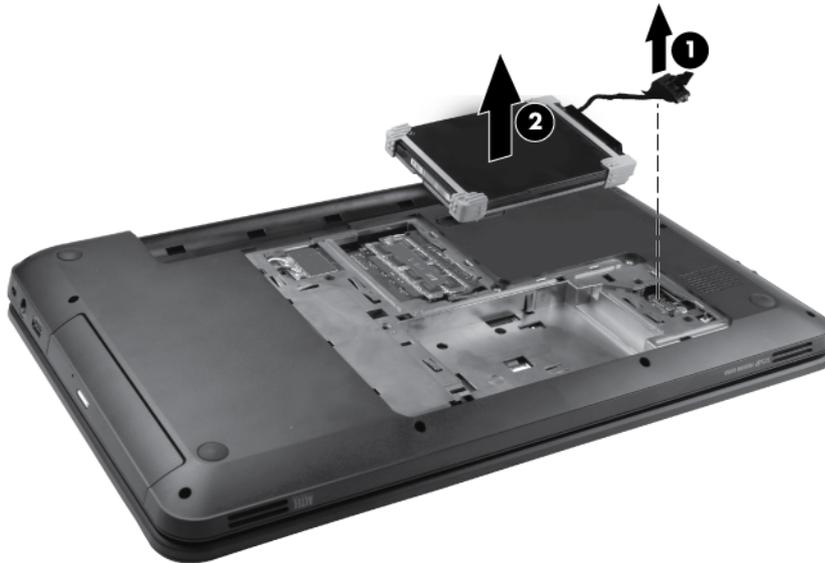
Description	Spare part number
Supports the following 9.5 mm / 7.0 mm, 6.35 cm (2.5 in) SATA hard drives:	
320 GB, 7200 rpm	634862-001
Hard Drive Hardware Kit (not illustrated, includes connector, bracket, and screws)	640878-001

Before removing the hard drive, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the hard drive:

1. Use the rubber tab on the hard drive bracket **(1)** to move the hard drive to the left and disconnect it from the hard drive adapter.
2. Lift the hard drive **(2)** out of the hard drive bay.



3. To replace the hard drive bracket, remove the four Phillips 3.0×3.0 screws **(1)** that secure the hard drive bracket to the hard drive.

4. Pull the bracket **(2)** straight up to remove it from the hard drive.



5. To replace the hard drive adapter, remove the Phillips pan head 2.0 x 2.0 screw **(1)**, and then disconnect the adapter from the system board at the outside edge **(2)**.
6. Then lift the adapter out at a 45-degree angle **(3)**.



Reverse this procedure to install the hard drive.

Optical drive

 **NOTE:** The optical drive spare part kit includes an optical drive bezel and optical drive bracket.

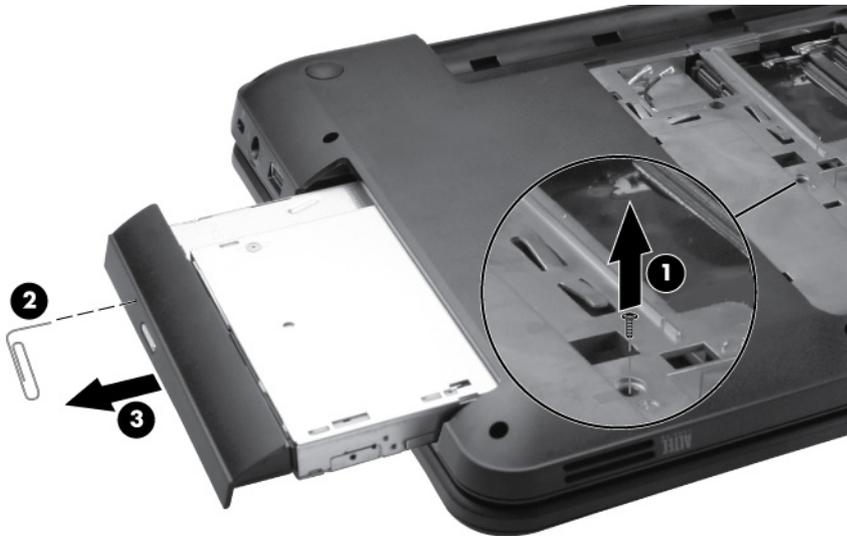
Description	Spare part number
DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive	660833-001

Before removing the optical drive:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the optical drive:

1. Remove the Phillips 6.0 x 2.5 screw **(1)** that secures the optical drive to the computer.
2. Insert a straightened paper clip **(2)**, into the release access opening in the bezel, and then press inward.
3. Grasp the bezel and slide the optical drive out of the computer **(3)**.



4. To replace the optical drive bracket, position the optical drive with the optical drive bracket toward you.
5. Remove the two Phillips 3.0 x 2.0 screws **(1)** that secure the optical drive bracket to the optical drive.

6. Remove the optical drive bracket **(2)**.



Reverse the above procedure to reassemble and install the optical drive.

WLAN module

Description	Spare part number
Ralink RT5390R 802.11 b/g/n 1×1 WiFi	691415-001

Before removing the WLAN module, remove the following components:

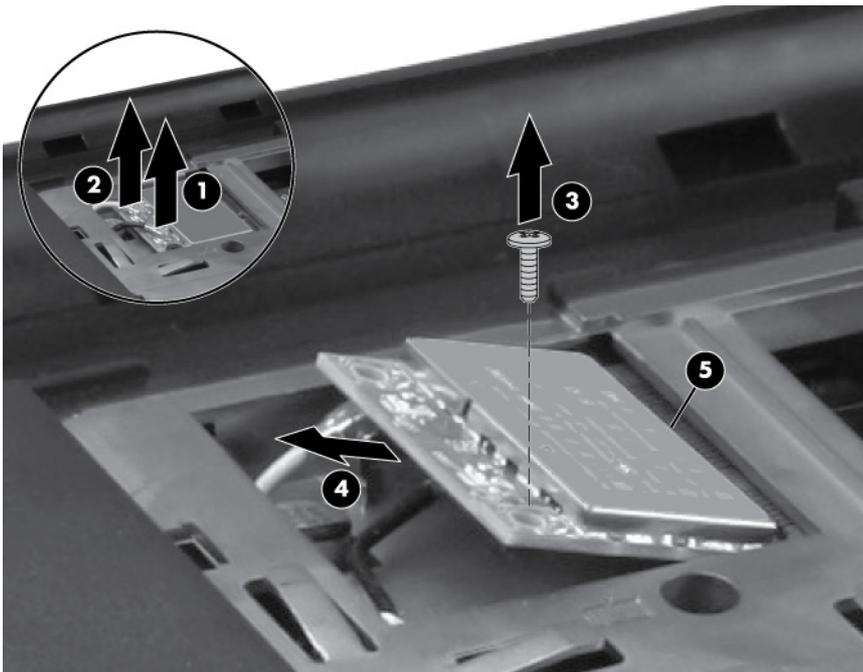
1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the WLAN module:

1. Disconnect the main antenna cable **(1)** and the auxiliary antenna cable **(2)** from the wireless module.
2. Remove the two Phillips 3.0 x 2.0 screws **(3)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)
3. Remove the WLAN module **(4)** by pulling it away from the slot at an angle.

⚠ 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 computer functionality, and then contact technical support through Help and Support.

📝 NOTE: WLAN modules are designed with a notch **(5)** to prevent incorrect insertion into the WLAN module slot.



Reverse this procedure to install a WLAN module.

Memory module

Description	Spare part number
4 GB PC3 12800 16000 MHz shared	641369-001
2 GB PC3 12800 16000 MHz shared	652972-001

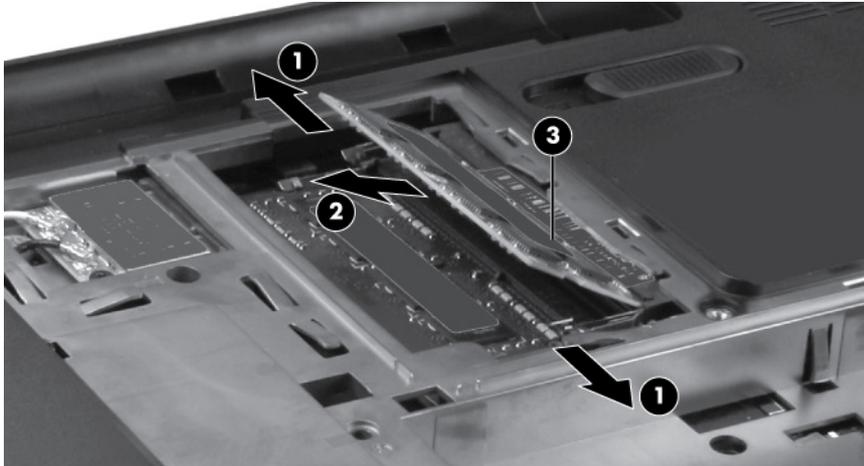
Before removing the memory module, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the memory module:

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

 **NOTE:** Memory modules are designed with a notch **(3)** to prevent incorrect insertion into the memory module slot.



Reverse this procedure to install a memory module.

RTC battery

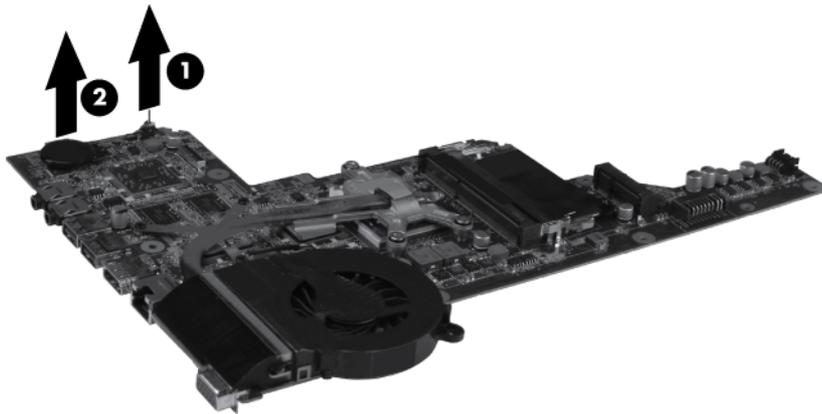
Description	Spare part number
RTC battery (includes mounting adhesive)	449137-001

Before removing the RTC battery, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the RTC battery:

1. Use a sharp, nonconductive tool to release the clip **(1)** that secures the battery to the system board.
2. Lift the battery **(2)** out of the computer.



Reverse this procedure to install the RTC battery.

Keyboard

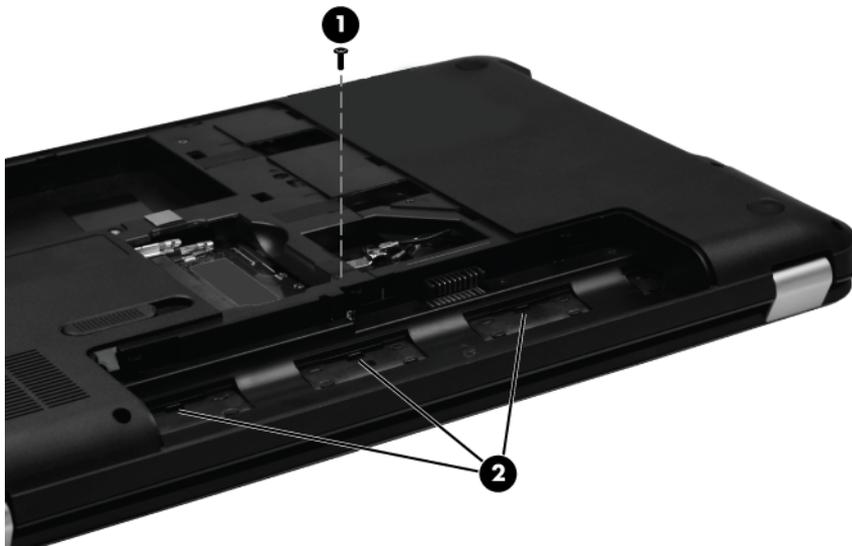
Description	Spare part number
For use in the United States, Black	698694-001
For use in French Canada, Black	698694-DB1

Before removing the keyboard, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))

Remove the keyboard:

1. Remove the Phillips 4.0 x 2.5 screw **(1)** in the WLAN module bay that secures the keyboard to the computer.
2. Using a thin, flat-bladed screwdriver, gently pry loose the three snaps **(2)** inside the battery bay to release the top edge keyboard tabs.



3. Turn the computer right-side up, with the front toward you.
4. Open the computer as far as possible.
5. Lift the rear edge of the keyboard, and then tilt the keyboard forward onto the palm rest.
6. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(2)** from the system board.

7. Remove the keyboard (3).



Reverse this procedure to install the keyboard.

Top cover

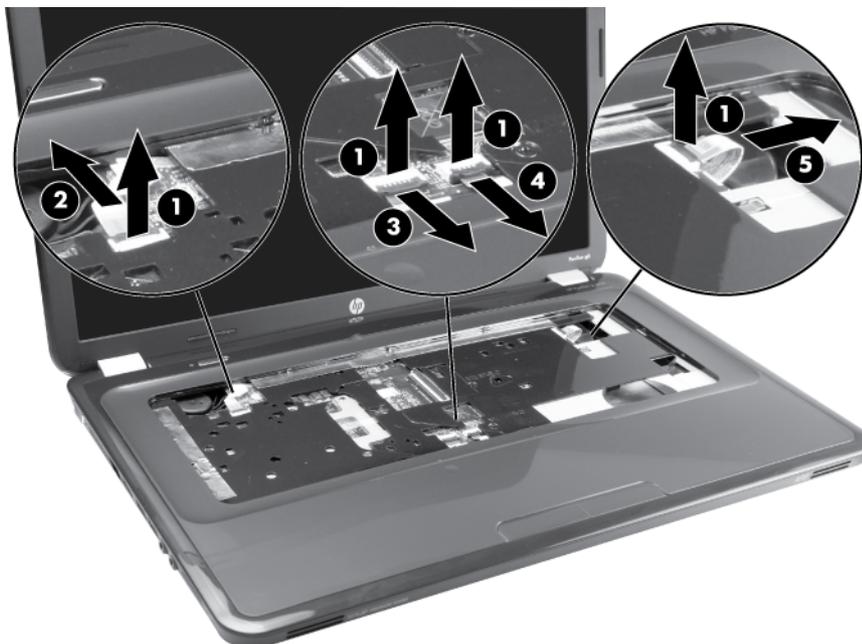
Description	Spare part number
For use in charcoal grey computer models	639532-001
For use in Pacific blue Compaq computer models	701884-001
For use in black HP computer models	701883-001

Before removing the top cover, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#)).
4. Optical drive (see [Optical drive on page 34](#)).
5. WLAN module (see [WLAN module on page 36](#)).
6. Memory module (see [Memory module on page 37](#)).
7. Keyboard (see [Keyboard on page 39](#)).

Remove the top cover:

1. Turn the computer right-side up, with the front toward you, and open the computer as far as possible.
2. Release the three ZIF connectors (**1**) to which the ZIF cables are attached and disconnect the USB cable (**2**), TouchPad cable (**3**), and power button cable (**4**) from the system board. Pull (**5**) to the right.

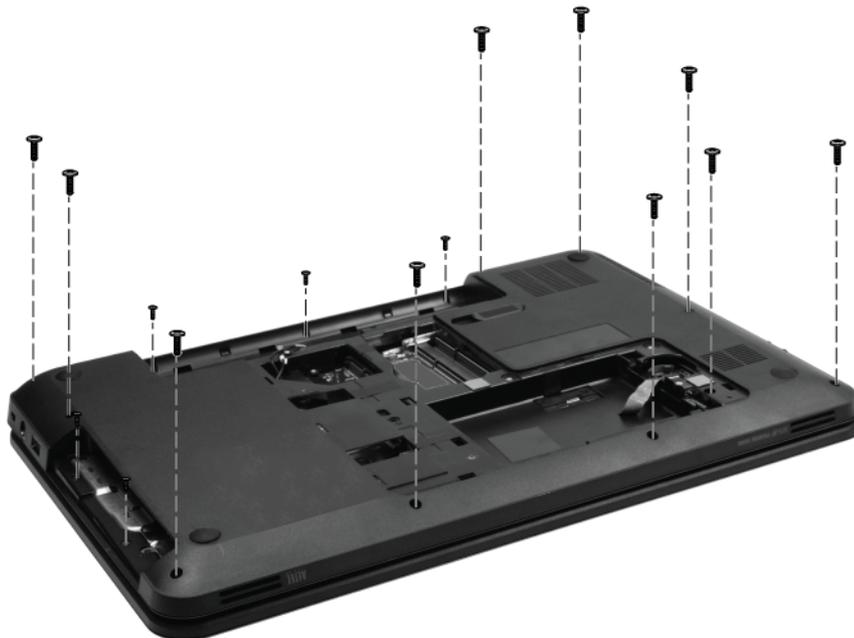


3. Remove the 6 Phillips 4.0 x 2.5 screws that secure the top cover to the computer.



4. Close the computer and turn it upside down, with the front toward you.
5. Remove the three Phillips 3.0 x 2.0 screws in the battery bay, two Phillips 3.0 x 2.0 screws in the optical drive bay, and ten Phillips 6.0 x 2.5 on the base enclosure.

 **NOTE:** The four screws along the front edge also serve to secure the speakers inside the base enclosure.



6. Lift the rear edge of the top cover **(1)** until the top cover disengages from the base enclosure. Remove the top cover **(2)**.



 **NOTE:** The TouchPad is glued to the top cover and is included with the top cover spare part.

Reverse this procedure to install the top cover.

Power button board

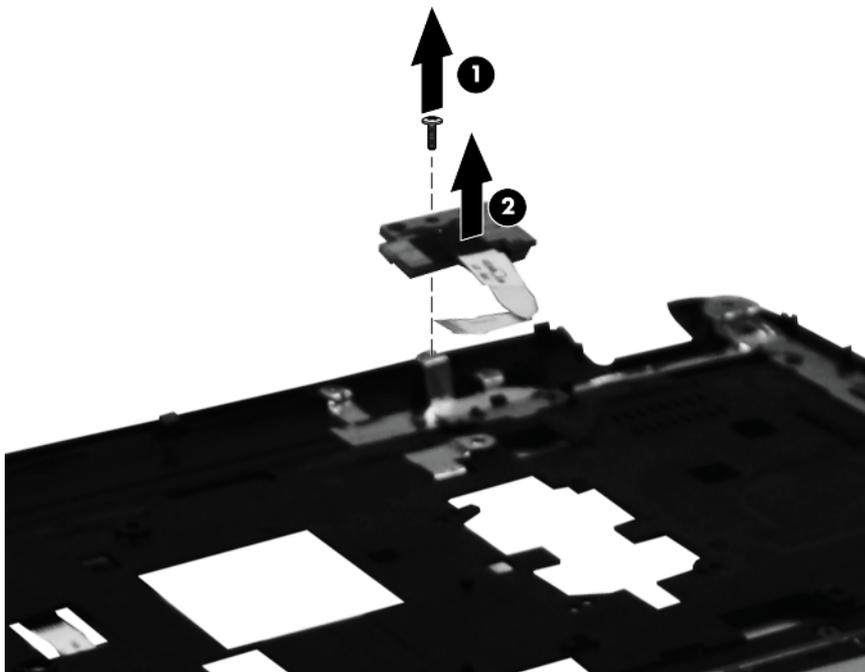
Description	Spare part number
Power button board	640884-001

Before removing the power button board, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. WLAN module (see [WLAN module on page 36](#)).
6. Memory module (see [Memory module on page 37](#))
7. Keyboard (see [Keyboard on page 39](#))
8. Top cover (see [Top cover on page 41](#))

Remove the power button board:

1. Turn the top cover upside down with the rear edge toward you.
2. Remove the Phillips 3.0 x 2.0 screw **(1)** that secures the power button board to the top cover.
3. Lift up and remove the power button board **(2)**.



Reverse this procedure to install the power button board.

Speaker assembly

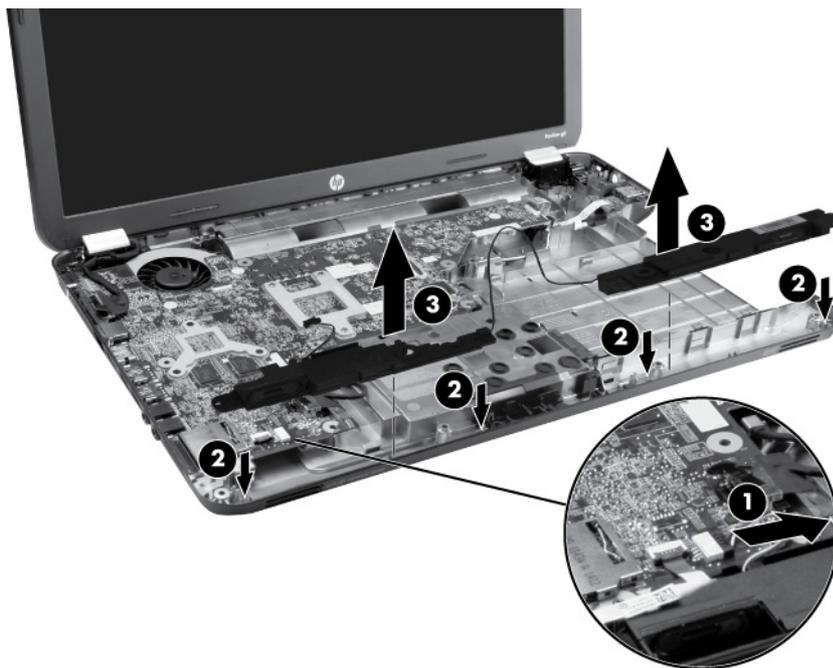
Description	Spare part number
Speaker assembly (includes cable)	639573-001

Before removing the speaker assembly, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))

Remove the speaker assembly:

1. Disconnect the speaker cable **(1)** from the system board and lift the speaker cable carefully from the notches **(2)**.
2. Lift up and remove the speakers **(3)**.



Reverse this procedure to install the speaker assembly.

TouchPad button board

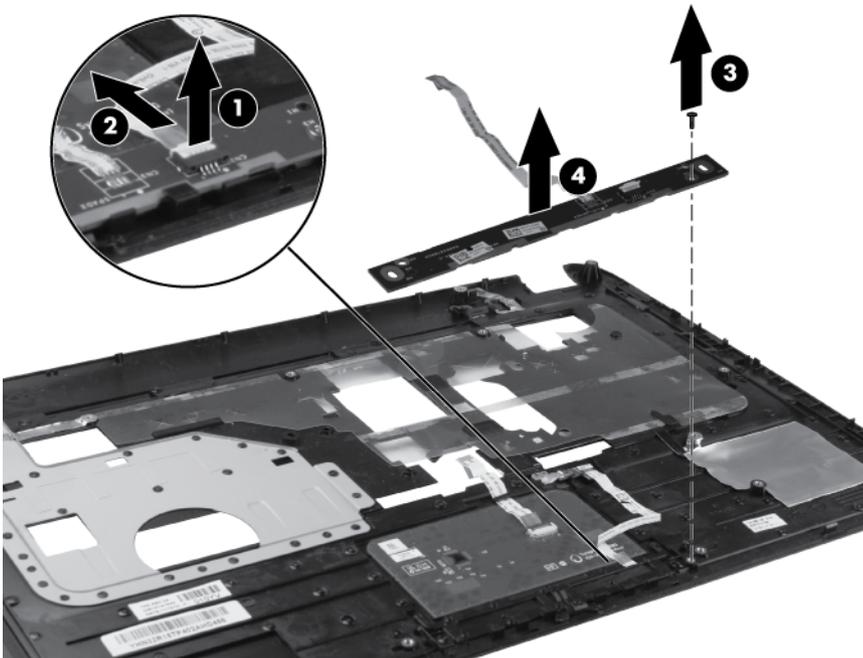
Description	Spare part number
TouchPad button board (includes bracket and cable)	640885-001

Before removing the TouchPad button board, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))

Remove the TouchPad button board:

1. Release the ZIF connector **(1)** to which the TouchPad button board cable is attached, and then disconnect the cable **(2)** from the TouchPad.
2. Remove the screw **(3)**.
3. Remove the TouchPad button board **(4)**.



Reverse the above procedure to reassemble and install the TouchPad button board.

USB board

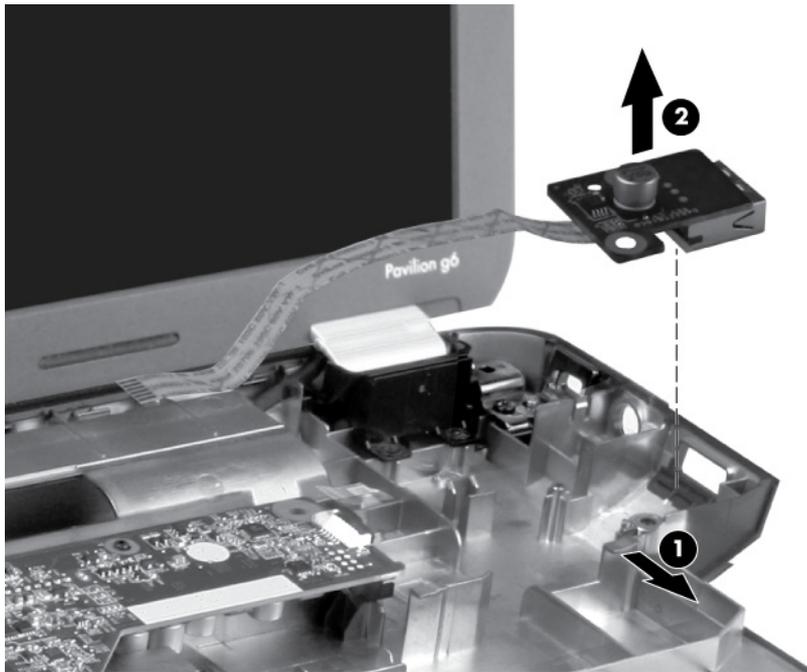
Description	Spare part number
USB board	640883-001

Before removing the USB board, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))

Remove the USB board:

1. Position the computer right-side up, with the right side toward you.
2. Release the clips **(1)** that secure the USB board to the base enclosure.
3. Lift the USB board **(2)** straight up to remove it from the computer.



Reverse this procedure to install the USB board.

Security cable lock

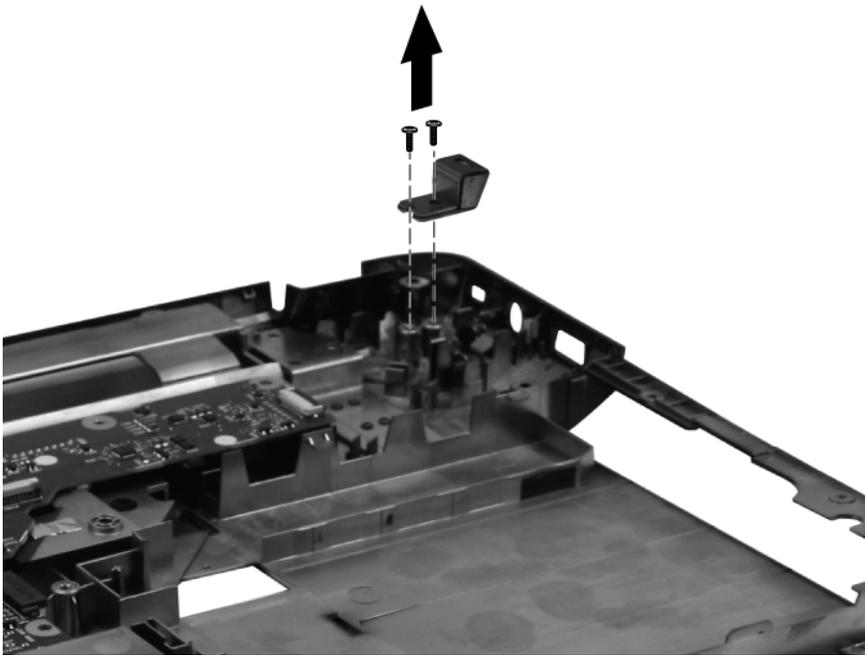
 **NOTE:** The security cable lock is included with the base enclosure, spare part number 701881-001.

Before removing the security cable lock, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))

Remove the security cable lock:

1. Remove the two Phillips 4.0 x 2.5 screws that secure the security lock to the base enclosure.
2. Lift the security lock straight up to remove it from the computer.



Reverse this procedure to install the security cable lock.

Power connector

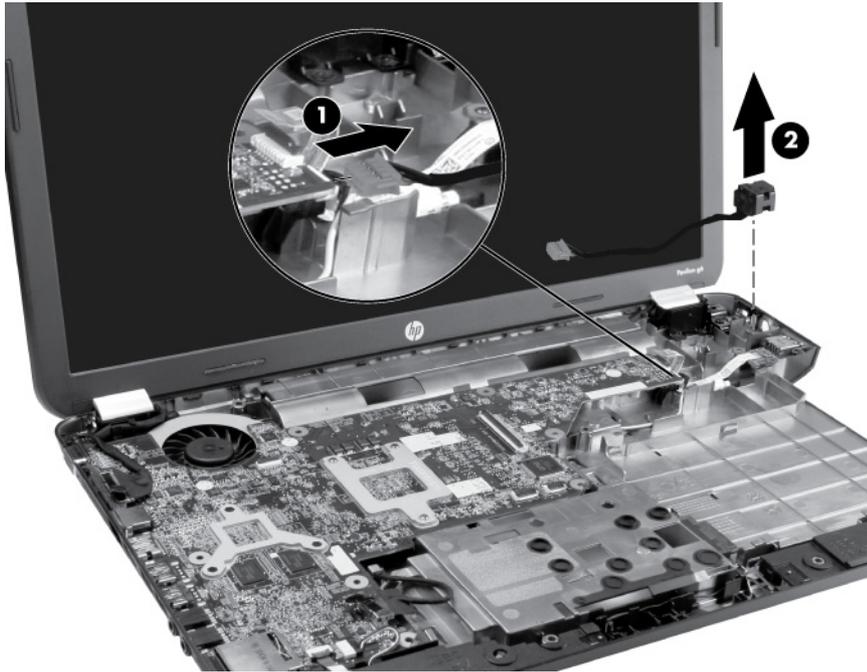
Description	Spare part number
Power connector (includes cable)	640891-001

Before removing the power connector cable, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))

Remove the power connector:

1. Turn the computer right-side up, with the right side toward you.
2. Disconnect the power connector cable **(1)** from the system board.
3. Lift the power connector **(2)** from the clips built into the base enclosure.



Reverse this procedure to install the power connector.

Display assembly

Description	Spare part number
39.6-cm (15.6-in) High Definition (HD), LED BrightView display assembly:	
• For use in charcoal grey computer models	639512-001
• For use in Pacific blue computer models	701769-001
• For use in black computer models	707798-001
• LCD rubber kit	640882-001
• Display hinges	639511-001
• Display hinge covers	640882-001

Before removing the display assembly, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Optical drive (see [Optical drive on page 34](#))
4. WLAN module (see [WLAN module on page 36](#))
5. Keyboard (see [Keyboard on page 39](#))
6. Top cover (see [Top cover on page 41](#))
7. USB board (see [USB board on page 47](#))

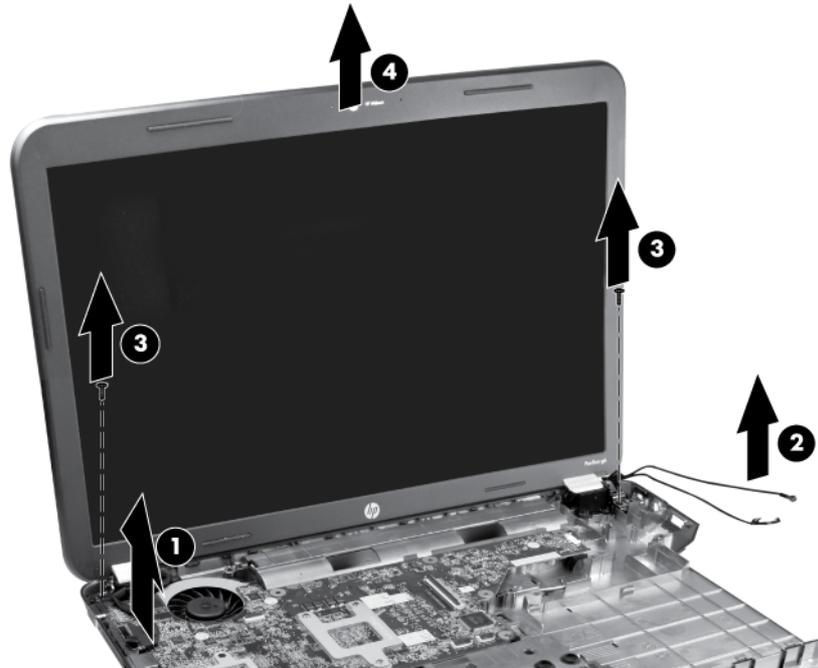
Remove the display assembly:

1. Turn the computer right-side up, with the front toward you.
2. Open the computer as far as possible.
3. Disconnect the display panel cable **(1)** from the system board and remove it from its routing channel.
4. Pull the antenna cables through the opening in the base enclosure **(2)**, and then disengage the cables from the clip in the routing channel leading to the display hinge.

 **CAUTION:** Support the display assembly when removing the display screws in the following steps. Failure to support the display assembly can result in damage to the assembly and other components.

5. Remove the five Phillips 6.0 x 2.5 screws **(3)** that secure the display assembly to the computer.

6. Lift the display panel **(4)** straight up to remove it.



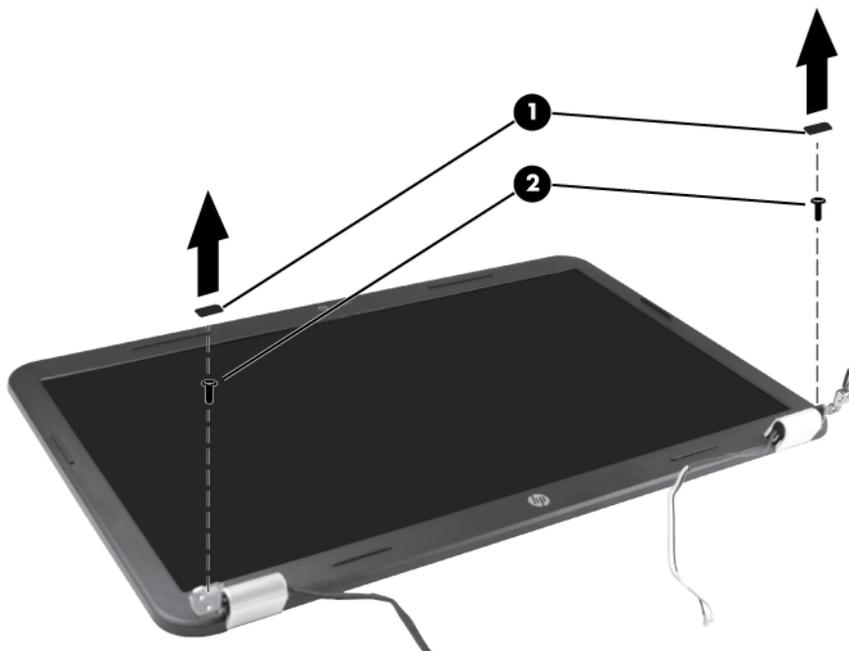
Reverse this procedure to install the display assembly.

7. To replace any of the display assembly internal components, remove the following screw covers and screws:

(1) Two screw covers on the display bezel bottom edge

(2) Two Phillips 4.0 x 2.5 screws

The display screw covers are included in the Display Rubber Kit, spare part number 640882-001.



8. Flex and lift up on the inside edges of the bezel on the left side **(1)**, the top and bottom **(2)**, and the right side **(3)** until the bezel disengages from the display back cover.
9. Remove the display bezel **(4)**.



Reverse this procedure to install the display bezel.

10. To replace the webcam module, lift the webcam module as far from the display enclosure as the webcam module cable allows.

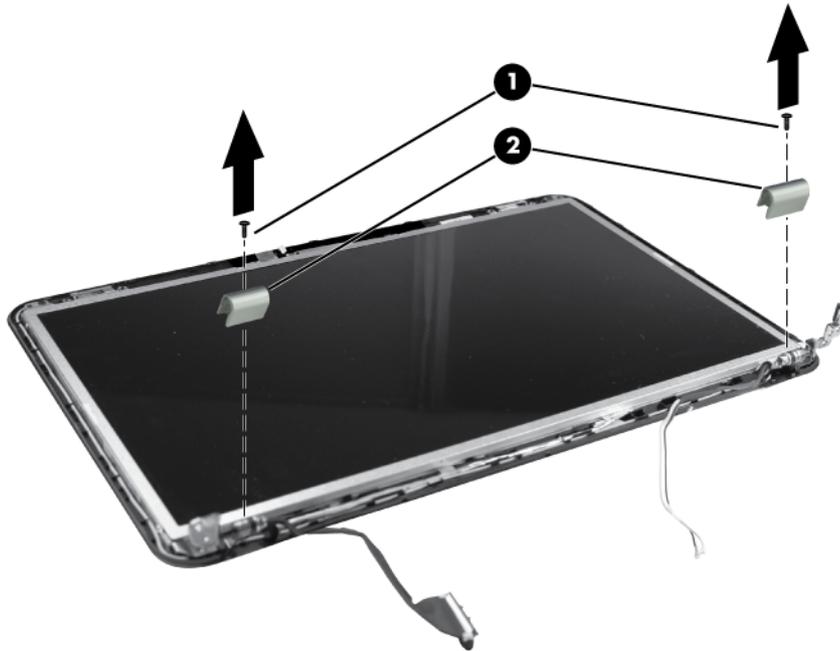
11. Disconnect the webcam module cable **(1)** from the webcam module, and then remove the webcam module **(2)**. The webcam module is available using spare part number 708150-001.



Reverse this procedure to install the webcam module.

12. To replace the display hinge covers, remove the three Phillips 4.0 x 2.5 screws **(1)** that secure the covers to the display enclosure.

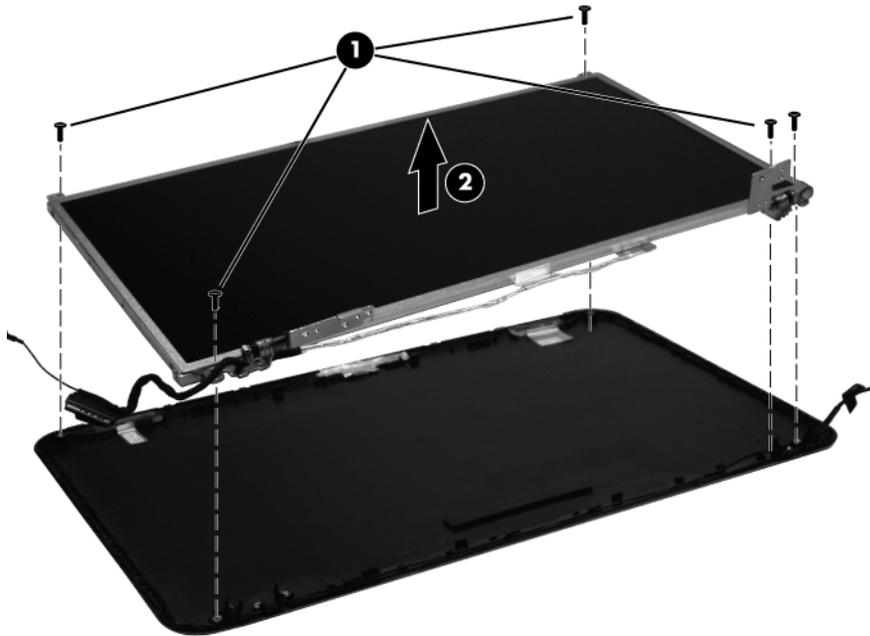
13. Remove the display hinge covers **(2)**. The display hinge covers are available using spare part number 640887-001.



Reverse this procedure to install the display hinge covers.

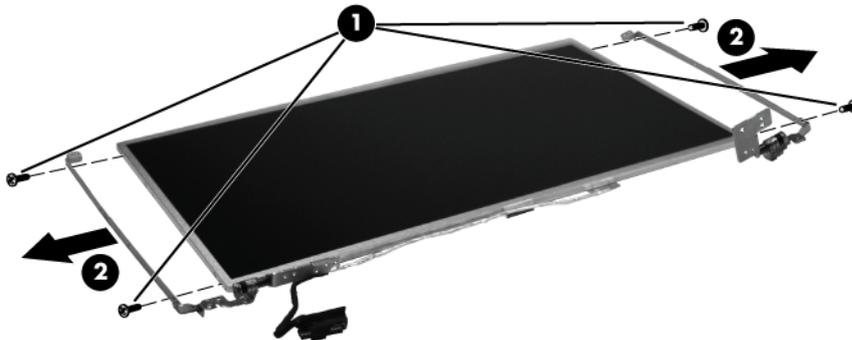
14. To replace the display panel, remove five Phillips 4.0 x 2.5 screws **(1)** that secure the display panel to the display enclosure.

- 15.** Remove the display panel **(2)** from the display enclosure. The display panel is available using the spare part number 641663-001.



Reverse this procedure to install the display panel.

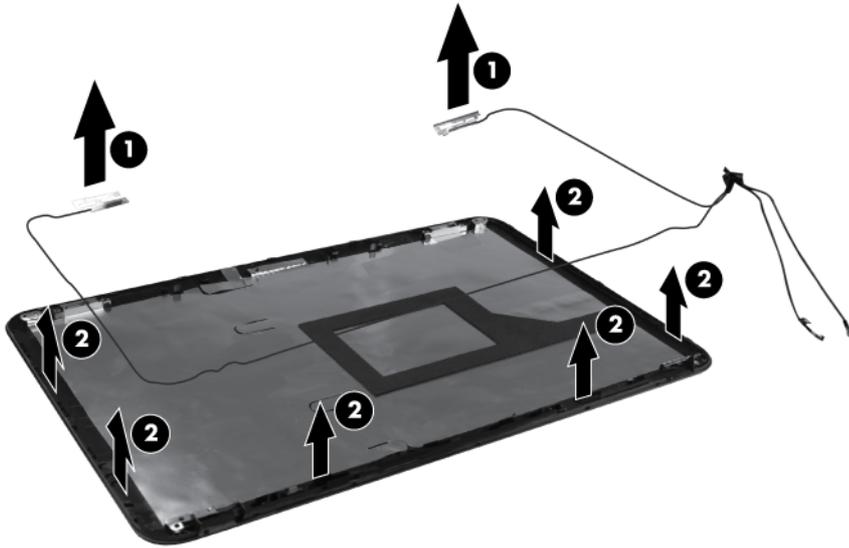
- 16.** To replace the display hinges, remove the two Phillips PM 3.0 x 2.0 screws **(1)** that secure each hinge to the display panel.
- 17.** Remove the display hinges **(2)** from the display panel. The display hinges are available using spare part number 639511-001.



Reverse this procedure to install the display hinges.

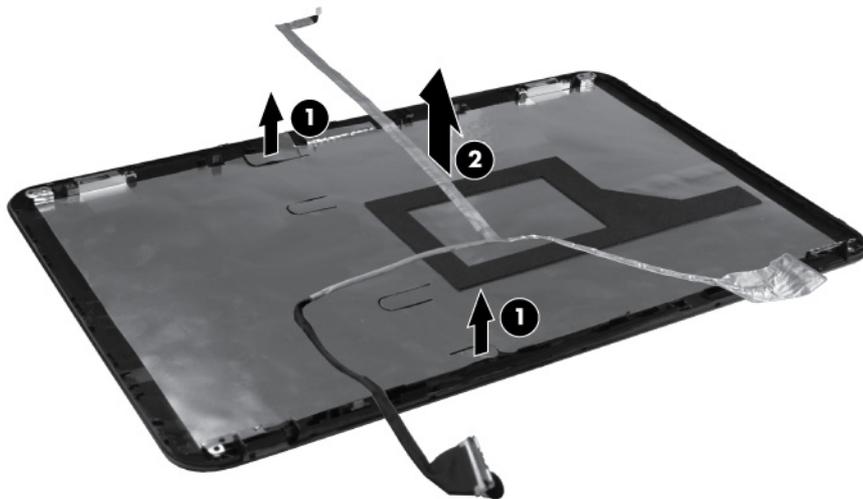
- 18.** To replace the wireless antenna transceivers, lift up on the silver transceiver **(1)**, and then release the adhesive material from the display cover.

19. Lift up to remove the antenna transceivers (2). The wireless antenna transceivers and cable are available using spare part number 639499-001 or 701878-001.



Reverse this procedure to install the display wireless antenna transceivers.

20. To remove the display cable from the display panel, lift the tape (1), and disconnect the cable (2). Then, gently peel the cable away from the display panel (3).



Reverse this procedure to install the display panel.

System board



NOTE: The system board spare part kit includes UMA or discrete graphics subsystem memory and replacement thermal material.

Description	Spare part number
For use in AMD E300 UMA computer models	701764-501
For use in AMD C60 UMA computer models	701765-501

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 modules (see [Memory module on page 37](#))
- WLAN module (see [WLAN module on page 36](#))

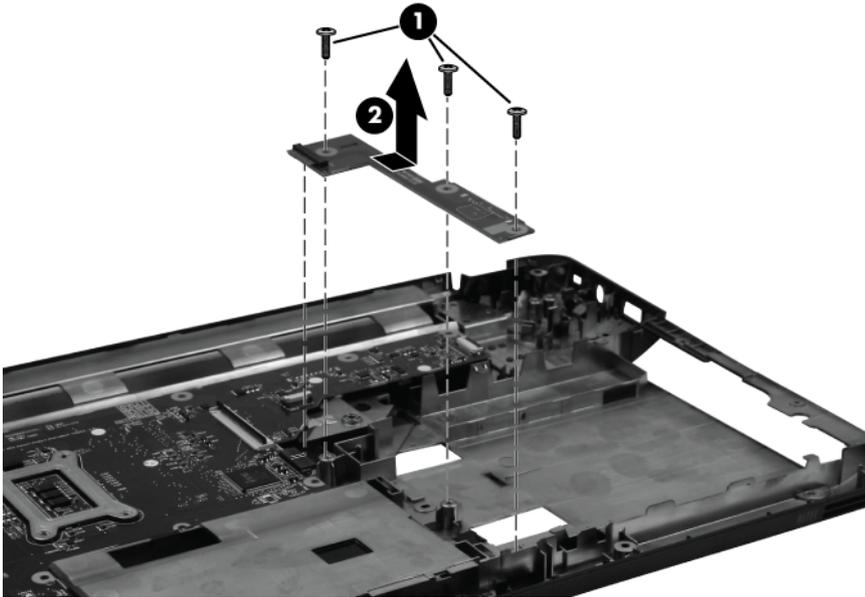
Before removing the system board, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. WLAN module (see [WLAN module on page 36](#))
6. Memory module (see [Memory module on page 37](#))
7. Keyboard (see [Keyboard on page 39](#))
8. Top cover (see [Top cover on page 41](#))
9. USB board (see [USB board on page 47](#))
10. Display assembly (see [Display assembly on page 50](#))
11. Power connector (see [Power connector on page 49](#))

Remove the optical drive connector board:

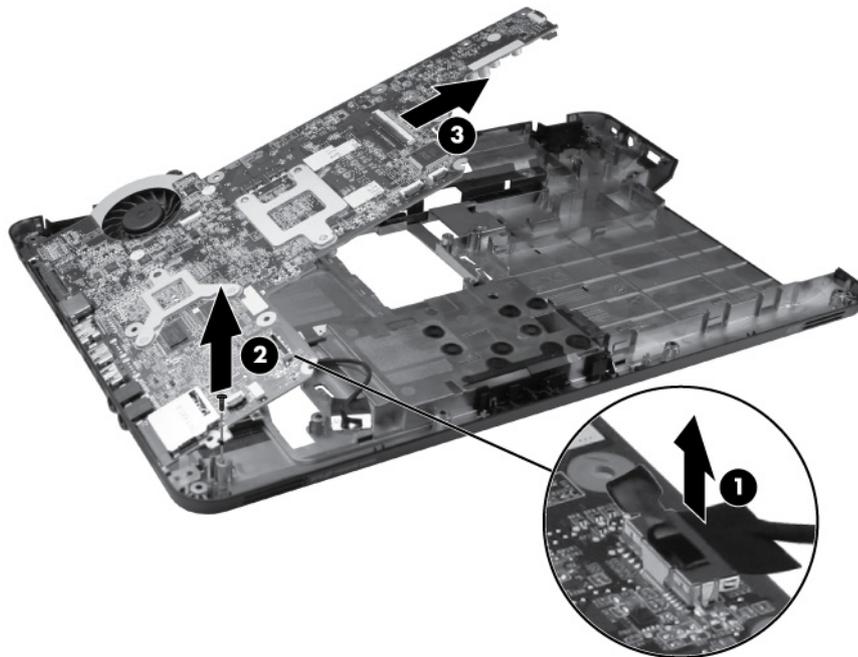
1. Turn the computer right-side up, with the front toward you.
2. Remove the three Phillips 4.0 x 2.5 screws (**1**) that secure the optical drive connector board to the computer.

3. Move the optical drive connector board **(2)** to the right, and then lift it up to disconnect it from the system board.



Reverse this procedure to install the optical drive connector board.

4. Remove the three Phillips 3.0 x 2.0 screws **(1)** that secure the system board to the computer.
5. Lift the system board **(2)** from the right edge and pull it away from the base enclosure at an angle. For AMD computer models, see the following image.



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:

- Fan/heat sink assembly (see [Fan/heat sink assembly on page 60](#))

Reverse the disassembly procedure to install the system board.

Fan/heat sink assembly

 **NOTE:** The fan/heat sink assembly includes replacement thermal material.

Description	Spare part number
For use in AMD A50M UMA computer models	657145-001
Thermal material	634366-001

Before removing the fan/heat sink assembly, remove the following components:

1. Battery (see [Battery on page 30](#))
2. Service door (see [Service door on page 31](#))
3. Hard drive (see [Hard drive on page 32](#))
4. Optical drive (see [Optical drive on page 34](#))
5. WLAN module (see [WLAN module on page 36](#))
6. Memory module (see [Memory module on page 37](#))
7. Keyboard (see [Keyboard on page 39](#))
8. Top cover (see [Top cover on page 41](#))
9. USB board (see [USB board on page 47](#))
10. Display assembly (see [Display assembly on page 50](#))
11. Power connector (see [Power connector on page 49](#))
12. System board (see [System board on page 57](#))

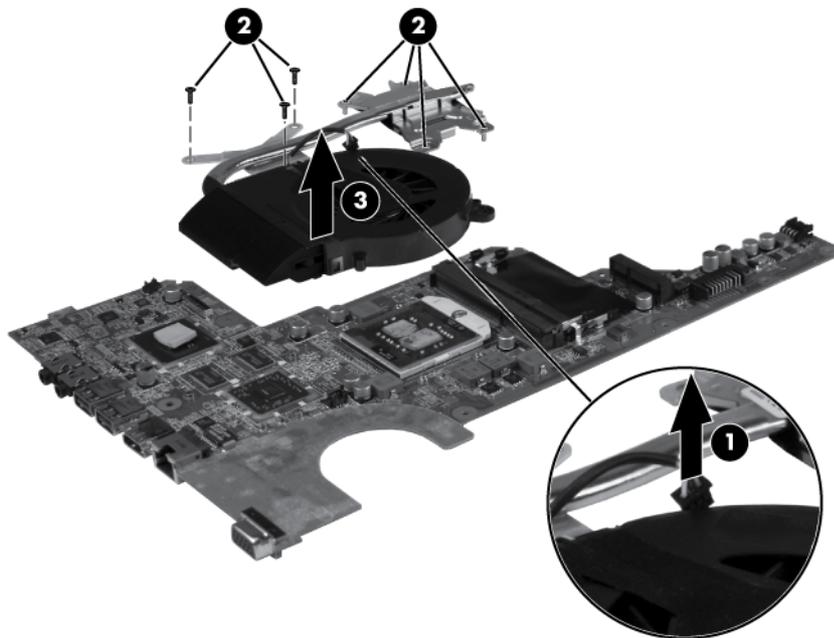
Remove the fan/heat assembly (fan/heat sink appearance may vary):

 **NOTE:** Steps 1 through 5 apply only to computer models equipped with Intel processors.

1. Turn the system board right-side up, with the front toward you.
2. Disconnect the fan cable from the system board **(1)**.
3. Remove the Phillips 3.0 x 2.0 screw **(2)** that secures the fan/heat sink assembly to the system board.
4. Follow the sequence embossed on heat sink to loosen the five Phillips 10.0 x 2.0 captive screws **(3)** that secure the fan/heat sink assembly to the system board.

 **NOTE:** Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it might be necessary to move the fan/heat sink assembly from side to side to detach the assembly.

5. Remove the fan/heat sink assembly by lifting it straight up.



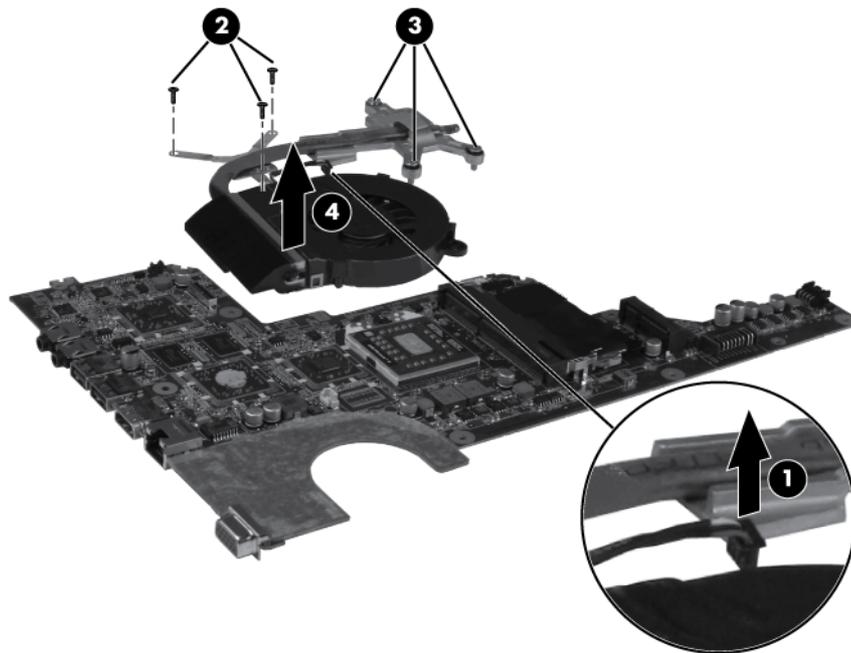
 **NOTE:** Steps 6 through 10 apply only to computer models equipped with AMD processors.

6. Turn the system board right-side up, with the front toward you.
7. Disconnect the fan cable from the system board **(1)**.
8. Remove the Phillips 3.0 x 2.0 screw **(2)** that secures the fan/heat sink assembly to the system board.

 **NOTE:** Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it might be necessary to move the fan/heat sink assembly from side to side to detach the assembly.

9. Follow the sequence embossed on the heat sink to loosen the six Phillips 10.0 x 2.0 captive screws **(3)** that secure the fan/heat sink assembly to the system board.

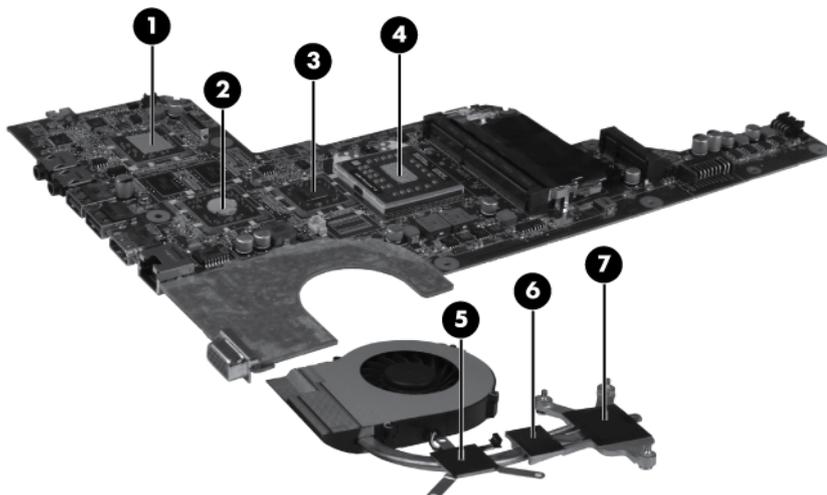
10. Remove the fan/heat sink assembly (4) by lifting straight up.



Each time the fan/heat sink assembly is removed, the thermal material must be thoroughly cleaned from the system board at locations (1) and (2), from the fan/heat sink assembly at locations (3) and (5), and from the processor (4). Thermal pads and thermal paste must be installed on all surfaces before the fan/heat sink assembly is reinstalled.

 **NOTE:** Thermal pads and thermal paste are included with all fan/heat sink assembly, system board, and processor spare part kits.

The following illustration shows the locations for thermal material on systems with AMD processors.



After applying fresh thermal paste to the components, reverse the above procedure to install the fan/heat sink assembly.

5 Specifications

Computer specifications

Dimensions	
Depth	24.5 cm (9.6 in)
Width	37.4 cm (14.7 in)
Height (front to rear)	3.1 to 3.6 cm (1.2 to 1.4 in)
Weight (lowest weight configuration)	< 2.5 kg (5.5 lbs)
Input power	
Operating voltage	18.5 V dc @ 3.5 A - 65W
Operating current	3.5 A
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	-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 computer operates well within this range of temperatures.	

39.6-cm (15.6-in) display specifications

Dimensions	
Height	21.0 cm (8.27 in)
Width	35.9 cm (14.1 in)
Diagonal	39.6 cm (15.6)
Number of colors	Up to 16.8 million
Contrast ratio	300:1 (typical)
Brightness	200 cd/m ² (typical)
Pixel resolution	
Pitch	0.259 × 0.259 mm
Format	1280 × 800; HD: 1366 × 768
Configuration	RGB vertical stripe
Backlight	LED
Character display	80 × 25
Total power consumption	4.0 W
Viewing angle	±40° horizontal, +120°/-40° vertical (typical)

Hard drive specifications

320 GB*		
Dimensions		
Height	9.5 mm / 7 mm	
Width	70 mm	
Weight	101 g	
Interface type		SATA
Transfer rate		100 MB/sec
Security		ATA security
Seek times (typical read, including setting)		
Single track	1.5 ms	
Average	12.0 ms	
Maximum	22.0 ms	
Logical blocks		625,142,448
Disc rotational speed		7200 rpm
Operating temperature		5°C to 55°C (41°F to 131°F)
<p>*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.</p>		
<p>NOTE: Certain restrictions and exclusions apply. Contact technical support for details.</p>		

DVD±RW and CD-RW SuperMulti Double-Layer Combo Drive specifications

Applicable disc	
Read	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM
Write	CD-R and CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Random access time	
DVD	< 230 ms
CD	< 175 ms
Cache buffer	
	2 MB
Data transfer rate	
24X CD-ROM	3,600 KB/sec
8X DVD-ROM	10,800 KB/sec
24X CD-R	3,600 KB/sec
16X CD-RW	2,400 KB/sec
8X DVD+R	10,800 KB/sec
4X DVD+RW	5,400 KB/sec
8X DVD-R	10,800 KB/sec
4X DVD-RW	5,400 KB/sec
2.4X DVD+R(9)	2,700 KB/sec
5X DVD-RAM	6,750 KB/sec
Transfer mode	
	Multiword DMA Mode

6 Using Setup Utility (BIOS) and System Diagnostics

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 displayed by pressing **fn** + **esc** (if you are already in Windows) or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS).
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 > Exit Discarding Changes**, and then press **enter**.

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, select the **HP Support Assistant** app.
2. Select **Updates** and then **tune-ups**, and then select **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. 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 displayed on the screen after the download is complete. If no instructions are displayed, 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 System Diagnostics

System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly.

To start System Diagnostics:

1. Turn on or restart the computer, quickly press **esc**, and then press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.



NOTE: If you need to stop a diagnostic test while it is running, press **esc**.

7 Backing up, restoring, and recovering

Your computer includes tools 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 guide 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**.

For additional information, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select **User guides**.

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 recovery media. This step creates a backup of the 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.

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 the state 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 recovery media on page 73](#)

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 Windows 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 Windows Help and Support. From the Start screen, type **h**, and then select **Help and Support**.

Creating recovery media

HP Recovery Manager is a software program that offers a way to create recovery media after you successfully set up the computer. 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. Recovery media can also be used to customize the system or aid in the replacement of a hard drive.

- Only one set of Recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the 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, DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, 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 recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Recovery Media Creation**, and follow the on-screen instructions to continue.

If you ever need to recover the system, see [Recovering using HP Recovery Manager on page 77](#).

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 Windows 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**, and then select **Drivers and Applications Reinstall**, and 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 a previous point, automatically created. For more information and steps for using Windows System Restore, see Windows 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 76](#).
- 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 76](#).

- If you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the recovery partition (select models only) or 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 77](#).

- If you want to recover the computer's original factory partitioning and content, you can choose the System Recovery option from the Recovery media. For more information, see [Recovering using HP Recovery Manager on page 77](#).
- If you have replaced the hard drive, you can use the Factory Reset option of Recovery media to restore the factory image to the replacement drive. For more information, see [Recovering using HP Recovery Manager on page 77](#).
- 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 recovery partition on page 78](#).

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.

 **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 Windows Help and Support for more information. From the Start screen, type **h**, and then select **Help and Support**.

To start Refresh:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display 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. Under **Refresh your PC without affecting your files**, select **Get started**, and 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:

1. Press **f11** while the computer boots.
– or –
Press and hold **f11** as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **Reset your PC**, and follow the on-screen instructions.

To use the Start screen:

1. On the Start screen, point to the far-right upper or lower corner of the screen to display 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. Under **Remove everything and reinstall Windows**, select **Get started**, and 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. Using the recovery media you created, you can choose from one of the following recovery options:

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.
- Minimized Image Recovery—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.
- Factory Reset—Restores the computer to the state 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 recovery partition (select models only) allows 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.
- Recovery media must be used if the computer hard drive fails.
- To use the Factory Reset or System Recovery options, you must use recovery media.
- If the 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 recovery partition to recover a minimized image (select models only)

The recovery partition (select models only) allows you to perform a 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 recovery partition:

1. Press **f11** while the computer boots.
– or –
Press and hold **f11** as you press the power button.
2. Select **Troubleshoot** from the boot options menu.
3. Select **HP Recovery Manager**, and follow the on-screen instructions.

Using recovery media to recover

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

1. If possible, back up all personal files.
2. Insert the first 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 78](#).

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 recovery media you created.
2. Restart the computer.
3. Press and hold **esc** while the computer is restarting, and then press **f9** for boot options.
4. Select the optical drive or USB flash drive you want to boot from.
5. Follow the on-screen instructions.

Removing the recovery partition

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

 **IMPORTANT:** Removing the recovery partition means you can no longer use Windows Refresh, the Windows Remove everything and reinstall Windows option, or the HP Recovery Manager option for minimized image recovery. Create recovery media before removing the Recovery partition to ensure you have recovery options; see [Creating recovery media on page 73](#).

Follow these steps to remove the recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.
2. Select **Remove Recovery Partition**, and follow the on-screen instructions to continue.

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 V ac, or from 220 to 240 V ac.

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.0 m** (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
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

Country/region	Accredited agency	Applicable note number
The United States	UL	2
<ol style="list-style-type: none"> 1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used. 2. The flexible cord must be Type SVT/SJT or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V ac) or NEMA 6-15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element. 3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² or 1.25 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration. 4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark. 5. The flexible cord must be Type HO5VV-F 3-conductor, 0.75 mm² conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label. 6. The flexible cord must be Type HVCTF 3-conductor, 1.25 mm² conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark. 7. For 127 V ac, the flexible cord must be Type SVT or SJT 3-conductor, 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type HO5VV-F 3-conductor, 0.75 mm² or 1.00 mm² conductor size, with plug BS 1363/A with BSI or ASTA marks. 		

9 Recycling

When a 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 website at www.hp.com/recycle.

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