



HP Pavilion dv4 Entertainment PC

Maintenance and Service Guide

© Copyright 2012 Hewlett-Packard
Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by Hewlett-Packard Company under license. Intel, Intel Centrino, and Intel Core are trademarks of Intel Corporation in the U.S. and other countries. Microsoft, Windows, and Windows 7 are U.S. registered trademarks of Microsoft Corporation. SD Logo is a trademark of its proprietor.

The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Third Edition: May 2012

First Edition: February 2012

Document Part Number: 676765-003

Safety warning notice

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

Table of contents

1 Product description	1
2 External component identification	5
Finding your hardware and software information	5
Front	6
Right side	7
Left side	8
Display	9
Top	10
TouchPad	10
Lights	11
Buttons and speakers	12
Keys	13
Bottom	14
3 Illustrated parts catalog	15
Service tag	15
Computer major components	16
Display assembly subcomponents	20
Mass storage devices	21
Miscellaneous parts	22
Sequential part number listing	23
4 Removal and replacement procedures	28
Preliminary replacement requirements	28
Tools required	28
Service considerations	28
Plastic parts	28
Cables and connectors	28
Drive handling	29
Grounding guidelines	29
Electrostatic discharge damage	29
Packaging and transporting guidelines	31
Component replacement procedures	32
Service tag	33
Computer feet	34

Battery	34
Service door	36
Hard drive	37
Optical drive	40
Memory module	42
Solid-state drive	44
RTC battery	46
WLAN module	47
Keyboard	50
Top cover	53
Power button board	56
TouchPad button board	58
Optical drive connector cable	59
System board	61
Fan/heat sink assembly	64
Processor	68
Power connector cable	69
Speakers	71
Display assembly	72

5 Using Setup Utility (BIOS) and System Diagnostics 79

Starting Setup Utility (BIOS)	79
Updating the BIOS	79
Determining the BIOS version	80
Downloading a BIOS update	80
Using System Diagnostics	81

6 Specifications 82

Computer specifications	82
35.6 cm (14.0 in) display specifications	82
Hard drive specifications	83

7 Backing up, restoring, and recovering 84

Creating backups	84
Creating recovery media to recover the original system	84
What you need to know	84
Creating the recovery media	85
Creating system restore points	85
What you need to know	85
Creating a system restore point	85

Backing up system and personal information	85
Tips for a successful backup	86
What you need to know	86
Creating a backup using Windows Backup and Restore	86
Restore and recovery	87
Restoring to a previous system restore point	87
Restoring specific files	87
Restoring specific files using Windows Backup and Restore	87
Recovering the original system using HP Recovery Manager	87
What you need to know	87
Recovering using HP Recovery partition (select models only)	88
Recovering using the recovery media	88
Changing the computer boot order	89
8 Power cord set requirements	90
Requirements for all countries	90
Requirements for specific countries and regions	90
9 Recycling	92
Index	93

1 Product description

Category	Description
Product Name	HP Pavilion dv4 Entertainment PC
Processors	<ul style="list-style-type: none">• Intel® Core™ i7-3612QM 2.1 GHz processor (SC turbo up to 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)• Intel Core i7-3610QM 2.3 GHz processor (SC turbo up to 3.3 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU• Intel Core i7-2670QM 2.2 GHz processor (SC turbo up to 3.1 GHz, 1333 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU• Intel Core i5-3320M 2.6 GHz processor (SC turbo up to 3.3 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)• Intel Core i5-3210M 2.5 GHz processor (SC turbo up to 3.1 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)• Intel Core i5-2450M 2.5 GHz processor (SC turbo up to 3.1 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU• Intel Core i3-3110M 2.4 GHz processor (1600 MHz/3.0 MB L3 cache, dual core, 35 W)• Intel Core i3-2370M 2.4 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W) for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU• Intel Core i3-2350M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU
Chipset	Intel HM77 Express chipset
Graphics	<p>Internal graphics (UMA):</p> <p>Intel HD Graphics 4000 (for use only on computer models equipped with an Intel Core i7/i5/i3 3000-series processor)</p> <p>Switchable Discrete Graphics:</p> <ul style="list-style-type: none">• NVIDIA GeForce GT 650M with 2048 MB of dedicated video memory (64 MB x 32 GDDR5 x 8 PCs, 5Gbps); 128 bit M2 29 mm x 29 mm• NVIDIA GeForce GT 650M with 1024 MB of dedicated video memory (32 MB x 32 GDDR5 x 8 PCs, 5Gbps); 128 bit M2 29 mm x 29 mm• NVIDIA GeForce GT 630M with 2048 MB of dedicated video memory (128 MB x 16 DDR3 900 MHz x 8 PCs); 128 bit M2 29 mm x 29 mm• NVIDIA GeForce GT 630M with 1024 MB of dedicated video memory (64 MB x 16 DDR3 900 MHz x 8 PCs); 128 bit M2 29 mm x 29 mm <p>Support HD decode, DX11, HDMI, and Optimus</p>

Category	Description
Display Panel	<p>35.6 cm (14.0 in), light-emitting diode (LED), SVA, high-definition (HD), BrightView (1366×768) display, 3.6 mm; typical brightness: 200 cd/m² (nits)</p> <p>All display assemblies include 2 wireless local area network (WLAN) antenna cables</p> <p>16:9 Ultra Wide Aspect Ratio</p>
Memory	<p>Two customer-accessible/upgradable SODIMM memory module slots</p> <p>DDR3-1600 MHz dual channel support</p> <p>Supports up to 16384 MB system RAM</p> <p>Supports the following system RAM configurations:</p> <ul style="list-style-type: none"> • 16384 MB (8192 MB×2) • 12288 MB (8192 MB×1+ 4096 MB×1) • 8192 MB (8192 MB×1 or 4096 MB×2) • 6144 MB (4096 MB×1 + 2048 MB×1) • 4096 MB (4096 MB×1 or 2048 MB×2) • 2048 MB (2048 MB×1)
Hard drive	<p>Supports 6.35cm (2.5 in) hard drives in 9.5 mm (.37 in) and 7.0 mm (.28 in) thicknesses (all hard drives use the same bracket)</p> <p>Customer-accessible</p> <p>Serial ATA</p> <p>Accelerometer protection support</p> <p>Intel Smart Response Technology support</p> <p>HP 3D DriveGuard support (select models only)</p> <p>Supports the following hard drives:</p> <ul style="list-style-type: none"> • 1 TB, 5400-rpm, 9.5 mm • 750 GB, 7200-rpm and 5400-rpm, 9.5 mm • 640 GB, 5400-rpm, 9.5 mm • 500 GB, 7200-rpm and 5400-rpm, 9.5 mm • 320 GB, 7200-rpm and 5400-rpm, 9.5 mm and 7.0 mm
Solid-state drives	Supports 32GB mSATA drive
Optical drive	<p>Fixed</p> <p>Serial ATA</p> <p>12.7 mm tray load</p> <p>Supports the following optical drives:</p> <ul style="list-style-type: none"> • Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive • DVD±RW Double-Layer SuperMulti Drive

Category	Description
Audio and video	<p>HD audio</p> <p>Beats audio</p> <p>Dual speakers</p> <p>Subwoofer</p> <p>Supports Microsoft® Premium requirements</p> <p>Supports Intel Wireless Display and Wireless Music</p> <p>HP TrueVision HD webcam (fixed, no tilt with activity LED; 1280×720 by 30 frames per second)</p> <p>Two dual array, digital microphones with appropriate beam-forming, echo-cancellation, noise-reduction software</p>
Ethernet	Integrated 10/100/1000 NIC
Wireless	<p>Integrated wireless local area network (WLAN) options by way of wireless module</p> <p>Two WLAN antennas built into display assembly</p> <p>Support for the following WLAN formats:</p> <ul style="list-style-type: none"> • Broadcom 4313 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter • Intel Centrino® Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter (select models only) • Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi and AR3012 Bluetooth 4.0 Combo Adapter (select models only) • Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only) • Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter
External media cards	<p>HP Multi-Format Digital Media Reader slot with push-push technology, supporting the following digital card formats:</p> <ul style="list-style-type: none"> • Secure Digital (SD) Memory Card • Secure Digital Extended Capacity (SDxC) Memory Card • Secure Digital High Capacity (SDHC) Memory Card • Ultra High Speed MultiMediaCard (UHS/MMC)
Internal media cards	<ul style="list-style-type: none"> • One half-size Mini Card slot for WLAN • One full-size mini-card slot for Intel mSATA 32 GB solid-state drive
Ports	<ul style="list-style-type: none"> • AC Smart Pin adapter plug • Audio-in (microphone) • Audio-out (stereo headphone) • HDMI 1.4 output supporting: 1920×1200 external resolution @ 60 Hz • VGA (Dsub 15 pin) supporting: 2048 x 1536 external resolution @ 75Hz, hot plug and unplug and autodetection for correct output to wide-aspect vs. standard aspect video • RJ-45 (Ethernet) • USB 3.0 (2 ports), USB 2.0 (1 port)

Category	Description
Keyboard/pointing devices	<p>Full-size, island-style, with numeric keypad</p> <p>Taps enabled by default</p>
Power requirements	<p>120 W slim AC adapter (RC, V, PFC, 3-wire) for use only on computer models equipped with switchable discrete graphics</p> <p>90 W HP Smart AC adapter (RC, V, PFC, EM, 3-wire) for use only on computer models equipped with NVIDIA GeForce GT 630M switchable discrete graphics</p> <p>65 W HP Smart AC adapter (RC, V, EM, 3-wire) for use only on computer models equipped with a graphics subsystem with UMA memory</p> <p>Supports 6-cell, 62 Wh, 2.8 Ah, Li-ion battery (battery is user-removable)</p> <p>Supports Fast Charge</p>
Security	<p>Security cable lock</p> <p>Intel/VeriSign support</p> <p>Intel AT-p Ready support</p>
Operating system	<p>Preinstalled:</p> <ul style="list-style-type: none"> • Windows 7® Home Basic 64 bit • Windows 7 Home Premium 64 bit • Windows 7 Professional 64 bit
Serviceability	<p>End-user replaceable parts:</p> <ul style="list-style-type: none"> • AC adapter • Battery • Hard drive • Memory module • Optical drive • Solid-state drive • WLAN module

2 External component identification

Finding your hardware and software information

▲ Select **Start > Computer**.

A list displays all the devices installed in your computer, including optical drives, solid-state drives (SSDs), or a secondary hard drive.

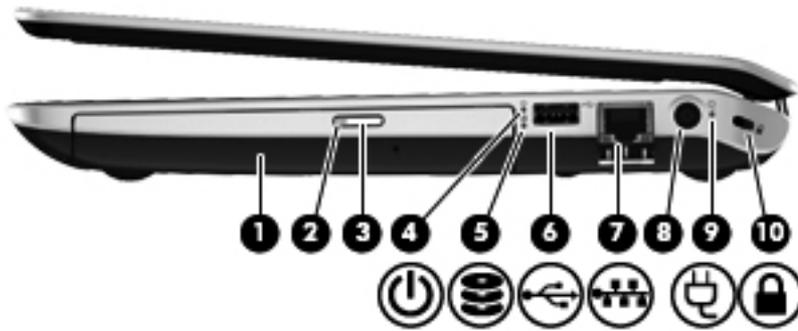
To find out what software is included on your computer, select **Start > All Programs**.

Front



Component	Description
 Digital Media Slot	Supports the following digital card formats: <ul style="list-style-type: none">• Secure Digital (SD) Memory Card• Secure Digital Extended Capacity (SDxC) Memory Card• Secure Digital High Capacity (SDHC) Memory Card• Ultra High Speed MultiMediaCard (UHS/MMC)

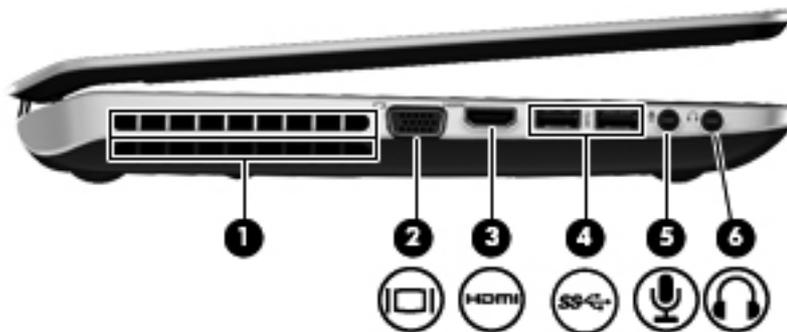
Right side



Component	Description
(1)	Optical drive Reads and writes (select models only) to an optical disc.
(2)	Optical drive light <ul style="list-style-type: none"> Green: The optical drive is being accessed. Off: The optical drive is idle.
(3)	Optical drive eject button Releases the disc tray.
(4) 	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. <p>NOTE: For select models, the Intel Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.</p>
(5) 	Hard drive light <ul style="list-style-type: none"> Blinking white: The hard drive is being accessed. Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(6) 	USB 2.0 port Connects an optional USB device.
(7) 	RJ-45 (network) jack Connects a network cable.
(8) 	Power connector Connects an AC adapter.

Component	Description
(9) AC adapter light	<ul style="list-style-type: none"> White: The AC adapter is connected and the battery is charged. Amber: The AC adapter is connected and the battery is charging. Off: The computer is using DC power.
(10)  Security cable slot	<p>Attaches an optional security cable to the computer.</p> <p>NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.</p>

Left side



Component	Description
(1) Vent	<p>Enables airflow to cool internal components.</p> <p>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.</p>
(2)  External monitor port	Connects an external VGA monitor or projector.
(3)  HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio device.
(4)  USB 3.0 ports (2)	Connect optional USB 3.0 devices and provide enhanced USB power performance.
(5)  Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(6)  Audio-out (headphone) jack	<p>Connect 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>

Display



Item	Component	Description
(1)	Internal microphones (2)	Record sound.
(2)	Webcam light	On: The webcam is in use.
(3)	HP TrueVision HD webcam	Records video, captures still photographs, allows you to video conference and chat online using streaming video. To use the webcam, select Start > All Programs > Communication and Chat > CyberLink YouCam .
(4)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLANs.

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

Top

TouchPad



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

Lights



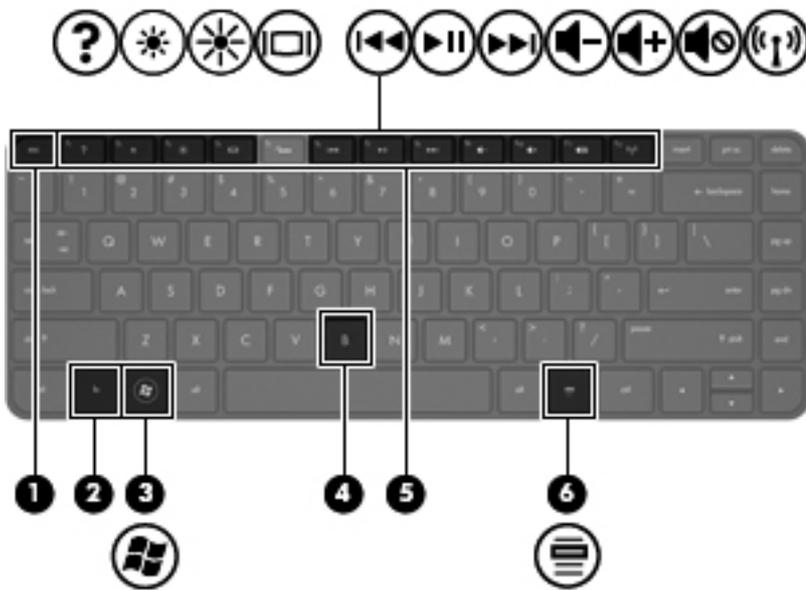
Component	Description
(1)  Power light	<ul style="list-style-type: none"> • White: The computer is on. • Blinking white: The computer is in the Sleep state, which is an energy-saving mode. The computer shuts off power to the display and other unneeded components. • Off: The computer is off or in Hibernation. Hibernation is an energy-saving mode that uses the least amount of power. <p>NOTE: For select models, the Intel® Rapid Start Technology feature is enabled at the factory. Rapid Start Technology allows your computer to resume quickly from inactivity.</p>
(2)  Mute light	<ul style="list-style-type: none"> • Amber: Computer sound is off. • Off: Computer sound is on.
(3)  Wireless light	<ul style="list-style-type: none"> • White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. • Amber: All wireless devices are off.
(4) Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.

Buttons and speakers



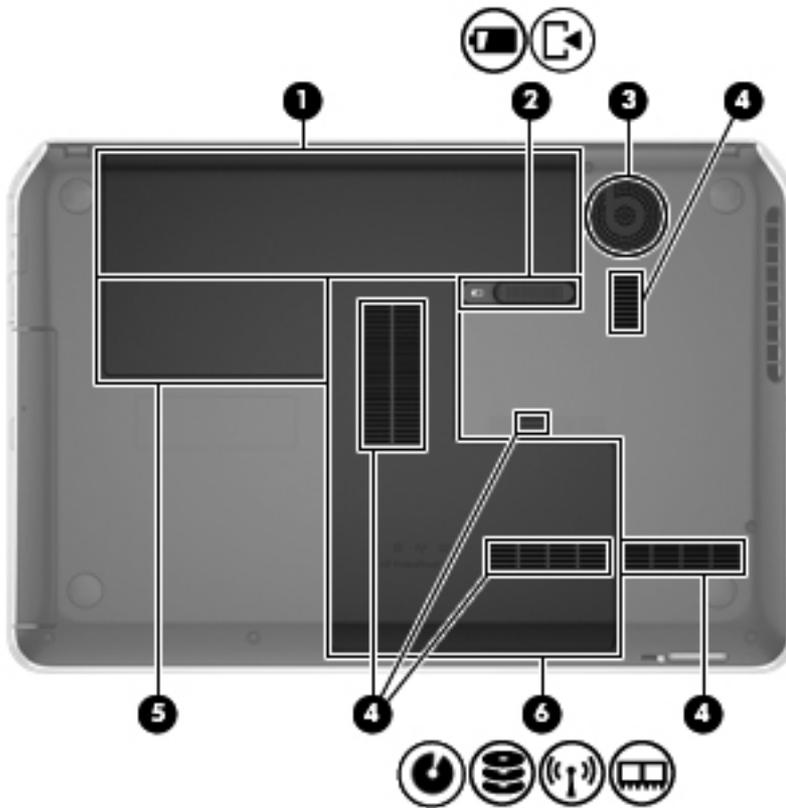
Component	Description
(1)  Power button	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When 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 shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Security > Power Options, or see the <i>HP User Guide</i>.</p>
(2) Speakers (2)	Produce sound.

Keys



Component	Description
(1) <code>esc</code> key	Displays system information when pressed in combination with the <code>fn</code> key.
(2) <code>fn</code> key	Executes frequently used system functions when pressed in combination with the <code>esc</code> key or the <code>b</code> key.
(3)  Windows® logo key	Displays the Windows Start menu.
(4) <code>b</code> key	<p>Enables or disables Beats Audio when pressed in combination with the <code>fn</code> key.</p> <p>Opens Beats Audio Control Panel, which allows you to view and control all audio settings. Beats Audio is an enhanced audio feature that provides a deep, controlled bass while maintaining a clear sound. Beats audio is enabled by default.</p> <p>NOTE: You can also open the Beats Audio Control Panel by selecting Start > Control Panel > Hardware and Sound > Beats Audio Control Panel.</p>
(5) Action keys	Execute frequently used system functions.
(6)  Windows applications key	Displays a shortcut menu for items beneath the cursor.

Bottom

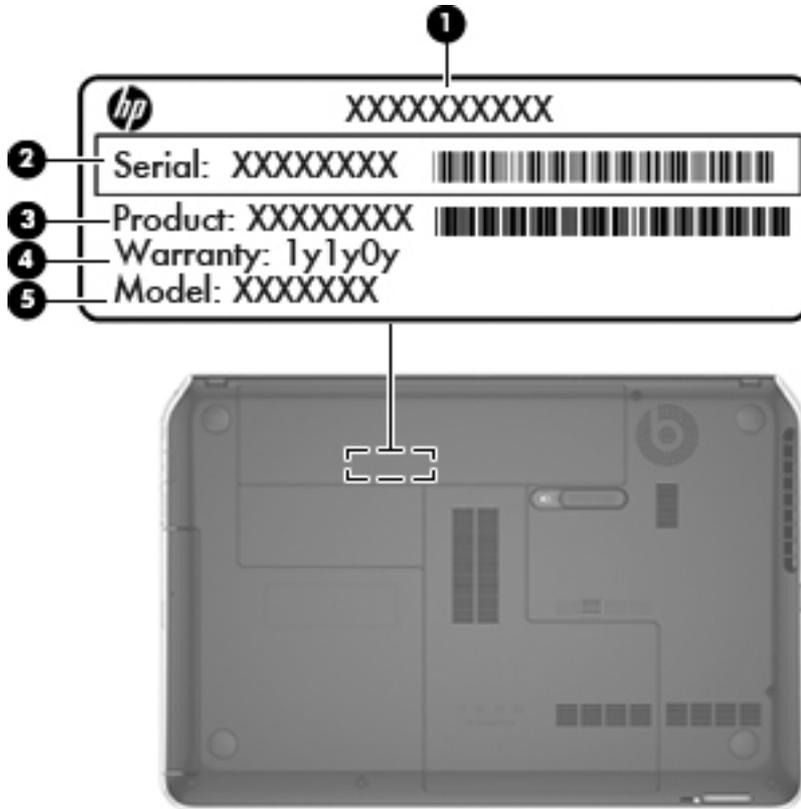


Item	Component	Description
(1)	Battery bay	Holds the battery.
(2)	 Battery release latch	Releases the battery from the battery bay and opens the service door.
(3)	Integrated subwoofer	Provides superior bass sound.
(4)	Vents (4)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5)	Wireless module compartment	Holds the WLAN device. 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.
(6)	 Hard drive bay and memory module compartment	The service door provides access to the hard drive bay and memory module compartment.

3 Illustrated parts catalog

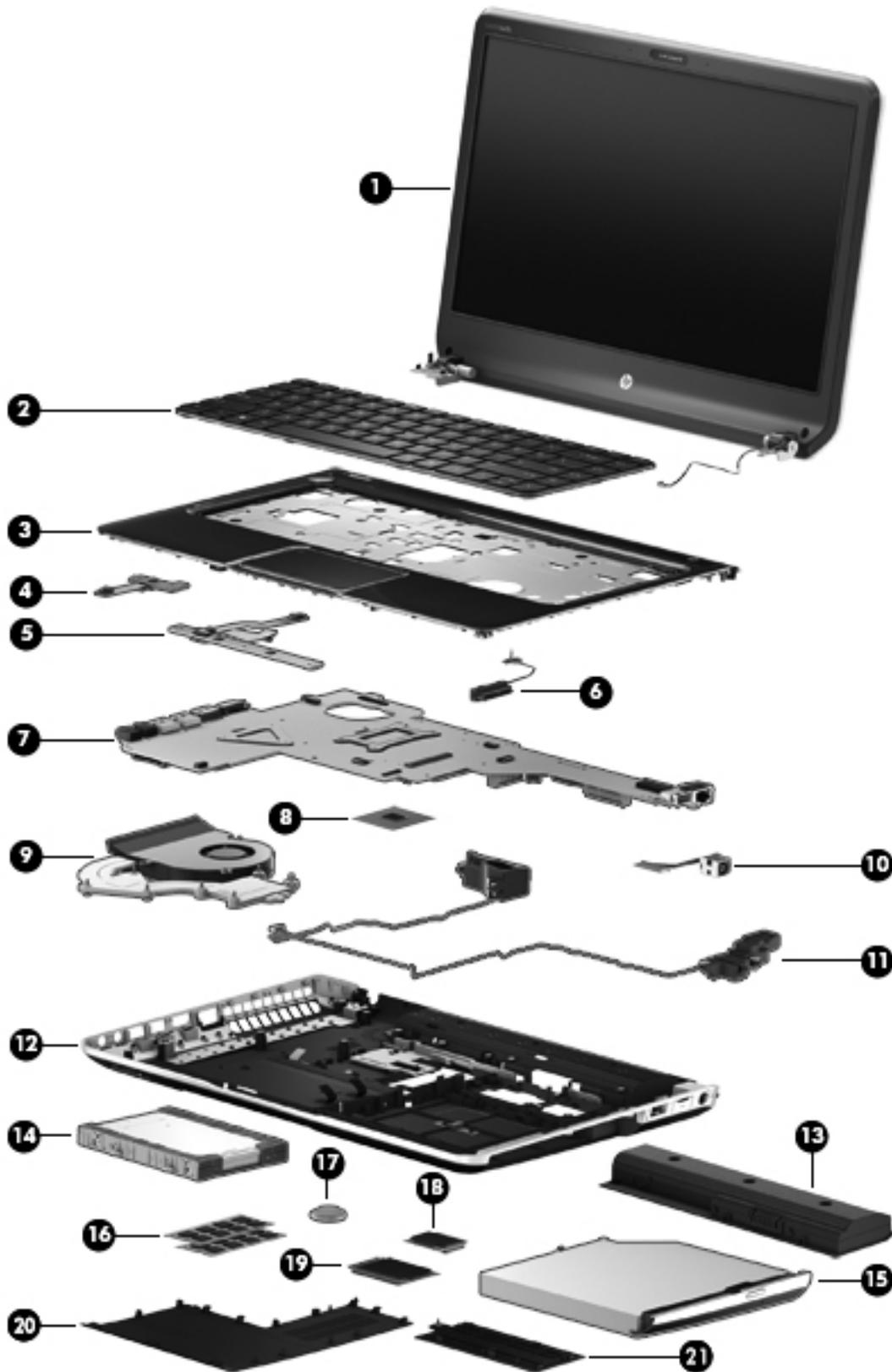
Service tag

When ordering parts or requesting information, provide the computer serial number and model description provided on the service tag. The service tag is located inside the battery bay. See [Battery on page 34](#) for battery removal instructions.



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

Computer major components

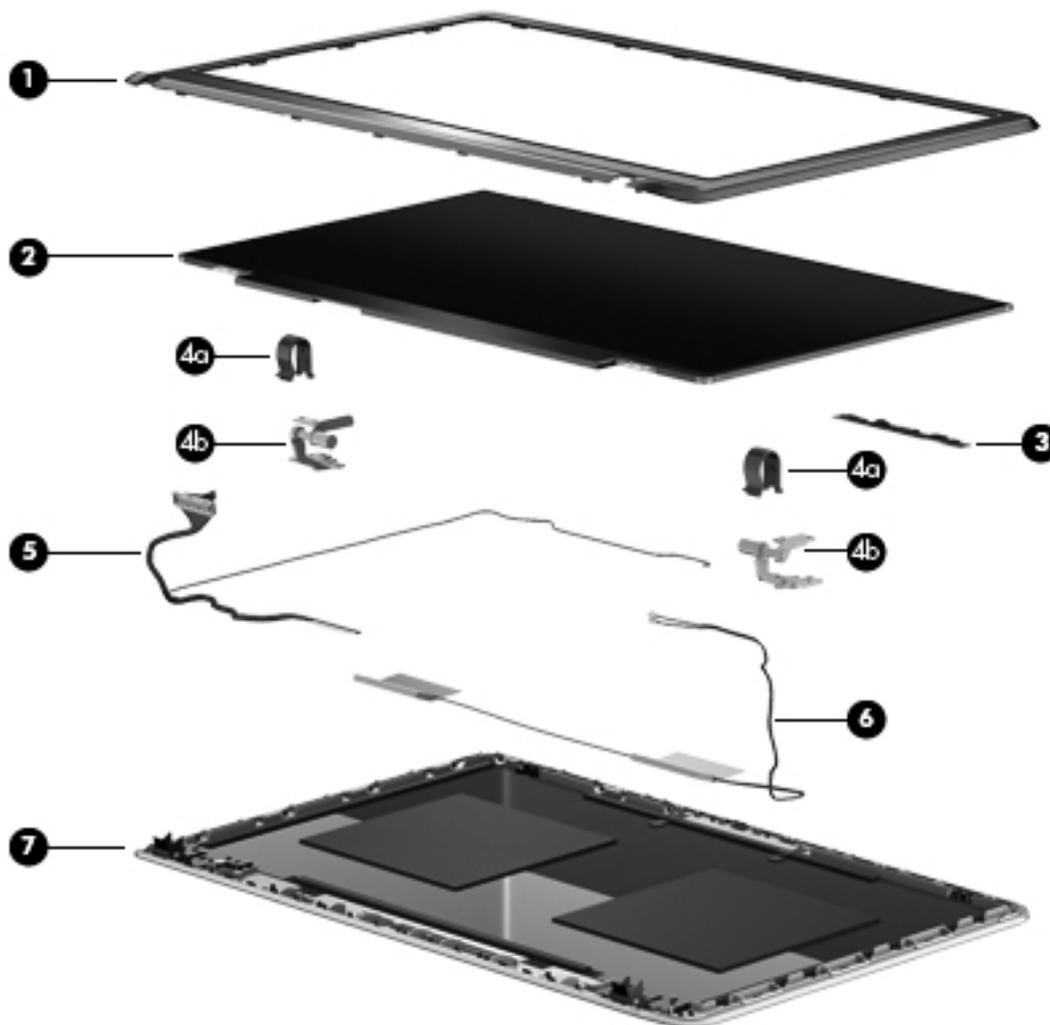


Item	Component	Spare part number
(1)	Display assembly: The display assembly is spared at the subcomponent level only. For more display assembly spare part information, see Display assembly subcomponents on page 20 .	
(2)	Keyboard (includes keyboard cable):	
	In black finish for use in Canada	676649-DB1
	In black finish for use in India	676649-D61
	In black finish for use in Japan	676649-291
	In black finish for use in Latin America	676649-161
	In black finish for use in South Korea	676649-AD1
	In black finish for use in Taiwan	676649-AB1
	In black finish for use in Thailand	676649-281
	In black finish for use in the United States	676649-001
	In linen white finish for use in Canada	676650-DB1
	In linen white finish for use in India	676650-D61
	In linen white finish for use in Japan	676650-291
	In linen white finish for use in Latin America	676650-161
	In linen white finish for use in South Korea	676650-AD1
	In linen white finish for use in Taiwan	676650-AB1
	In linen white finish for use in Thailand	676650-281
	In linen white finish for use in the United States	676650-001
(3)	Top cover (includes TouchPad and cable):	
	In black licorice finish	676657-001
	In carmine red finish	678261-001
	In linen white finish	676658-001
(4)	Power button board (includes cable)	676651-001
(5)	TouchPad button board (includes cable)	682488-001
(6)	Optical drive connector cable (included in the Optical Drive Hardware Kit, spare part number 681227-001)	
(7)	System board (includes replacement thermal material):	
	For use only on computer models equipped with a 45 W processor and a graphics subsystem with 2 GB of discrete memory	676761-001
	For use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory	684215-001
	For use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory	676759-001
	For use only on computer models equipped with a 45 W processor and a graphics subsystem with 1 GB of discrete memory	676760-001
	For use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory	684674-001

Item	Component	Spare part number
	For use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory	676758-001
	For use only on computer models equipped with a 35 W processor and a graphics subsystem with UMA memory	676756-001
(8)	Processor (includes replacement thermal material):	
	Intel Core i7-3612QM 2.1 GHz processor (SC turbo up 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)	680647-001
	Intel Core i7-3610QM 2.3 GHz processor (SC turbo up 3.3 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU	680646-001
	Intel Core i7-2670QM 2.2 GHz processor (SC turbo up 3.1 GHz, 1333 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU	665116-001
	Intel Core i5-3320M 2.6 GHz processor (SC turbo up 3.3 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)	681952-001
	Intel Core i5-3210M 2.5 GHz processor (SC turbo up 3.1 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)	680645-001
	Intel Core i5-2450M 2.5 GHz processor (SC turbo up 3.1 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or with NVIDIA GeForce GT 630M GPU	676359-001
	Intel Core i3-3110M 2.4 GHz processor (1600 MHz/3.0 MB L3 cache, dual core, 35 W)	682417-001
	Intel Core i3-2370M 2.4 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W) for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU	677152-001
	Intel Core i3-2350M 2.2 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory and NVIDIA GeForce GT 630M GPU	653340-001
	Intel Core i3-2330M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core 35 W), for use only on computer models equipped with UMA memory and NVIDIA GeForce GT 630M GPU (not available for all models)	653339-001
(9)	Fan/heat sink assembly (includes replacement thermal material):	
	For use only on computer models equipped with a graphics subsystem with discrete memory	681226-001
	For use only on computer models equipped with a graphics subsystem with UMA memory	681225-001
(10)	Power connector cable (includes bracket):	676645-001
(11)	Speakers (include subwoofer, speaker cables, and 4 rubber isolators)	676655-001
(12)	Base enclosure (includes battery release latch mechanism and RJ45 cover)	676643-001
	Rubber Feet Kit (includes 2 base enclosure rear rubber feet, not illustrated)	689843-001
(13)	6-cell, 62 Wh, 2.8 Ah, Li-ion battery	671731-001
(14)	Hard drive (does not include hard drive connector cable or hard drive rubber bracket):	
	1 TB, 5400-rpm, 9.5 mm	676521-001

Item	Component	Spare part number
	750 GB, 7200-rpm, 9.5 mm	633252-001
	750 GB, 5400-rpm, 9.5 mm	634250-001
	640 GB, 5400-rpm, 9.5 mm	669300-001
	500 GB, 7200-rpm, 9.5 mm	634925-001
	500 GB, 5400-rpm, 9.5 mm	669299-001
	320 GB, 7200-rpm, 7.0 mm	634862-001
	320 GB, 5400-rpm, 7.0 mm	645193-001
	Hard Drive Hardware Kit (not illustrated, includes hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and 2 screws)	676647-001
(15)	Optical drive (includes bezel and bracket):	
	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive (includes bezel and bracket)	676662-001
	DVD±RW Double-Layer SuperMulti Drive (includes bezel and bracket)	676661-001
	Optical Drive Hardware Kit (not illustrated, includes optical drive bezel, optical drive bracket, and optical drive connector cable)	681227-001
(16)	Memory modules (2, PC3, 12800, 1600 MHz):	
	8 GB memory module	670034-001
	4 GB memory module	641369-001
	2 GB memory module	652972-001
(17)	RTC battery	676654-001
(18)	WLAN module:	
	Broadcom 4313 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-005
	Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter (select models only)	670290-001
	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi and AR3012 Bluetooth 4.0 Combo Adapter (select models only)	655795-005
	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only)	675794-001
	Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter	670691-001
(19)	32 GB mSATA solid-state drive	676656-001
	Plastics Kit , includes:	676652-001
(20)	Service door	
(21)	Wireless cover (includes one captive retention screw, secured by a C-ring)	

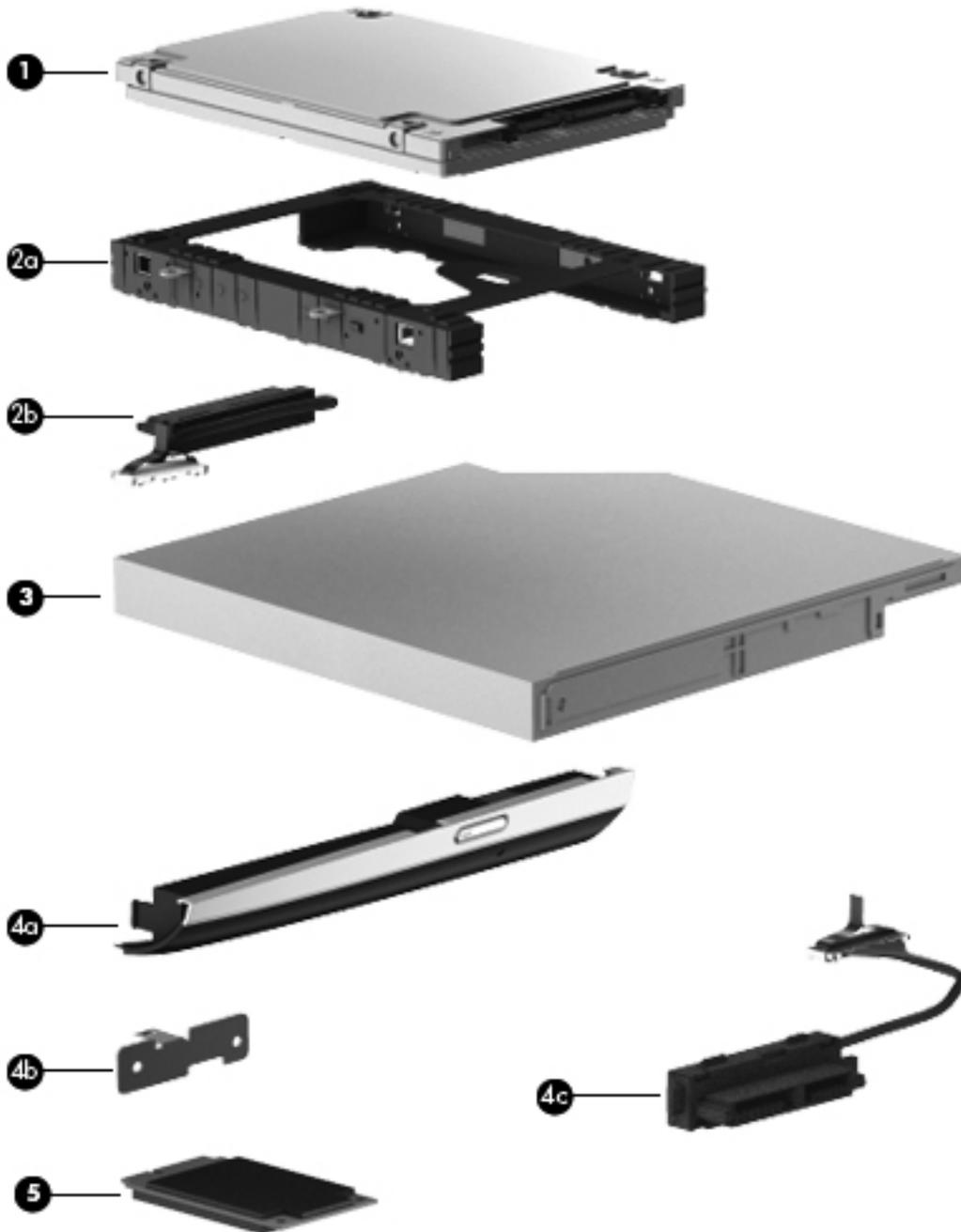
Display assembly subcomponents



Item	Component	Spare part number
(1)	Display bezel (includes 2 rubber screw covers)	676644-001
(2)	35.6 cm (14.0 in), LED, HD, BrightView display panel (includes 2 rubber screw covers)	676653-001
(3)	Webcamera/microphone module (includes 2 rubber screw covers)	676659-001
	Display Hinge Kit (includes 2 rubber screw covers, and):	676648-001
(4a)	Left and right hinge covers	
(4b)	Left and right hinges	
(5)	Display panel cable (includes webcam/microphone module cable and 2 rubber screw covers)	676646-001
(6)	Antenna Kit (includes left and right wireless antenna cables and transceivers and 2 rubber screw covers)	676640-001
(7)	Display enclosure (includes 2 rubber screw covers):	

Item	Component	Spare part number
	In black licorice finish	676641-001
	In carmine red finish	678260-001
	In linen white finish	676642-001

Mass storage devices



Item	Component	Spare part number
(1)	Hard drive (does not include the hard drive rubber bracket, hard drive connector cable, or screws)	
	1 TB, 5400-rpm, 9.5 mm	676521-001
	750 GB, 7200-rpm, 9.5 mm	633252-001
	750 GB, 5400-rpm, 9.5 mm	634250-001
	640 GB, 5400-rpm, 9.5 mm	669300-001
	500 GB, 7200-rpm, 9.5 mm	634925-001
	500 GB, 5400-rpm, 9.5 mm	669299-001
	320 GB, 7200-rpm, 7.0 mm	634862-001
	320 GB, 5400-rpm, 7.0 mm	645193-001
	Hard Drive Hardware Kit , includes:	676647-001
(2a)	Hard drive rubber bracket	
(2b)	Hard drive connector cable	
	Hard drive retention brackets (2, not illustrated)	
	Hard drive retention screws (2, not illustrated)	
(3)	Optical drive:	
	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive (includes bezel and bracket)	676662-001
	DVD±RW Double-Layer SuperMulti Drive (includes bezel and bracket)	676661-001
	Optical Drive Hardware Kit , includes:	681227-001
(4a)	Optical drive bezel	
(4b)	Optical drive bracket	
(4c)	Optical drive connector cable	
(5)	32 GB mSATA solid-state drive	676656-001

Miscellaneous parts

Component	Spare part number
AC adapter:	
120 W slim AC adapter (RC, V, PFC, 3-wire)	645156-001
90 W HP Smart AC adapter (RC, V, PFC, EM, 3-wire)	609947-001
90 W HP Smart AC adapter (RC, V, PFC, 3-wire)	609940-001
65 W HP Smart AC adapter (RC, V, EM, 3-wire)	609948-001
65 W HP Smart AC adapter (RC, V, 3-wire)	609939-001
Power cord (3-pin, black, 1.83-m):	

Component	Spare part number
For use in Argentina	490371-D01
For use in Australia	490371-011
For use in Europe	490371-021
For use in India	490371-D61
For use in Italy	490371-061
For use in Japan	490371-291
For use in North America	490371-001
For use in the People's Republic of China	490371-AA1
For use in South Korea	490371-AD1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
Screw Kit	681228-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use in North America (3-pin, black, 1.83-m)
490371-011	Power cord for use in Australia (3-pin, black, 1.83-m)
490371-021	Power cord for use in Europe (3-pin, black, 1.83-m)
490371-031	Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m)
490371-061	Power cord for use in Italy (3-pin, black, 1.83-m)
490371-201	Power cord for use in Thailand (3-pin, black, 1.83-m)
490371-291	Power cord for use in Japan (3-pin, black, 1.83-m)
490371-AA1	Power cord for use in the People's Republic of China (3-pin, black, 1.83-m)
490371-AD1	Power cord for use in South Korea (3-pin, black, 1.83-m)
490371-D01	Power cord for use in Argentina (3-pin, black, 1.83-m)
490371-D61	Power cord for use in India (3-pin, black, 1.83-m)
609939-001	65 W HP Smart AC adapter (RC, V, 3-wire)
609940-001	90 W HP Smart AC adapter (RC, V, PFC, 3-wire)
609947-001	90 W HP Smart AC adapter (RC, V, PFC, EM, 3-wire)
609948-001	65 W HP Smart AC adapter (RC, V, EM, 3-wire)
633252-001	750 GB, 7200-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws)
	NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.

Spare part number	Description
634250-001	750 GB, 5400-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
634862-001	320 GB, 7200-rpm hard drive (SATA, 7.0 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
634925-001	500 GB, 7200-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
641369-001	4 GB memory module (PC3, 12800, 1600 MHz)
645156-001	120 W slim AC adapter (RC, V, PFC, 3-wire)
645193-001	320 GB, 5400-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
652972-001	2 GB memory module (PC3, 12800, 1600 MHz)
653339-001	Intel Core i3-2330M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core 35 W), for use only on computer models equipped with UMA memory and NVIDIA GeForce GT 630M GPU (not available for all models)
653340-001	Intel Core i3-2350M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU; includes replacement thermal material
655795-005	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi and AR3012 Bluetooth 4.0 Combo Adapter (select models only)
657325-005	Broadcom 4313 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
665116-001	Intel Core i7-2670QM 2.2 GHz processor (SC turbo up 3.1 GHz, 1333 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU; includes replacement thermal material
669299-001	500 GB, 5400-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
669300-001	640 GB, 5400-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
670034-001	8 GB memory module (PC3, 12800, 1600 MHz)
670290-001	Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter (select models only)
670691-001	Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter
671731-001	6-cell, 62 Wh, 2.8 Ah, Li-ion battery

Spare part number	Description
675794-001	Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only)
676359-001	Intel Core i5-2450M 2.5 GHz processor (SC turbo up to 3.1 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or with NVIDIA GeForce GT 630M GPU; includes replacement thermal material
676521-001	1 TB, 5400-rpm hard drive (SATA, 9.5 mm, does not include hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws) NOTE: The hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, and screws are included in the Hard Drive Hardware Kit, spare part number 676647-001.
676640-001	Antenna Kit (includes left and right wireless antenna cables and transceivers and 2 rubber screw covers)
676641-001	Display enclosure in black licorice finish (includes 2 rubber screw covers)
676642-001	Display enclosure in linen white finish (includes 2 rubber screw covers)
676643-001	Base enclosure (includes battery release latch mechanism and RJ45 cover)
676644-001	Display bezel (includes 2 rubber screw covers and rubber bumpers)
676645-001	Power connector cable (includes bracket)
676646-001	Display panel cable (includes (includes webcam/microphone module cable and 2 rubber screw covers)
676647-001	Hard Drive Hardware Kit (includes hard drive rubber bracket, 2 hard drive retention brackets, 2 hard drive retention screws, and hard drive connector cable)
676648-001	Display Hinge Kit (includes left and right hinges and 2 rubber screw covers)
676649-001	Keyboard in black finish for use in the United States (includes keyboard cable)
676649-161	Keyboard in black finish for use in Latin America (includes keyboard cable)
676649-281	Keyboard in black finish for use in Thailand (includes keyboard cable)
676649-291	Keyboard in black finish for use in Japan (includes keyboard cable)
676649-AB1	Keyboard in black finish for use in Taiwan (includes keyboard cable)
676649-AD1	Keyboard in black finish for use in South Korea (includes keyboard cable)
676649-D61	Keyboard in black finish for use in India (includes keyboard cable)
676649-DB1	Keyboard in black finish for use in Canada (includes keyboard cable)
676650-001	Keyboard in linen white finish for use in the United States (includes keyboard cable)
676650-161	Keyboard in linen white finish for use in Latin America (includes keyboard cable)
676650-281	Keyboard in linen white finish for use in Thailand (includes keyboard cable)
676650-291	Keyboard in linen white finish for use in Japan (includes keyboard cable)
676650-AB1	Keyboard in linen white finish for use in Taiwan (includes keyboard cable)
676650-AD1	Keyboard in linen white finish for use in South Korea (includes keyboard cable)
676650-D61	Keyboard in linen white finish for use in India (includes keyboard cable)
676650-DB1	Keyboard in linen white finish for use in Canada (includes keyboard cable)
676651-001	Power button board (includes cable)

Spare part number	Description
676652-001	Plastics Kit (includes service door and wireless module compartment cover)
676653-001	35.6 cm (14.0 in), LED, HD, BrightView display panel (includes 2 rubber screw covers)
676654-001	RTC battery
676655-001	Speakers (include subwoofer, speaker cables, and 4 rubber isolators)
676656-001	32 GB mSATA solid-state drive
676657-001	Top cover in black licorice finish (includes TouchPad and cable)
676658-001	Top cover in linen white finish (includes TouchPad and cable)
676659-001	Webcamera/microphone module
676661-001	DVD±RW Double-Layer SuperMulti Drive (includes bezel and bracket)
676662-001	Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive (includes bezel and bracket)
676756-001	System board for use only on computer models equipped with a 35 W processor and a graphics subsystem with UMA memory (includes replacement thermal material)
676758-001	System board for use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory (includes replacement thermal material)
676759-001	System board for use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory (includes replacement thermal material)
676760-001	System board for use only on computer models equipped with a 45 W processor and a graphics subsystem with 1 GB of discrete memory (includes replacement thermal material)
676761-001	System board for use only on computer models equipped with a 45 W processor and a graphics subsystem with 2 GB of discrete memory (includes replacement thermal material)
677152-001	Intel Core i3-2370M 2.4 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W) for use only on computer models equipped with UMA memory or NVIDIA GeForce GT 630M GPU; includes replacement thermal material
678260-001	Display enclosure in carmine red finish (includes 2 rubber screw covers)
678261-001	Top cover in carmine red finish (includes TouchPad and cable)
680645-001	Intel Core i5-3210M 2.5 GHz processor (SC turbo up to 3.1 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W); includes replacement thermal material
680646-001	Intel Core i7-3610QM 2.3 GHz processor (SC turbo up to 3.3 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU; includes replacement thermal material
680647-001	Intel Core i7-3612QM 2.1 GHz processor (SC turbo up to 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W), includes replacement thermal material
681225-001	Fan/heat sink assembly for use only on computer models equipped with a graphics subsystem with UMA memory (includes replacement thermal material)
681226-001	Fan/heat sink assembly for use only on computer models equipped with a graphics subsystem with discrete memory (includes replacement thermal material)
681227-001	Optical Drive Hardware Kit (includes optical drive bezel, optical drive bracket, and optical drive connector cable)
681228-001	Screw Kit
681952-001	Intel Core i5-3320M 2.6 GHz processor (SC turbo up to 3.3 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W); includes replacement thermal material

Spare part number	Description
682417-001	Intel Core i3-3110M 2.4 GHz processor (1600 MHz/3.0 MB L3 cache, dual core, 35 W; includes replacement thermal material)
682488-001	TouchPad button board (includes cable)
684215-001	System board for use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory (includes replacement thermal material)
684674-001	System board for use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory (includes replacement thermal material)
689843-001	Rubber Feet Kit (includes 2 base enclosure rear rubber feet)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

 **CAUTION:** Using excessive force during disassembly and reassembly can damage plastic parts. Use care when handling the plastic parts. Apply pressure only at the points designated in the maintenance instructions.

Cables and connectors

 **CAUTION:** When servicing the computer, be sure that cables are placed in their proper locations during the reassembly process. Improper cable placement can damage the computer.

Cables must be handled with extreme care to avoid damage. Apply only the tension required to unseat or seat the cables during removal and insertion. Handle cables by the connector whenever possible. In all cases, avoid bending, twisting, or tearing cables. Be sure that cables are routed in such a way that they cannot be caught or snagged by parts being removed or replaced. Handle flex cables with extreme care; these cables tear easily.

Drive handling

⚠ CAUTION: Drives are fragile components that must be handled with care. To prevent damage to the computer, damage to a drive, or loss of information, observe these precautions:

Before removing or inserting a hard drive, shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

Before handling a drive, be sure that you are discharged of static electricity. While handling a drive, avoid touching the connector.

Before removing a diskette drive or optical drive, be sure that a diskette or disc is not in the drive and be sure that the optical drive tray is closed.

Handle drives on surfaces covered with at least one inch of shock-proof foam.

Avoid dropping drives from any height onto any surface.

After removing a hard drive, an optical drive, or a diskette drive, place it in a static-proof bag.

Avoid exposing an internal hard drive to products that have magnetic fields, such as monitors or speakers.

Avoid exposing a drive to temperature extremes or liquids.

If a drive must be mailed, place the drive in a bubble pack mailer or other suitable form of protective packaging and label the package "FRAGILE."

Grounding guidelines

Electrostatic discharge damage

Electronic components are sensitive to electrostatic discharge (ESD). Circuitry design and structure determine the degree of sensitivity. Networks built into many integrated circuits provide some protection, but in many cases, ESD contains enough power to alter device parameters or melt silicon junctions.

A discharge of static electricity from a finger or other conductor can destroy static-sensitive devices or microcircuitry. Even if the spark is neither felt nor heard, damage may have occurred.

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

⚠ CAUTION: To prevent damage to the computer when you are removing or installing internal components, observe these precautions:

Keep components in their electrostatic-safe containers until you are ready to install them.

Before touching an electronic component, discharge static electricity by using the guidelines described in this section.

Avoid touching pins, leads, and circuitry. Handle electronic components as little as possible.

If you remove a component, place it in an electrostatic-safe container.

The following table shows how humidity affects the electrostatic voltage levels generated by different activities.

⚠ CAUTION: A product can be degraded by as little as 700 V.

Typical electrostatic voltage levels

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 must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

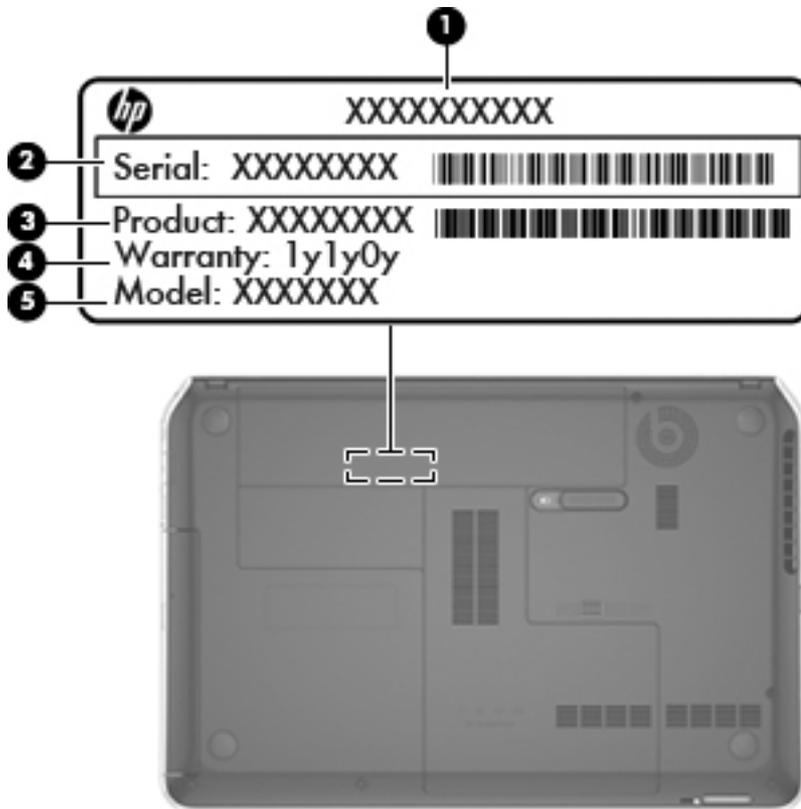
Component replacement procedures

This chapter provides removal and replacement procedures.

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

Service tag

When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag. It is necessary to remove the battery to obtain these numbers. See [Battery on page 34](#) for battery removal instructions.



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

Computer feet

Description	Spare part number
Rubber Feet Kit	689843-001

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



Battery

Description	Spare part number
6-cell, 62 Wh, 2.8 Ah, Li-ion battery	671731-001

Before disassembling the computer, follow these steps:

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

Remove the 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 front edge of the battery **(2)** up and back.

4. Remove the battery (3) from the computer.



To insert the battery:

1. Align the tabs on the rear edge of the battery with the notches on the rear edge of the battery bay.
2. Pivot the front edge of the battery down into the battery bay until it is seated. (The battery release latch will automatically lock into place.)

Service door

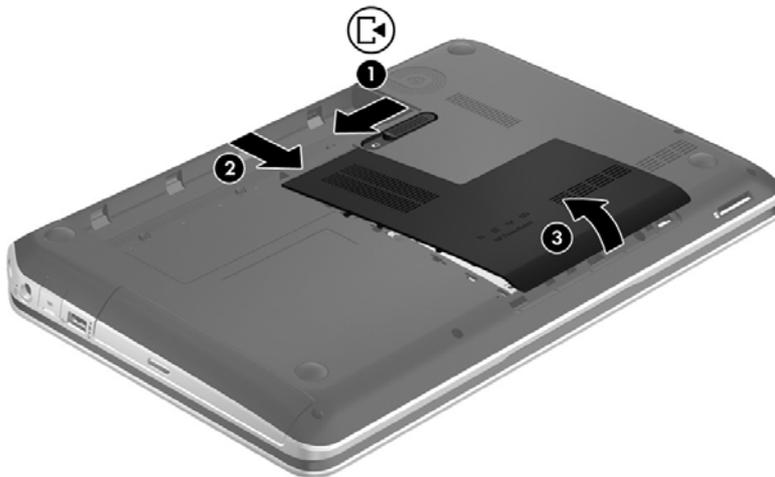
Description	Spare part number
Plastics Kit (contains the service door)	676652-001

Before removing the service door, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 34](#)).

Remove the service door:

1. Slide the battery release latch **(1)** to release the service door.
2. Slide the service door **(2)** toward the front of the computer.
3. Lift up and remove the service door **(3)**.



Reverse this procedure to replace the service door.

Hard drive



NOTE: The hard drive spare part kit does not include the hard drive rubber bracket, 2 hard drive retention brackets, hard drive connector cable, or screws. These components are included in the Hard Drive Hardware Kit, spare part number 676647-001.

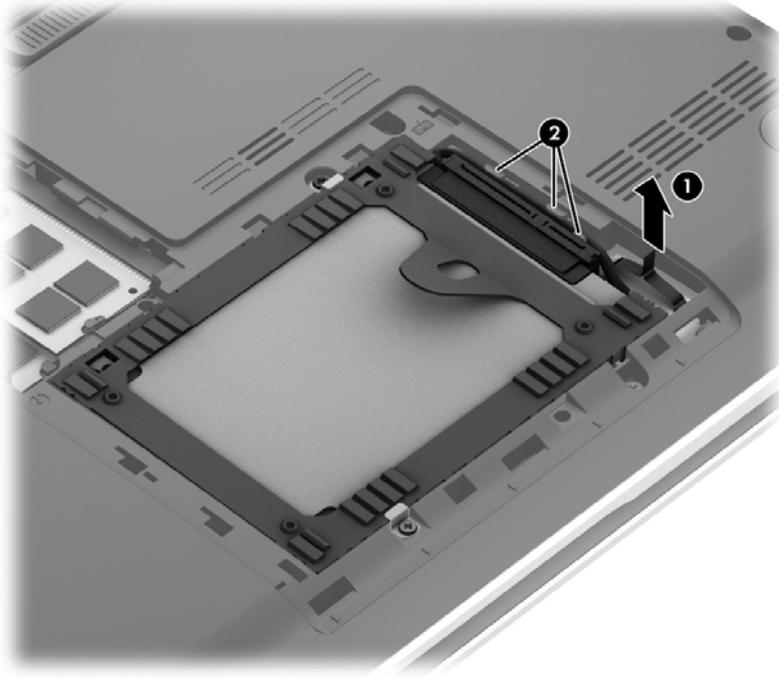
Description	Spare part number
1 TB, 5400-rpm, 9.5 mm	676521-001
750 GB, 7200-rpm, 9.5 mm	633252-001
750 GB, 5400-rpm, 9.5 mm	634250-001
640 GB, 5400-rpm, 9.5 mm	669300-001
500 GB, 7200-rpm, 9.5 mm	634925-001
500 GB, 5400-rpm, 9.5 mm	669299-001
320 GB, 7200-rpm, 7.0 mm	634862-001
320 GB, 5400-rpm, 7.0 mm	645193-001

Before removing the hard drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

Remove the hard drive:

1. Using the cable tab **(1)**, carefully lift up and disconnect the hard drive cable from the computer, and then pull the cable out from the routing clips **(2)**.

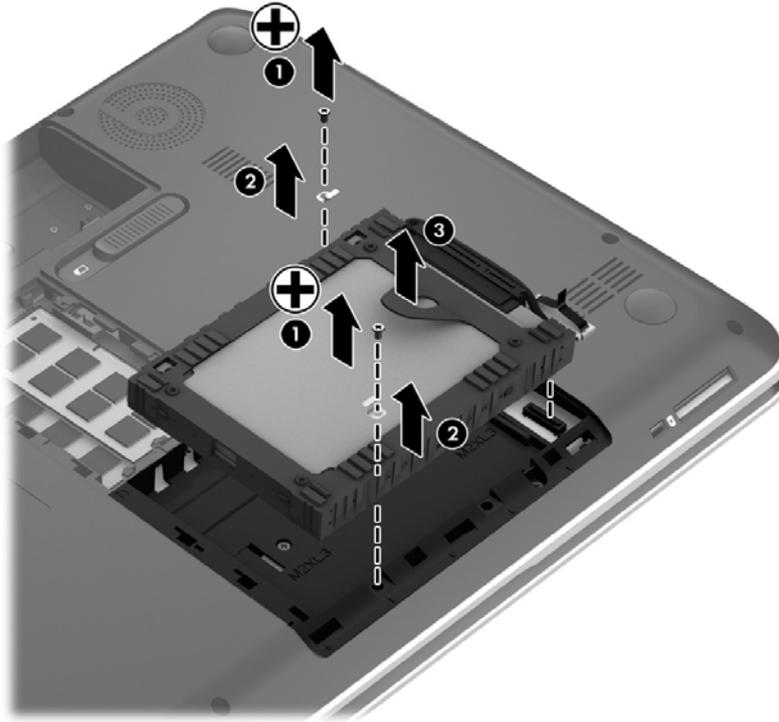


2. Remove the two Phillips M2.0×3.0 screws **(1)** that secure the hard drive to the computer.

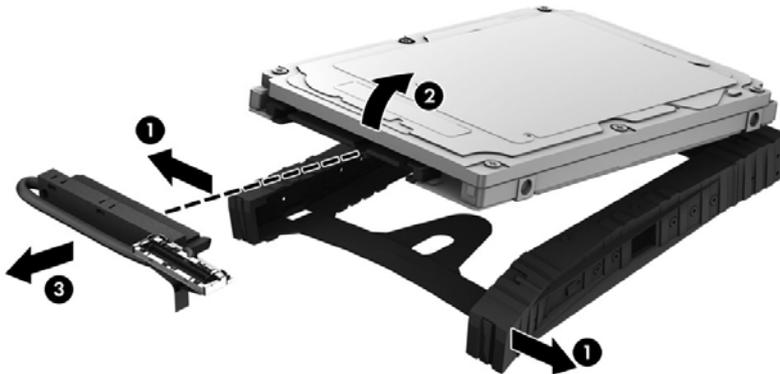


NOTE: When removing the hard drive retention screws, make note of the location and orientation of the hard drive retention brackets **(2)**. The hard drive retention brackets are included in the Hard Drive Hardware Kit, spare part number 676647-001.

3. Use the tab (3) to lift and remove the hard drive from the hard drive bay.



4. If it is necessary to disassemble the hard drive, perform the following steps:
 - a. Separate the front edges of the hard drive rubber bracket (1) from the hard drive
 - b. Remove the hard drive (2) from the bracket.
 - c. If necessary, disconnect the hard drive connector cable (3) from the hard drive. The hard drive rubber bracket and hard drive connector cable are available in the Hard Drive Hardware Kit, spare part number 676647-001.



To install a hard drive, reverse the removal procedure.

Optical drive



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

Description	Spare part number
Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive (includes bezel and bracket)	676662-001
DVD±RW Double-Layer SuperMulti Drive (includes bezel and bracket)	676661-001
Optical Drive Hardware Kit (includes optical drive bezel, optical drive bracket, and optical drive connector cable)	681227-001

Before removing the optical drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

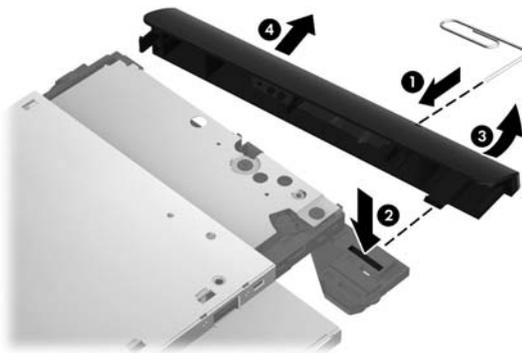
Remove the optical drive:

1. Remove the Phillips M2.5×7.0 screw **(1)** that secures the optical drive to the computer.
2. Use a flat-blade screw driver or similar tool to press on the optical drive bracket tab **(2)** to release the optical drive.

3. Remove the optical drive (3) from the computer.

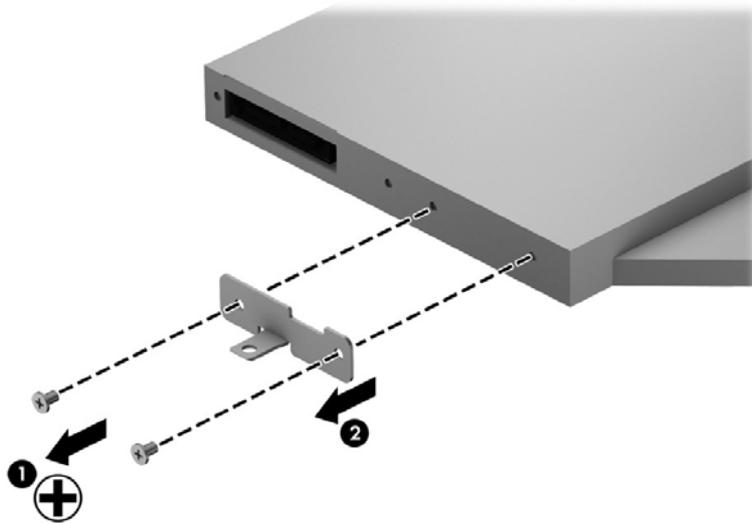


4. If it is necessary to replace the optical drive bezel, use a thin tool or an unbent paper clip (1) to release the optical drive tray.
5. Use a flat-blade screw driver or similar tool to press on the optical drive bezel tab (2) to release the optical drive bezel.
6. Release the left side of the optical drive bezel (3).
7. Remove the optical drive bezel (4).



8. If it is necessary to replace the optical drive bracket, position the optical drive with the rear panel toward you.
9. Remove the two Phillips M2.0×3.0 screws (1) that secure the optical drive bracket to the optical drive.

10. Remove the optical drive bracket (2).



Reverse this procedure to reassemble and install the optical drive.

Memory module

Description	Spare part number
8 GB memory module (PC3, 12800, 1600 MHz)	670034-001
4 GB memory module (PC3, 12800, 1600 MHz)	641369-001
2 GB memory module (PC3, 12800, 1600 MHz)	652972-001

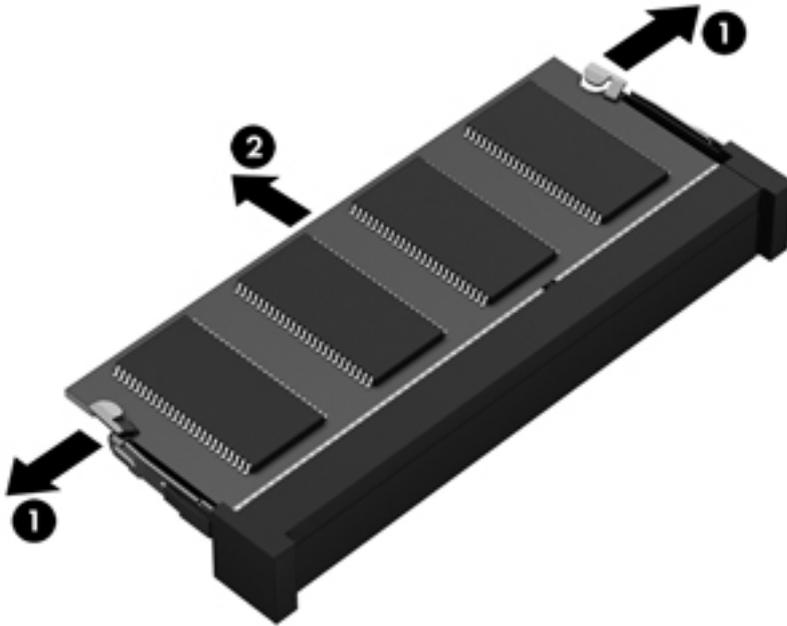
Before removing a memory module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

Remove the memory module:

1. Spread the retaining tabs (1) on each side of the memory module slot to release the memory module. (The memory module tilts up.)

2. Remove the memory module (2) by pulling it away from the slot at an angle.



Reverse this procedure to install the memory module.

Solid-state drive

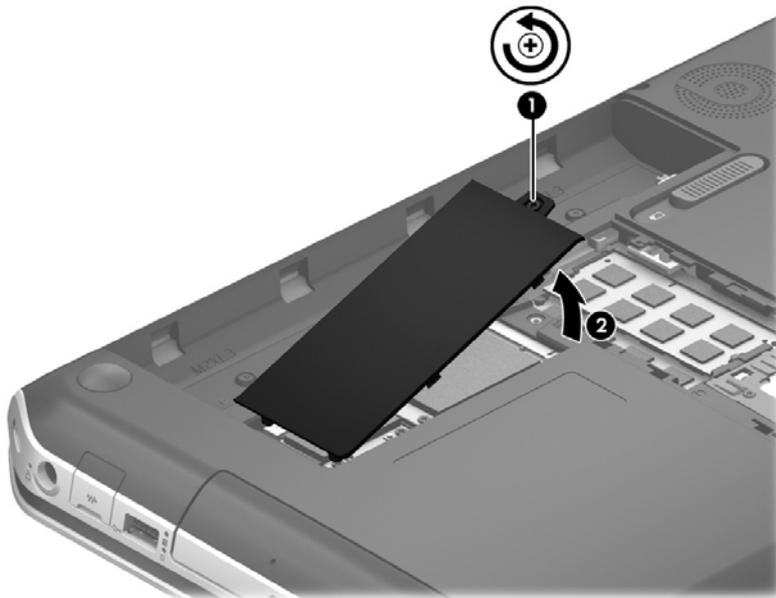
Description	Spare part number
32 GB mSATA solid-state drive	676656-001

Before removing the solid-state drive, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

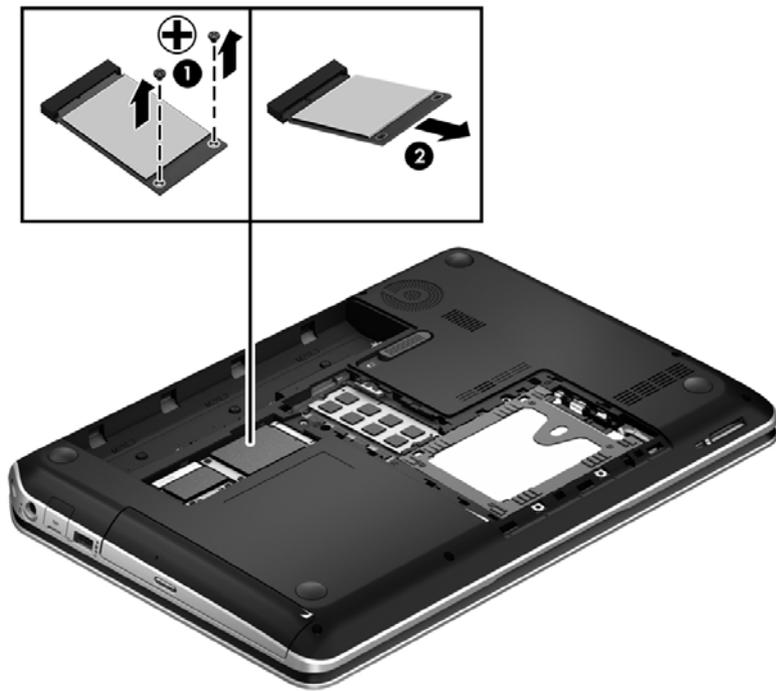
Remove the solid-state drive:

1. Loosen the Phillips M2.5×4.5 captive screw **(1)** that secures the wireless module compartment cover to the computer.
2. Lift the right side of the wireless module compartment cover **(2)** until it rests at an angle.



3. Remove the wireless module compartment cover. The wireless module compartment cover is available in the Plastics Kit, spare part number 676652-001.
4. Remove the two Phillips M2.0×3.5 screws **(1)** that secure the solid-state drive to the computer. (The solid-state drive tilts up.)

5. Remove the solid-state drive (2) by pulling the module away from the slot at an angle.



6. Remove the solid-state drive.
Reverse this procedure to install the solid-state drive.

RTC battery

Description	Spare part number
RTC battery	676654-001

Before removing the RTC battery, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).
6. Remove the solid-state drive (see [Solid-state drive on page 44](#)).

Remove the RTC battery:

1. Use a flat-bladed, non-metallic tool **(1)** to release the RTC battery from the socket on the system board.
2. Remove the RTC battery **(2)**.



3. Remove the RTC battery.

Reverse this procedure to install the RTC battery. When installing the RTC battery, make sure the “+” sign faces up.

WLAN module

Description	Spare part number
Broadcom 4313 802.11b/g/n 1×1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-005
Intel Centrino Wireless-N 2230 802.11b/g/n 2×2 WiFi and Bluetooth Combo Adapter (select models only)	670290-001
Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi and AR3012 Bluetooth 4.0 Combo Adapter (select models only)	655795-005
Qualcomm Atheros AR9485 802.11b/g/n 1×1 WiFi Adapter (select models only)	675794-001
Ralink RT5390R 802.11b/g/n 1×1 WiFi Adapter	670691-001

 **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore device functionality, and then contact technical support.

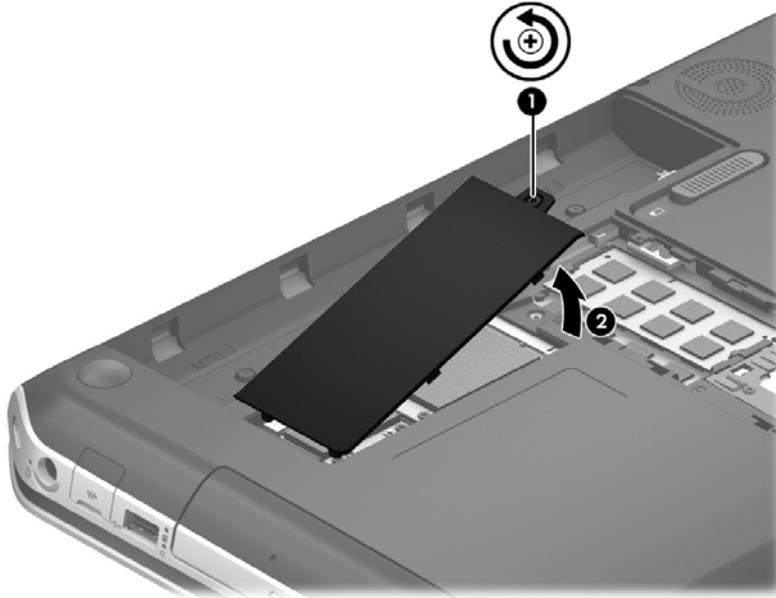
Before removing the WLAN module, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

Remove the WLAN module:

1. Loosen the Phillips M2.5×4.5 captive screw **(1)** that secures the wireless module compartment cover to the computer.

2. Lift the right side of the wireless module compartment cover (2) until it rests at an angle.



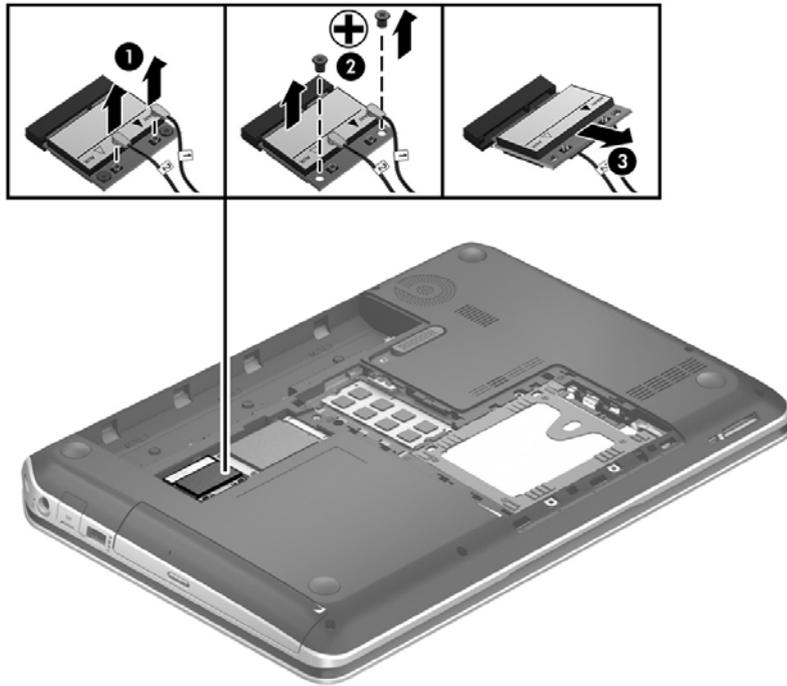
3. Remove the wireless module compartment cover. The wireless module compartment cover is available in the Plastics Kit, spare part number 676652-001.
4. Disconnect the WLAN antenna cables (1) from the terminals on the WLAN module.



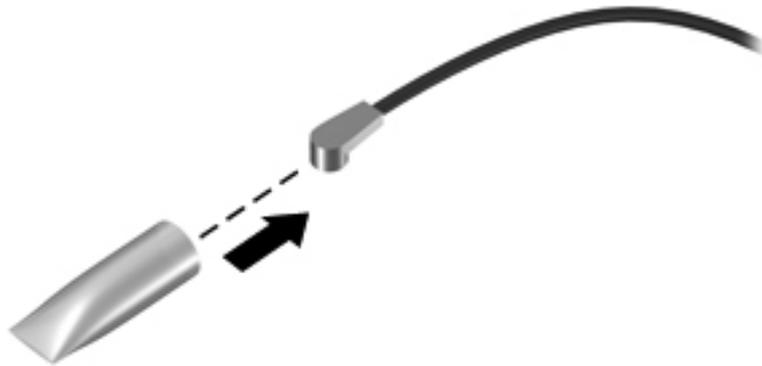
NOTE: The #1 WLAN antenna cable is connected to the WLAN module “Main” terminal. The #2 WLAN antenna cable is connected to the WLAN module “Aux” terminal.

5. Remove the two Phillips M2.0×3.5 screws (2) that secure the WLAN module to the system board. (The WLAN module tilts up.)

6. Remove the WLAN module (3) by pulling the module away from the slot at an angle.



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



Reverse this procedure to install the WLAN module.

Keyboard



NOTE: The keyboard spare part kit includes a keyboard cable.

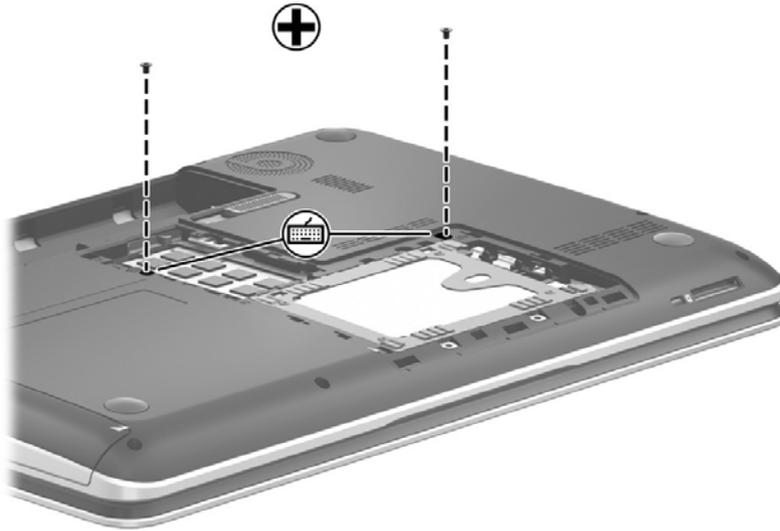
Description	Spare part number
In black finish for use in Canada	676649-DB1
In black finish for use in India	676649-D61
In black finish for use in Japan	676649-291
In black finish for use in Latin America	676649-161
In black finish for use in South Korea	676649-AD1
In black finish for use in Taiwan	676649-AB1
In black finish for use in Thailand	676649-281
In black finish for use in the United States	676649-001
In linen white finish for use in Canada	676650-DB1
In linen white finish for use in India	676650-D61
In linen white finish for use in Japan	676650-291
In linen white finish for use in Latin America	676650-161
In linen white finish for use in South Korea	676650-AD1
In linen white finish for use in Taiwan	676650-AB1
In linen white finish for use in Thailand	676650-281
In linen white finish for use in the United States	676650-001

Before removing the keyboard, follow these steps:

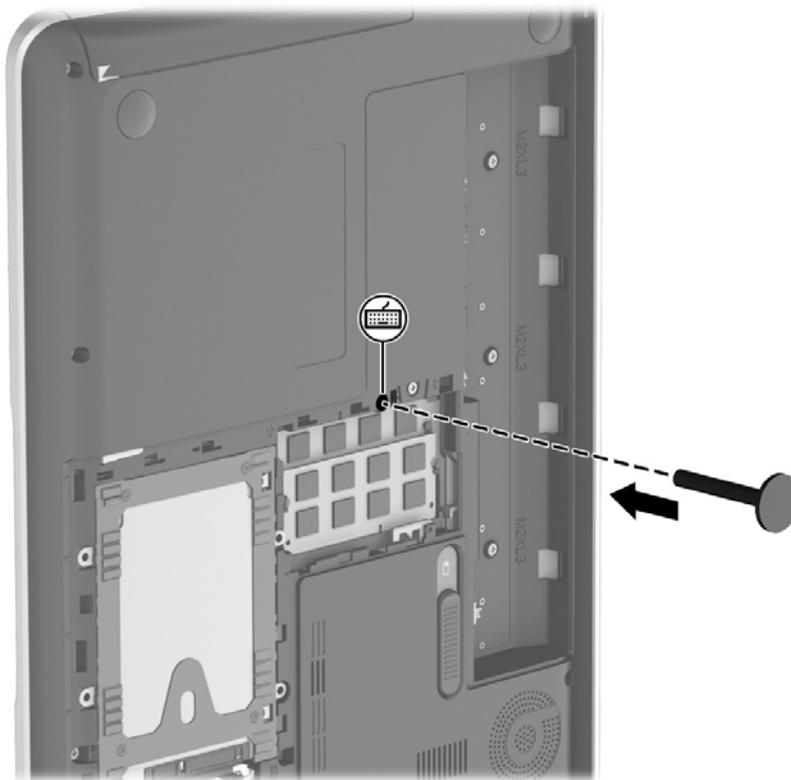
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)).
5. Remove the service door (see [Service door on page 36](#)).

Remove the keyboard:

1. Remove the two Phillips M2.5×6.5 screws that secure the keyboard to the computer.



2. Rest the computer on its left side.
3. Open the computer.
4. Insert a thin tool into the left retention screw hole, and then press on the back of the keyboard until the keyboard disengages from the computer.



5. Turn the computer right-side up with the front toward you.

6. Lift the rear edge of the keyboard (1), and then swing the keyboard (2) up and forward until it rests upside down on the palm rest.



7. Release the ZIF connector (1) to which the keyboard cable is connected, and then disconnect the keyboard cable (2) from the system board.
8. Remove the keyboard (3).



Reverse this procedure to install the keyboard.

Top cover



NOTE: The top cover spare part kit includes the includes TouchPad and cable.

Description	Spare part number
In black licorice finish	676657-001
In carmine red finish	678261-001
In linen white finish	676658-001

Before removing the top cover, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Keyboard (see [Keyboard on page 50](#))

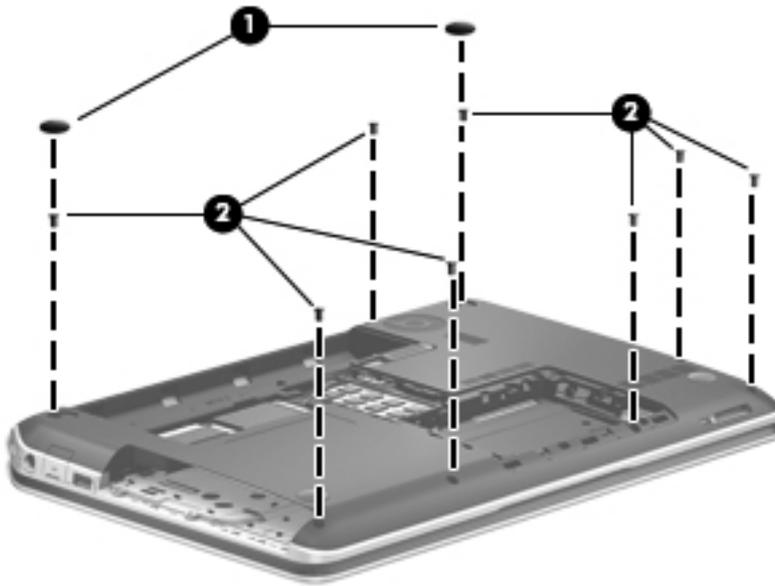


NOTE: When replacing the top cover, be sure to remove the power button board and TouchPad button board from the defective top cover and install them on the replacement top cover. See [Power button board on page 56](#) and [TouchPad button board on page 58](#) for removal and replacement instructions for these components.

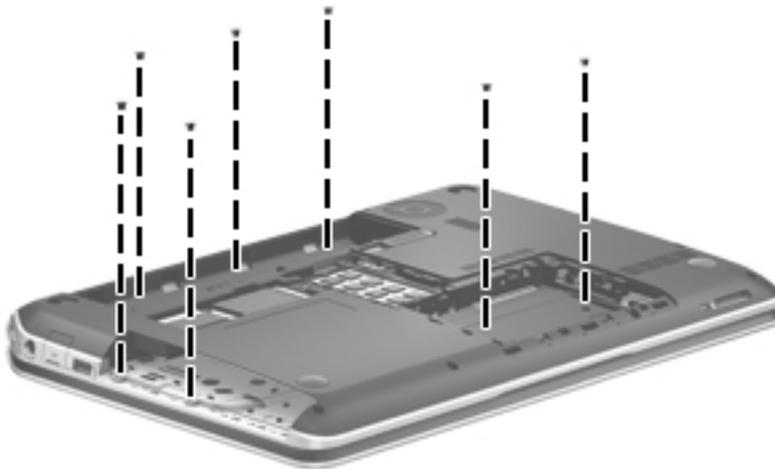
Remove the top cover:

1. Remove the two rear rubber feet **(1)**. The rubber feet are included in the Rubber Feet Kit, spare part number 689843-001.

2. Remove the eight Phillips M2.5×6.5 screws (2) that secure the top cover to the computer.



3. Remove the seven Phillips M2.0×3.5 screws that secure the top cover to the computer.

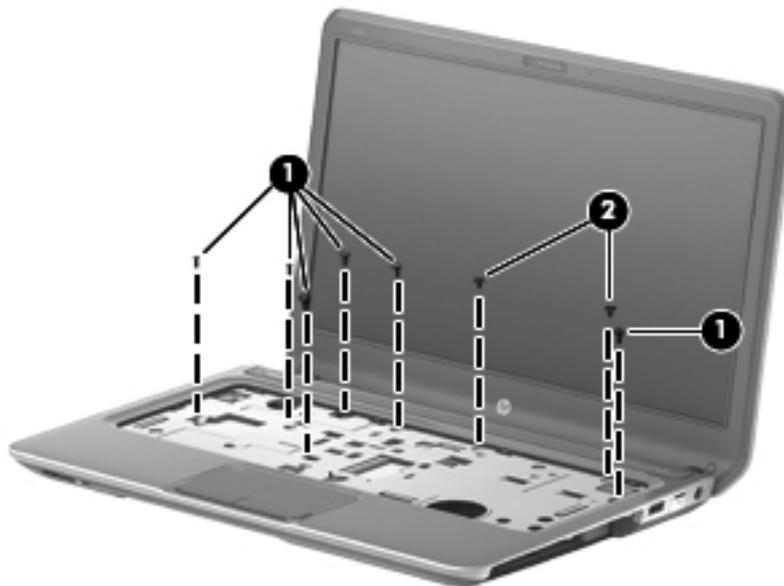


4. Turn the computer right side up, with the front toward you.
5. Open the computer.
6. Release the ZIF connector to which the power button board cable is connected, and then disconnect the power button board (1) cable from the system board.

7. Release the ZIF connector to which the TouchPad button board cable is connected, and then disconnect the TouchPad button board (2) cable from the system board.



8. Remove the six Phillips M2.5×6.5 screws (1) that secure the top cover to the computer.
9. Remove the two Phillips M2.0×3.5 screws (2) that secure the top cover to the computer.



10. Use a thin plastic tool to release the top cover. Insert the tool between the top cover and base enclosure and slide the tool as shown from the following points:
 - a. Between the VGA and HDMI connectors (1)
 - b. Under the TouchPad area (2)

CAUTION: Be careful not to damage the thin section of the base enclosure around the optical drive bay when releasing the top cover.

 - c. Before the optical drive bay (3)
 - d. From the rear left and right edges (4)
11. Lift the rear edge of the top cover (5).
12. Remove the top cover (6).



Reverse this procedure to install the top cover.

Power button board

Description	Spare part number
Power button board (includes cable)	676651-001

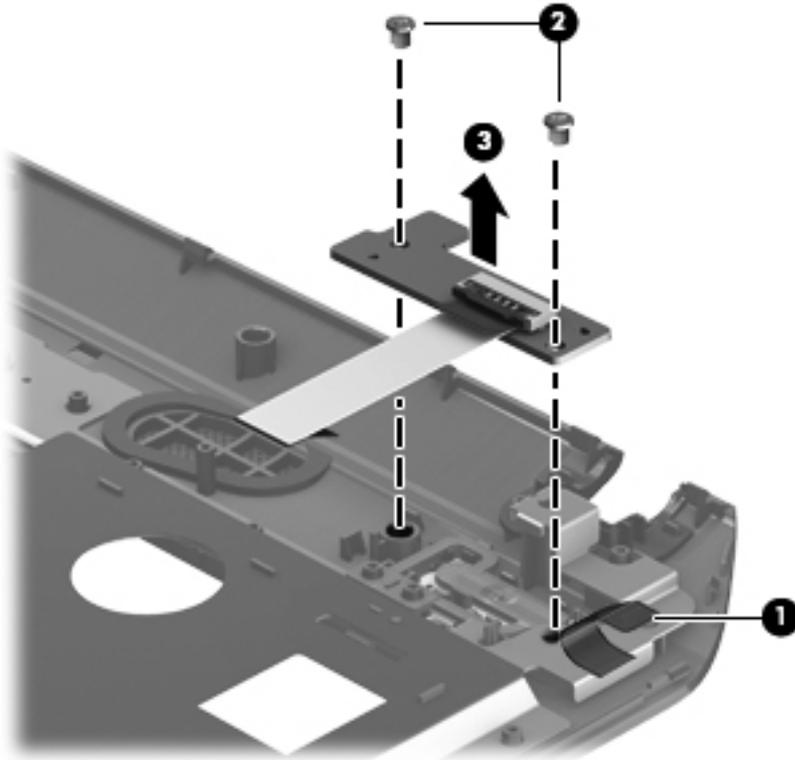
Before removing the power button board, follow these steps:

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

3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Keyboard (see [Keyboard on page 50](#))
 - e. Top cover (see [Top cover on page 53](#))

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.
2. Release the shield (1) that covers the power button board.
3. Remove the two Phillips M2.0×4.5 screws (2) that secure the power button board to the top cover.
4. Remove the power button board (3) and cable.



Reverse this procedure to install the power button board.

TouchPad button board

Description	Spare part number
TouchPad button board (includes cable)	682488-001

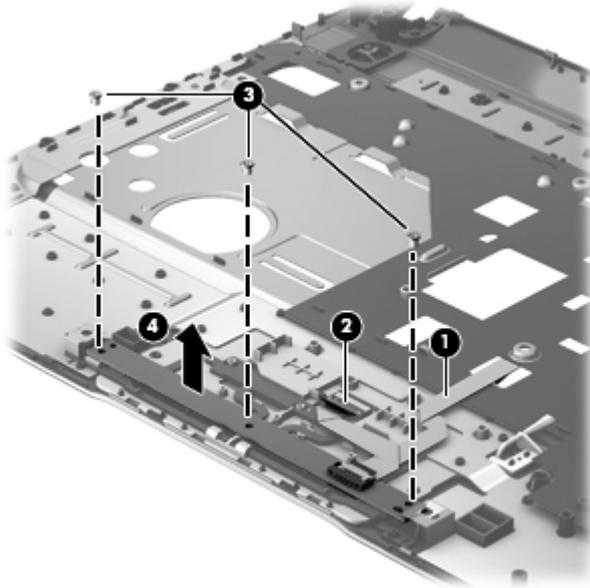
Before removing the TouchPad button board, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Keyboard (see [Keyboard on page 50](#))
 - e. Top cover (see [Top cover on page 53](#))

Remove the TouchPad button board:

1. Turn the top cover upside down, with the front toward you.
2. Release the TouchPad button board cable **(1)** from the top cover. (The TouchPad button board cable is attached to the top cover by double-sided tape.)
3. Release the TouchPad ZIF connector to which the TouchPad button board cable is connected, and then disconnect the TouchPad button board cable **(2)** from the TouchPad board.
4. Remove the three Phillips M2.0×3.5 screws **(3)** that secure the TouchPad button board bracket to the top cover.

5. Remove the TouchPad button board (4).



Reverse this procedure to install the TouchPad button board.

Optical drive connector cable

 **NOTE:** The optical drive connector cable is included in the Optical Drive Hardware Kit, spare part number 681227-001.

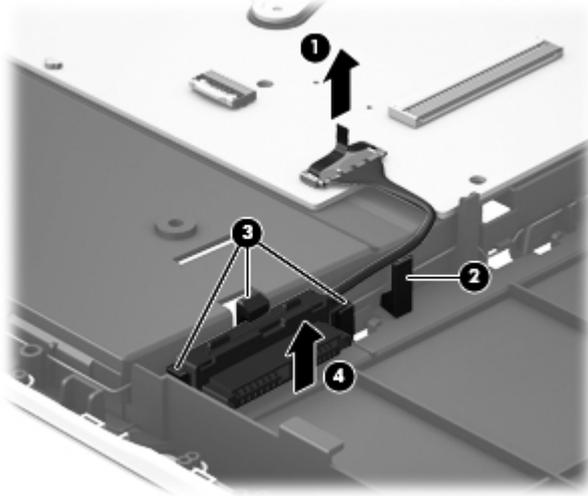
Before removing the optical drive connector cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Keyboard (see [Keyboard on page 50](#))
 - e. Top cover (see [Top cover on page 53](#))

Remove the optical drive connector cable:

1. Disconnect the optical drive connector cable (1) from the system board.
2. Release the optical drive connector cable from the clip (2) built into the base enclosure.
3. Release the clip (3) built into the base enclosure that secures the optical drive connector to the base enclosure.

4. Remove the optical drive connector cable (4).



Reverse this procedure to install the optical drive connector cable.

System board



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

Description	Spare part number
For use only on computer models equipped with a 45 W processor and a graphics subsystem with 2 GB of discrete memory	676761-001
For use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory	684215-001
For use only on computer models equipped with a 35 W processor and a graphics subsystem with 2 GB of discrete memory	676759-001
For use only on computer models equipped with a 45 W processor and a graphics subsystem with 1 GB of discrete memory	676760-001
For use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory	684674-001
For use only on computer models equipped with a 35 W processor and a graphics subsystem with 1 GB of discrete memory	676758-001
For use only on computer models equipped with a 35 W processor and a graphics subsystem with UMA memory	676756-001

Before removing the system board, follow these steps:

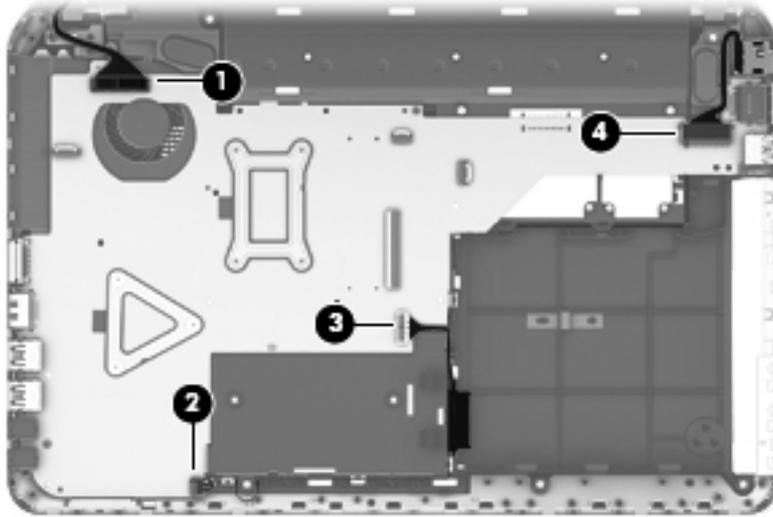
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Solid-state drive (see [Solid-state drive on page 44](#))
 - e. WLAN module (see [WLAN module on page 47](#))
 - f. Keyboard (see [Keyboard on page 50](#))
 - g. Top cover (see [Top cover on page 53](#))

When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see [Memory module on page 42](#))
- RTC battery (see [RTC battery on page 46](#))
- Fan/heat sink assembly (see [Fan/heat sink assembly on page 64](#))
- Processor (see [Processor on page 68](#))

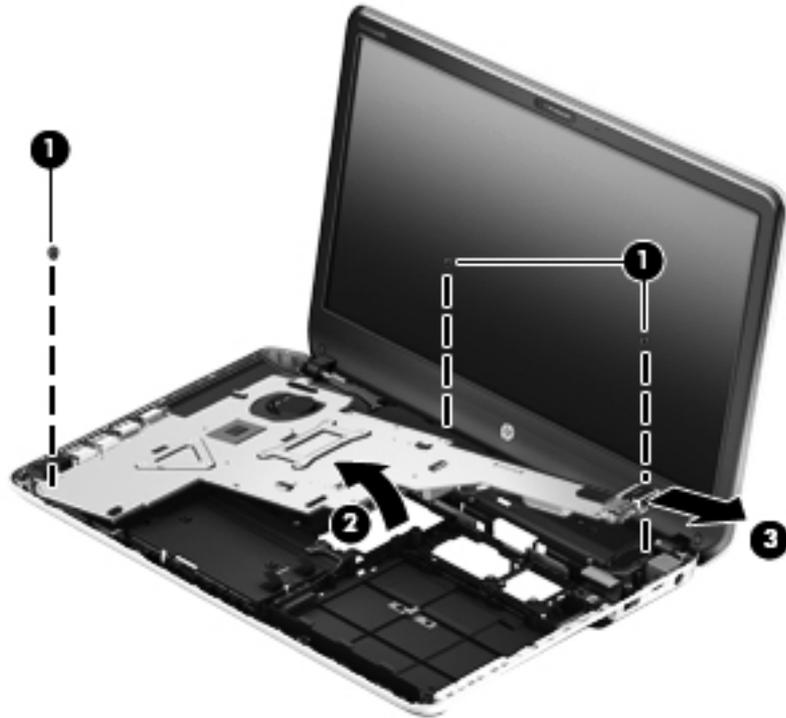
Remove the system board:

1. Disconnect the following cables from the system board:
 - (1) Display panel cable
 - (2) Speaker cable
 - (3) Optical drive connector cable
 - (4) Power connector cable



2. Remove the three Phillips M2.0×5.0 screws (1) that secure the system board to the base enclosure.
3. Lift the right side of the system board (2) until it rests at an angle.

4. Remove the system board (3) by sliding it up and to the right at an angle.



Reverse this procedure to install the system board.

Fan/heat sink assembly

 **NOTE:** The fan/heat sink assembly spare part kit include replacement thermal material.

Description	Spare part number
For use only on computer models equipped with a graphics subsystem with discrete memory	681226-001
For use only on computer models equipped with a graphics subsystem with UMA memory	681225-001

 **NOTE:** To properly ventilate the computer, allow at least 7.6 cm (3 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

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

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Solid-state drive (see [Solid-state drive on page 44](#))
 - e. WLAN module (see [WLAN module on page 47](#))
 - f. Keyboard (see [Keyboard on page 50](#))
 - g. Top cover (see [Top cover on page 53](#))
 - h. System board (see [System board on page 61](#))

Remove the fan/heat sink assembly:

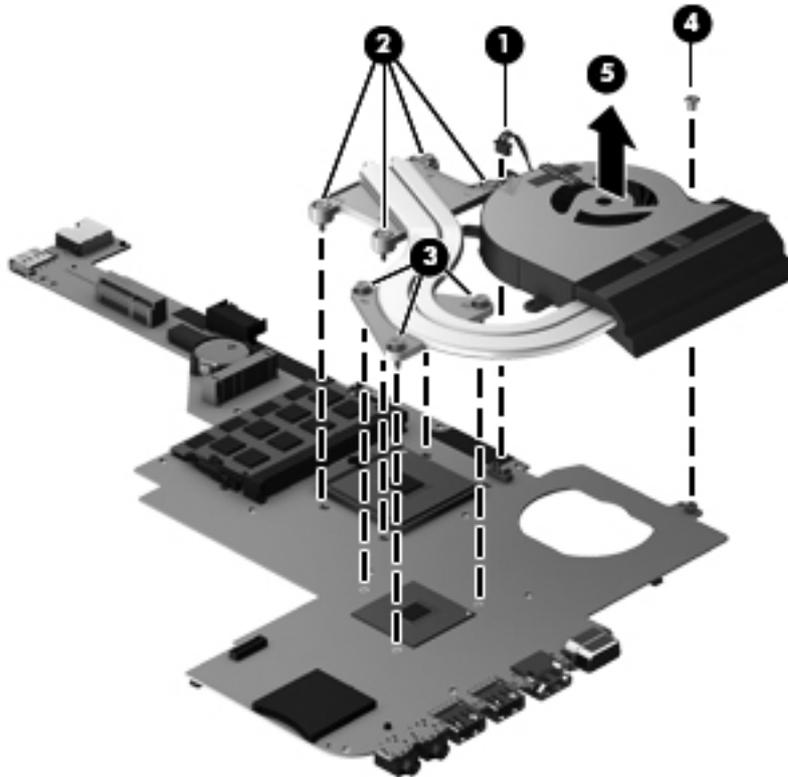
1. Turn the system board upside down, with the front toward you.

 **NOTE:** Steps 2 through 5 apply to computer models equipped with a graphics subsystem with discrete memory. See steps 6 and 9 for fan/heat sink assembly removal information for computer models equipped with a graphics subsystem with UMA memory.

2. Disconnect the fan cable **(1)** from the system board.
3. Following the 1, 2, 3, 4, 5, 6, 7 sequence stamped into the fan/heat sink assembly, loosen the four Phillips M2.0×10.0 captive screws **(2)** and the three Phillips M2.0×3.5 captive screws **(3)** that secure the fan/heat sink assembly to the system board.
4. Remove the Phillips M2.0×5.0 screw **(4)** that secures the fan/heat sink assembly to the system board.

5. Remove the fan/heat sink assembly (5).

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

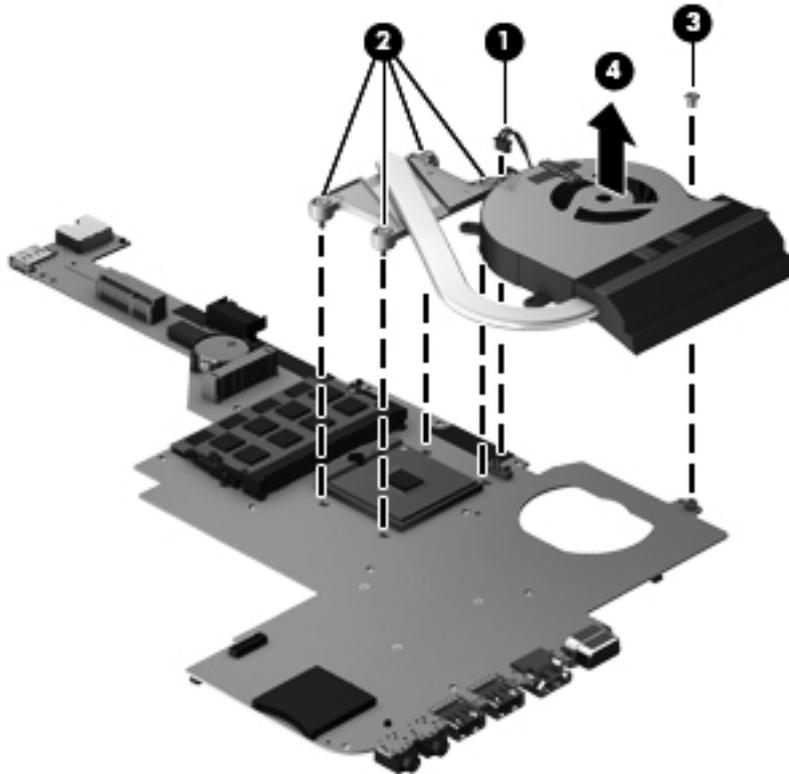


 **NOTE:** Steps 6 and 9 apply to computer models equipped with a graphics subsystem with UMA memory. See steps 2 through 5 for fan/heat sink assembly removal information for computer models equipped with a graphics subsystem with discrete memory.

6. Disconnect the fan cable (1) from the system board.
7. Following the 1, 2, 3, 4 sequence stamped into the fan/heat sink assembly, loosen the four Phillips M2.0×10.0 captive screws (2) that secure the fan/heat sink assembly to the system board.
8. Remove the Phillips M2.0×5.0 screw (3) that secures the fan/heat sink assembly to the system board.

9. Remove the fan/heat sink assembly **(4)**.

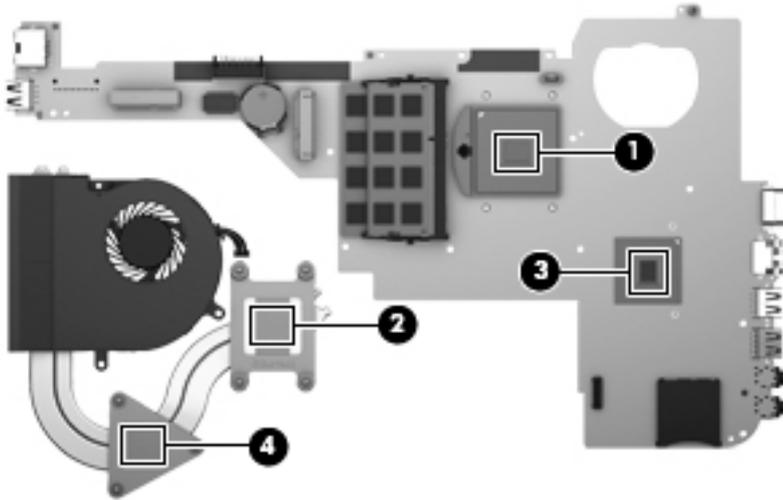
 **NOTE:** Due to the adhesive quality of the thermal material located between the fan/heat sink assembly and system board components, it may be necessary to move the fan/heat sink assembly from side to side to detach it.



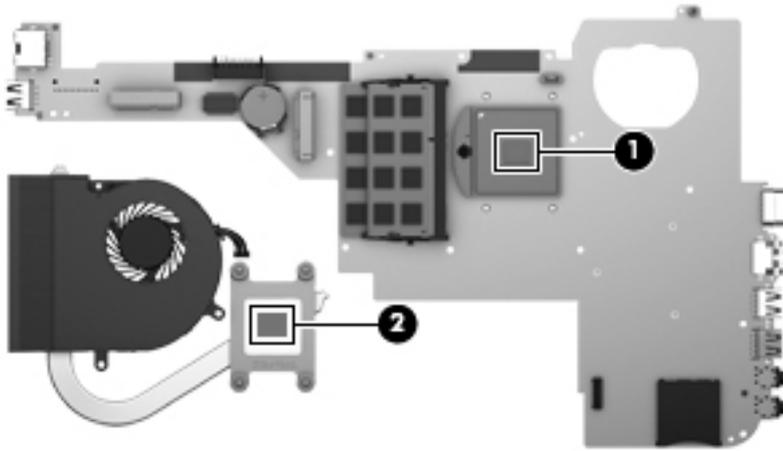
 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board components each time the fan/heat sink assembly is removed. Replacement thermal material is included with the fan/heat sink assembly, processor, and system board spare part kits.

 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with a graphics subsystem with discrete memory.

- Thermal paste is used on the processor **(1)** and the fan/heat sink assembly section **(2)** that services it
- Thermal paste is used on the graphics subsystem chip **(3)** and the fan/heat sink assembly section **(4)** that services it



 **NOTE:** The following illustration shows the replacement thermal material locations on a computer model equipped with a graphics subsystem with UMA memory. Thermal paste is used on the processor (1) and the fan/heat sink assembly section (2) that services it.



Reverse this procedure to install the fan/heat sink assembly.

Processor



NOTE: The processor spare part kit include replacement thermal material.

Description	Spare part number
Intel Core i7-3612QM 2.1 GHz processor (SC turbo up 3.1 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 35 W)	680647-001
Intel Core i7-3610QM 2.3 GHz processor (SC turbo up 3.3 GHz, 1600 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU	680646-001
Intel Core i7-2670QM 2.2 GHz processor (SC turbo up 3.1 GHz, 1333 MHz/6.0 MB L3 cache, quad core, 45 W), for use only on computer models equipped with NVIDIA GeForce GT 630M GPU	665116-001
Intel Core i5-3320M 2.6 GHz processor (SC turbo up 3.3 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)	681952-001
Intel Core i5-3210M 2.5 GHz processor (SC turbo up 3.1 GHz, 1600 MHz/3.0 MB L3 cache, dual core, 35 W)	680645-001
Intel Core i5-2450M 2.5 GHz processor (SC turbo up 3.1 GHz, 1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or with NVIDIA GeForce GT 630M GPU	676359-001
Intel Core i3-3110M 2.4 GHz processor (1600 MHz/3.0 MB L3 cache, dual core, 35 W)	682417-001
Intel Core i3-2370M 2.4 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or with NVIDIA GeForce GT 630M GPU	677152-001
Intel Core i3-2350M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core, 35 W), for use only on computer models equipped with UMA memory or with NVIDIA GeForce GT 630M GPU	653340-001
Intel Core i3-2330M 2.3 GHz processor (1333 MHz/3.0 MB L3 cache, dual core 35 W), for use only on computer models equipped with UMA memory and NVIDIA GeForce GT 630M GPU (not available for all models)	653339-001

Before removing the processor, follow these steps:

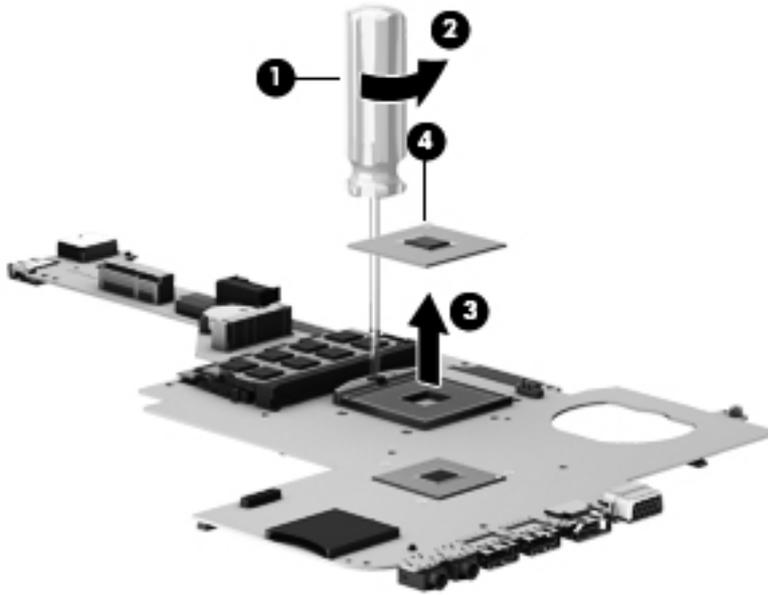
1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Fan/heat sink assembly (see [Fan/heat sink assembly on page 64](#))
4. Disconnect all external devices from the computer.
5. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Solid-state drive (see [Solid-state drive on page 44](#))
 - e. WLAN module (see [WLAN module on page 47](#))
 - f. Keyboard (see [Keyboard on page 50](#))

- g. Top cover (see [Top cover on page 53](#))
- h. System board (see [System board on page 61](#))
- i. Fan/heat sink assembly (see [Fan/heat sink assembly on page 64](#))

Remove the processor:

1. Use a flat-bladed screw driver (1) to turn the processor locking screw one-half turn counterclockwise (2), until you hear a click.
2. Lift the processor (3) straight up, and remove it.

 **NOTE:** The gold triangle (4) on the processor must be aligned with the triangle icon embossed on the processor socket when you install the processor.



Reverse this procedure to install the processor.

Power connector cable

Description	Spare part number
Power connector cable (includes bracket)	676645-001

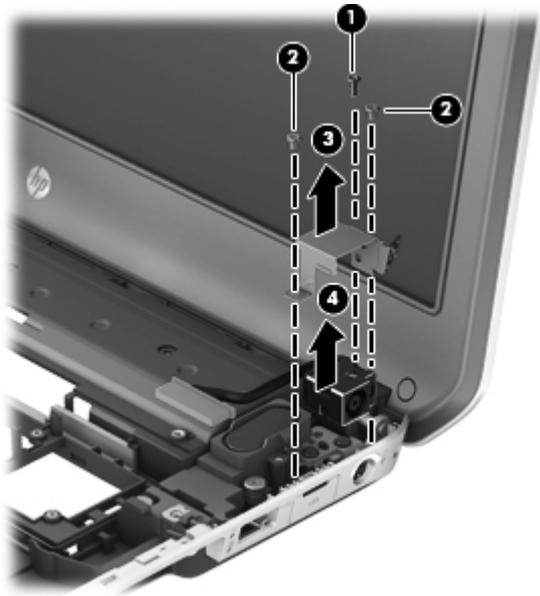
Before removing the power connector cable, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))

- c. Optical drive (see [Optical drive on page 40](#))
- d. Solid-state drive (see [Solid-state drive on page 44](#))
- e. WLAN module (see [WLAN module on page 47](#))
- f. Keyboard (see [Keyboard on page 50](#))
- g. Top cover (see [Top cover on page 53](#))
- h. System board (see [System board on page 61](#))

Remove the power connector cable:

1. Remove the Phillips M2.5×6.5 screw **(1)** and the two Phillips M2.0×5.0 screws **(2)** that secure the power connector bracket to the base enclosure.
2. Remove the power connector bracket **(3)**.
3. Release the power connector **(4)** from the clip built into the base enclosure.



4. Remove the power connector cable.

Reverse this procedure to install the power connector cable.

Speakers

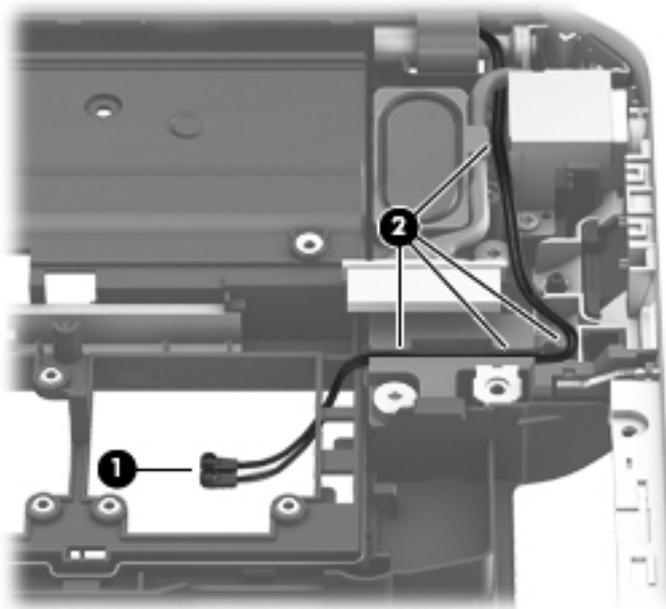
Description	Spare part number
Speakers (include subwoofer, speaker cable, and 4 rubber isolators)	676655-001

Before removing the speakers, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Solid-state drive (see [Solid-state drive on page 44](#))
 - e. WLAN module (see [WLAN module on page 47](#))
 - f. Keyboard (see [Keyboard on page 50](#))
 - g. Top cover (see [Top cover on page 53](#))
 - h. System board (see [System board on page 61](#))

Remove the speakers:

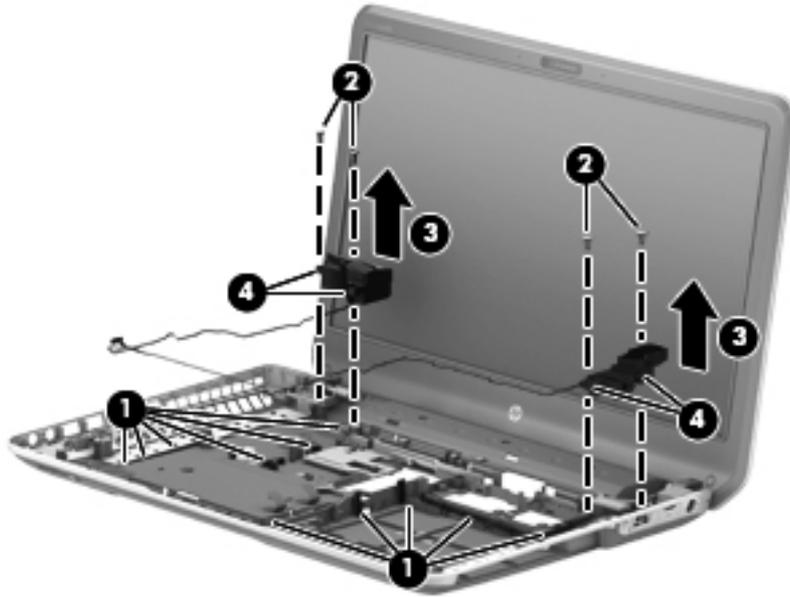
1. Release the wireless antenna cables (1) from the clip (2) built into the right speaker.



2. Release the speaker cables (1) from the clips and routing channel built into the base enclosure.

3. Remove the four Phillips M3.0×7.0 screws (2) that secure the speakers to the base enclosure.
4. Remove the speakers (3).

 **NOTE:** The speakers include four rubber isolators that are installed in the screw holes (4). These isolators are crucial to the performance of the speakers.



Reverse this procedure to install the subwoofer.

Display assembly

 **NOTE:** The display assembly is spared at the subcomponent level only.

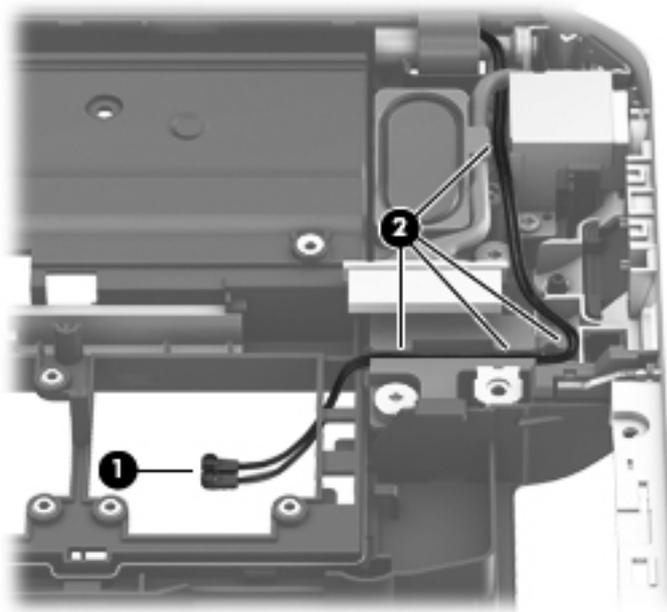
Description	Spare part number
35.6 cm (14.0 in), LED, HD, BrightView display panel (includes 2 rubber screw covers)	676653-001
Antenna Kit (includes left and right wireless antenna cables and transceivers and 2 rubber screw covers)	676640-001
Display bezel (includes 2 rubber screw covers)	676644-001
Display enclosure (includes 2 rubber screw covers):	
In black licorice finish	676641-001
In carmine red finish	678260-001
In linen white	676642-001
Display Hinge Kit (includes left and right hinges and 2 rubber screw covers)	676648-001
Display panel cable (includes webcam/microphone module cable and 2 rubber screw covers)	676646-001
Webcamera/microphone module (includes 2 rubber screw covers)	676659-001

Before removing the display assembly, follow these steps:

1. Turn off the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect the power from the computer by unplugging the power cord from the computer.
3. Disconnect all external devices from the computer.
4. Remove the battery (see [Battery on page 34](#)), and then remove the following components:
 - a. Service door (see [Service door on page 36](#))
 - b. Hard drive (see [Hard drive on page 37](#))
 - c. Optical drive (see [Optical drive on page 40](#))
 - d. Solid-state drive (see [Solid-state drive on page 44](#))
 - e. WLAN module (see [WLAN module on page 47](#))
 - f. Keyboard (see [Keyboard on page 50](#))
 - g. Top cover (see [Top cover on page 53](#))
 - h. System board (see [System board on page 61](#))
 - i. Power connector cable (see [Power connector cable on page 69](#))

Remove the display assembly:

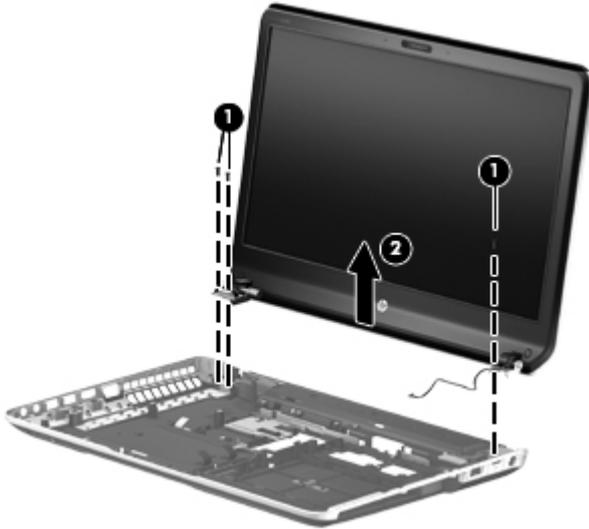
1. Release the wireless antenna cables (1) from the clips (2) built into the right speaker.



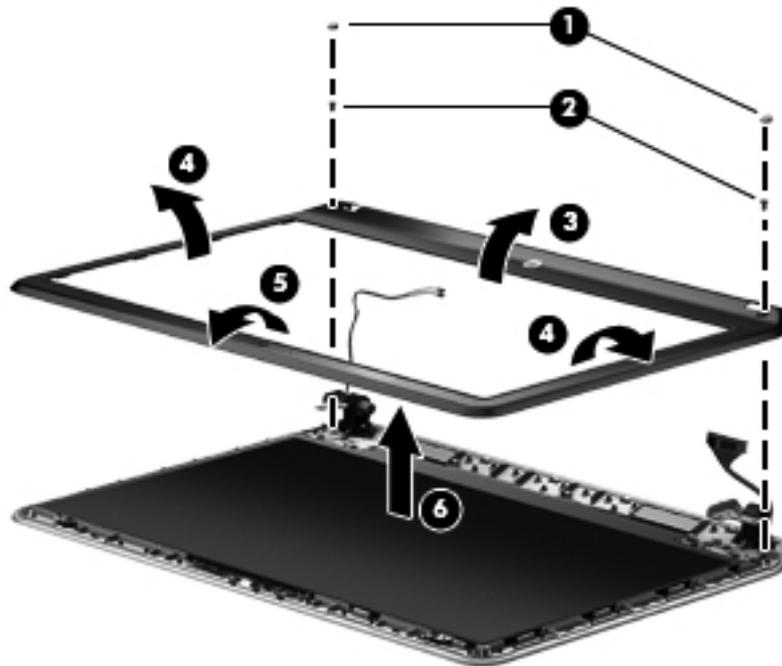
⚠ CAUTION: Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

2. Remove the three Phillips M2.5×6.5 screws (1) that secure the display assembly to the base enclosure.

3. Remove the display assembly (2).

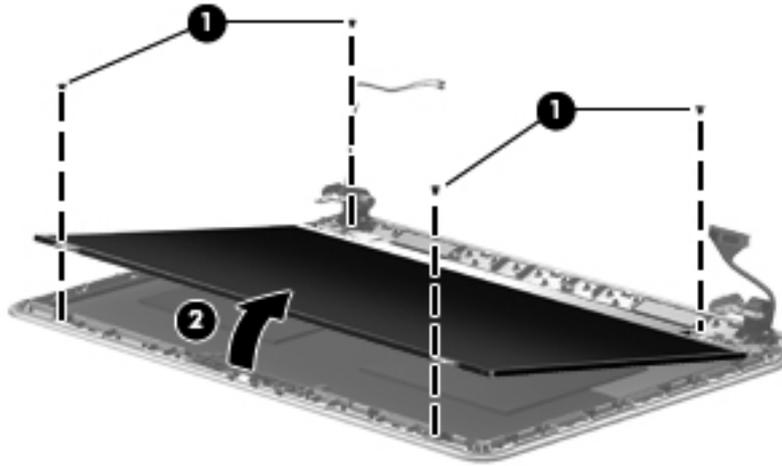


4. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
 - a. Remove the two display bezel screw covers (1) and the two Phillips M2.5×5.0 screws (2) that secure the display bezel to the display assembly.
 - b. Flex the inside edges of the bottom edge (3), the left and right sides (4), and the top edge (5) of the display bezel until the bezel disengages from the display enclosure.
 - c. Remove the display bezel (6).

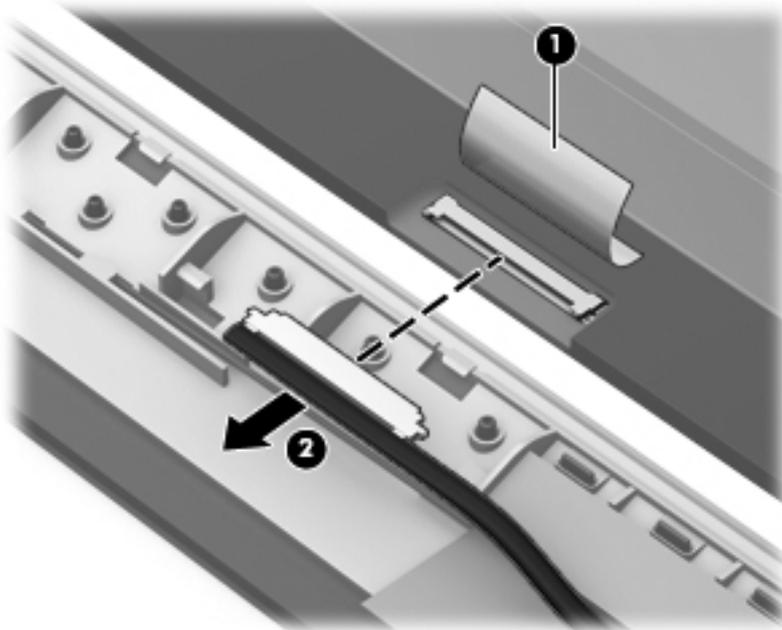


CAUTION: Be sure the work surface is clear of all tools, screws, and computer components before turning the display panel upside down on the work surface.

5. If it is necessary to replace the display panel:
- Remove the four Phillips M2.0×3.5 screws (1) that secure the display panel to the display enclosure.
 - Lift the top edge of the display panel (2) and turn the display panel upside down.

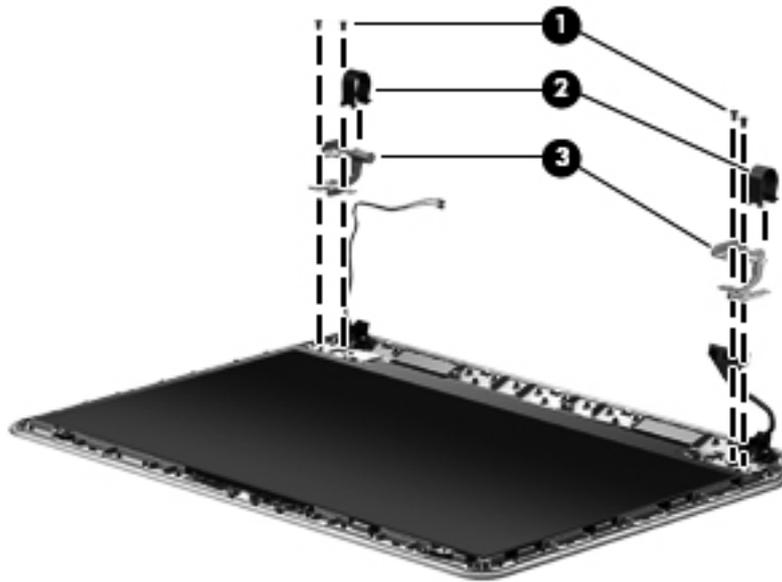


- Release the adhesive support strip (1) that secures the display panel cable connector to the display panel.
- Disconnect the display panel cable (2) from the display panel.

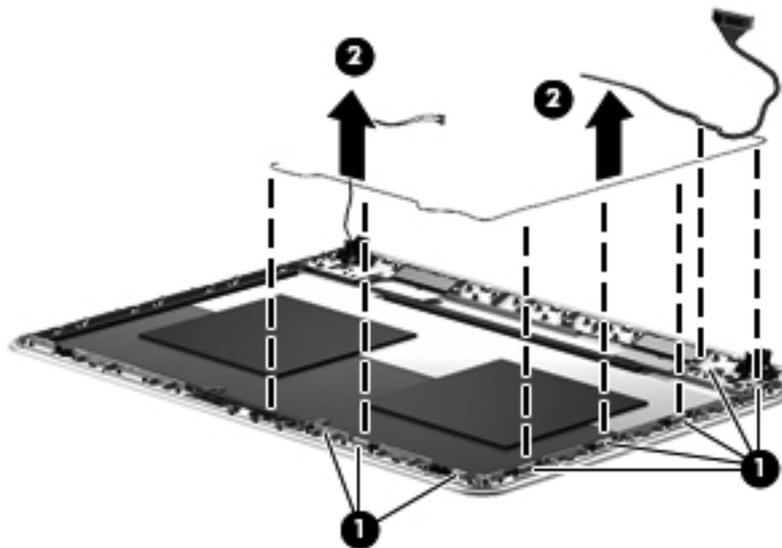


- Remove the display panel from the display enclosure.
6. If it is necessary to replace the webcam/microphone module:
- Disconnect the webcam/microphone module cable (1) from the webcam/microphone module. (The webcam/microphone module cable is part of the display panel cable.)

- c. Remove the hinges (2) from the display enclosure.

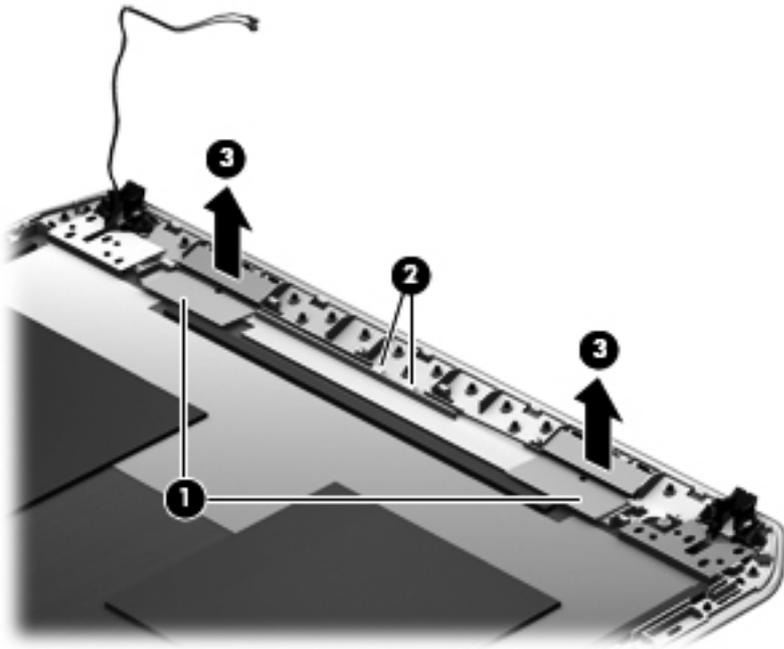


8. If it is necessary to replace the display panel cable:
- Release the display panel cable from the clips (1) and routing channel built into the display enclosure.
 - Remove the display panel cable (2).



9. If it is necessary to replace the wireless antenna cables and transceivers:
- Release the wireless antenna transceivers (1) from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)
 - Release the wireless antenna cables from the clips (2) built into the display enclosure.

- c. Remove the wireless antenna cables and transceivers (3).



Reverse this procedure to install the display assembly.

5 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), follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press **f10** to enter Setup Utility (BIOS).

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 tab key and 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 or Hibernation.

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

1. Select **Start > Help and Support > Maintain**.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
 - a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

1. Open Windows Explorer by selecting **Start > Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder 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. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, 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 diagnostics test while it is running, press **esc**.

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Width	34.4 cm	13.54 in
Depth	23.4 cm	9.21 in
Height (front to back)	2.93 to 3.35 cm	1.15 to 1.32 in
Weight		
	2.17 kg	4.79 lb
Input power		
Operating voltage and current	18.5 V @ 3.5 A or 19.5 V @ 3.33 A – 65 W 19 V @ 4.74 A or 19.5 V @ 4.62 A – 90 W 19.5 V @ 6.15 A – 120 W	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.		

35.6 cm (14.0 in) display specifications

	Metric	U.S.
Dimensions		
Height	17.6 cm	6.93 in
Width	31.2 cm	12.28 in
Diagonal	35.7 cm	14.06 in
Number of colors		
	Up to 16.8 million	

	Metric	U.S.
Contrast ratio	200:1 (typical)	
Brightness	200 cd/m ² (nits), typical	
Pixel resolution		
Pitch	0.197 × 0.197 mm	
Format	1366×768	
Configuration	RGB vertical stripe	
Backlight	LED	
Character display	80 × 25	
Total power consumption	2.0 W	
Viewing angle	±65° horizontal, ±50° vertical (typical)	

Hard drive specifications

	1 TB*	750 GB**	640 GB**	500 GB**	320 GB**
Dimensions					
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm	9.5 mm and 7.0 mm
Length	100.2 mm	100.2 mm	100.4 mm	100.4 mm	100.4 mm
Width	69.9 mm	69.9 mm	69.9 mm	69.9 mm	69.9 mm
Weight	152 g	110 g	110 g	110 g	110 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate					
Synchronous (maximum)	97 MB/sec	97 MB/sec	97 MB/sec	97 MB/sec	97 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	2.0 ms	2.0 ms	1.5 ms	1.5 ms	1.5 ms
Average (read/write)	12/16 ms	12/16 ms	11/13 ms	11/13 ms	11/13 ms
Maximum	21 ms	22 ms	221 ms	22 ms	22 ms
Logical blocks	1,953,525,168	1,465,149,168	1,282,009,226	976,773,168	628,142,448
Disk rotational speed	5400 rpm	7200 and 5400 rpm	5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm
Operating temperature	0°C to 60°C (32°F to 140°F)				

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

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

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

7 Backing up, restoring, and recovering

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

Creating backups

1. Use HP Recovery Manager to create recovery media immediately after you set up the working computer.
2. As you add hardware and software programs, create system restore points.
3. As you add photos, video, music, and other personal files, create a backup of your system and personal information.

Creating recovery media to recover the original system

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

What you need to know

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.
- HP Recovery Manager examines the computer and determines the required storage capacity for the flash drive or the number of blank DVD discs that will be required.

Use DVD-R, DVD+R, DVD-R DL, DVD+R DL discs or a flash drive. Do not use rewriteable discs such as CD±RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.
- If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from the HP website. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.
- Be sure that the computer is connected to AC power before you begin creating the recovery media.
- The creation process can take up to an hour or more. Do not interrupt the creation process.
- Store the recovery media in a safe location, separate from the computer.
- If necessary, you can exit the program before you have finished creating the recovery media. The next time you open HP Recovery Manager, you will be prompted to continue the process.

Creating the recovery media

1. Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list. Allow the action to continue, if prompted.
2. Click **Recovery Media Creation**.
3. Follow the on-screen instructions to continue.

To recover, see [Recovering the original system using HP Recovery Manager on page 87](#)

Creating system restore points

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

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

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

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

What you need to know

- If you restore to a restore point and then change your mind, you can undo the restoration.
- You should create system restore points:
 - Before you add or change software or hardware
 - Periodically, whenever the computer is running normally
- System Restore also saves shadow copies of files that have been changed since the last restore point was created. For more information about using shadow copies to restore, see Help and Support.

Creating a system restore point

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **Create**, and follow the on-screen instructions.

To restore, see [Restoring to a previous system restore point on page 87](#).

Backing up system and personal information

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

Tips for a successful backup

- Number backup discs before inserting them into the optical drive.
- Store personal files in the Documents, Music, Pictures, and Videos libraries, and back up these folders periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:
To copy only the active window, press **alt+prt sc**.
To copy the entire screen, press **prt sc**.
3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.
4. Save and print the document.

What you need to know

- You can back up your information to an optional external hard drive, a flash drive, a network drive, or discs.
- Connect the computer to AC power during backups.
- Allow enough time for the backup. Depending on files sizes, it may take more than an hour.
- Verify the amount of free space on your backup storage device before you back up.
- You should back up:
 - Before adding or changing software or hardware.
 - Before the computer is repaired or restored.
 - On a regular schedule to be sure you have recent copies of personal information.
 - After you add many files—for example, if you saved videos from a birthday party.
 - Before using antivirus software to remove a malicious program.
 - After adding information that is hard to replace, such as pictures, videos, music, project files, or data records.

Creating a backup using Windows Backup and Restore

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

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to schedule and create a backup.



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

To restore, see [Restoring specific files using Windows Backup and Restore on page 87](#).

Restore and recovery

Restoring to a previous system restore point

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

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

1. Select **Start > Control Panel > System and Security > System**.
2. In the left pane, click **System Protection**.
3. Click the **System Protection** tab.
4. Click **System Restore**, and follow the on-screen instructions.

Restoring specific files

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

Restoring specific files using Windows Backup and Restore

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

1. Select **Start > Control Panel > System and Security > Backup and Restore**.
2. Follow the on-screen instructions to restore your backup.



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

Recovering the original system using HP Recovery Manager

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

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the disc provided by the manufacturer.
- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see [Restoring to a previous system restore point on page 87](#)) and partial restores (see [Restoring specific files on page 87](#)), try them before using HP Recovery Manager to recover your system.
- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

- If the recovery media do not work, you can obtain recovery discs for your system from the HP website.
- The Minimized Image Recovery option is recommended for advanced users only. All hardware-related drivers and software are re-installed, but other software applications are not. Do not interrupt the process until it is complete, otherwise the recovery will fail.

Recovering using HP Recovery partition (select models only)

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

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



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

1. Access HP Recovery Manager in either of the following ways:
 - Select **Start** and type `recovery` in the search field. Select **Recovery Manager** from the list.
 - or –
 - Turn on or restart the computer, and then press `esc` while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen. Then press `f11` while the “F11 (System Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **HP Recovery Manager** window.
3. Follow the on-screen instructions.

Recovering using the recovery media

1. If possible, back up all personal files.
2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

– or –

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



NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See [Changing the computer boot order on page 89](#).

3. Press `f9` at system bootup.
4. Select the optical drive or the flash drive.
5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.
2. Press **esc** while the computer is restarting, and then press **f9** for boot options.
3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for a recovery flash drive:

1. Insert the flash drive into a USB port.
2. Restart the computer.
3. Press **esc** while the computer is restarting, and then press **f9** for boot options.
4. Select the flash drive from the boot options window.

8 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 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 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

Country/region	Accredited agency	Applicable note number
Australia	EANSW	1
Austria	OVE	1
Belgium	CEBC	1
Canada	CSA	2
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
Italy	IMQ	1
Japan	METI	3
The Netherlands	KEMA	1
Norway	NEMKO	1
The People's Republic of China	COC	5
South Korea	EK	4

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

1. The flexible cord must be Type HO5VV-F, 3-conductor, 1.0 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
2. The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.
3. The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00 mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.
4. The flexible cord must be Type RVV, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.
5. The flexible cord must be Type VCTF, 3-conductor, 0.75 mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

9 Recycling

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

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

Index

A

- AC adapter 8
- AC adapter, spare part numbers 22, 23, 24
- action keys
 - identifying 13
- antenna
 - locations 9
 - removal 77
 - spare part number 20, 25, 72
- Antenna Kit, spare part number 20, 25, 72
- audio, product description 3
- audio-in (microphone) jack 8
- audio-out (headphone) jack 8

B

- b key 13
- backups 84
- base enclosure, spare part number 18, 25
- battery
 - removal 34
 - spare part number 18, 24, 34
- battery bay 14
- battery release latch 14
- Blu-ray Disc ROM with SuperMulti DVD±R/RW Double-Layer Drive
 - precautions 29
 - removal 40
 - spare part number 19, 22, 26, 40
- boot order
 - changing 89
- bottom components 14
- buttons
 - optical drive eject 7
 - power 12
 - TouchPad 10
 - TouchPad on/off 10

C

- cables, service considerations 28
- caps lock light, identifying 11
- chipset, product description 1

- components
 - bottom 14
 - display 9
 - front 6
 - left side 8
 - right side 7
 - top 10
- computer feet
 - locations 34
 - spare part number 34
- computer major components 16
- computer part number 33
- computer specifications 82
- connector, power 7
- connectors, service considerations 28

D

- deleted files
 - restoring 87
- Digital Media Slot, identifying 6
- display
 - components 9
 - specifications 82
- display assembly
 - removal 72
 - spare part numbers 72
 - subcomponents 20
- display bezel
 - removal 74
 - spare part number 20, 25, 72
- display enclosure, spare part numbers 20, 25, 26, 72
- display hinge
 - removal 76
 - spare part number 20, 25, 72
- Display Hinge Kit, spare part number 20, 25, 72
- display panel
 - product description 2
 - removal 75
 - spare part number 20, 26, 72
- display panel cable
 - removal 77
 - spare part number 20, 25, 72

- drives, preventing damage 29
- DVD±RW Double-Layer SuperMulti Drive
 - precautions 29
 - removal 40
 - spare part number 19, 22, 26, 40

E

- electrostatic discharge 29
- equipment guidelines 32
- esc key, identifying 13
- Ethernet, product description 3
- external monitor port 8

F

- fan/heat sink assembly
 - removal 64
 - spare part numbers 18, 26, 64
- feet
 - locations 34
 - spare part number 34
- fn key, identifying 13

G

- graphics, product description 1
- grounding guidelines 29
- guidelines
 - equipment 32
 - grounding 29
 - packaging 31
 - transporting 31
 - workstation 31

H

- hard drive
 - precautions 29
 - product description 2
 - removal 37
 - spare part numbers 18, 22, 23, 24, 25, 37
- hard drive bay 14
- hard drive connector cable
 - illustrated 22
 - removal 39

Hard Drive Hardware Kit
 contents 22
 spare part number 19, 22, 25, 37
hard drive light 7
hard drive rubber bracket
 illustrated 22
 removal 39
HDMI port, identifying 8
HP Recovery Manager 87

I

internal media card, product description 3

J

jacks

 audio-in (microphone) 8
 audio-out (headphone) 8
 network 7
 RJ-45 (network) 7

K

keyboard

 product description 4
 removal 50
 spare part numbers 17, 25, 50

keys

 action 13
 b 13
 esc 13
 fn 13
 Windows applications 13
 Windows logo 13

L

lights

 AC adapter 8
 caps lock 11
 hard drive 7
 mute 11
 optical drive 7
 power 7, 11
 TouchPad 10
 webcam 9
 wireless 11

M

mass storage device
 precautions 29

 removal 37
 spare part numbers 26, 37
memory module
 product description 2
 removal 42
 spare part numbers 19, 24, 42
memory module compartment 14
microphone
 location 9
 product description 3
model description 33
model name 1
mute light, identifying 11

N

network jack, identifying 7

O

operating system, product description 4

optical drive

 precautions 29
 product description 2
 removal 40
 spare part numbers 19, 22, 26, 40

optical drive bezel

 illustrated 22
 removal 41

optical drive bracket

 illustrated 22
 removal 41

optical drive connector cable

 illustrated 22
 removal 59
 spare part number 17, 59

optical drive eject button, identifying 7

Optical Drive Hardware Kit

 contents 22
 spare part number 19, 22, 26, 40

optical drive light, identifying 7

optical drive, identifying 7

original system recovery 87

P

packaging guidelines 31

plastic parts, service considerations 28

Plastics Kit 36

Plastics Kit, spare part number 19, 26, 44, 48

pointing device, product description 4

ports

 external monitor 8

 HDMI 8

 product description 3

 USB 2.0 7

 USB 3.0 8

power button board

 removal 56

 spare part number 17, 25, 56

power button, identifying 12

power connector cable

 removal 69

 spare part number 18, 25, 69

power connector, identifying 7

power cord

 set requirements 90

 spare part numbers 22, 23

power lights, identifying 7, 11

power requirements, product description 4

processor

 product description 1

 removal 68

 spare part numbers 18, 24, 25, 26, 27, 68

product description

 audio 3

 chipset 1

 display panel 2

 Ethernet 3

 external media cards 3

 graphics 1

 hard drive 2

 internal media card 3

 keyboard 4

 memory module 2

 microphone 3

 operating system 4

 optical drive 2

 pointing device 4

 ports 3

 power requirements 4

 processors 1

 product name 1

 security 4

 serviceability 4

- solid-state drives 2
 - video 3
 - wireless 3
 - product name 1, 33
 - product number 33
- R**
- recovering from the recovery
 - discs 88
 - recovering the original system 87
 - recovery 87
 - HP Recovery Manager 87
 - recovery discs 84
 - recovery media 84
 - recovery, system 87
 - removal/replacement
 - preliminaries 28
 - procedures 32
 - restore points 85
 - restoring the original system
 - creating recovery media 84
 - RJ-45 (network) jack, identifying 7
 - RTC battery
 - removal 46
 - spare part number 19, 26, 46
 - Rubber Feet Kit, spare part number 18, 27, 34
- S**
- Screw Kit, spare part number 23, 26
 - security cable slot, identifying 8
 - security, product description 4
 - serial number 33
 - service considerations
 - cables 28
 - connectors 28
 - plastic parts 28
 - service door
 - removal 36
 - spare part number 26, 36
 - service tag 15, 33
 - serviceability, product description 4
 - slots
 - Digital Media 6
 - security cable 8
 - solid-state drive
 - product description 2
 - removal 44
 - spare part number 19, 22, 26, 44
 - speakers
 - removal 71
 - spare part number 18, 26, 71
 - specifications
 - computer 82
 - display 82
 - subwoofer, location 14
 - supported discs 84
 - system board
 - removal 61
 - spare part numbers 17, 26, 27, 61
 - system recovery 87
 - system restore points 85
 - creating 85
- T**
- tools required 28
 - top cover
 - removal 53
 - spare part numbers 17, 26, 53
 - TouchPad button 10
 - TouchPad button board
 - removal 58
 - spare part number 17, 27, 58
 - TouchPad light 10
 - TouchPad on/off button 10
 - TouchPad zone 10
 - transporting guidelines 31
- U**
- USB 3.0 ports, identifying 8
 - USB ports, identifying 7
- V**
- vents 14
 - vents, identifying 8
 - video, product description 3
- W**
- warranty period 33
 - webcam 9
 - webcam light 9
 - webcamera/microphone module
 - removal 75
 - spare part number 20, 26, 72
 - Windows applications key, identifying 13
 - Windows Backup and Restore
 - restoring files 87
 - Windows logo key, identifying 13
 - wireless antenna
 - locations 9
 - removal 77
 - spare part number 20, 25, 72
 - wireless light 11
 - wireless module compartment 14
 - wireless module compartment
 - cover
 - removal 44, 48
 - spare part number 26, 44, 48
 - wireless, product description 3
 - WLAN module
 - removal 47
 - spare part numbers 19, 24, 47
 - workstation guidelines 31