



HP ENVY 17

Maintenance and Service Guide

© Copyright 2010 Hewlett-Packard
Development Company, L.P.

Intel is a trademark of Intel Corporation in
the U.S. and other countries. Microsoft,
Windows, and Windows Vista are U.S.
registered trademarks of Microsoft
Corporation.

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.

Second edition: September 2010

First Edition: April 2010

Document Part Number: 595029-001
Revision B

Revision history

Revision	Publication date	Description
A	September 2010	<ul style="list-style-type: none">• Chapter 1 — added new descriptions for the following components:<ul style="list-style-type: none">◦ Intel Quad Core i7-840QM 1.86-GHz, Intel Quad Core i7-740QM 1.73-GHz, and Intel Dual Core i5-450M 2.40-GHz processors◦ 300-GB solid-state drive◦ Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter• Chapter 3 and Chapter 4 — added new spare part numbers and descriptions for the following components:<ul style="list-style-type: none">◦ AC adapters◦ 300-GB solid-state drive◦ 640-GB, 7200-rpm hard drive◦ Intel Quad Core i7-840QM 1.86-GHz, Intel Quad Core i7-740QM 1.73-GHz, and Intel Dual Core i5-450M 2.40-GHz processors◦ System boards for use with computer models equipped with FHD display assembly◦ Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter◦ Power cord for use in Thailand◦ Keyboard for use in Latin America
A	October 2010	<ul style="list-style-type: none">• Chapter 1 — added new descriptions for the following components:<ul style="list-style-type: none">◦ 17.3-in, WVA 3D, LED, AntiGlare display◦ Intel Dual Core i5-580M 2.66-GHz processor◦ Intel Dual Core i5-560M 2.66-GHz processor◦ Intel Dual Core i5-460M 2.53-GHz processor• Chapters 3 and 4 — added new spare part numbers and descriptions for the following components:<ul style="list-style-type: none">◦ 17.3-in AG, FG, 3D display assembly, spare part number 620775-001 (updated in the following locations: Computer major components on page 18, Sequential part number listing on page 27, and Display assembly on page 71)◦ 3D glasses with nose pieces, spare part number 622779-001 (updated in the following locations: Miscellaneous parts on page 26 and Sequential part number listing on page 27)◦ Display Cable Kit for use with computer models equipped with a 3D display assembly, spare part number 621337-001 (updated in the

Revision	Publication date	Description
		<p>following locations: Display assembly subcomponents on page 23, Sequential part number listing on page 27, and Display assembly on page 71)</p>
		<ul style="list-style-type: none"> ◦ Display enclosure for use with computer models equipped with a 3D display assembly, spare part number 621336-001 (updated in the following locations: Display assembly subcomponents on page 23, Sequential part number listing on page 27, and Display assembly on page 71)
		<ul style="list-style-type: none"> ◦ Infrared emitter board, spare part number 631398-001 (updated in the following locations: Miscellaneous parts on page 26 and Sequential part number listing on page 27)
		<ul style="list-style-type: none"> ◦ Intel Dual Core i5-580M 2.66-GHz processor, spare part number 625825-001 (updated in the following locations: Computer major components on page 18, Sequential part number listing on page 27, and Processor on page 67)
		<ul style="list-style-type: none"> ◦ Intel Dual Core i5-560M 2.66-GHz processor, spare part number 625824-001 (updated in the following locations: Computer major components on page 18, Sequential part number listing on page 27, and Processor on page 67)
		<ul style="list-style-type: none"> ◦ Intel Dual Core i5-460M 2.53-GHz processor, spare part number 626039-001 (updated in the following locations: Computer major components on page 18, Sequential part number listing on page 27, and Processor on page 67)
		<ul style="list-style-type: none"> ◦ Protective case for 3D glasses, spare part number 622778-001 (updated in the following locations: Miscellaneous parts on page 26 and Sequential part number listing on page 27)
		<ul style="list-style-type: none"> ◦ System board for use with computer models equipped with HD5850 chipset and 3D display assembly, spare part number 620774-001 (updated in the following locations: Computer major components on page 18, Sequential part number listing on page 27, and System board on page 61)

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	6
Top components	6
Display components	6
Button	7
Keys	8
Lights	9
TouchPad	10
Front components	11
Left-side components	12
Right-side components	14
Bottom components	15
3 Illustrated parts catalog	16
Service tag	17
Computer major components	18
Display assembly subcomponents	23
Plastics Kit	24
Mass storage devices	25
Miscellaneous parts	26
Sequential part number listing	27
4 Removal and replacement procedures	31
Preliminary replacement requirements	31
Tools required	31
Service considerations	31
Plastic parts	31
Cables and connectors	31
Drive handling	32
Grounding guidelines	32
Electrostatic discharge damage	32
Packaging and transporting guidelines	34

Component replacement procedures	36
Service tag	36
Computer feet	37
Battery	38
Primary hard drive	39
RTC battery	42
Memory module	43
Secondary hard drive	45
WLAN module	49
Keyboard	51
Top cover	53
Power button board	56
USB/Card Reader board	57
Optical drive	58
Power connector cable	60
System board	61
Fan/heat sink assembly	65
Processor	67
Speakers	69
Subwoofer	70
Display assembly	71
5 Setup Utility (BIOS)	78
Starting Setup Utility	78
Using Setup Utility	78
Changing the language of Setup Utility	78
Navigating and selecting in Setup Utility	79
Display system information	79
Restoring factory default settings in Setup Utility	79
Exiting Setup Utility	79
Updating the BIOS	80
Determining the BIOS version	80
Downloading a BIOS update	81
6 Specifications	83
Computer specifications	83
17.3-inch, WVA, FHD, LED AntiGlare display specifications	84
17.3-inch, SVA, HD+, LED AntiGlare display specifications	85
Hard drive specifications	86
Blu-ray ROM DVD±RW Super Multi Double-Layer Drive specifications	87
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive specifications	88

7 Backup and recovery	89
Recovery discs	90
Performing a system recovery	91
Recovering using the dedicated partition (select models only)	91
Recovering using the recovery discs	91
Backing up your information	92
Using Windows Backup and Restore	92
Using system restore points	93
When to create restore points	93
Create a system restore point	93
Restore to a previous date and time	93
8 Connector pin assignments	94
Audio-in (microphone)	94
Audio-out (headphone)	94
External monitor	95
HDMI	96
RJ-45 (network)	97
Universal Serial Bus	97
9 Power cord set requirements	98
Requirements for all countries	98
Requirements for specific countries and regions	99
10 Recycling	100
Battery	100
Display	100
Index	106

1 Product description

Category	Description
Product Name	HP ENVY 17
Processors	<p>Intel® Quad Core™ processors (support Intel Turbo Boost Technology):</p> <ul style="list-style-type: none">• Intel Quad Core i7-840QM 1.86-GHz processor (SC turbo up to 3.20-MHz), 8-MB L3 cache, 1333-MHz front side bus (FSB), 45-W• Intel Quad Core i7-820QM 1.73-GHz processor (SC turbo up to 3.06-GHz), 8-MB L3 cache, 45-W• Intel Quad Core i7-740QM 1.73-GHz processor (SC turbo up to 2.93-GHz), 6-MB L3 cache, 1333-MHz FSB, 45-W• Intel Quad Core i7-720QM 1.60-GHz processor (SC turbo up to 2.80-GHz), 6-MB L3 cache, 45-W <p>Intel Dual Core processors (support Intel Turbo Boost Technology):</p> <ul style="list-style-type: none">• Intel Dual Core i5-580M 2.66-GHz processor, (SC turbo up to 3.33-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-560M 2.66-GHz processor, (SC turbo up to 3.20-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-540M 2.53-GHz processor, (SC turbo up to 3.06-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-520M 2.40-GHz processor, (SC turbo up to 2.93-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-460M 2.53-GHz processor, (SC turbo up to 2.80-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-450M 2.40-GHz processor, (SC turbo up to 2.93-GHz), 3-MB L3 cache, 35-W• Intel Dual Core i5-430M 2.26-GHz processor, (SC turbo up to 2.53-GHz), 3-MB L3 cache, 35-W
Chipset	Intel HM55 Express chipset
Graphics	ATI Mobility Radeon HD 5850 discrete graphics with 1024-MB of GDDR5 dedicated video memory (32 MB × 32 MB × 8 PCs); Supports BD and or HD-DVD playback with HD decode, and DX11 support and HDMI support

Category	Description
Panel	17.3-in, WVA 3D, LED, AntiGlare (1920×1080, 6.5 mm) display; typical brightness: 300 nits
	17.3-in, WVA full high-definition (FHD), LED, AntiGlare (1920×1080, 6.0 mm) display; typical brightness: 300 nits
	17.3-in, SVA high-definition+ (HD+), LED, AntiGlare (1600×900, 6.0 mm) display; typical brightness: 200 nits
	All display assemblies include 2 wireless local area network (WLAN) antenna cables
	Supports flush display panel cover
	Supports 16:9 ultra wide aspect ratio
	Lighted logo on top bezel
Memory	2 customer-accessible/upgradable memory module slots
	Supports dual-channel memory
	Supports up to 8192 GB of system RAM
	DDR3 1333-MHz, PC3-10600
	1333-MHz bus speed on computer models equipped with Quad Core processors
	1066-MHz bus speed on computer models equipped with Dual Core and Core Duo processors
	Supports the following configurations: <ul style="list-style-type: none"> • 8192-MB total system memory (4096 × 2) • 6144-MB total system memory (4096 × 1 + 2048 × 1) • 4096-MB total system memory (4096 × 1) • 4096-MB total system memory (2048 × 2)
Hard drives	Supports 6.35-cm (2.5-in) hard drives in 12.5-mm (.49-in) and 9.5-mm (.37-in) thicknesses
	Customer-accessible
	Supports dual hard drive configuration, including solid-state drive
	Serial ATA
	Accelerometer (HP Mobile Data Protection System 3D) RAID 0/1 Support

Category	Description
	<p>Supports the following dual hard drive configurations:</p> <ul style="list-style-type: none"> • 2 TB: 1-TB hard drive (5200-rpm, 12.5-mm) × 2 • 1500 GB: 750-GB hard drive (5200-rpm, 12.5-mm) × 2 • 1280 GB: 640-GB hard drive (7200-rpm, 9.5-mm) × 2 • 1280 GB: 640-GB hard drive (5400-rpm, 9.5-mm) × 2 • 1000 GB: 500-GB hard drive (7200-rpm, 9.5-mm) × 2 • 800 GB: 160-GB solid-state drive + 640-GB hard drive (7200-rpm, 9.5-mm) • 800 GB: 160-GB solid-state drive + 640-GB hard drive (5400-rpm, 9.5-mm) • 660 GB: 160-GB solid-state drive + 500-GB hard drive (7200-rpm, 9.5-mm) • 640 GB: 320-GB hard drive (7200-rpm, 9.5-mm) × 2
	<p>Supports the following single hard drive configurations:</p> <ul style="list-style-type: none"> • 1 TB: 1-TB hard drive (5200-rpm, 12.5-mm) • 750 GB: 750-GB hard drive (5200-rpm, 12.5-mm) • 640 GB: 640-GB hard drive (7200-rpm, 9.5-mm) • 640 GB: 640-GB hard drive (5400-rpm, 9.5-mm) • 500 GB: 500-GB hard drive (7200-rpm, 9.5-mm) • 320 GB: 320-GB hard drive (7200-rpm, 9.5-mm) • 300 GB: 160-GB solid-state drive • 160 GB: 160-GB solid-state drive
Optical drives	<p>Fixed</p> <p>Customer-accessible</p> <p>Serial ATA</p> <p>12.7-mm slot load</p> <p>Supports the following drives:</p> <ul style="list-style-type: none"> • Blu-ray ROM DVD±RW Super Multi Double-Layer Drive • DVD±RW and CD-RW Super Multi Double-Layer Combo Drive
Audio and video	<p>Integrated dual-array digital microphones with beam-forming, echo-cancellation, noise-suppression software</p> <p>HD audio</p> <p>Beats audio</p> <p>Supports Microsoft Premium Requirements</p> <p>Integrated HP triple bass reflex subwoofer</p>

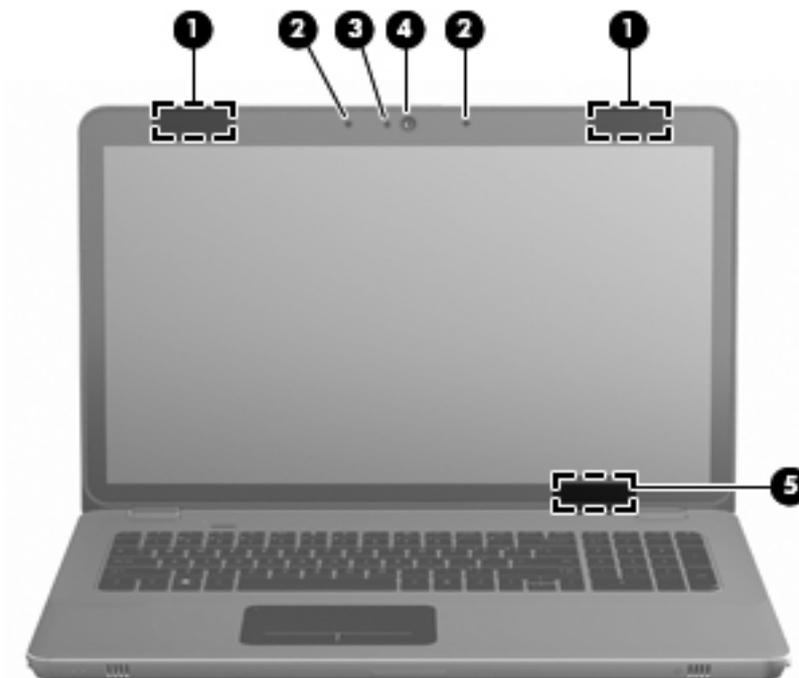
Category	Description
	HP ENVY HD webcam (fixed, no tilt) with activity LED, 1280×800 by 24 frames per second
Ethernet	Integrated 10/100/1000 GB network interface card (NIC)
Wireless	<p>Integrated wireless local area network (WLAN) options by way of wireless module:</p> <p>Two WLAN antennas built into display assembly</p> <p>Support for the following WLAN formats:</p> <ul style="list-style-type: none"> • Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter • Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter • Intel Centrino Advanced-N 6200 802.11a/b/g/n WLAN module <p>Integrated personal area network (PAN) options by way of Bluetooth® module:</p> <p>Support for no-WPAN option</p> <p>Intel Centrino Bluetooth</p>
External media card	<p>One Digital Media Slot, supporting the following optional formats:</p> <ul style="list-style-type: none"> • Memory Stick • Memory Stick Pro • MultiMediaCard • Secure Digital Memory Card • Secure Digital High Capacity Memory Card • xD-Picture Card
Ports	<ul style="list-style-type: none"> • 3-pin AC power • Combination audio-in (mono microphone)/audio-out (stereo headphone) • eSATA • HDMI version 1.3c supporting up to 1080p, 1920×1080 at 60 Hz and 1920×1200 at 60 Hz in DVI mode • Mini Display Port • RJ-45 (Ethernet, includes link and activity lights) • eSATA/USB 2.0 (1), USB 2.0 (2) • VGA (Dsub 15-pin) supporting 1920×1200 and 1600×1200 external resolution at 75-GHz (hot plug/unplug with auto-detect)
Keyboard/pointing devices	<p>Full-size, backlit, island-style keyboard with DuraCoat</p> <p>Keyboard eject key design with eject icon</p> <p>Supports Multitouch gestures (enabled by default)</p>

Category	Description
	Taps enable by default
Power requirements	120-W HP Smart Adapter and 65-W Slim Travel Adapter AC adapters with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector) Support for the following batteries: <ul style="list-style-type: none">• 9-cell, 2.80-Ah (93-Wh) Li-ion battery• 6-cell, 2.80-Ah (62-Wh) Li-ion battery
Security	Security cable slot
Operating system	Preinstalled: <ul style="list-style-type: none">• Windows® 7 Home Premium 64• Windows 7 Professional 64• Windows 7 Ultimate• Linux embedded HP QuickWeb
Serviceability	End-user replaceable parts: <ul style="list-style-type: none">• AC adapter• Battery• Hard drive (primary and secondary)• RTC battery• WLAN module• Memory modules (2)

2 External component identification

Top components

Display components



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks.
(2)	Internal microphones (2)	Record sound.
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam	Records video and captures still photographs.

Item	Component	Description
(5)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on. NOTE: The internal display switch is not visible from the outside of the computer.

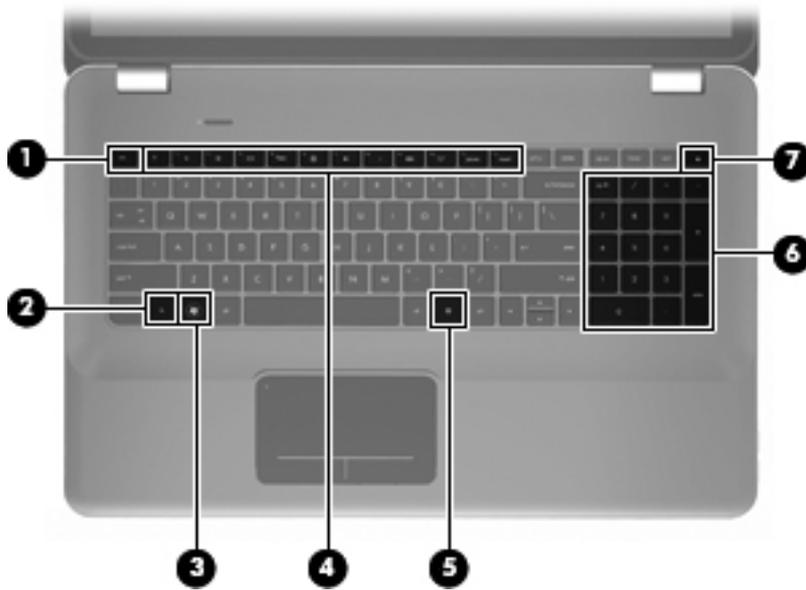
*The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, refer to the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country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

Button



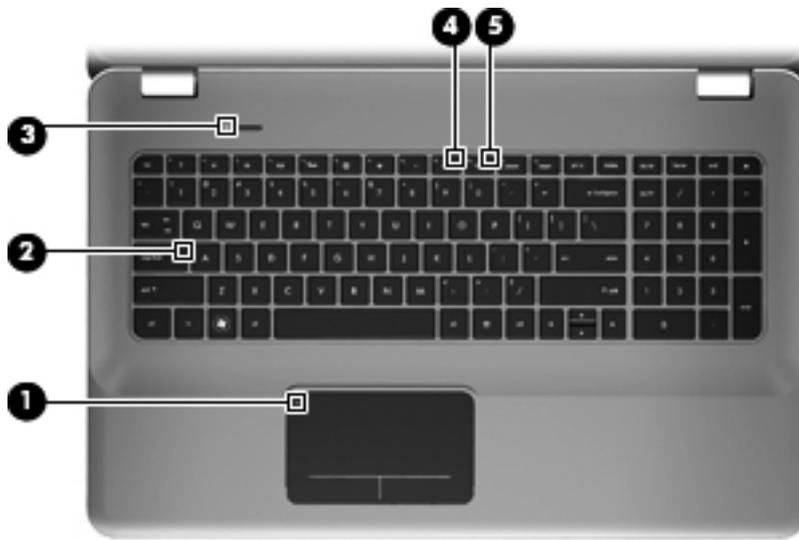
Component	Description
Power button*	<ul style="list-style-type: none"> When the computer is off, press the button to turn on the computer. When the computer is on, press the button briefly to initiate Sleep. When the computer is in the Sleep state, press the button briefly to exit Sleep. When the computer is in Hibernation, press the button briefly to exit Hibernation. <p>If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button for at least 5 seconds to turn off the computer.</p> <p>To learn more about your power settings, select Start > Control Panel > System and Security > Power Options, or refer to the <i>HP Notebook Reference Guide</i>.</p>

Keys



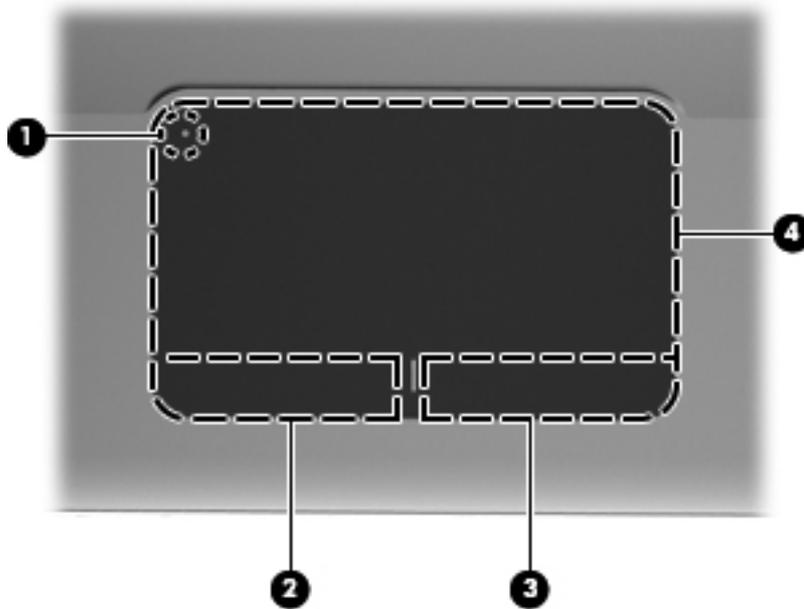
Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the b key or the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	Windows applications key	Displays a shortcut menu for items beneath the pointer.
(6)	Integrated numeric keypad	Can be used like an external numeric keypad.
(7)	Optical drive eject key	Ejects the optical drive.

Lights



Item	Component	Description
(1)	TouchPad off indicator	<ul style="list-style-type: none">• Amber: The TouchPad is off.• Off: The TouchPad is on.
(2)	Caps lock light	<ul style="list-style-type: none">• White: Caps lock is on.• Off: Caps lock is off.
(3)	Power light	<ul style="list-style-type: none">• White: The computer is on.• Blinking white: The computer is in the Sleep state.• Off: The computer is off or in Hibernation.
(4)	Mute light	<ul style="list-style-type: none">• Amber: Computer sound is off.• Off: Computer sound is on.
(5)	Wireless light	<ul style="list-style-type: none">• White: An integrated wireless device, such as a wireless local area network device, is on. <p>NOTE: Wireless devices are enabled at the factory.</p> <ul style="list-style-type: none">• Amber: All wireless devices are off.

TouchPad



Item	Component	Description
(1)	TouchPad off indicator	Turns the TouchPad on and off. Quickly double-tap the TouchPad off indicator to turn the TouchPad on and off.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.
(4)	TouchPad zone	Moves the pointer and selects or activates items on the screen.

Front components



Item	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.• Off: The computer is off or in Hibernation.
(2)	Drive light	<ul style="list-style-type: none">• Blinking white: The hard drive is being accessed.• Amber: HP ProtectSmart Hard Drive Protection has temporarily parked the hard drive. <p>NOTE: For information on HP ProtectSmart Hard Drive Protection, refer to the <i>HP Notebook Reference Guide</i>.</p>
(3)	Speakers (2)	Produce sound.

Left-side components



Item	Component	Description
(1)	Vent	Enables airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(2)	External monitor port	Connects an external VGA monitor or projector.
(3)	RJ-45 (network) jack	Connects a network cable.
(4)	Mini DisplayPort	Connects an optional digital display device such as a high performance monitor or projector.
(5)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.
(6)	eSATA/USB port	Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.
(7)	SuperSpeed USB port	Connects an optional USB 3.0 device and provides enhanced USB power performance. NOTE: The SuperSpeed USB port is also compatible with USB 1.0 and 2.0 devices.

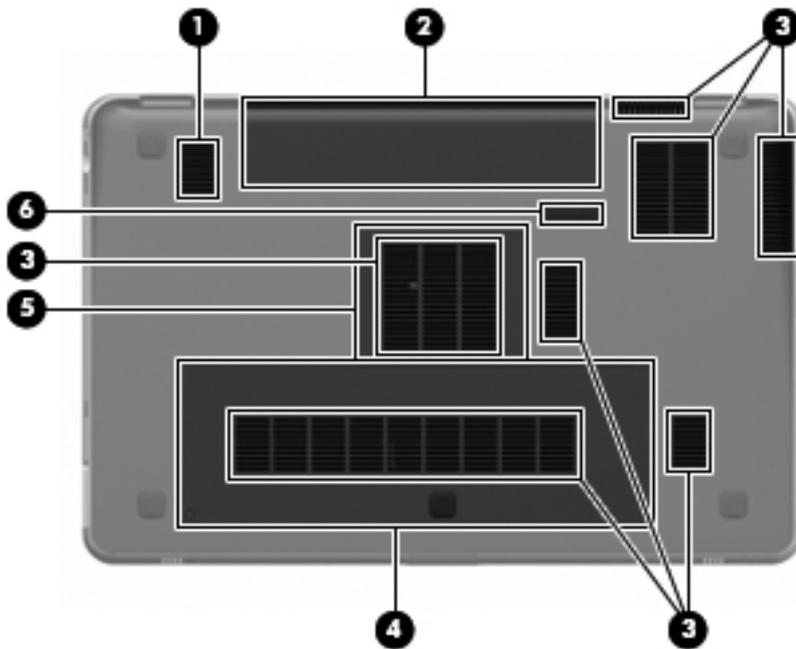
Item	Component	Description
(8)	Audio-out (headphone) jack/Audio-in (microphone) jack	<p data-bbox="948 237 1453 348">Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone.</p> <p data-bbox="948 380 1453 516">WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the Regulatory, Safety, and Environmental Notices.</p> <p data-bbox="948 548 1453 600">NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>
(9)	Audio-out (headphone) jack	<p data-bbox="948 632 1453 716">Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio.</p> <p data-bbox="948 747 1453 884">WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the Regulatory, Safety, and Environmental Notices.</p> <p data-bbox="948 915 1453 968">NOTE: When a device is connected to the jack, the computer speakers are disabled.</p>

Right-side components



Item	Component	Description
(1)	USB ports (2)	Connect optional USB devices.
(2)	Digital Media Slot	<ul style="list-style-type: none">• Memory Stick• Memory Stick Pro• MultiMediaCard• Secure Digital Memory Card• Secure Digital High Capacity Memory Card• xD-Picture Card
(3)	Optical drive	Reads and writes to an optical disc. CAUTION: Do not insert 8-cm optical discs into the optical drive. This can cause damage to the computer.
(4)	Battery light	<ul style="list-style-type: none">• Off: The computer is running on battery power.• Blinking amber: The battery has reached a low battery level, a critical battery level, or there is a battery error.• Amber: A battery is charging.• White: The computer is connected to external power and the battery is fully charged.
(5)	Power connector	Connects an AC adapter.
(6)	Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Bottom components

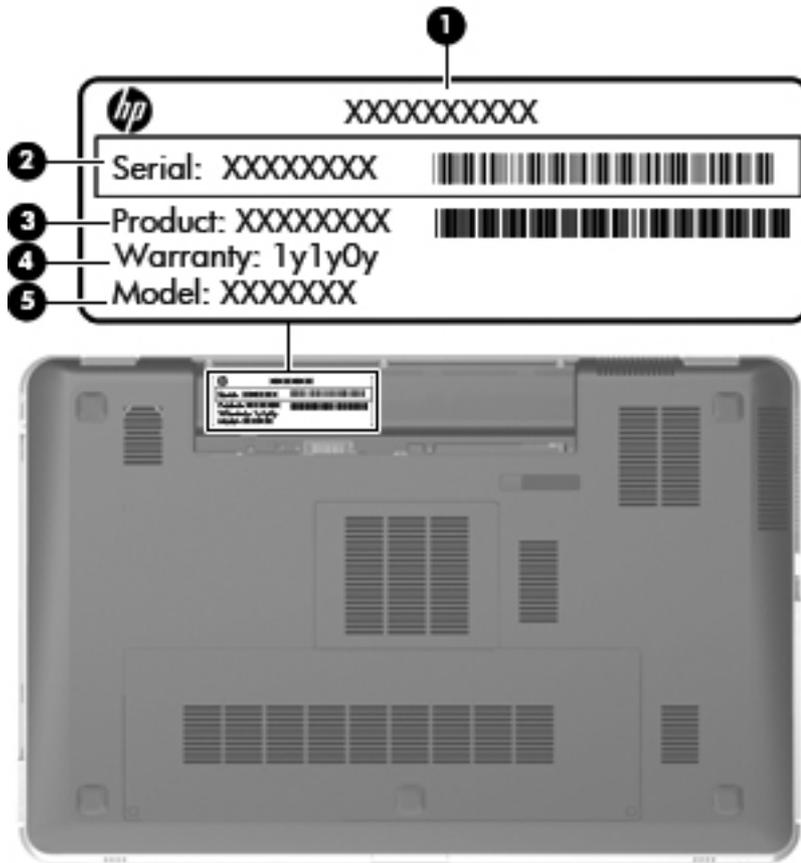


Item	Component	Description
(1)	Subwoofer	Contains the subwoofer speaker.
(2)	Battery bay	Holds the battery. NOTE: The battery is preinstalled in the battery bay at the factory.
(3)	Vents (7)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Hard drive bay	Holds the hard drive.
(5)	Memory module compartment	Holds the memory modules.
(6)	Battery release latch	Releases the battery from the battery bay.

3 Illustrated parts catalog

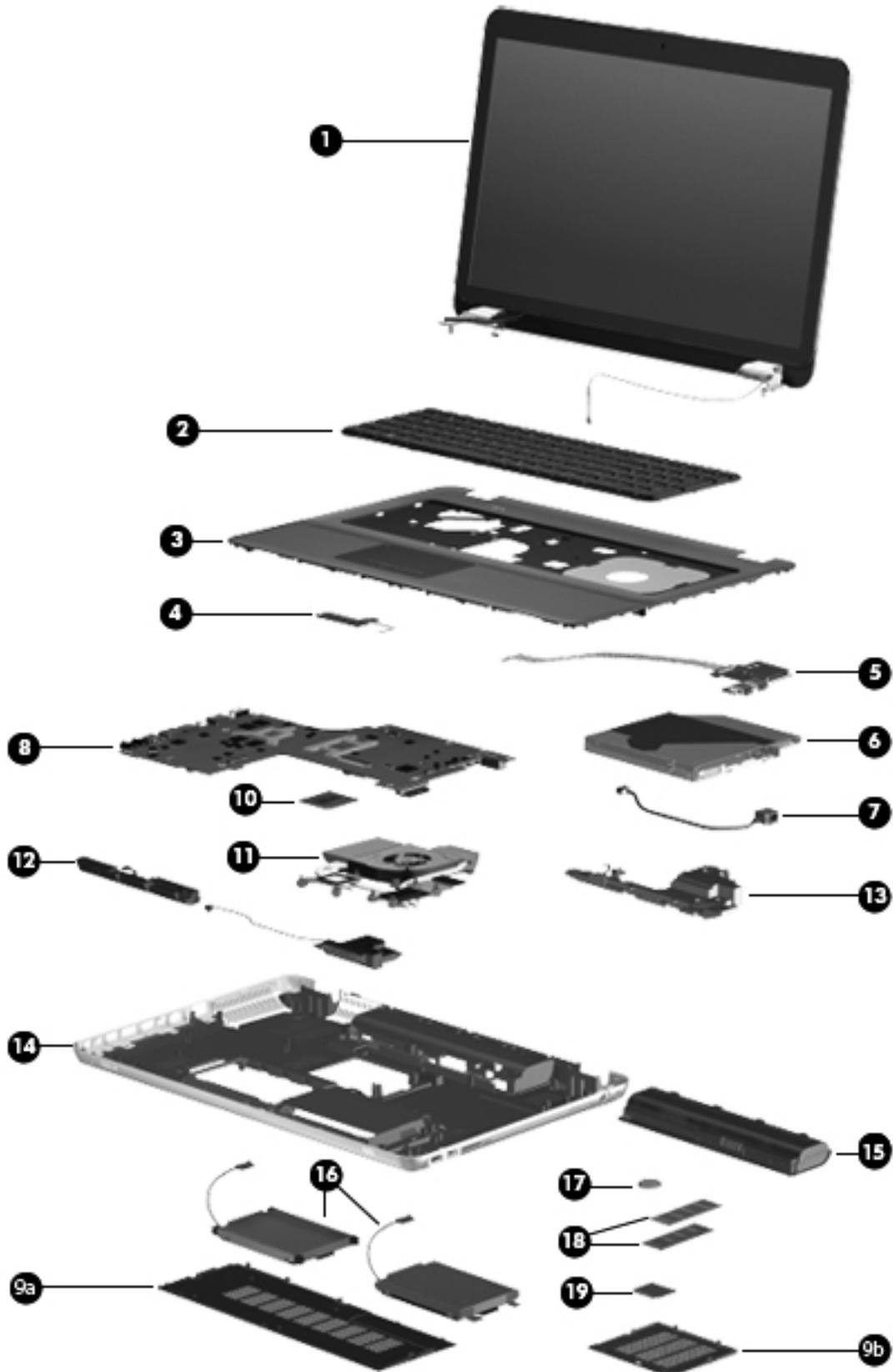
Service tag

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



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)	Model description	This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.
(5)	Warranty period	This number describes the duration of the warranty period for the computer.

Computer major components



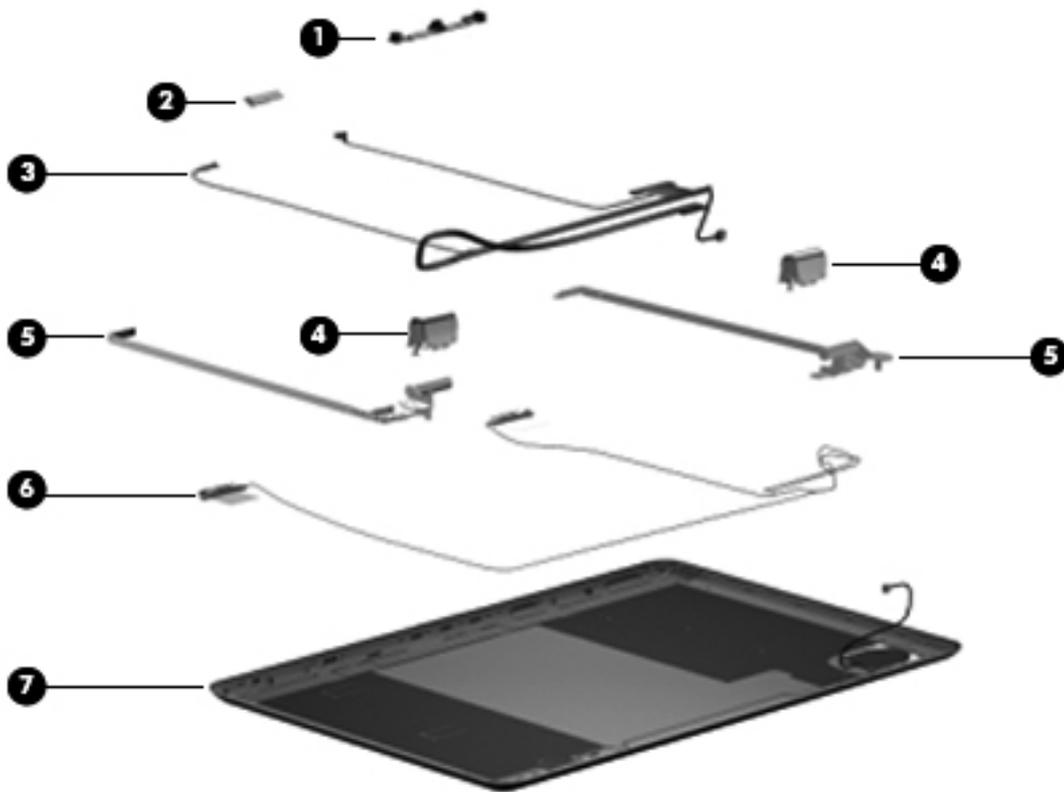
Item	Description	Spare part number
(1)	Display assembly (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers):	
	17.3-in AG, FG, 3D	620775-001
	17.3-in AG, FG, FHD	603774-001
	17.3-in AG, FG, HD+	603773-001
	NOTE: See Display assembly subcomponents on page 23 for more display component information and spare part numbers.	
(2)	Keyboard (includes keyboard cable and keyboard light cable):	
	For use in Belgium	603791-A41
	For use in Brazil	603791-201
	For use in Denmark, Finland, and Sweden	603791-DH1
	For use in France	603791-051
	For use in French Canada	603791-121
	For use in Germany	603791-041
	For use in Italy	603791-061
	For use in Japan	603791-291
	For use in Latin America	603791-161
	For use in the Netherlands	603791-B31
	For use in Portugal	603791-131
	For use in Russia	603791-251
	For use in South Korea	603791-AD1
	For use in Spain	603791-071
	For use in Switzerland	603791-BG1
	For use in Thailand	603791-281
	For use in the United Kingdom and Singapore	603791-031
	For use in the United States and Canada	603791-001
(3)	Top cover (includes TouchPad and cable)	603793-001
(4)	Power button board (includes cable)	603794-001
(5)	USB/Card Reader board (includes cable)	604064-001
(6)	Optical drive:	
	Blu-ray ROM DVD±RW Super Multi Double-Layer Drive	603790-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	603789-001

Item	Description	Spare part number
(7)	Power connector cable	617348-001
(8)	System board (includes replacement thermal material):	
	For use with computer models equipped with a 3D display assembly (includes 1 GB of discrete graphics subsystem memory)	620774-001
	For use with computer models equipped with an FHD display assembly (includes 1 GB of discrete graphics subsystem memory)	618859-001
	For use with computer models equipped with an HD+ display assembly (includes 1 GB of discrete graphics subsystem memory)	603771-001
	Plastics Kit , includes:	603795-001
(9a)	Hard drive cover	
(9b)	Memory module compartment cover	
(10)	Processor (includes replacement thermal material):	
	Intel Core i7-840QM 1.86-GHz (SC turbo up to 3.20-GHz), 45W processor	612260-001
	Intel Core i7-820QM 1.73-GHz (SC turbo up to 3.06-GHz), 45W processor	583053-001
	Intel Core i7-740QM 1.73-GHz (SC turbo up to 2.93-GHz), 45W processor	612259-001
	Intel Core i7-720QM 1.60-GHz (SC turbo up to 2.80-GHz), 45W processor	586170-001
	Intel Core i5-580M 2.66-GHz (SC turbo up to 3.33-GHz), 35W processor	625825-001
	Intel Core i5-560M 2.66-GHz (SC turbo up to 3.20-GHz), 35W processor	625824-001
	Intel Core i5-540M 2.53-GHz (SC turbo up to 3.06-GHz), 35W processor	594188-001
	Intel Core i5-520M 2.40-GHz (SC turbo up to 2.93-GHz), 35W processor	594187-001
	Intel Core i5-460M 2.53-GHz (SC turbo up to 2.80-GHz), 35W processor	626039-001
	Intel Core i5-450M 2.40-GHz (SC turbo), 35W processor	613585-001
	Intel Core i5-430M 2.26-GHz (SC turbo up to 2.53-GHz), 35W processor	597624-001
(11)	Fan/heat sink assembly (includes replacement thermal material):	
	For use only with Intel Core i7, 45-W processors	608650-001
	For use only with Intel Core i5, 35-W processors	603799-001
(12)	Speakers (include cable)	603796-001
(13)	Subwoofer (includes cable)	603800-001
(14)	Base enclosure (includes 5 rubber feet)	603792-001
	Rubber Feet Kit (not illustrated, includes 5 rubber feet)	603798-001
(15)	Battery:	
	9-cell, 93-Wh, 2.8-Ah, Li-ion battery	593550-001
	6-cell, 62-Wh, 2.8-Ah, Li-ion battery	593562-001

Item	Description	Spare part number
(16)	Hard drive (2, includes hard drive brackets and hard drive cables):	
	640-GB, 7200-rpm	621046-001
	500-GB, 7200-rpm	603784-001
	320-GB, 7200-rpm	603783-001
	1-TB, 5400-rpm	603788-001
	750-GB, 5400-rpm	603787-001
	640-GB, 5400-rpm	603785-001
	Solid-state drive:	
	300-GB solid-drive	631146-001
	160-GB solid-drive	603781-001
	Hard Drive Hardware Kit (not illustrated, includes primary hard drive bracket and cable and secondary hard drive bracket and cable)	603772-001
(17)	RTC battery	602745-001
(18)	Memory modules (2, PC3, 10600, 1333-MHz)	
	4-GB	599092-001
	2-GB	598856-001
(19)	WLAN module:	
	Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	619997-001
	Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	582564-001

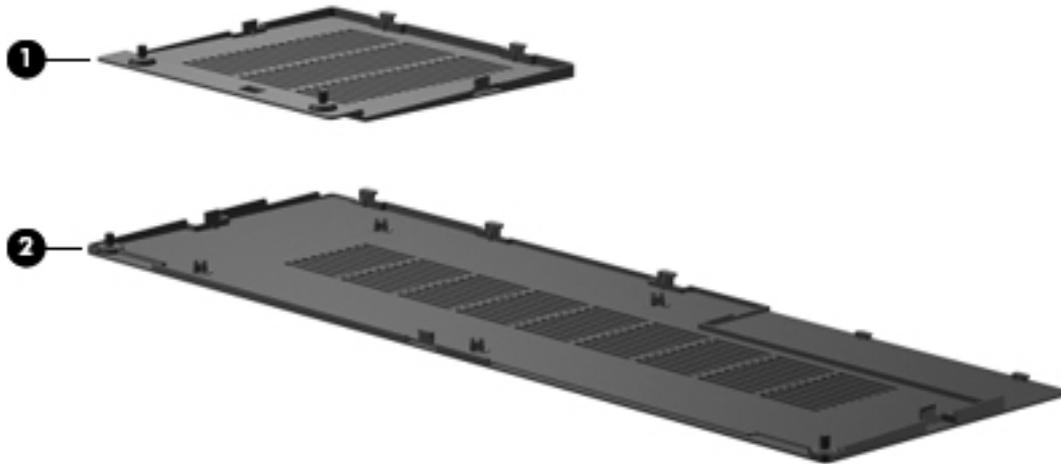
Item	Description	Spare part number
	Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002
	Intel Centrino Advanced-N 6200 802.11a/b/g/n WLAN module	572509-001
	Intel Centrino Advanced-N 6200 802.11a/b/g WLAN module	572510-001

Display assembly subcomponents



Item	Description	Spare part number
(1)	Webcam/microphone module	603779-001
(2)	Bluetooth module	537921-001
(3)	Display Cable Kit (include display panel cable, Bluetooth module cable, and webcam/microphone module cable):	
	For use with computer models equipped with a 3D display assembly	621337-001
	For use with computer models equipped with an HD or FHD display assembly	603777-001
(4)	Display hinge covers (2)	604063-001
(5)	Display Hinge Kit (includes left and right display hinges)	603778-001
(6)	Wireless Antenna Kit (includes left and right wireless antenna transceivers and cables)	603780-001
(7)	Display enclosure (includes logo light and cable):	
	For use with computer models equipped with a 3D display assembly	621336-001
	For use with computer models equipped with an HD or FHD display assembly	603775-001
	Infrared emitter board (not illustrated, for use with computer models equipped with a 3D display assembly)	631398-001
	Display Screw Kit (not illustrated, includes Mylar screw covers)	603776-001

Plastics Kit



Item	Description	Spare part number
	Plastics Kit , includes:	603795-001
(1)	memory module compartment cover (includes 2 captive screws, secured by C-clips)	
(2)	Hard drive cover (includes 2 captive screws, secured by C-clips)	

Mass storage devices



Item	Description	Spare part number
(1)	Optical drive:	
	Blu-ray ROM DVD±RW Super Multi Double-Layer Drive	603790-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	603789-001
	Hard drive (includes hard drive brackets and hard drive cables):	
(2)	Primary hard drive	
(3)	Secondary hard drive	
	640-GB, 7200-rpm	621046-001
	500-GB, 7200-rpm	603784-001
	320-GB, 7200-rpm	603783-001
	1-TB, 5400-rpm	603788-001
	750-GB, 5400-rpm	603787-001
	640-GB, 5400-rpm	603785-001
	Solid-state drive:	
	300-GB solid-state drive	631146-001
	160-GB solid-state drive	603781-001
	Hard Drive Hardware Kit (not illustrated, includes primary hard drive bracket and cable and secondary hard drive bracket and cable)	603772-001

Miscellaneous parts

Description	Spare part number
AC adapter:	
135-W HP Smart AC adapter (PFC RC/V 3-wire)	613155-001
120-W HP Smart AC adapter (PFC RC/V 3-wire)	613154-001
3D glasses with nose pieces	622779-001
Protective case for 3D glasses	622778-001
Power cord:	
For use in Australia	490371-011
For use in Brazil	490371-202
For use in Denmark	490371-081
For use in Europe, the Middle East, and Africa	490371-021
For use in India	490371-D61
For use in Italy	490371-061
For use in the People's Republic of China	490371-AA1
For use in South Korea	490371-AD1
For use in Switzerland	490371-111
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
For use in the United States and Canada	490371-001
Screw Kit	603797-001

Sequential part number listing

Spare part number	Description
409371-001	Power cord for use in the United States and Canada
409371-011	Power cord for use in Australia and New Zealand
409371-021	Power cord for use in Europe, the Middle East, and Africa
409371-031	Power cord for use in the United Kingdom and Singapore
409371-061	Power cord for use in Italy
409371-081	Power cord for use in Denmark
409371-111	Power cord for use in Switzerland
409371-201	Power cord for use in Thailand
409371-202	Power cord for use in Brazil
409371-AA1	Power cord for use in the People's Republic of China
409371-AD1	Power cord for use in South Korea
409371-D61	Power cord for use in India
537921-001	Bluetooth module
572509-001	Intel Centrino Advanced-N 6200 802.11a/b/g/n WLAN module
572510-001	Intel Centrino Advanced-N 6200 802.11a/b/g WLAN module
582564-001	Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States
582564-002	Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe

Spare part number	Description
583053-001	Intel Core i7-820QM 1.73-GHz (SC turbo up to 3.06-GHz), 45W processor (includes replacement thermal material)
586170-001	Intel Core i7-720QM 1.60-GHz (SC turbo up to 2.80-GHz), 45W processor (includes replacement thermal material)
593550-001	9-cell, 93-Wh, 2.8-Ah, Li-ion battery
593562-001	6-cell, 62-Wh, 2.8-Ah, Li-ion battery
594187-001	Intel Core i5-520M 2.40-GHz (SC turbo up to 2.93-GHz), 35W processor (includes replacement thermal material)
594188-001	Intel Core i5-540M 2.53-GHz (SC turbo up to 3.06-GHz), 35W processor (includes replacement thermal material)
597624-001	Intel Core i5-430M 2.26-GHz (SC turbo up to 2.53-GHz), 35W processor (includes replacement thermal material)
598856-001	2-GB memory module (PC3, 10600, 1333-MHz)
599092-001	4-GB memory module (PC3, 10600, 1333-MHz)
602745-001	RTC battery
603771-001	System board for use with computer models equipped with an HD+ display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
603772-001	Hard Drive Hardware Kit (includes primary hard drive bracket and cable and secondary hard drive bracket and cable)
603773-001	17.3-in AG, FG, HD+ display assembly (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
603774-001	17.3-in AG, FG, FHD display assembly (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
603775-001	Display enclosure (includes logo light and cable)
603776-001	Display Screw Kit (includes Mylar screw covers)
603777-001	Display Cable Kit (includes display panel cable, Bluetooth module cable, and webcam/microphone module cable)
603778-001	Display Hinge Kit (includes left and right display hinges)
603779-001	Webcam/microphone module
603780-001	Wireless Antenna Kit (includes left and right wireless antenna transceivers and cables)
603781-001	160-GB solid-state drive
603783-001	320-GB, 7200-rpm hard drive (includes hard drive bracket and hard drive cable)
603784-001	500-GB, 7200-rpm hard drive (includes hard drive bracket and hard drive cable)
603785-001	640-GB, 5400-rpm hard drive (includes hard drive bracket and hard drive cable)
603786-001	640-GB, 7200-rpm hard drive (includes hard drive bracket and hard drive cable)
603787-001	750-GB, 5400-rpm hard drive (includes hard drive bracket and hard drive cable)

Spare part number	Description
603788-001	1-TB, 5400-rpm hard drive (includes hard drive bracket and hard drive cable)
603789-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive
603790-001	Blu-ray ROM DVD±RW Super Multi Double-Layer Drive
603791-001	Keyboard for use in the United States and Canada (includes keyboard cable and keyboard light cable)
603791-031	Keyboard for use in the United Kingdom and Singapore (includes keyboard cable and keyboard light cable)
603791-041	Keyboard for use in Germany (includes keyboard cable and keyboard light cable)
603791-051	Keyboard for use in France (includes keyboard cable and keyboard light cable)
603791-061	Keyboard for use in Italy (includes keyboard cable and keyboard light cable)
603791-071	Keyboard for use in Spain (includes keyboard cable and keyboard light cable)
603791-121	Keyboard for use in French Canada (includes keyboard cable and keyboard light cable)
603791-131	Keyboard for use in Portugal (includes keyboard cable and keyboard light cable)
603791-161	Keyboard for use in Latin America (includes keyboard cable and keyboard light cable)
603791-201	Keyboard for use in Brazil (includes keyboard cable and keyboard light cable)
603791-251	Keyboard for use in Russia (includes keyboard cable and keyboard light cable)
603791-281	Keyboard for use in Thailand (includes keyboard cable and keyboard light cable)
603791-291	Keyboard for use in Japan (includes keyboard cable and keyboard light cable)
603791-A41	Keyboard for use in Belgium (includes keyboard cable and keyboard light cable)
603791-AD1	Keyboard for use in South Korea (includes keyboard cable and keyboard light cable)
603791-B31	Keyboard for use in the Netherlands (includes keyboard cable and keyboard light cable)
603791-BG1	Keyboard for use in Switzerland (includes keyboard cable and keyboard light cable)
603791-DH1	Keyboard for use in Denmark, Finland, and Sweden (includes keyboard cable and keyboard light cable)
603792-001	Base enclosure (includes 5 rubber feet)
603793-001	Top cover (includes TouchPad and cable)
603794-001	Power button board (includes cable)
603795-001	Plastics Kit, includes: NOTE: See Plastics Kit on page 24 for more Plastics Kit component information.
603796-001	Speakers (include cable)
603797-001	Screw Kit
603798-001	Rubber Feet Kit (includes 5 rubber feet)
603799-001	Fan/heat sink assembly for use only with Intel Core i5, 35-W processors (includes replacement thermal material)

Spare part number	Description
603800-001	Subwoofer (includes cable)
604063-001	Display hinge covers
604064-001	USB/Card Reader board (includes cable)
608650-001	Fan/heat sink assembly for use only with Intel Core i7, 45-W processors (includes replacement thermal material)
609941-001	120-W HP Smart AC adapter (PFC RC/V 3-wire)
612259-001	Intel Core i7-740QM 1.73-GHz (SC turbo up to 2.93-GHz), 45W processor (includes replacement thermal material)
612260-001	Intel Core i7-840QM 1.86-GHz (SC turbo up to 3.20-GHz), 45W processor (includes replacement thermal material)
613154-001	120-W HP Smart AC adapter (PFC RC/V 3-wire)
613155-001	135-W HP Smart AC adapter (PFC RC/V 3-wire)
613585-001	Intel Core i5-450M 2.40-GHz (SC turbo), 35W processor (includes replacement thermal material)
617348-001	Power connector cable
618859-001	System board for use with computer models equipped with an FHD display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
619997-001	Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter
620774-001	System board for use with computer models equipped with HD5850 chipset and 3D display assembly (includes 1 GB of discrete graphics subsystem memory and replacement thermal material)
620775-001	17.3-in AG, FG, 3D display assembly (includes display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers)
621046-001	640-GB, 7200-rpm hard drive (includes hard drive bracket and hard drive cable)
621336-001	Display enclosure for use with computer models equipped with a 3D display assembly
621337-001	Display Cable Kit for use with computer models equipped with a 3D display assembly
622778-001	Protective case for 3D glasses
622779-001	3D glasses with nose pieces
625825-001	Intel Core i5-580M 2.66-GHz (SC turbo up to 3.33-GHz), 35W processor (includes replacement thermal material)
625824-001	Intel Core i5-560M 2.66-GHz (SC turbo up to 3.20-GHz), 35W processor (includes replacement thermal material)
626039-001	Intel Core i5-460M 2.53-GHz (SC turbo up to 2.80-GHz), 35W processor (includes replacement thermal material)
631146-001	300-GB solid-state drive
631398-001	Infrared emitter board (for use with computer models equipped with a 3D display assembly)

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

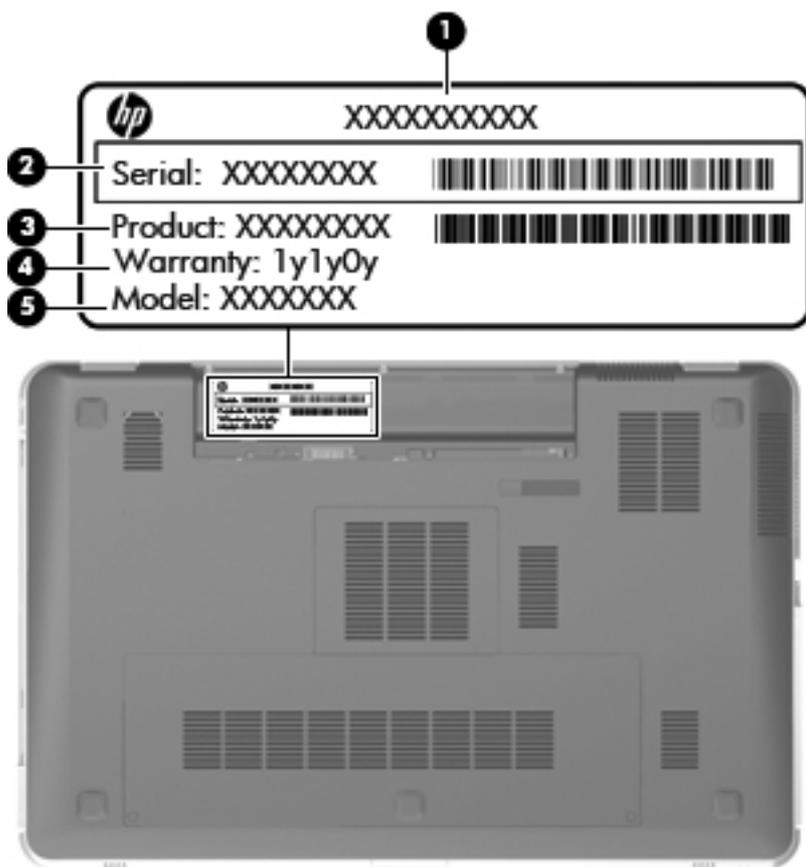
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 82 screws and screw locks that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock 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.

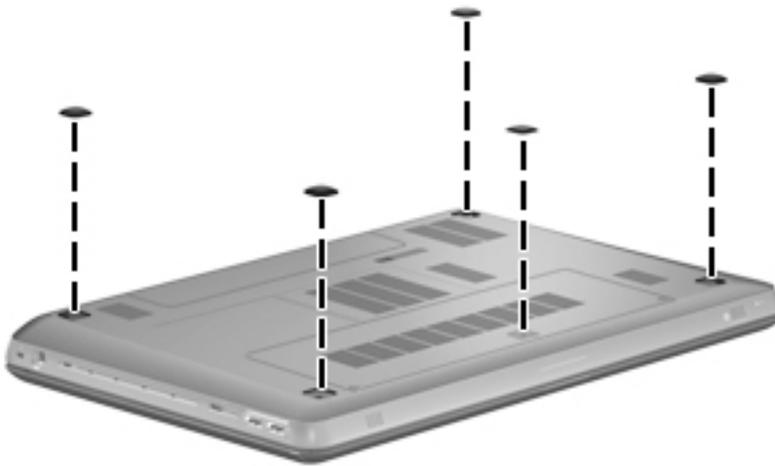


Item	Component	Description
(1)	Product name	This is the product name affixed to the front of the computer.
(2)	Serial number (s/n)	This is an alphanumeric identifier that is unique to each product.
(3)	Part number/Product number (p/n)	This number provides specific information about the product's hardware components. The part number helps a service technician determine what components and parts are needed.

Item	Component	Description
(4)	Model description	This is the alphanumeric identifier used to locate documents, drivers, and support for the computer.
(5)	Warranty period	This number describes the duration of the warranty period for the computer.

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Feet Kit, spare part number 603798-001. There are 5 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

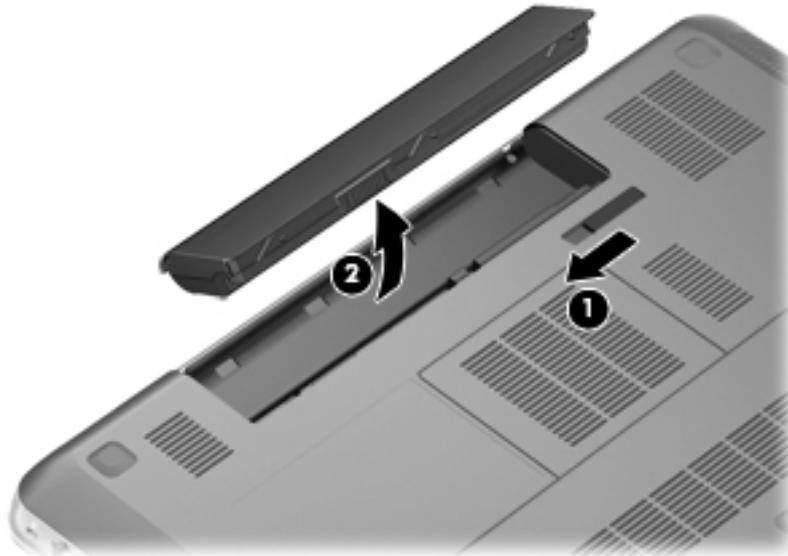
Description	Spare part number
9-cell, 93-Wh, 2.8-Ah, Li-ion battery	593550-001
6-cell, 62-Wh, 2.8-Ah, Li-ion battery	593562-001

Before disassembling the computer, follow these steps:

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

Remove the battery:

1. Turn the computer upside down on a flat surface, with the front toward you.
2. Slide the battery release latch **(1)** to release the battery.
3. Pivot the front edge of the battery **(2)** upward.



4. Remove the battery from the computer.

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

Primary hard drive

 **NOTE:** The hard drive spare part kit includes a hard drive bracket and hard drive connector cable.

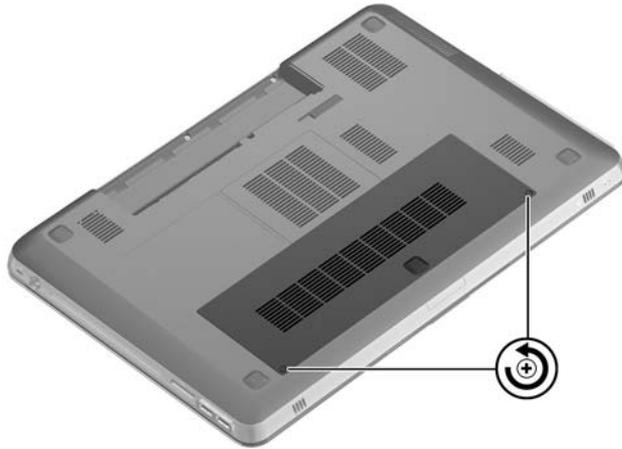
Description	Spare part number
640-GB, 7200-rpm	621046-001
500-GB, 7200-rpm	603784-001
320-GB, 7200-rpm	603783-001
1-TB, 5400-rpm	603788-001
750-GB, 5400-rpm	603787-001
640-GB, 5400-rpm	603785-001
300-GB solid-state drive	631146-001
160-GB solid-state drive	603781-001
Hard Drive Hardware Kit (includes primary hard drive bracket and cable and secondary hard drive bracket and cable)	603772-001

Before removing the primary hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the memory module compartment cover (see [Memory module on page 43](#)).
6. Remove the hard drive cover (see [Primary hard drive on page 39](#)).

Remove the primary hard drive:

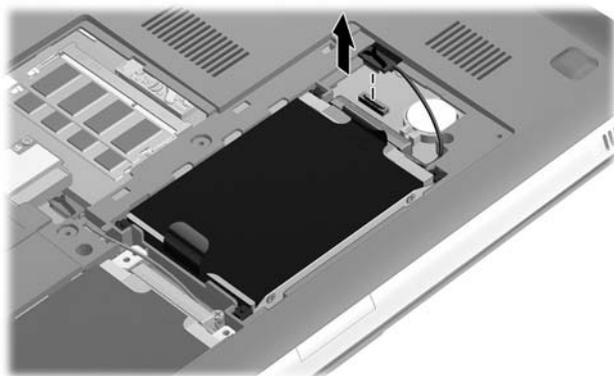
1. Loosen the two captive Phillips screws that secure the hard drive cover to the computer.



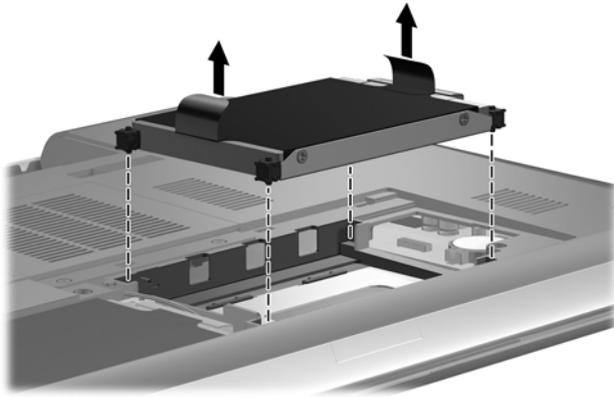
2. Pivot the front edge of the hard drive cover upward.



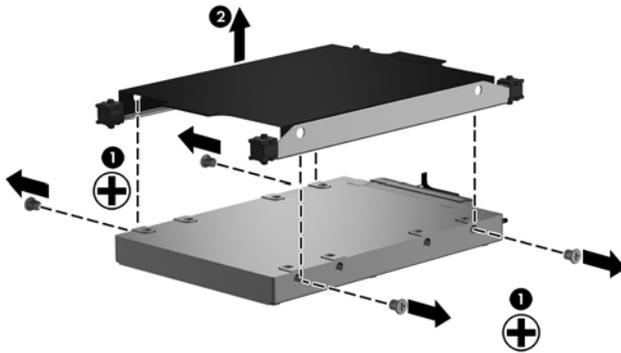
3. Remove the hard drive cover. The hard drive cover is included in the Plastics Kit, spare part number 603795-001.
4. Disconnect the primary hard drive cable from the system board.



5. Use the Mylar tabs to remove the primary hard drive from the computer.



6. If it is necessary to replace the primary hard drive bracket, remove the four Phillips PM3.0x3.0 screws **(1)** that secure the bracket to the primary hard drive.
7. Lift the primary hard drive bracket straight up **(2)** and remove the bracket from the hard drive.



8. If it is necessary to replace the primary hard drive isolators, disconnect the isolators from the hard drive bracket. The primary hard drive bracket and isolators are included in the Hard Drive Hardware Kit, spare part number 603772-001.



Reverse this procedure to reassemble and install the primary hard drive.

RTC battery

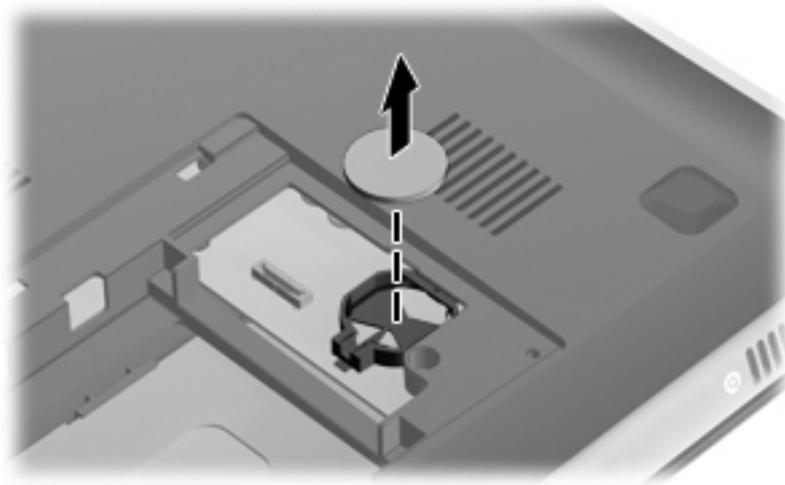
Description	Spare part number
RTC battery	602745-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the hard drive cover (see [Primary hard drive on page 39](#)).

Remove the RTC battery:

- ▲ Remove the RTC battery from the socket on the system board.



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

Memory module

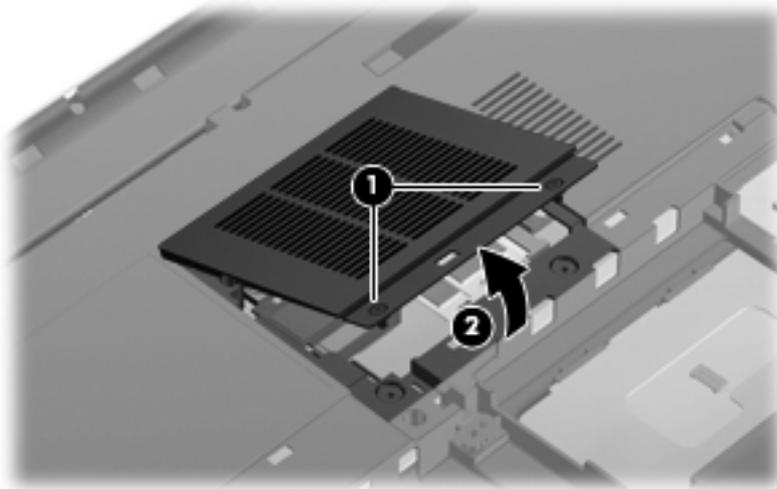
Description	Spare part number
4-GB (PC3, 10600, 1333-MHz)	599092-001
2-GB (PC3, 10600, 1333-MHz)	598856-001

Before removing a memory module, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the hard drive cover (see [Primary hard drive on page 39](#)).

Remove the memory module:

1. Loosen the two captive Phillips screws **(1)** that secure the memory module compartment cover to the computer.
2. Pivot the front edge of the memory module compartment cover **(2)** upward.



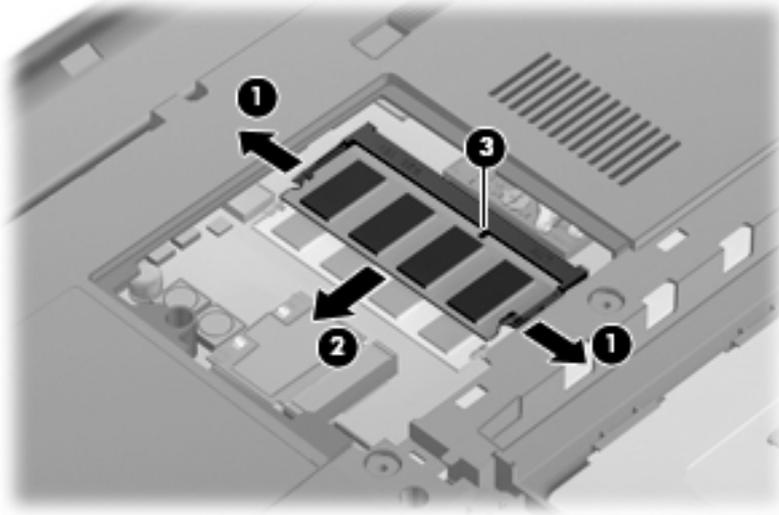
3. Remove the memory module compartment cover. The memory module compartment cover is included in the Plastics Kit, spare part number 603795-001.

 **NOTE:** The top memory module slot contains the expansion memory module. The memory module slot contains the primary memory module.

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

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

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



Reverse this procedure to install a memory module.

Secondary hard drive

 **NOTE:** The hard drive spare part kit includes a hard drive bracket and hard drive connector cable.

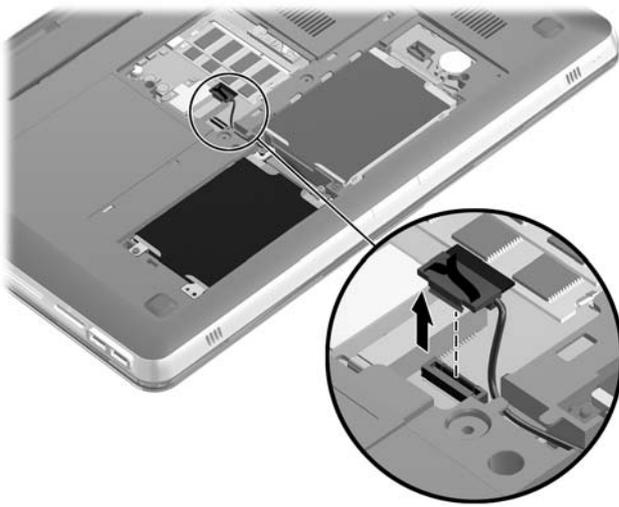
Description	Spare part number
640-GB, 7200-rpm	603786-001
500-GB, 7200-rpm	603784-001
320-GB, 7200-rpm	603783-001
1-TB, 5400-rpm	603788-001
750-GB, 5400-rpm	603787-001
640-GB, 5400-rpm	603785-001
300-GB solid-state drive	631146-001
160-GB solid-state drive	603781-001
Hard Drive Hardware Kit (includes primary hard drive bracket and cable and secondary hard drive bracket and cable)	603772-001

Before removing the secondary hard drive, follow these steps:

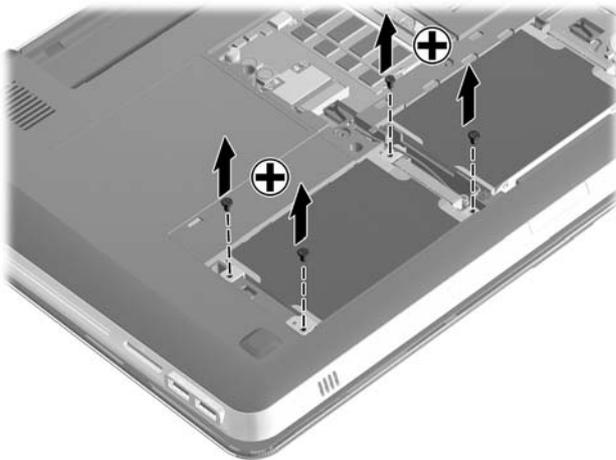
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the hard drive cover (see [Primary hard drive on page 39](#)).
6. Remove the memory module compartment cover (see [Memory module on page 43](#)).

Remove the secondary hard drive:

1. Disconnect the secondary hard drive cable from the system board, and then release the cable from the clips and routing channel built into the base enclosure.

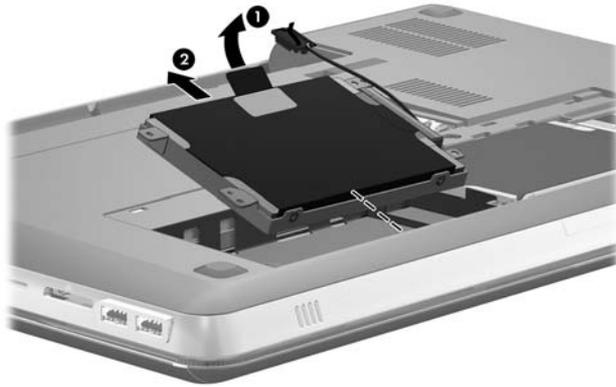


2. Remove the four Phillips PM2.5×6.0 screws that secure the secondary hard drive to the computer.

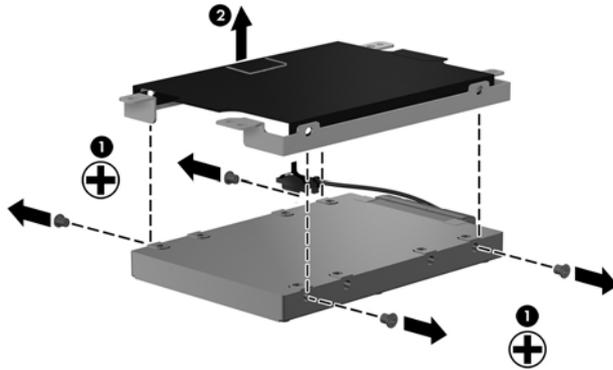


3. Use the Mylar tab **(1)** to lift the rear edge of the secondary hard drive until it rests at an angle.

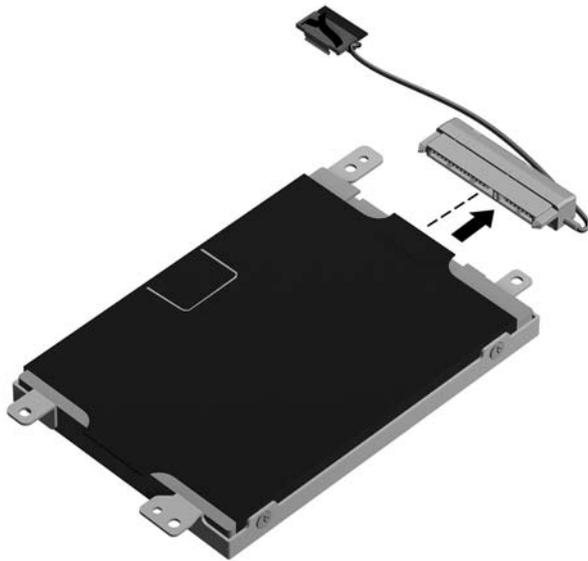
4. Remove the secondary hard drive **(2)** by sliding it up and away from the computer at an angle.



5. If it is necessary to replace the secondary hard drive bracket, remove the four Phillips PM3.0×3.0 screws **(1)** that secure the bracket to the secondary hard drive.
6. Lift the secondary hard drive bracket straight up **(2)** and remove the bracket from the hard drive.



7. If it is necessary to replace the secondary hard drive connector cable, disconnect the cable from the hard drive. The secondary hard drive bracket and secondary hard drive connector cable are included in the Hard Drive Hardware Kit, spare part number 603772-001.



Reverse this procedure to reassemble and install the primary hard drive.

WLAN module

Description	Spare part number
Broadcom 4312G 802.11b/g WiFi and 2070 Bluetooth 2.1+EDR Combo Adapter	619997-001
Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Antigua and Barbuda, Barbados, Belize, Canada, the Cayman Islands, Guam, Puerto Rico, Trinidad and Tobago, the U.S. Virgin Islands, and the United States	582564-001
Broadcom 43224 802.11a/b/g/n 2x2 WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Central African Republic, Chad, Chile, Colombia, Comoros, the Congo, Costa Rica, Croatia, Cyprus, the Czech Republic, Denmark, Djibouti, Dominica, the Dominican Republic, East Timor, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Finland, France, French Guiana, Gabon, Gambia, Georgia, Germany, Ghana, Gibraltar, Greece, Grenada, Guadeloupe, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Indonesia, Ireland, Italy, the Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, the Maldives, Mali, Malta, the Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, the Nether Antilles, the Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, the People's Republic of China, Peru, the Philippines, Poland, Portugal, Qatar, the Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, the Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, the Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent, Suriname, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002
Intel Centrino Advanced-N 6200 802.11a/b/g/n WLAN module	572509-001
Intel Centrino Advanced-N 6200 802.11a/b/g WLAN module	572510-001

△ **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. 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 38](#)).
5. Remove the memory module compartment cover (see [Memory module on page 43](#)).

Remove the WLAN module:

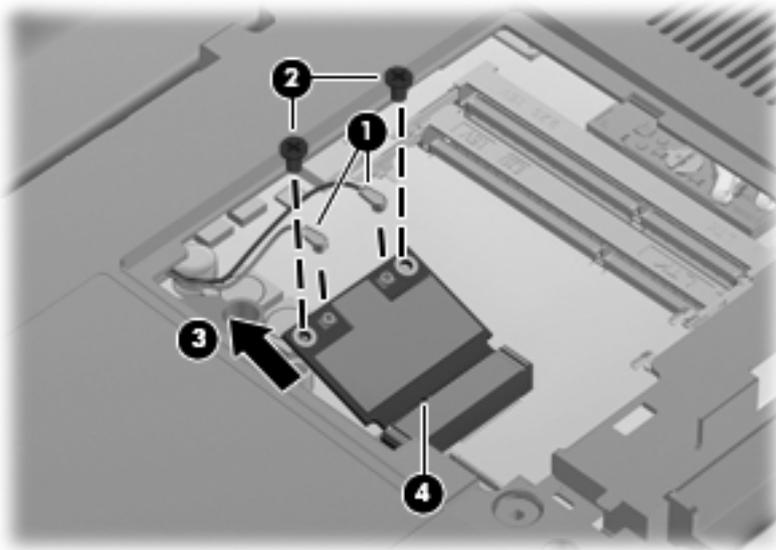
1. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

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

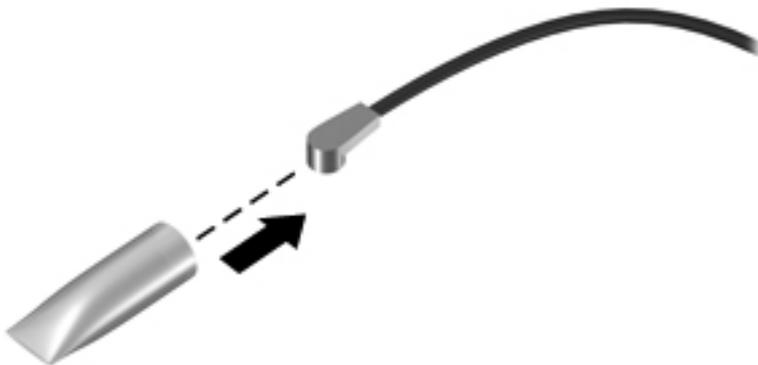
2. Remove the two Phillips PM2.0×4.0 screws **(2)** that secure the WLAN module to the system board. (The WLAN module tilts up.)

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

 **NOTE:** WLAN modules are designed with a notch **(4)** to prevent incorrect insertion of the WLAN module into the WLAN module slot.



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



Reverse this procedure to install the WLAN module.

Keyboard

 **NOTE:** The keyboard spare part kit includes a keyboard cable and a keyboard light cable.

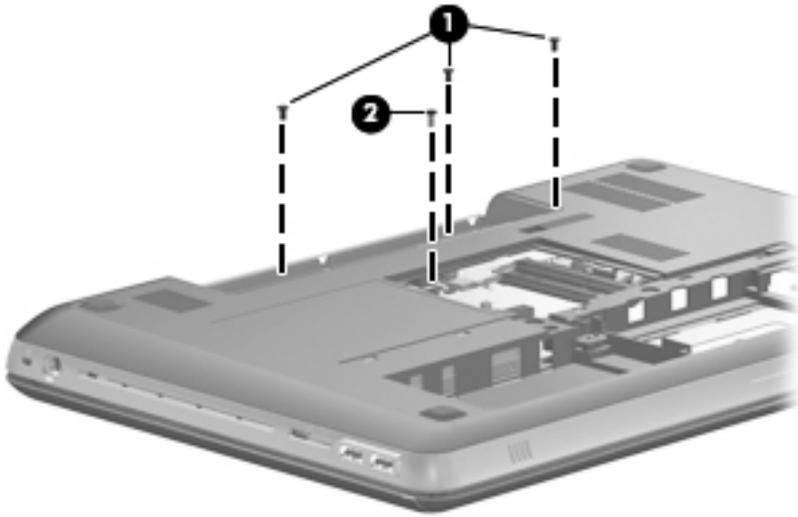
Description	Spare part number
For use in Belgium	603791-A41
For use in Brazil	603791-201
For use in Denmark, Finland, and Sweden	603791-DH1
For use in France	603791-051
For use in French Canada	603791-121
For use in Germany	603791-041
For use in Italy	603791-061
For use in Japan	603791-291
For use in Latin America	603791-161
For use in the Netherlands	603791-B31
For use in Portugal	603791-131
For use in Russia	603791-251
For use in South Korea	603791-AD1
For use in Spain	603791-071
For use in Switzerland	603791-BG1
For use in Thailand	603791-281
For use in the United Kingdom and Singapore	603791-031
For use in the United States and Canada	603791-001

Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the memory module compartment cover (see [Memory module on page 43](#)).

Remove the keyboard:

1. Remove the three Phillips PM 2.5×5.0 screws **(1)** and the Phillips PM 2.5×7.0 **(2)** screw that secure the keyboard to the computer.

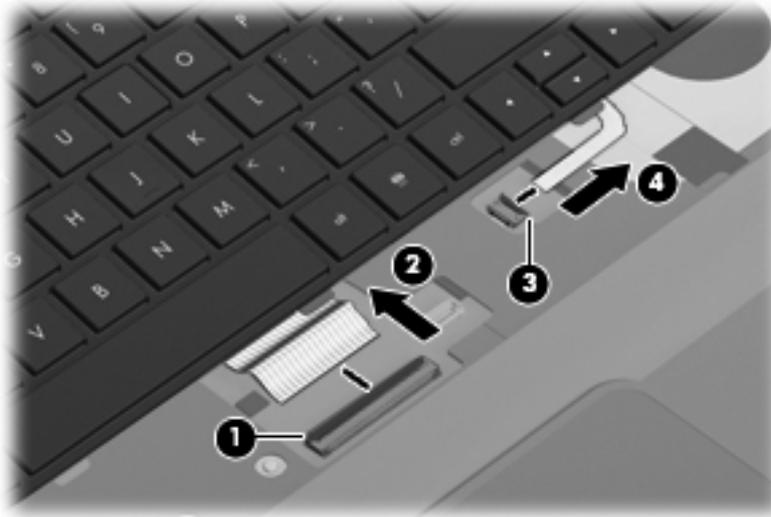


2. Lift the rear edge of the keyboard **(1)** until it rests at an angle.
3. Slide the keyboard **(2)** toward the display until the tabs on the front edge of keyboard disengage from the slots in the top cover.



4. Release the zero insertion force (ZIF) connector **(1)** to which the keyboard cable is attached, and then disconnect the keyboard cable **(2)** from the system board.

5. Release the ZIF connector **(3)** to which the keyboard light cable is attached, and then disconnect the keyboard light cable **(2)** from the system board.



6. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

Description	Spare part number
Top cover (includes TouchPad and cable)	603793-001

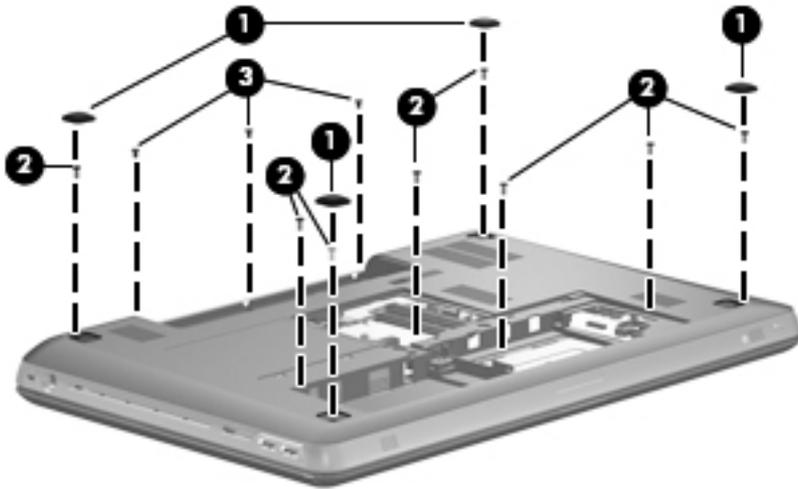
Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)).
5. Remove the memory module compartment cover (see [Memory module on page 43](#)).
6. Remove the keyboard (see [Keyboard on page 51](#)).

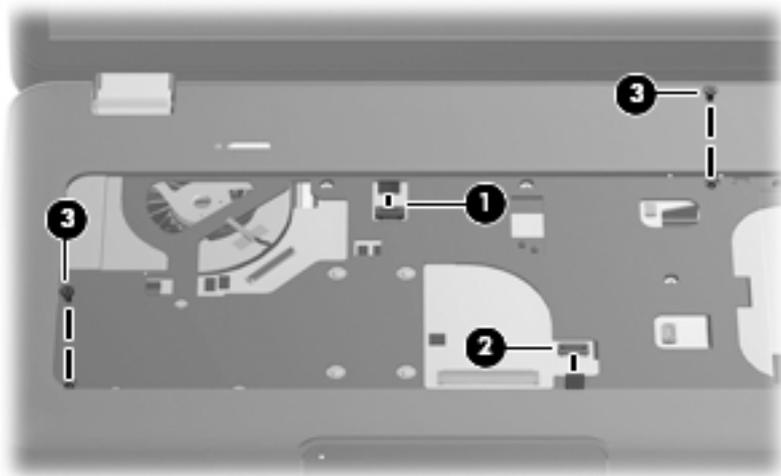
Remove the top cover:

1. Turn the computer upside down, with the front toward you.
2. Remove the four rubber feet **(1)** from the base enclosure. The rubber feet are included in the Rubber Feet Kit, spare part number 603798-001.

3. Remove the eight Phillips PM2.5×8.0 screws **(2)** that secure the top cover to the computer.
4. Remove the three Phillips PM2.5×5.0 screws **(3)** that secure the top cover to the computer in the battery bay.

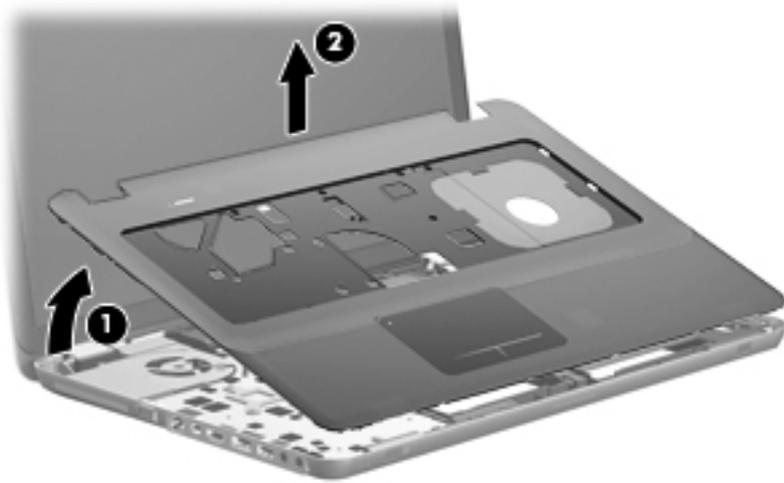


5. Turn the computer display-side up, with the front toward you.
6. Open the computer as far as it will open.
7. Release the ZIF connector **(1)** to which the power button board cable is attached, and then disconnect the power button board cable from the system board.
8. Release the ZIF connector **(2)** to which the TouchPad cable is attached, and then disconnect the TouchPad cable from the system board.
9. Remove the two Phillips PM2.5×5.0 screws **(3)** that secure the top cover to computer.



10. Lift the rear edge of the top cover **(1)** until it rests at an angle.

11. Remove the top cover **(2)**.



Reverse this procedure to install the top cover.

Power button board

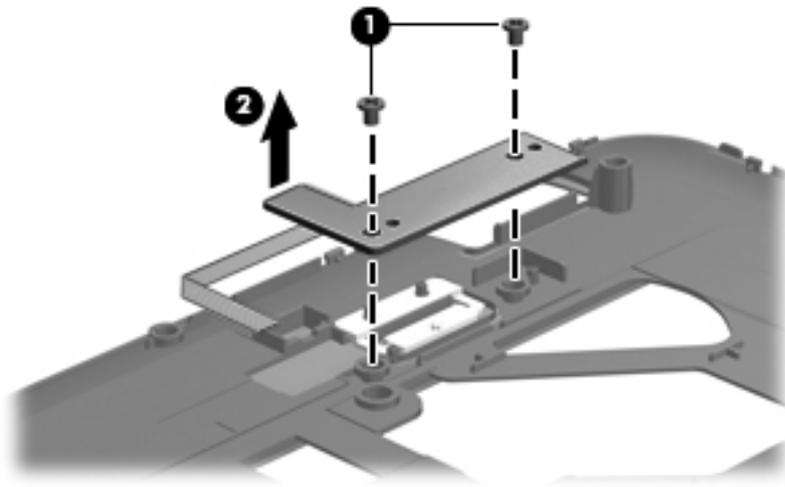
Description	Spare part number
Power button board (includes cable)	603794-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. memory module compartment cover (see [Memory module on page 43](#))
 - b. Keyboard (see [Keyboard on page 51](#))
 - c. 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. Remove the two Phillips PM2.5×5.0 screws **(1)** that secure the power button board to the top cover.
3. Remove the power button board **(2)**.



Reverse this procedure to install the power button board.

USB/Card Reader board

Description	Spare part number
USB/Card Reader board (includes cable)	604064-001

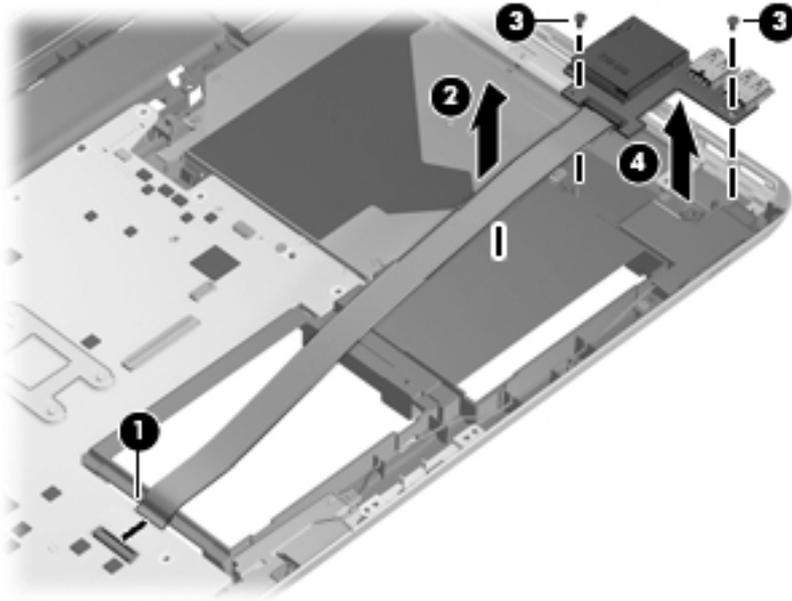
Before removing the USB/Card Reader board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. memory module compartment cover (see [Memory module on page 43](#))
 - b. Keyboard (see [Keyboard on page 51](#))
 - c. Top cover (see [Top cover on page 53](#))

Remove the processor USB/Card Reader board:

1. Release the ZIF connector to which the USB/Card Reader board cable is connected, and then disconnect the USB/Card Reader board cable **(1)** from the system board.
2. Release the USB/Card Reader board cable **(2)** from the base enclosure. (The USB/Card Reader board cable is attached to the base enclosure with double-sided tape).
3. Remove the two Phillips PM2.5×5.0 screws **(3)** that secure the USB/Card Reader board to the base enclosure.

4. Remove the USB/Card Reader board (4).



Reverse this procedure to install the USB/Card Reader board.

Optical drive

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

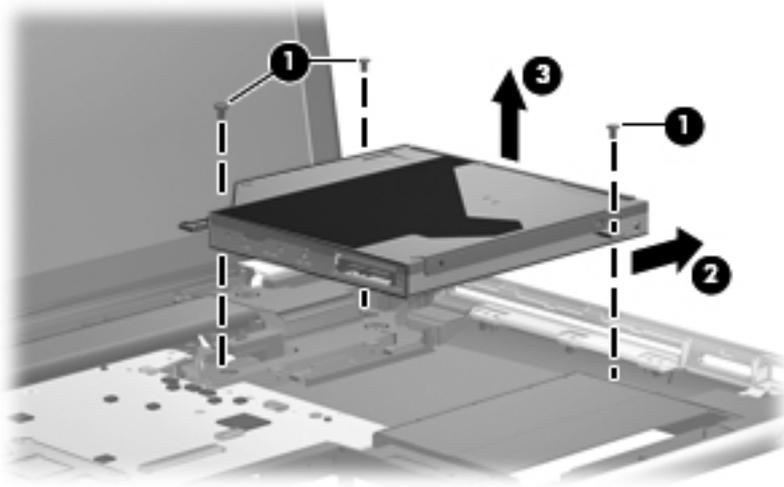
Description	Spare part number
Blu-ray ROM DVD±RW Super Multi Double-Layer Drive	603790-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	603789-001

Before removing the optical drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. memory module compartment cover (see [Memory module on page 43](#))
 - b. Keyboard (see [Keyboard on page 51](#))
 - c. Top cover (see [Top cover on page 53](#))

Remove the optical drive:

1. Remove the three Phillips PM2.5×5.0 screws **(1)** that secure the optical drive to the computer.
2. Slide the optical drive **(2)** to the right to disconnect it from the system board.
3. Remove the optical drive **(3)** by lifting it straight up.



Reverse this procedure to install the optical drive.

Power connector cable

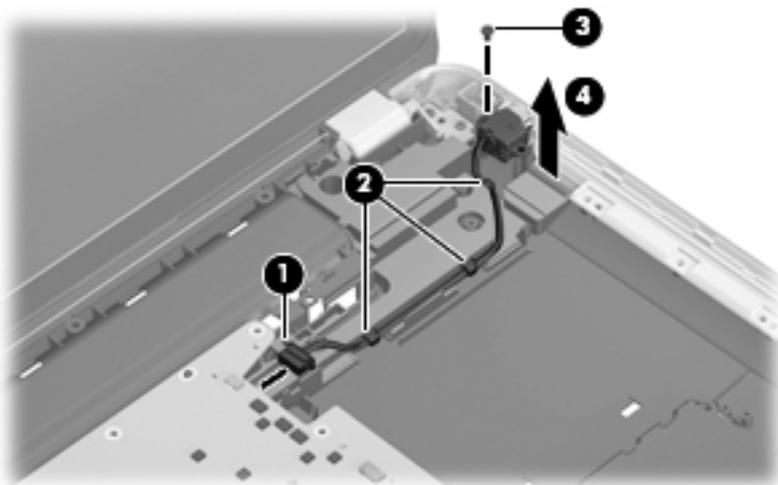
Description	Spare part number
Power connector cable	617348-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. memory module compartment cover (see [Memory module on page 43](#))
 - b. Keyboard (see [Keyboard on page 51](#))
 - c. Top cover (see [Top cover on page 53](#))

Remove the power connector cable:

1. Disconnect the power cable **(1)** from the system board.
2. Release the power cable from the clips **(2)** built into the base enclosure.
3. Remove the Phillips PM2.5x5.0 screw **(3)** that secures the power connector to the base enclosure.
4. Release the power connector **(4)** from the clip built into the base enclosure.



5. Remove the power connector cable.

Reverse this procedure to install the power connector cable.

System board

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

Description	Spare part number
For use with computer models equipped with a 3D display assembly (includes 1 GB of discrete graphics subsystem memory)	620774-001
For use with computer models equipped with an FHD display assembly (includes 1 GB of discrete graphics subsystem memory)	618859-001
For use with computer models equipped with an HD+ display assembly (includes 1 GB of discrete graphics subsystem memory)	603771-001

Before removing the system board, follow these steps:

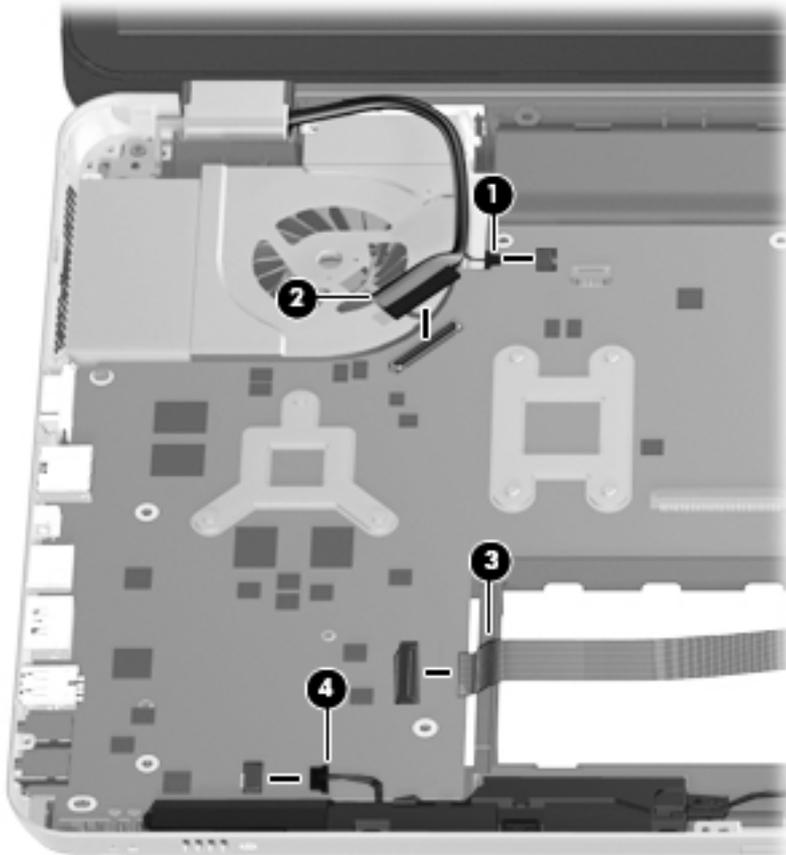
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. Hard drives (see [Primary hard drive on page 39](#) and see [Secondary hard drive on page 45](#))
 - b. memory module compartment cover (see [Memory module on page 43](#))
 - c. Keyboard (see [Keyboard on page 51](#))
 - d. Top cover (see [Top cover on page 53](#))
 - e. Optical drive (see [Optical drive on page 58](#))

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:

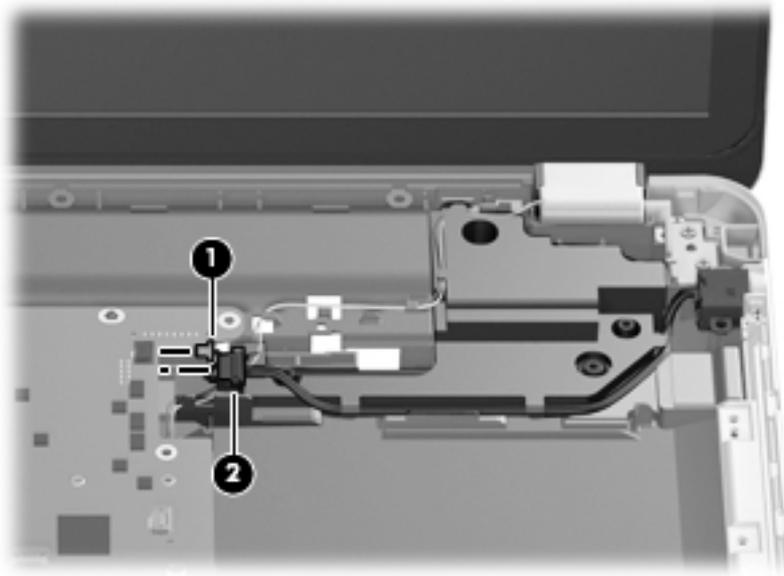
- RTC battery (see [RTC battery on page 42](#))
- Memory modules (see [Memory module on page 43](#))
- WLAN module (see [WLAN module on page 49](#))
- Fan/heat sink assembly (see [Fan/heat sink assembly on page 65](#))
- Processor (see [Processor on page 67](#))

Remove the system board:

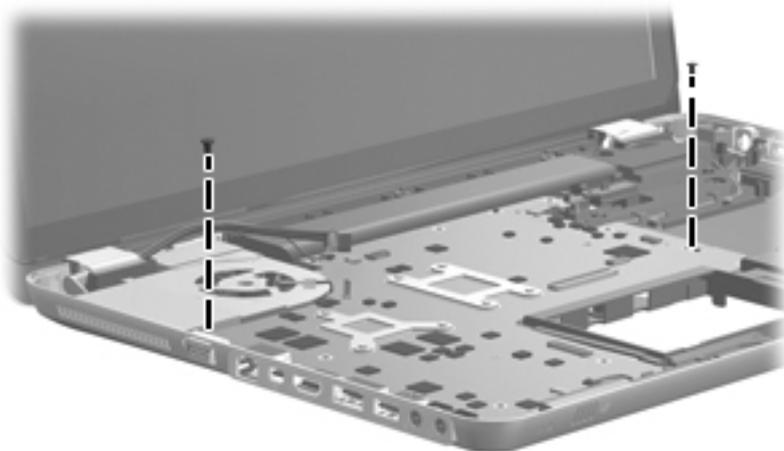
1. Disconnect the following cables from the system board:
 - (1) Bluetooth module cable
 - (2) Display panel cable
 - (3) USB/Card Reader board cable
 - (4) Speaker cable



2. Disconnect the subwoofer cable **(1)** and the power connector cable **(2)** from the system board.

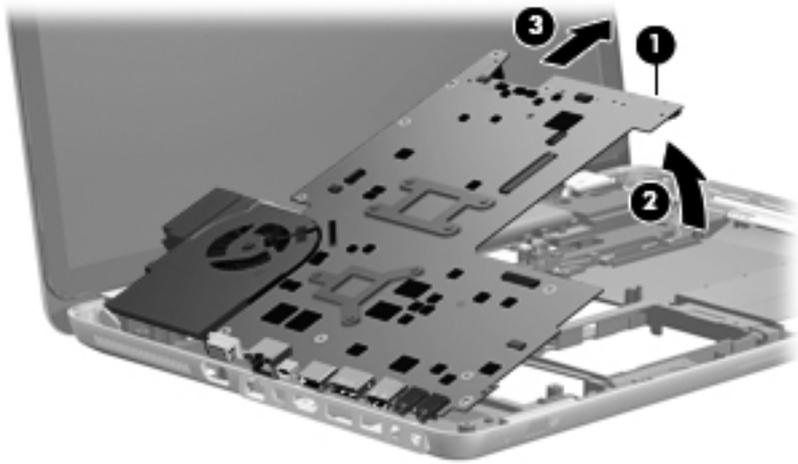


3. Remove the two Phillips PM2.5×5.0 screws that secure the system board to the base enclosure.



4. Use the optical drive connector **(1)** to lift the right side of the system board **(2)** until it rests at an angle.

5. 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 includes replacement thermal material.

Description	Spare part number
For use only with Intel Core i7, 45-W processors	608650-001
For use only with Intel Core i5, 35-W processors	603799-001

 **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:

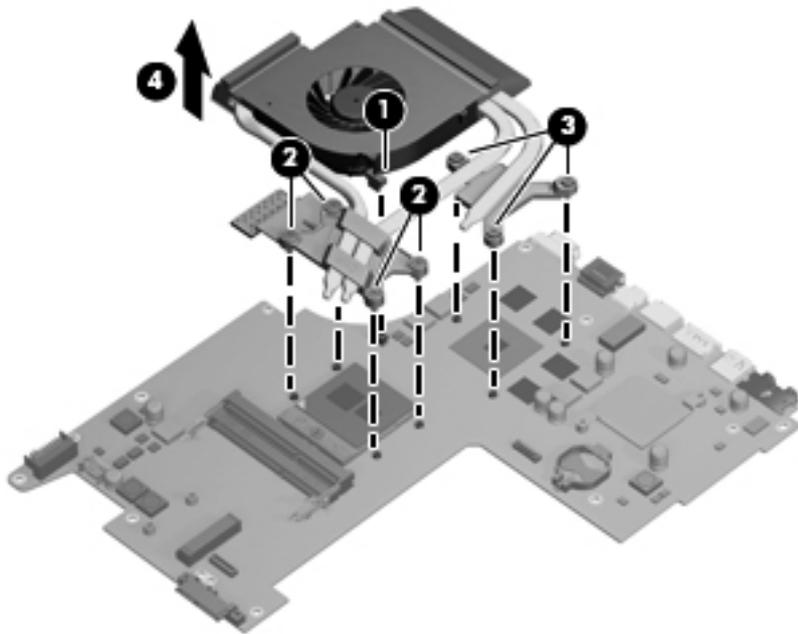
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. Hard drives (see [Primary hard drive on page 39](#) and see [Secondary hard drive on page 45](#))
 - b. memory module compartment cover (see [Memory module on page 43](#))
 - c. Keyboard (see [Keyboard on page 51](#))
 - d. Top cover (see [Top cover on page 53](#))
 - e. Optical drive (see [Optical drive on page 58](#))
 - f. 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.
2. Disconnect the fan cable **(1)** from the system board.
3. Loosen the seven captive screws **(2)** that secure the fan/heat sink assembly to the system board.

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

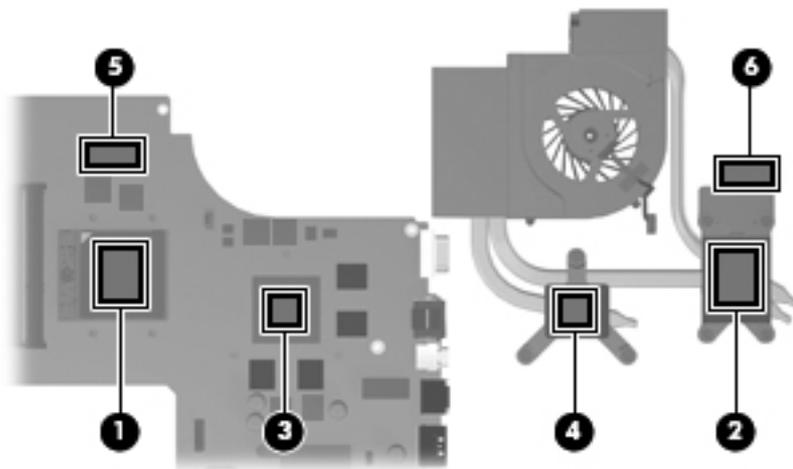
4. Remove the fan/heat sink assembly **(3)**.



 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board each time the fan/heat sink assembly is removed:

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it
- Thermal pads are used on the graphics subsystem chip **(3)** and the heat sink section **(4)** that services it
- Thermal pads are used on the system board capacitors **(5)** and the heat sink section **(6)** that services them

Replacement thermal material is included with all fan/heat sink assembly, system board, and processor spare part kits.



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

Processor

 **NOTE:** The processor spare part kit includes replacement thermal material.

Description	Spare part number
Intel Core i7-840QM 1.86-GHz (SC turbo up to 3.20-GHz), 45-W processor	612260-001
Intel Core i7-820QM 1.73-GHz (SC turbo up to 3.06-GHz), 45-W processor	583053-001
Intel Core i7-740QM 1.73-GHz (SC turbo up to 2.93-GHz), 45-W processor	612259-001
Intel Core i7-720QM 1.60-GHz (SC turbo up to 2.80-GHz), 45-W processor	586170-001
Intel Core i5-580M 2.66-GHz (SC turbo up to 3.33-GHz), 35-W processor	625825-001
Intel Core i5-560M 2.66-GHz (SC turbo up to 3.20-GHz), 35-W processor	625824-001
Intel Core i5-540M 2.53-GHz (SC turbo up to 3.06-GHz), 35-W processor	594188-001
Intel Core i5-520M 2.40-GHz (SC turbo up to 2.93-GHz), 35-W processor	594187-001
Intel Core i5-460M 2.53-GHz (SC turbo up to 2.80-GHz), 35-W processor	626039-001
Intel Core i5-450M 2.40-GHz (SC turbo), 35-W processor	613585-001
Intel Core i5-430M 2.26-GHz (SC turbo up to 2.53-GHz), 35-W processor	597624-001

Before removing the processor, follow these steps:

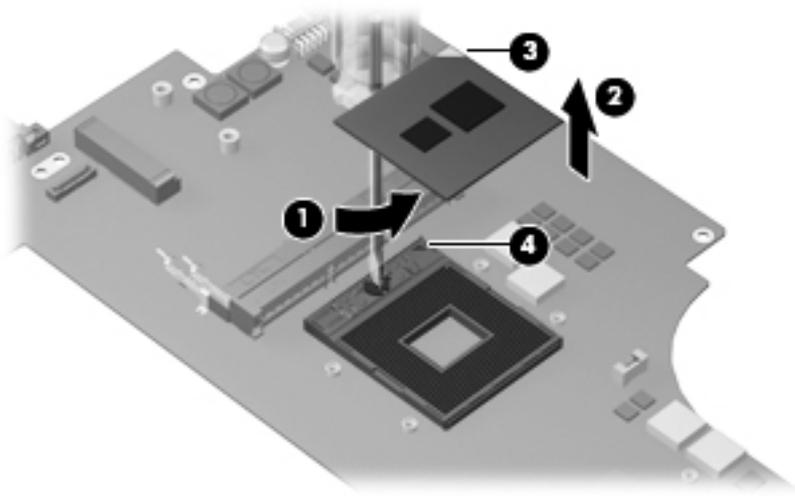
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. Hard drives (see [Primary hard drive on page 39](#) and see [Secondary hard drive on page 45](#))
 - b. memory module compartment cover (see [Memory module on page 43](#))
 - c. Keyboard (see [Keyboard on page 51](#))
 - d. Top cover (see [Top cover on page 53](#))
 - e. Optical drive (see [Optical drive on page 58](#))
 - f. System board (see [System board on page 61](#))

Remove the processor:

1. Turn the processor locking screw **(1)** one-half turn counterclockwise, until you hear a click.

2. Lift the processor **(2)** straight up, and remove it.

 **NOTE:** The gold triangle **(3)** on the processor must be aligned with the triangle icon **(4)** embossed on the processor socket when you install the processor.



Reverse this procedure to install the processor.

Speakers

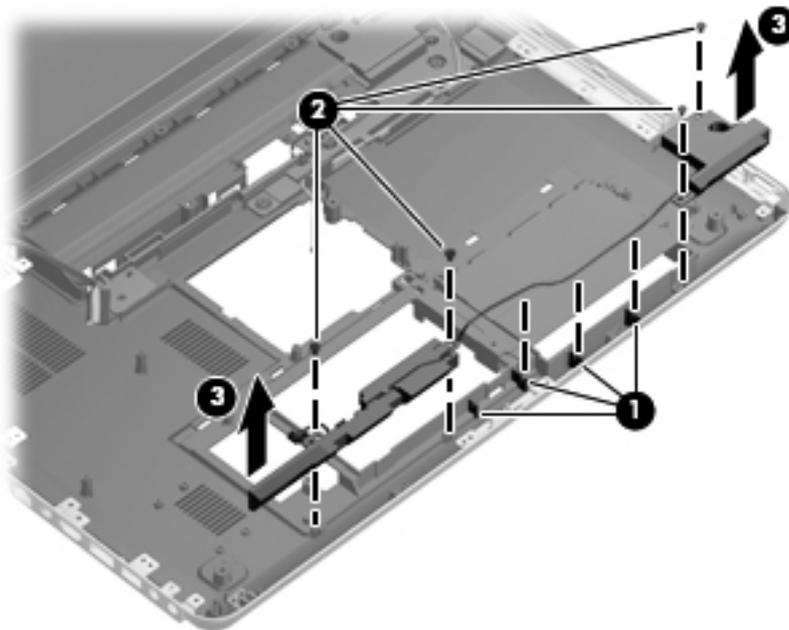
Description	Spare part number
Speakers (include cable)	603796-001

Before removing the speakers, 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 38](#)).
5. Remove the memory module compartment cover (see [Memory module on page 43](#)).
6. Remove the top cover (see [Top cover on page 53](#)).

Remove the speakers:

1. Disconnect the speaker cable **(1)** from the system board.
2. Remove the speakers **(2)**.



Reverse this procedure to install the speakers.

Subwoofer

Description	Spare part number
Subwoofer (includes cable)	603800-001

Before removing the subwoofer, follow these steps:

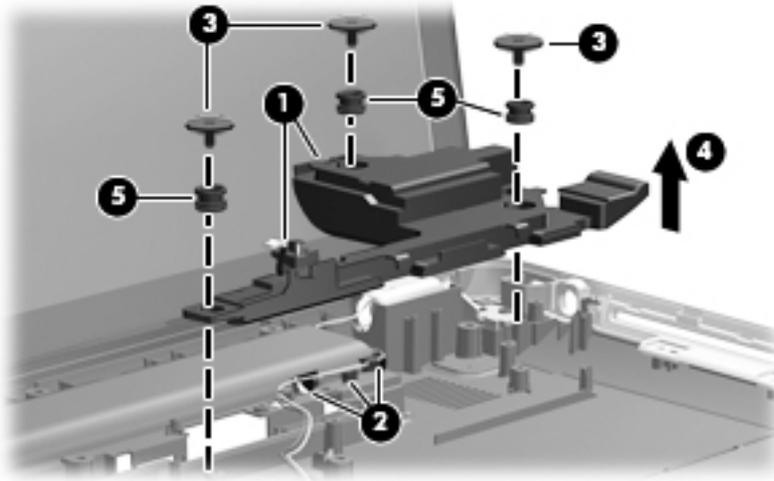
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. Hard drive cover (see [Primary hard drive on page 39](#))
 - b. memory module compartment cover (see [Memory module on page 43](#)).
 - c. Keyboard (see [Keyboard on page 51](#))
 - d. Top cover (see [Top cover on page 53](#))
 - e. System board (see [System board on page 61](#))

Remove the subwoofer:

1. Release the wireless antenna cables from the clips built into the subwoofer **(1)** and the base enclosure **(2)**.
2. Remove the three Phillips PM2.5×5.0 broad head screws **(3)** that secure the subwoofer to the base enclosure.

3. Remove the subwoofer **(4)**.

 **NOTE:** When removing the subwoofer, make note of the location of the isolators **(5)** that are installed in screw holes.



Reverse this procedure to install the subwoofer.

Display assembly

 **NOTE:** The display assembly spare part kit includes a display panel cable, webcam/microphone module and cable, and 2 wireless antenna cables and transceivers.

Description	Spare part number
17.3-in AG, FG, 3D	620775-001
17.3-in AG, FG, FHD	603774-001
17.3-in AG, FG, HD+	603773-001

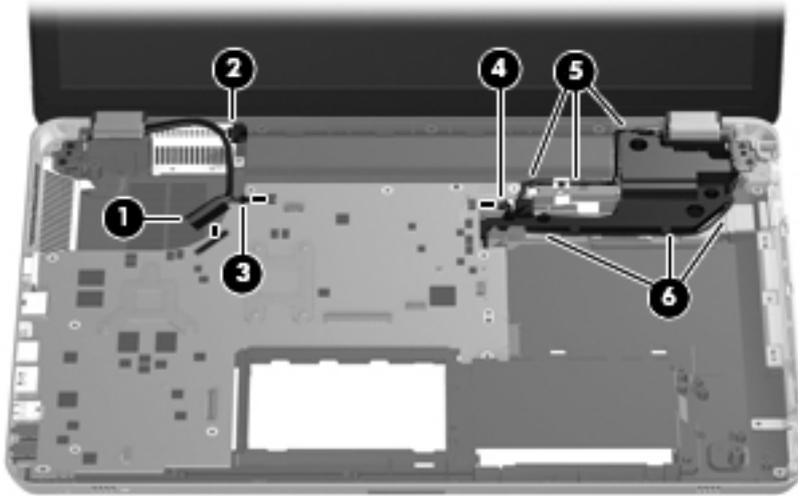
Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - a. Hard drive cover (see [Primary hard drive on page 39](#))
 - b. memory module compartment cover (see [Memory module on page 43](#)).

- c. Keyboard (see [Keyboard on page 51](#))
- d. Top cover (see [Top cover on page 53](#))

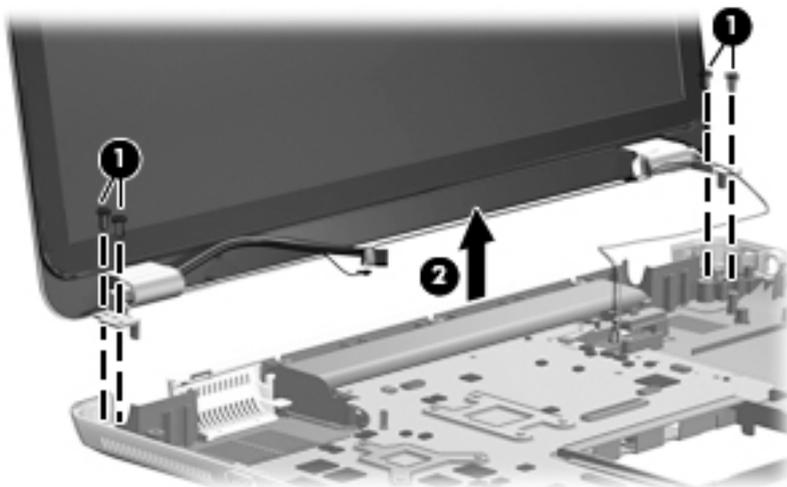
Remove the display assembly:

1. Disconnect the display panel cable **(1)** from the system board and release the cable from the clip **(2)** built into the base enclosure.
2. Disconnect the Bluetooth module cable **(3)** from the system board.
3. Release the wireless antenna cables **(4)** from the opening in the base enclosure.
4. Release the wireless antenna cables from the clips built into the base enclosure **(5)** and subwoofer **(6)**.

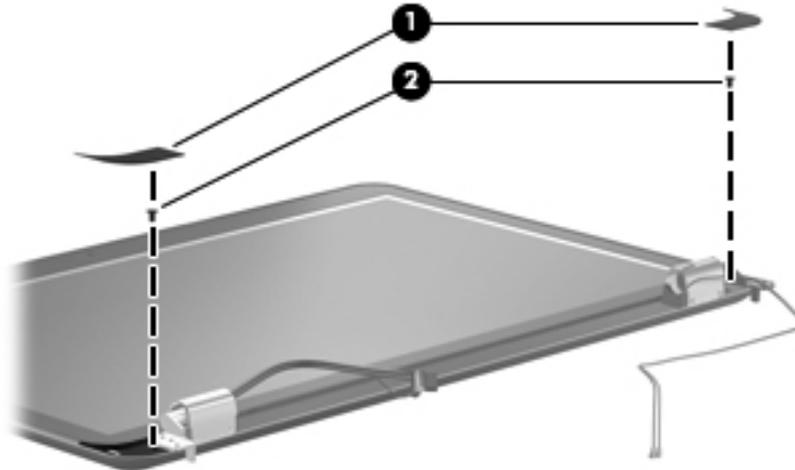


△ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

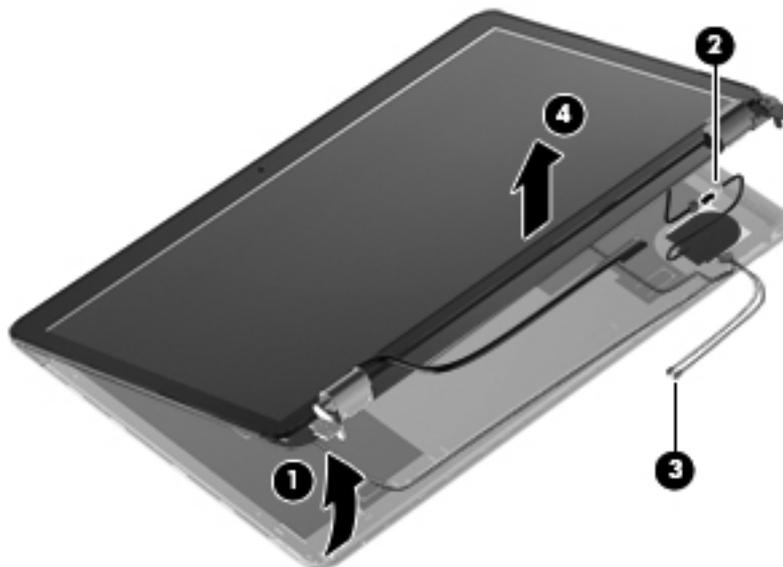
5. Remove the four Phillips PM2.5×7.0 screws **(1)** that secure the display assembly to the computer.
6. Remove the display assembly **(2)**.



7. If it is necessary to replace the display enclosure or any of the display assembly internal components:
- a. Remove the Mylar screw covers **(1)**. The screw covers are included in the Display Screw Kit, spare part number 603776-001.
 - b. Remove the two Phillips PM2.5×5.0 screws **(2)** that secure the display enclosure to the display assembly.

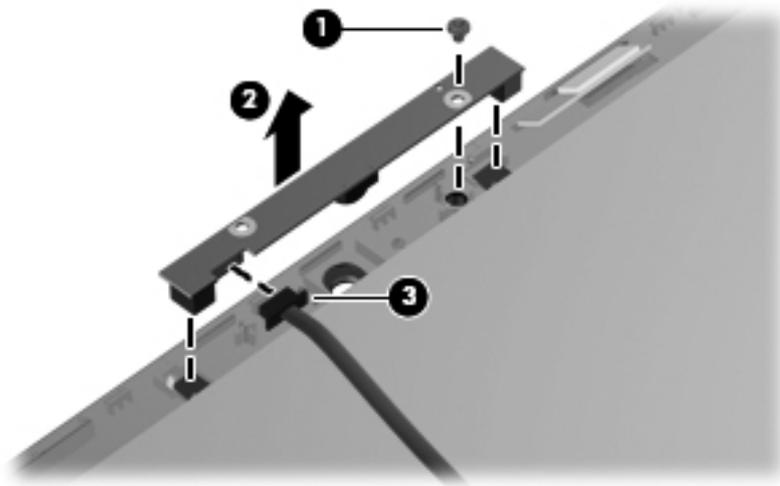


- c. Lift the bottom edge of the display bezel/panel assembly **(1)** until it rests at a slight angle.
- d. Disconnect the logo light cable **(2)** from the display panel cable.
- e. Release the wireless antenna cables **(3)** from the right display hinge.
- f. Remove the display bezel/panel assembly **(4)**.



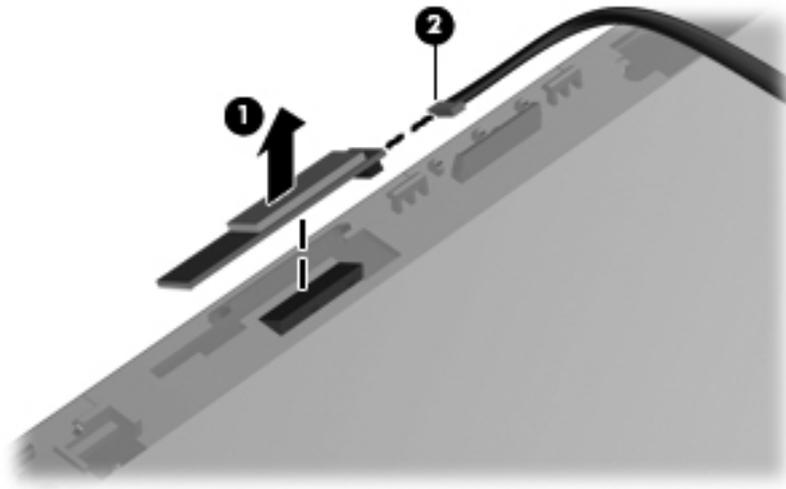
- g. Set the display enclosure aside. The display enclosure is available using spare part number 603775-001.

8. If it is necessary to replace the webcam/microphone module:
 - a. Remove the Phillips PM2.0×4.0 screw **(1)** that secures the webcam/microphone module to the display bezel.
 - b. Release the webcam/microphone module **(2)** as far as the webcam/microphone module allows.
 - c. Disconnect the webcam/microphone module cable **(3)** from the webcam/microphone module.



- d. Remove the webcam/microphone module. The webcam/microphone module is available using spare part number 603779-001.
9. If it is necessary to replace the Bluetooth module:
 - a. Detach the Bluetooth module **(1)** from the display bezel. (The Bluetooth module is attached to the display bezel using double-sided tape).

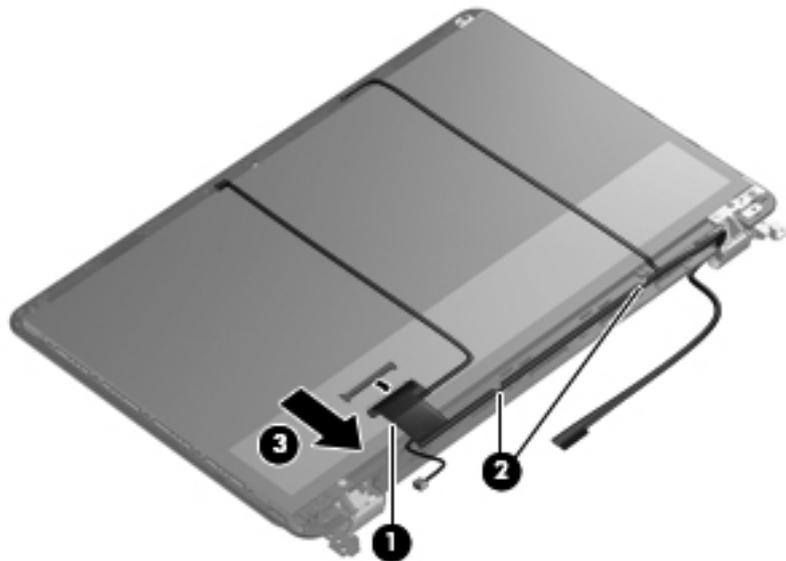
- b. Disconnect the Bluetooth module cable (2) from the Bluetooth module.



- c. Remove the Bluetooth module. The Bluetooth module is available using spare part number 537921-001.

10. If it is necessary to replace the display panel cable:

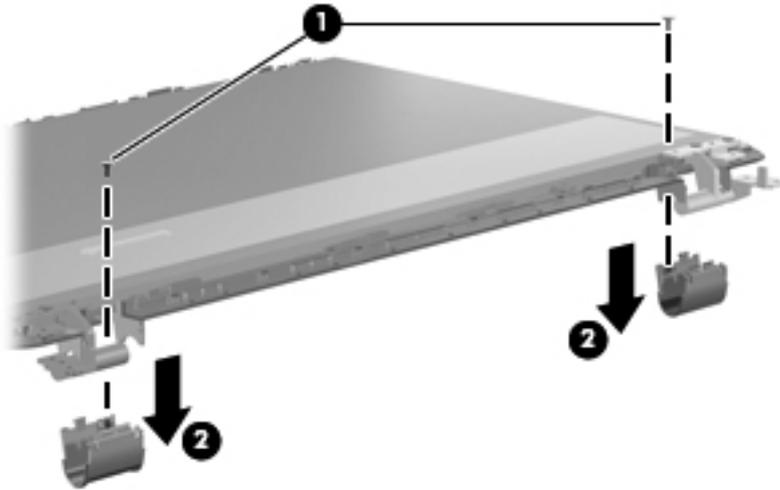
- a. Release the support strip (1) that secures the display panel cable to the display panel.
- b. Release the display panel cable from the clips (2) and routing channel built into the display bezel.
- c. Disconnect the display panel cable (3) from the display panel.



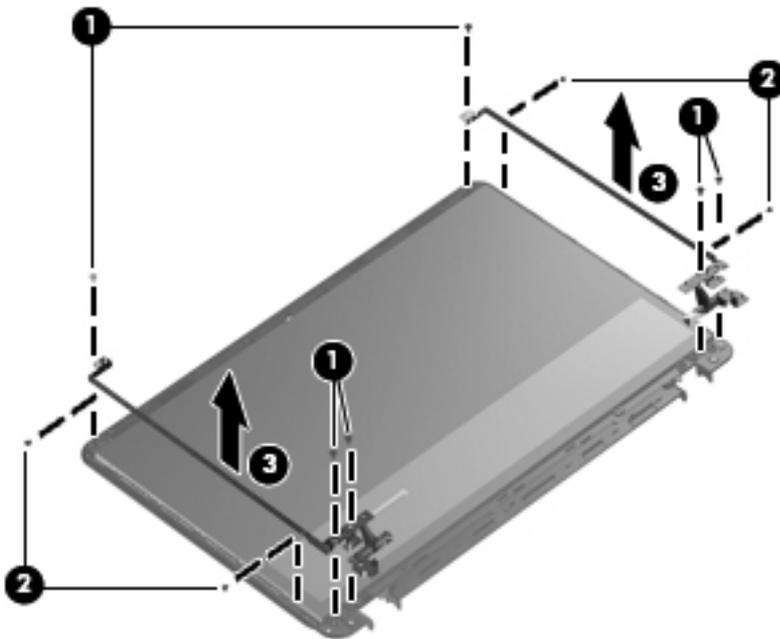
- d. Remove the display panel cable. The display panel cable is available using spare part numbers 621337-001 (for use with computer models equipped with a 3D display assembly) and 603777-001 (for use with computer models equipped with an FHD or HD+ display assembly), and includes the webcam cable and Bluetooth module cable.

11. If it is necessary to replace the display hinges and hinge covers:

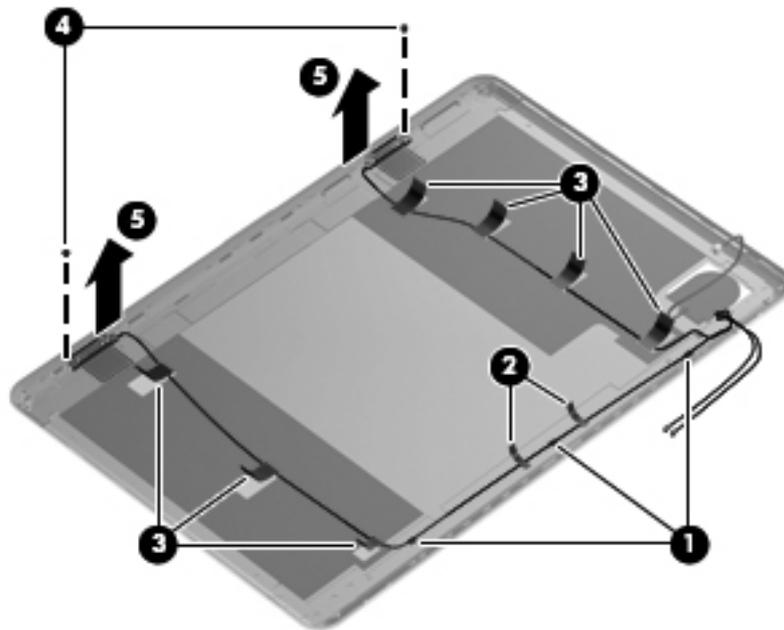
- a.** Remove the two Phillips PM2.0×4.0 screws **(1)** that secure the hinge covers to the display bezel.
- b.** Remove the hinge covers **(2)**.



- c.** Remove the six Phillips PM2.5×5.0 screws **(1)** that secure the hinges to the display panel.
- d.** Remove the four Phillips PM2.0×4.0 screws **(2)** that secure the hinges to the display panel.
- e.** Remove the hinges **(3)**. The hinge covers are available using spare part number 604063-001. The hinges are available using spare part number 603778-001.



- 12.** If it is necessary to replace the wireless antenna cables and transceivers:
- a.** Release the wireless antenna cables from the clips and routing channel built into the display enclosure.
 - b.** Release the two pieces of tape that secure the wireless antenna cables to the display enclosure.
 - c.** Release the tabs built into the display enclosure that secure the wireless antenna cables.
 - d.** Remove the two Phillips PM2.0×4.0 screws that secure the wireless antenna transceivers to the display enclosure.
 - e.** Remove the wireless antenna cables and transceivers. The wireless antenna cables and transceivers are available in the Wireless Antenna Kit, spare part number 603780-001.



Reverse this procedure to reassemble and install the display assembly.

5 Setup Utility (BIOS)

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 includes settings for the types of peripherals installed, the startup sequence of the computer, and the amount of system and extended memory.

△ **CAUTION:** Use extreme care when making changes in Setup Utility. Errors can prevent the computer from operating properly.

Starting Setup Utility

 **NOTE:** The fingerprint reader (select models only) cannot be used to access Setup Utility.

- 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 **f10**.

Using Setup Utility

Changing the language of Setup Utility

1. Start Setup Utility.
2. Use the arrow keys to select **System Configuration > Language**, and then press **enter**.
3. Use the arrow keys to select a language, and then press **enter**.
4. When a confirmation prompt with your language selected is displayed, press **enter**.
5. To save your change and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

Your change takes effect immediately.

Navigating and selecting in Setup Utility

Because Setup Utility is not Windows based, it does not support the TouchPad. Navigation and selection are by keystroke.

- To choose a menu or a menu item, use the arrow keys.
- To choose an item in a list or to toggle a field—for example an Enable/Disable field—use either the arrow keys or **f5** and **f6**.
- To select an item, press **enter**.
- To close a text box or return to the menu display, press **esc**.
- To display additional navigation and selection information while Setup Utility is open, press **f1**.

Display system information

1. Start Setup Utility.
2. Select the **Main** menu. System information such as the system time and date, and identification information about the computer is displayed.
3. To exit Setup Utility without changing any settings, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Restoring factory default settings in Setup Utility

1. Start Setup Utility.
2. Use the arrow keys to select **Exit > Load Setup Defaults**, and then press **enter**.
3. When the Setup Confirmation is displayed, press **enter**.
4. To save your change and exit Setup Utility, use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.

The Setup Utility factory settings take effect when the computer restarts.

 **NOTE:** Your password, security, and language settings are not changed when you restore the factory settings.

Exiting Setup Utility

- To exit Setup Utility and save your changes from the current session:
If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Saving Changes**, and then press **enter**.
- To exit Setup Utility without saving your changes from the current session:
If the Setup Utility menus are not visible, press **esc** to return to the menu display. Then use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Updating the BIOS

Updated versions of the BIOS may be available on the HP Web site.

Most BIOS updates on the HP Web site 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.

1. Start Setup Utility.
2. If the system information is not displayed, use the arrow keys to select the **Main** menu.
BIOS and other system information is displayed.
3. To exit Setup Utility, use the arrow keys to select **Exit > Exit Discarding Changes**, and then press **enter**.

Downloading a BIOS update

- △ **CAUTION:** To reduce the risk of damage to the computer or an unsuccessful installation, download and install a BIOS update only when the computer is connected to reliable external power using the AC adapter. Do not download or install a BIOS update while the computer is running on battery power, docked in an optional docking device, or connected to an optional power source. During the download and installation, follow these instructions:

Do not disconnect power from the computer by unplugging the power cord from the AC outlet.

Do not shut down the computer or initiate Sleep or Hibernation.

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

1. Access the page on the HP Web site that provides software for your computer:

Windows 7—Select **Start > Help and Support > Maintain**.

Windows XP—Select **Start > Help and Support**, and then select the software and drivers update.

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. **Windows 7**—Open Windows Explorer by selecting **Start > Computer**.

Windows XP—Open Windows Explorer by selecting **Start > My 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.

6 Specifications

Computer specifications

416 275 31.7 38.7 3710 8.16	Metric	U.S.
Dimensions		
Width	41.6 cm	16.38 in
Depth	27.5 cm	10.83 in
Height (front to back)	3.2 cm to 3.9 cm	1.25 in to 1.52 in
Weight	3.71 kg	8.18 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Operating (not writing to optical disc)	0°C to 35°C	32°F to 95°F
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 90%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	

416 275 31.7 38.7 3710 8.16	Metric	U.S.
Nonoperating	1.50 g zero-to-peak, 10 Hz to 500 Hz, 0.5 oct/min sweep rate	
NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The computer operates well within this range of temperatures.		

17.3-inch, WVA, FHD, LED AntiGlare display specifications

	Metric	U.S.
Dimensions		
Width	24.83 cm	9.78 in
Depth	38.77 cm	15.26 in
Diagonal	43.96 cm	17.31 in
Number of colors	Up to 16.8 million, 72% color gamut	
Contrast ratio	200:1 (typical)	
Brightness	300 nits (typical)	
Backlight	LED	
Character display	80 × 25	
Total power consumption	6.0 W	
Viewing angle	+/-65 horizontal, +/-50° vertical (typical)	

17.3-inch, SVA, HD+, LED AntiGlare display specifications

	Metric	U.S.
Dimensions		
Width	24.83 cm	9.78 in
Depth	38.77 cm	15.26 in
Diagonal	43.96 cm	17.31 in
Number of colors	Up to 16.8 million, 45 to 60% color gamut	
Contrast ratio	200:1 (typical)	
Brightness	200 nits (typical)	
Backlight	LED	
Character display	80 × 25	
Total power consumption	6.0 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
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	101 g	101 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	3 ms	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms	24 ms
Disk rotational speed	5400 rpm	5400 rpm	7200 and 5400 rpm	7200 rpm	7200 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)				
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.					
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.					

Blu-ray ROM DVD±RW Super Multi Double-Layer Drive specifications

Applicable disc	Read:	Write:
	BD-ROM, BD-ROM-DL, BD-R, BD-R-DL, BD-RE, BD-RE-DL, DVD-ROM, DVD+R, DVD+R-DL, DVD+RW, DVD-R, DVD-R-DL, DVD-RW, DVD-RAM (Ver.2), CD-DA, CD-ROM (mode 1 and mode 2), CD-ROM XA (mode 2, form 1 and form 2), Photo CD (single and multiple sessions), CD Extra, CD-R, CD-RW, and CD-TEXT	DVD-RAM (Ver.2), DVD+R, DVD-R, CD-R, and CD-ROM
Access time	BD	DVD
Random	< 230 ms	< 180 ms
Cache buffer	4.5 MB	
Data transfer rate		
2X BD-RAM	9 MB/sec	
8X DVD	2,400 KB/sec	
16X CD-R	2,400 KB/sec	
16X CD-RW	2,400 KB/sec	

DVD±RW and CD-RW Super Multi Double-Layer Combo Drive specifications

Applicable disc	Read:	Write:
	CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Access time	CD	DVD
Random	< 175 ms	< 230 ms
Cache buffer	2.5 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	

7 Backup and recovery

Recovery after a system failure is as good as your most recent backup. HP recommends that you create recovery discs immediately after software setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup.

Tools provided by the operating system and HP Recovery Manager software are designed to help you with the following tasks for safeguarding your information and restoring it in case of a computer failure:

- Creating a set of recovery discs (Recovery Manager software feature)
- Backing up your information
- Creating system restore points
- Recovering a program or driver
- Performing a full system recovery (from the partition or recovery discs)

 **NOTE:** Recovery discs have been included if your computer does not have a partition. Use these discs to recover your operating system and software. To check for the presence of a recovery partition, select Start, right-click Computer, click Manage, and then click Disk Management. If the partition is present, an HP Recovery drive is listed in the window.

Recovery discs

HP recommends that you create recovery discs to be sure that you can restore your computer to its original factory state if the hard drive fails, or if for any reason you cannot recover using the recovery partition tools. Create these discs after setting up the computer for the first time.

Handle these discs carefully and keep them in a safe place. The software allows the creation of only one set of recovery discs.

 **NOTE:** 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 purchase recovery discs for your computer from the HP Web site. 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.

Guidelines:

- Purchase high-quality DVD-R, DVD+R, BD-R (writable Blu-ray), or CD-R discs. DVDs and BDs have a much higher storage capacity than CDs. If you use CDs, up to 20 discs may be required, whereas only a few DVDs or BDs are required.

 **NOTE:** Read-write discs, such as CD-RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs, are not compatible with the Recovery Manager software.

- The computer must be connected to AC power during this process.
- Only one set of recovery discs can be created per computer.
- Number each disc before inserting it into the optical drive.
- If necessary, you can exit the program before you have finished creating the recovery discs. The next time you open Recovery Manager, you will be prompted to continue the disc creation process.

To create a set of recovery discs:

1. Select **Start > All Programs > Recovery Manager > Recovery Disc Creation**.
2. Follow the on-screen instructions.

Performing a system recovery

Recovery Manager software allows you to repair or restore the computer to its original factory state. Recovery Manager works from recovery discs or from a dedicated recovery partition (select models only) on the hard drive.

Note the following when performing a system recovery:

- You can recover only files that you have previously backed up. HP recommends that you use HP Recovery Manager to create a set of recovery discs (entire drive backup) as soon as you set up the computer.
- Windows has its own built-in repair features, such as System Restore. If you have not already tried these features, try them before using Recovery Manager.
- Recovery Manager recovers only software that was preinstalled at the factory. Software not provided with this computer must be downloaded from the manufacturer's Web site or reinstalled from the disc provided by the manufacturer.

Recovering using the dedicated partition (select models only)

On some models, you can perform a recovery from the partition on the hard drive, accessed by clicking **Start** or pressing the **f11** key. This type of recovery restores the computer to its factory condition without using recovery discs.

To restore the computer from the partition, follow these steps:

1. Access Recovery Manager in either of the following ways:
 - Select **Start > All Programs > Recovery Manager > Recovery Manager**.
 - 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 (HP Recovery)” message is displayed on the screen.
2. Click **System Recovery** in the **Recovery Manager** window.
3. Follow the on-screen instructions.

Recovering using the recovery discs

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.
3. Follow the on-screen instructions.

Backing up your information

You should back up your computer files on a regular schedule to maintain a current backup. You can back up your information to an optional external hard drive, a network drive, or discs. Back up your system at the following times:

- At regularly scheduled times

 **NOTE:** Set reminders to back up your information periodically.

- Before the computer is repaired or restored
- Before you add or modify hardware or software

Guidelines:

- Create system restore points using the Windows System Restore feature, and periodically copy them to an optical disc or an external hard drive. For more information on using system restore points, refer to the “Using system restore points” section.
- Store personal files in the Documents library and back up this folder 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 reset your preferences.

Using Windows Backup and Restore

Windows Backup and Restore allows you to back up individual files or back up the entire computer image.

Guidelines:

- Be sure that the computer is connected to AC power before you start the backup process.
- Allow enough time to complete the backup process. Depending on file sizes, it may take over an hour.

To create a backup:

- 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. Refer to Help and Support for more information.

Using system restore points

A system restore point allows you to save and name a snapshot of your hard drive at a specific point in time. You can then recover back to that point if you want to reverse subsequent changes.

 **NOTE:** Recovering to an earlier restore point does not affect data files saved or e-mails created since the last restore point.

You also can create additional restore points to provide increased protection for your files and settings.

When to create restore points

- Before you add or extensively modify software or hardware
- Periodically, whenever the computer is functioning optimally

 **NOTE:** If you revert to a restore point and then change your mind, you can reverse the restoration.

Create 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. Follow the on-screen instructions.

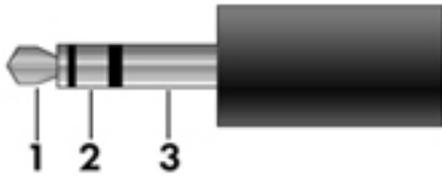
Restore to a previous date and time

To revert to a restore point (created at a previous date and time), when the computer was functioning optimally, follow these steps:

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**.
5. Follow the on-screen instructions.

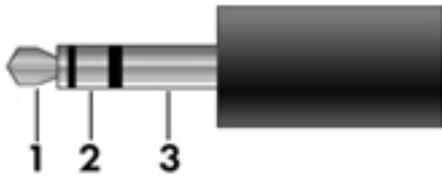
8 Connector pin assignments

Audio-in (microphone)



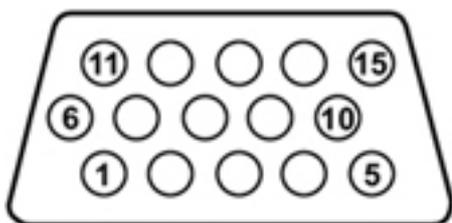
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)



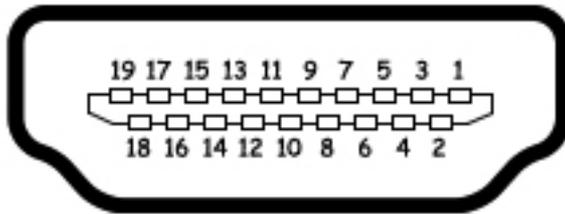
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor



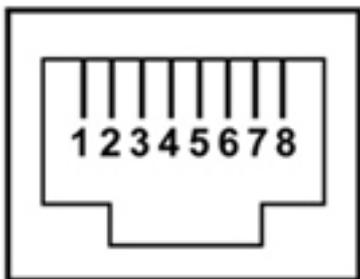
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

HDMI



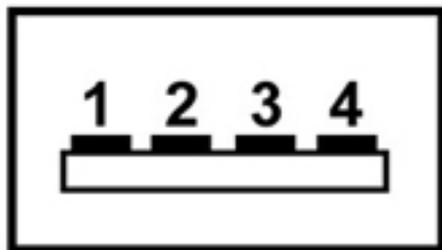
Pin	Signal
1	TMDS data 2+
2	TMDS data 2 shield
3	TMDS data 2-
4	TMDS data 1+
5	TMDS data 1 shield
6	TMDS data 1-
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0-
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock-
13	CEC
14	No connect
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect
20	Shell

RJ-45 (network)



Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

Universal Serial Bus



Pin	Signal
1	+5 VDC
2	Data
3	Data +
4	Ground

9 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 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
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.

10 Recycling

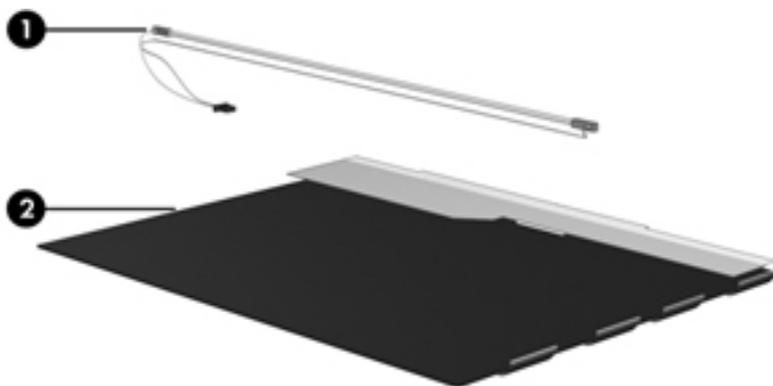
Battery

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

Display

- ⚠ **WARNING!** The backlight contains mercury. Caution must be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.
- ⚠ **CAUTION:** The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. When you remove these components, handle them carefully.
- 📄 **NOTE:** Materials Disposal. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at <http://www.eiai.org>.

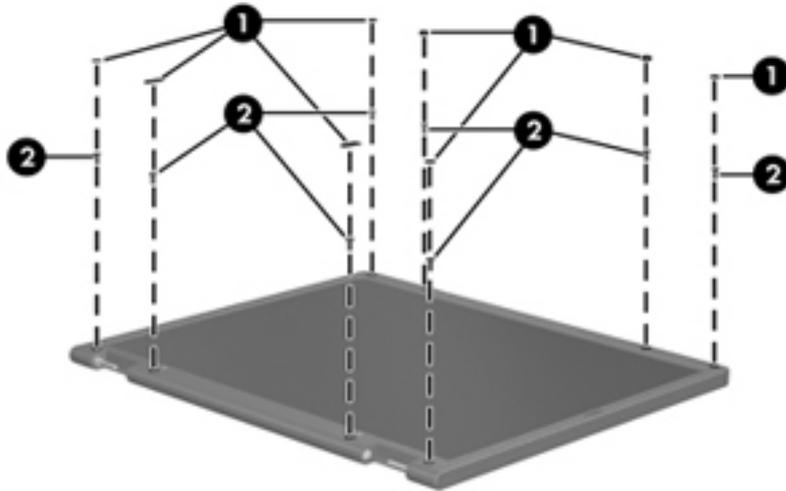
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



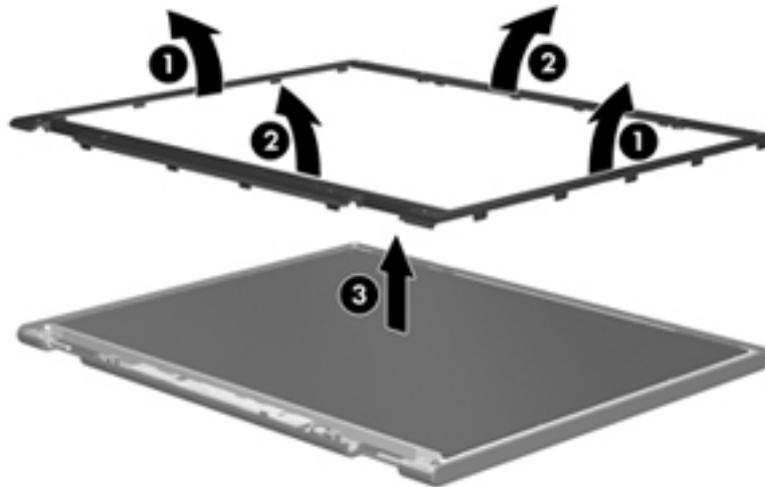
- 📄 **NOTE:** The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps:

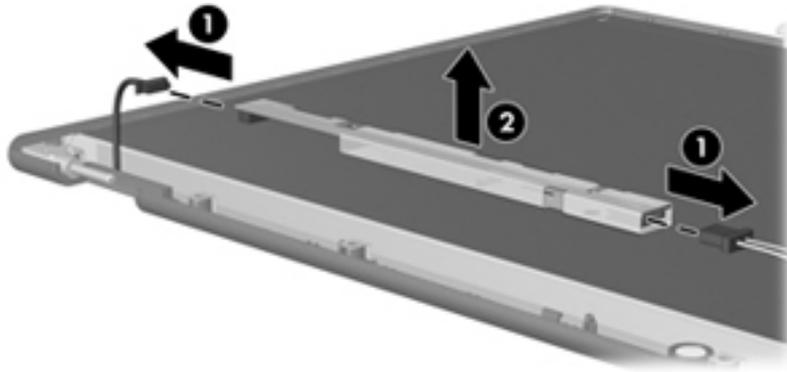
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



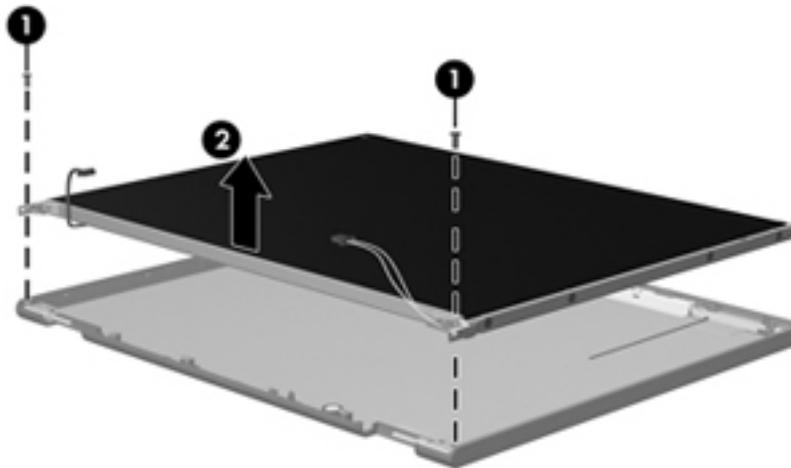
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel 3.



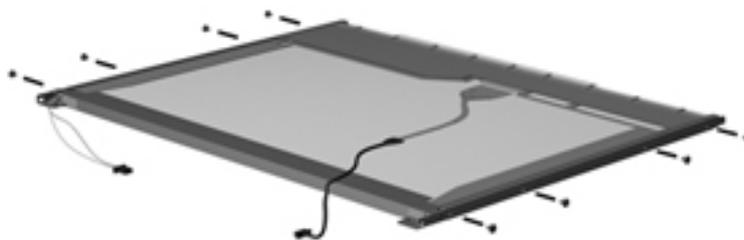
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter 2.



5. Remove all screws (1) that secure the display panel assembly to the display enclosure.
6. Remove the display panel assembly (2) from the display enclosure.

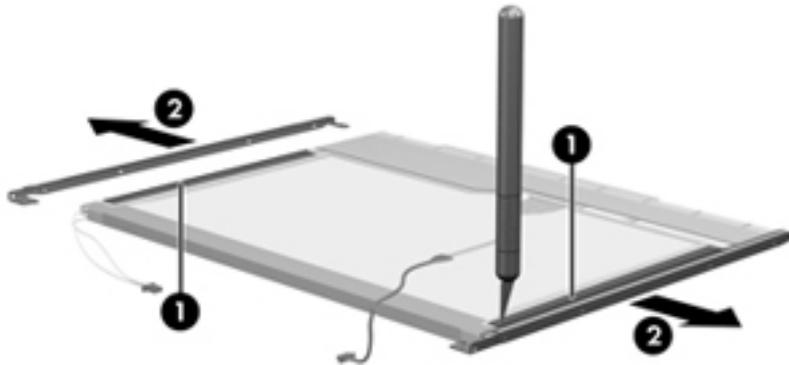


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.



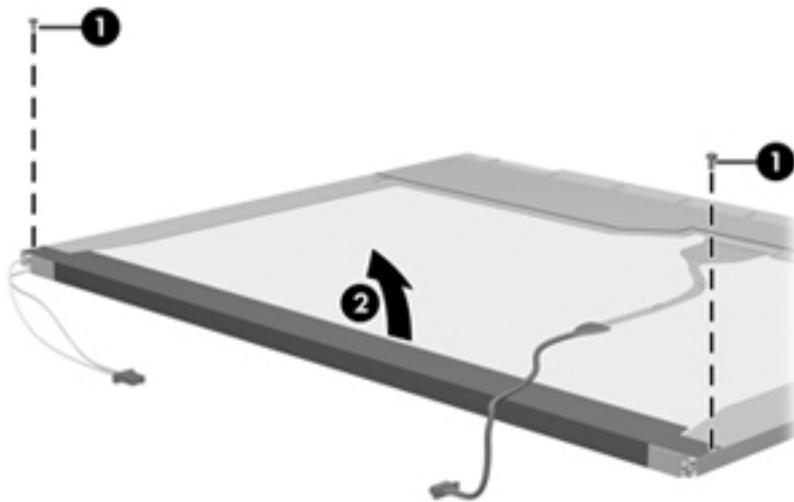
9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

10. Remove the display panel frame **(2)** from the display panel.



11. Remove the screws **(1)** that secure the backlight cover to the display panel.

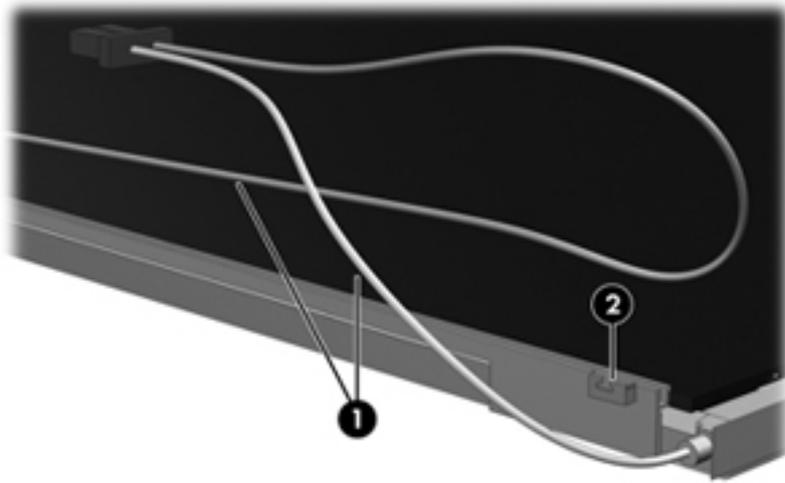
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



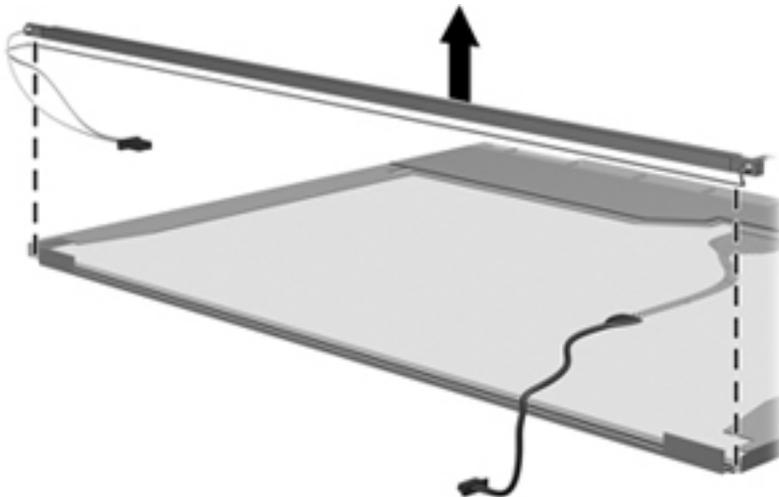
13. Remove the backlight cover.

14. Turn the display panel right-side up.

15. Remove the backlight cables (1) from the clip (2) in the display panel.

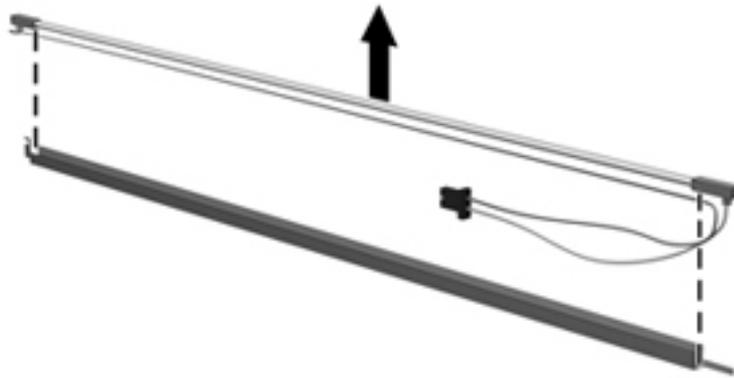


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.



⚠ WARNING! The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

18. Remove the backlight from the backlight frame.

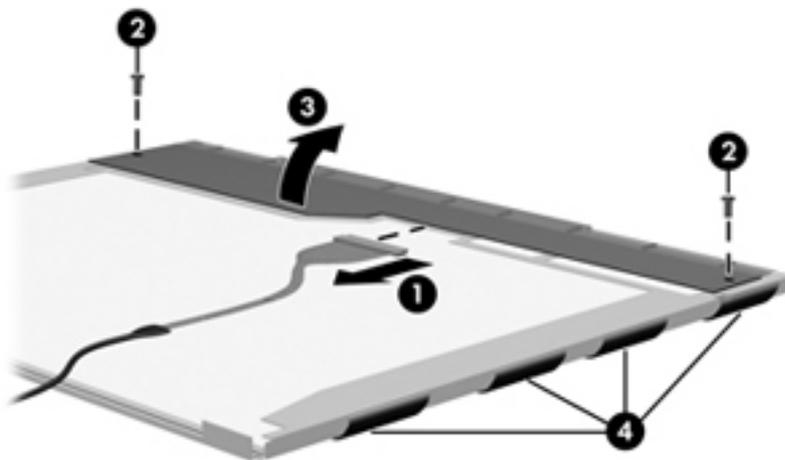


19. Disconnect the display cable **(1)** from the LCD panel.

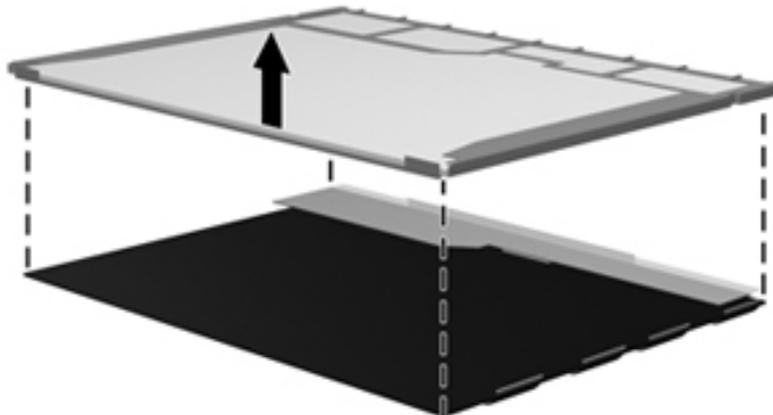
20. Remove the screws **(2)** that secure the LCD panel to the display rear panel.

21. Release the LCD panel **(3)** from the display rear panel.

22. Release the tape **(4)** that secures the LCD panel to the display rear panel.



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

Index

- A**
 - AC adapter, spare part
 - numbers 26, 30
 - action keys 8
 - antenna
 - location 6
 - removal 77
 - spare part number 23, 28, 77
 - audio, product description 3
 - audio-in jack
 - connector pinout 94
 - location 13
 - audio-out jack
 - connector pinout 94
 - location 13
- B**
 - base enclosure, spare part
 - number 20, 29
 - battery
 - removal 38
 - spare part
 - numbers 20, 28, 38
 - battery bay 15
 - battery light 14
 - battery release latch 15
 - Blu-ray ROM DVD±RW Super Multi
 - Double-Layer Drive
 - removal 58
 - spare part
 - number 19, 25, 29, 58
 - specifications 87
 - Bluetooth module
 - removal 74
 - spare part number 23, 27, 75
 - bottom components 15
 - button component 7
- buttons
 - power 7
 - TouchPad 10
- C**
 - cables, service considerations 31
 - caps lock light 9
 - case, 3D glasses, spare part
 - number 26, 30
 - chipset, product description 1
 - components
 - bottom 15
 - button 7
 - display 6
 - front 11
 - keys 8
 - left-side 12
 - lights 9
 - right-side 14
 - TouchPad 10
 - computer feet
 - locations 37
 - removal 53
 - spare part number 37, 53
 - computer part number 17, 36
 - computer specifications 83
 - connector pinout
 - audio-in jack 94
 - audio-out jack 94
 - external monitor port 95
 - HDMI port 96
 - headphone 94
 - microphone 94
 - monitor port 95
 - network jack 97
 - RJ-45 jack 97
 - Universal Serial Bus (USB) port 97
- connectors, service
 - considerations 31
- D**
 - Digital Media Slot 14
 - display assembly
 - removal 71
 - spare part
 - numbers 19, 28, 30, 71
 - subcomponents 23
 - Display Cable Kit, spare part
 - number 28
 - Display Cable Kit, spare part
 - numbers 23, 30
 - display components 6
 - display enclosure
 - removal 73
 - spare part number 28, 73
 - spare part numbers 23, 30
 - display panel cable
 - removal 75
 - spare part numbers 75
 - display panel, product
 - description 2
 - Display Screw Kit, spare part
 - number 23, 28
 - display specifications 84, 85
 - display switch 7
 - drive light 11
 - drives, preventing damage 32
 - DVD±RW and CD-RW Super Multi
 - Double-Layer Combo Drive
 - removal 58
 - spare part
 - number 19, 25, 29, 58
 - specifications 88
- E**
 - electrostatic discharge 32
 - equipment guidelines 35

- eSATA port 12
- esc key 8
- Ethernet, product description 4
- external media cards, product description 4
- external monitor port
 - connector pinout 95
 - location 12

F

- fan/heat sink assembly
 - removal 65
 - spare part
 - numbers 20, 29, 30, 65
- feet
 - locations 37
 - removal 53
 - spare part number 37, 53
- fn key 8
- front components 11

G

- glasses, 3D, spare part
 - number 26, 30
- graphics, product description 1
- grounding guidelines 32
- guidelines
 - equipment 35
 - grounding 32
 - packaging 34
 - transporting 34
 - workstation 34

H

- hard drive
 - product description 2
 - removal 39, 45
 - spare part
 - numbers 21, 25, 28, 29, 30, 39, 45
 - specifications 86
- hard drive bay 15
- hard drive bracket,
 - removal 41, 48
- hard drive connector cable,
 - removal 48
- hard drive cover
 - illustrated 24
 - removal 40

- Hard Drive Hardware Kit, spare part
 - number 21, 25, 28, 39, 45
- hard drive isolator, removal 41
- HDMI port
 - connector pinout 96
 - location 12

J

- headphone jack
 - connector pinout 94
 - location 13
- hinge
 - removal 76
 - spare part number 23, 28, 76
- hinge cover
 - removal 76
 - spare part number 23, 30, 76

I

- infrared emitter board, spare part
 - number 23, 30

J

- jacks
 - audio-in 13
 - audio-out 13
 - headphone 13
 - microphone 13
 - network 12
 - RJ-45 12

K

- key components 8
- keyboard
 - product description 4
 - removal 51
 - spare part
 - numbers 19, 29, 51
- keys
 - action 8
 - esc 8
 - fn 8
 - optical drive eject 8
 - Windows applications 8
 - Windows logo 8

L

- left-side components 12
- light components 9
- lights
 - battery 14
 - caps lock 9

- drive 11
- mute 9
- power 9, 11
- TouchPad off indicator 9, 10
- webcam 6
- wireless 9

M

- mass storage device, spare part
 - numbers 25
- memory module
 - product description 2
 - removal 43
 - spare part
 - numbers 21, 28, 43
- memory module compartment 15
- memory module compartment cover
 - illustrated 24
 - removal 43
- microphone
 - location 6
 - product description 3
- microphone jack
 - connector pinout 94
 - location 13
- mini DisplayPort 12
- model description 17, 37
- model name 1
- monitor port
 - connector pinout 95
 - location 12
- mute light 9

N

- network jack
 - connector pinout 97
 - location 12
- numeric keypad 8

O

- operating system, product description 5
- optical drive
 - location 14
 - product description 3
 - removal 58
 - spare part
 - numbers 19, 25, 29, 58
 - specifications 87, 88
- optical drive eject key 8

- P**
- packaging guidelines 34
- part number listing, sequential 27
- plastic parts, service considerations 31
- Plastics Kit
 - components 24, 29
 - spare part number 20, 24, 29
- pointing device, product description 4
- ports
 - eSATA 12
 - external monitor 12
 - HDMI 12
 - mini DisplayPort 12
 - monitor 12
 - product description 4
 - SuperSpeed USB 12
 - Universal Serial Bus (USB) 12, 14
- power button 7
- power button board
 - removal 56
 - spare part number 19, 29, 56
- power connector 14
- power connector cable
 - removal 60
 - spare part number 20, 30, 60
- power cord
 - set requirements 98
 - spare part numbers 26, 27
- power light 9, 11
- power requirements, product description 5
- processor
 - product description 1
 - removal 67
 - spare part numbers 20, 28, 30, 67
- product description
 - audio 3
 - chipset 1
 - display panel 2
 - Ethernet 4
 - external media cards 4
 - graphics 1
 - hard drives 2
 - keyboard 4
 - memory module 2
 - microphone 3
 - operating system 5
 - optical drives 3
 - pointing device 4
 - ports 4
 - power requirements 5
 - processors 1
 - product name 1
 - security 5
 - serviceability 5
 - video 3
 - wireless 4
- product name 1, 17, 36
- product number 17, 36
- R**
- removal/replacement
 - preliminaries 31
 - procedures 36
- right-side components 14
- RJ-45 jack
 - connector pinout 97
 - location 12
- RTC battery
 - removal 42
 - spare part number 21, 28, 42
- Rubber Feet Kit, spare part number 20, 29, 53
- S**
- Screw Kit, spare part number 26, 29
- security cable slot 14
- security, product description 5
- serial number 17, 36
- service considerations
 - cables 31
 - connectors 31
 - plastic parts 31
- service tag 17, 36
- serviceability, product description 5
- solid-state drive, spare part numbers 21, 25, 28, 30, 39, 45
- speakers
 - location 11
 - removal 69
 - spare part number 20, 29, 69
- specifications
 - Blu-ray ROM DVD±RW Super Multi Double-Layer Drive 87
 - computer 83
 - display 84, 85
 - DVD±RW and CD-RW Super Multi Double-Layer Combo Drive 88
 - hard drive 86
 - optical drive 87, 88
- subwoofer
 - location 15
 - removal 70
 - spare part number 20, 30, 70
- SuperSpeed USB port 12
- system board
 - removal 61
 - spare part numbers 20, 28, 30, 61
- T**
- tools required 31
- top cover
 - removal 53
 - spare part number 19, 29, 53
- TouchPad button 10
- TouchPad components 10
- TouchPad off indicator 9, 10
- TouchPad zone 10
- transporting guidelines 34
- U**
- Universal Serial Bus (USB) port
 - connector pinout 97
 - location 12, 14
- USB/Card Reader board
 - removal 57
 - spare part number 19, 30, 57
- V**
- vents 12, 15
- video, product description 3
- W**
- warranty period 17, 37
- webcam 6
- webcam light 6
- webcam/microphone module
 - removal 74
 - spare part number 23, 28, 74

- Windows applications key 8
- Windows logo key 8
- wireless antenna
 - location 6
 - removal 77
 - spare part number 23, 28, 77
- Wireless Antenna Kit, spare part number 23, 28, 77
- wireless light 9
- wireless, product description 4
- WLAN module
 - removal 49
 - spare part numbers 21, 27, 30, 49
- workstation guidelines 34

