



HP ProBook 6565b Notebook PC

Maintenance and Service Guide

© Copyright 2011 Hewlett-Packard
Development Company, L.P.

Bluetooth is a trademark owned by its proprietor and used by Hewlett-Packard Company under license. Advanced Micro Devices, Inc. AMD are trademarks of Advanced Micro Devices, Inc. Microsoft, Windows, and Windows Vista are either trademarks or registered trademarks of Microsoft Corporation in the United States and/or other countries. SD Logo is a trademark of its proprietor.

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

Second Edition: October 2011

First Edition: June 2011

Document Part Number: 654365-002

Safety warning notice


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

Table of contents

1 Product description	1
2 External component identification	7
Display	7
Top	9
TouchPad	9
Lights	10
Buttons and fingerprint reader	11
Keys	13
Front	14
Left	15
Rear	16
Right	17
Bottom	18
3 Illustrated parts catalog	20
Service tag	20
Computer major components	21
Display components	25
Plastics Kit	27
Cable Kit	27
Mass storage devices	29
Miscellaneous parts	29
Sequential part number listing	30
4 Removal and replacement procedures	34
Preliminary replacement requirements	34
Tools required	34
Service considerations	34
Plastic parts	34
Cables and connectors	35

Drive handling	35
Grounding guidelines	36
Electrostatic discharge damage	36
Packaging and transporting guidelines	37
Workstation guidelines	37
Equipment guidelines	38
Component replacement procedures	39
Service tag	39
Rubber screw covers	40
Battery	41
Display assembly (panel, bezel, webcam, microphone)	42
SIM	46
Bottom door	47
Optical drive	48
Upgrade bay	50
Hard drive	52
RTC battery	54
Memory modules	55
WWAN module	57
WLAN module	59
Bluetooth module	62
Modem module	63
Fan	65
Heat sink	66
Processor	69
Keyboard	71
Bottom cover	73
Speaker assembly	78
RJ-11 jack cable	80
Function board	82
System board	83
USB board	87
Display assembly and components (whole hinge-up, cable, antennas, hinges, enclosure)	89
5 Computer Setup (BIOS) and System Diagnostics	98
Using Computer Setup	98
Starting Computer Setup	98
Navigating and selecting in Computer Setup	98
Restoring factory settings in Computer Setup	99
Updating the BIOS	100

Determining the BIOS version	100
Downloading a BIOS update	100
Using System Diagnostics	101
6 Specifications	102
Computer specifications	102
39.6-cm (15.6-in), HD display specifications	103
39.6-cm (15.6-in), HD+ display specifications	104
Hard drive specifications	105
Blu-ray BD-R/RE + DVDSM DL Drive	106
DVD±RW and CD-RW SuperMulti DL Combo Drive specifications	107
Blu-ray ROM DVD±RW SuperMulti DL Drive	108
DVD-ROM Drive specifications	109
Specification information in Device Manager	110
7 Backup and recovery	111
Windows 7	111
Backing up your information	111
Performing a system recovery	112
Using the Windows recovery tools	113
Using f11 recovery tools	113
Using a Windows 7 operating system DVD (purchased separately)	114
Windows Vista	115
Backing up your information	115
Performing a recovery	116
Using the Windows recovery tools	116
Using f11 recovery tools	117
Using a Windows Vista operating system DVD (purchased separately)	117
8 Power cord set requirements	119
Requirements for all countries and regions	119
Requirements for specific countries and regions	120
9 Recycling	121
Battery	121
Display	121
Index	127

1 Product description

Category	Description
Product Name	HP ProBook 6565b Notebook PC
Processors (Accelerated Processing Unit [APU])	AMD Quad-Core A8-3510MX Accelerated Processor with Radeon HD 6620G Graphics (2.5 GHz/1.8 GHz; 4 MB L2 cache; 45W) AMD Quad-Core A6-3410MX Accelerated Processor with Radeon HD 6520G Graphics (2.3 GHz/1.6 GHz; 4 MB L2 cache; 45W) AMD Dual-Core A4-3310MX Accelerated Processor with Radeon HD 6480G Graphics (2.5 GHz/2.1 GHz; 2 MB L2 cache; 45W)
Chipset (Fusion Controller Hub)	AMD A60M FCH
Graphics	ATI (AMD Integrated) UMA Processor-specific, see Processors . Supports dual-display ports through the dock
Panel	All display assemblies include 2 wireless local area network (WLAN) antennas 39.6-cm (15.6-in) HD, anti-glare, LED SVA (1366x768) 39.6-cm (15.6-in) HD+, anti-glare, LED WVA (1600x900) 39.6-cm (15.6-in) HD, anti-glare, LED SVA (1366x768) with WWAN 39.6-cm (15.6-in) HD+, anti-glare, LED WVA (1600x900) with WWAN 39.6-cm (15.6-in) HD, anti-glare, LED SVA (1366x768) with camera 39.6-cm (15.6-in) HD+, anti-glare, LED WVA (1600x900) with camera 39.6-cm (15.6-in) HD, anti-glare, LED SVA (1366x768) with camera and WWAN 39.6-cm (15.6-in) HD+, anti-glare, LED WVA (1600x900) with camera and WWAN Support privacy filter
Memory	Two customer-accessible/upgradeable memory module slots supporting up to 16 GB of RAM Supports dual-channel memory PC3-10600, 1333-MHz, DDR3

Category	Description
	<p>Supports the following configurations:</p> <ul style="list-style-type: none"> • 16384 (8192 × 2) • 8192 (8192 × 1) • 8192 (4096 × 2) • 6144 (4096 + 2048) • 4096 (2048 × 2) • 4096 (4096 × 1) • 3072 (2048 + 1024) • 2048 (2048 × 1)
Storage	<p>Supports 9.5-mm or 7-mm, 6.35-cm (2.50-in) SATA hard drives</p> <p>Customer-accessible</p> <p>Supports the following 7-mm or 9.5-mm, 6.35-cm (2.5-in) hard drives:</p> <ul style="list-style-type: none"> • 320-GB, 7200-rpm, self-encrypting • 320-GB, 7200-rpm • 250-GB, 7200 <p>Supports the following 9.5-mm, 6.35-cm (2.5-in) hard drives:</p> <ul style="list-style-type: none"> • 750-GB, 7200 • 500-GB, 7200 <p>Supports the following solid-state drives:</p> <ul style="list-style-type: none"> • 128-GB
Upgrade bay	<p>Supports “No Drive” option</p> <p>Supports the following 12.7-mm SATA optical drives:</p> <ul style="list-style-type: none"> • DVD-ROM drive • DVD+/-RW SuperMulti DL drive • Blu-ray ROM DVD+/-RW SuperMulti DL drive <p>Supports the following 9.5-mm SATA hard drive:</p> <ul style="list-style-type: none"> • 500-GB, 7200-rpm
Microphone	<p>Integrated dual-array microphone (webcam models only)</p> <p>Integrated mono (non-webcam models only)</p>
Audio	<p>SRS Premium Sound</p> <p>HP Premier Sound</p> <p>Stereo speakers (2)</p> <p>Supports “No camera” option</p>
Webcam	<p>Integrated webcam (720p HD)</p>

Category	Description
Modem	56K V.92 MDC data/fax modem
	Modem cable not included
	Supports “No Modem” option
Ethernet	Realtek RTL8151EH-CG LAN 10/100/1000 network interface card (NIC)
	S3/S4/S5 wake on LAN
	NIC power down technology
	Ethernet cable not included
Wireless	Integrated WLAN options by way of wireless module:
	Two WLAN antennas built into display assembly
	Supports “no WLAN” option
	Supports the following WLAN formats:
	<ul style="list-style-type: none"> • Broadcom 802.11 b/g/n, 1×1 • Broadcom 802.11 a/b/g/n, 2×2
	Integrated WWAN options by way of wireless module:
	Two WWAN antennas built into display assembly (world-wide 5 band, in WWAN panels only)
	Subscriber identity module (SIM) security (customer-accessible in battery bay)
	Supports “no WWAN” option
	Supports the following WWAN modules:
	<ul style="list-style-type: none"> • Gobi 3000: HP un2430 EV-DO/HSPA Mobile Broadband • Ericsson: HP hs2340 HSPA+ Mobile Broadband
Integrated personal area network (PAN) options by way of Bluetooth® module:	
Supports “no PAN” option	
Integrated Bluetooth 2.1	
External media card	One ExpressCard/54 slot
	Integrated Media Card Reader with SD, MMC support
Ports	Audio-in (stereo microphone)
	Audio-out (stereo headphone)
	DisplayPort 1.1a
	RJ-11 (modem)
	RJ-45 (Ethernet, includes link and activity lights)
	USB 2.0 (4)
	eSATA/USB 2.0 combo port
	VGA (Dsub 15-pin) supporting 1920 × 1200 external resolution at 75-GHz (hot plug with auto-detect)

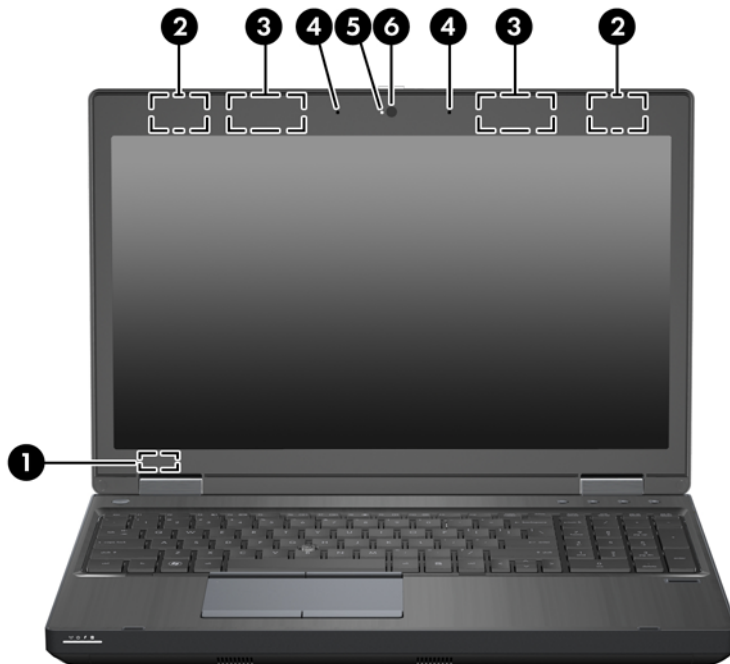
Category	Description
	1394a
	Serial port
	3-pin AC power
	Secondary battery connector
	Docking connector
Docking	HP Docking Station
	HP Advanced Docking Station
Keyboard/pointing devices	Keyboard with numeric keypad
	Dual point
	Spill-resistant design
	Full chiclet keyboard
	Touchpad includes: on/off button, supports 2-way scroll with legend, taps enabled by default, 2-finger scrolling and zoom enabled by default
Power requirements	Smart AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector):
	<ul style="list-style-type: none"> 90-W
	9-cell, 3.0-Ah (100-Wh) Li-ion battery
	6-cell, 2.8-Ah (62-Wh) Li-ion battery
	6-cell, 2.55-Ah (55-Wh) Li-ion battery
	3-cell, 2.8-Ah (31-Wh) Li-ion battery
	9-cell, 73-Wh HP Ultra-Capacity Extended Life Battery
	9-cell, 100-Wh, HP Extended Life Battery
	6-cell, 55 WHr (2.8 Ahr) HP Long Life Li-ion battery (available only with 3-year platinum warranty)
	HP Fast Charge Technology
Security	Integrated fingerprint reader
	Integrated smart card reader
	Security cable slot
	Trusted platform module (TPM) V.1.2
	Full volume encryption
	Preboot authentication (password, smart card)
Operating system	Preinstalled:
	Windows 7 Professional 32 with Microsoft® Basics (localizations for only U.S. and French Canada)
	Windows 7 Professional 64 with Microsoft Basics (localizations for only U.S. and French Canada)

Category	Description
	Windows 7 Home Premium 64 with Microsoft Basics (localizations for only U.S. and French Canada)
	Windows 7 Home Premium 32 with Microsoft Basics (localizations for only U.S. and French Canada)
	Novell™: SuSE Linux™ – SLED 11 (available worldwide)
	FreeDOS (available worldwide)
	Preinstalled with Microsoft Office:
	Windows 7 Professional 32 with Microsoft Office 2010 Starter
	Windows 7 Professional 64 with Microsoft Office 2010 Starter
	Windows 7 Home Premium 32 with Microsoft Office 2010 Starter
	Windows 7 Home Premium 64 with Microsoft Office 2010 Starter
	Windows 7 Home Basic 32 with Microsoft Office 2010 Starter
	Restore Media:
	Windows 7 Professional 64
	Windows 7 Professional 32
	Windows 7 Home Basic 32
	Windows 7 Home Premium 64
	Windows 7 Home Premium 32
	DRDVD Windows 7 (available with Windows 7 Home Basic and Windows 7 Starter)
	DRDVD Windows 7 with WinDVD (available with Windows 7 Professional and Windows 7 Home Premium)
	Web-only support:
	Windows XP Professional 32
	Windows Vista Enterprise 32/64
	Windows Vista Business 32/64
	Windows 7 Enterprise 32/64
	Windows 7 Ultimate 32/64
	Certified:
	Microsoft WHQL
	Novell: SuSE Linux
Serviceability	End-user replaceable parts:
	AC adapter
	Battery (system)
	Hard drive
	Memory module

Category	Description
	Optical drive
	Mini-PCI components (WLAN, WWAN, SIM)
	Modem
	Keyboard
	Bluetooth module

2 External component identification

Display



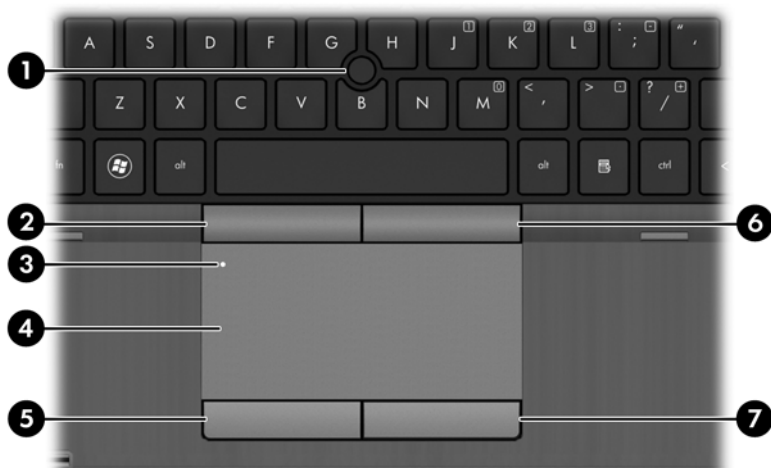
Component	Description
(1) Internal display switch	Turns off the display or initiates Sleep if the display is closed while the power is on. NOTE: The display switch is not visible from the outside of the computer.
(2) WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLAN).
(3) WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide area networks (WWAN).
(4) Internal microphone(s) (1 or 2 depending on model)	Record sound.
(5) Webcam light (select models only)	On: The webcam is in use.

Component	Description
(6) Webcam (select models only)	Records video and captures still photographs. To use the webcam, select Start > All Programs > HP > HP Webcam .

*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.

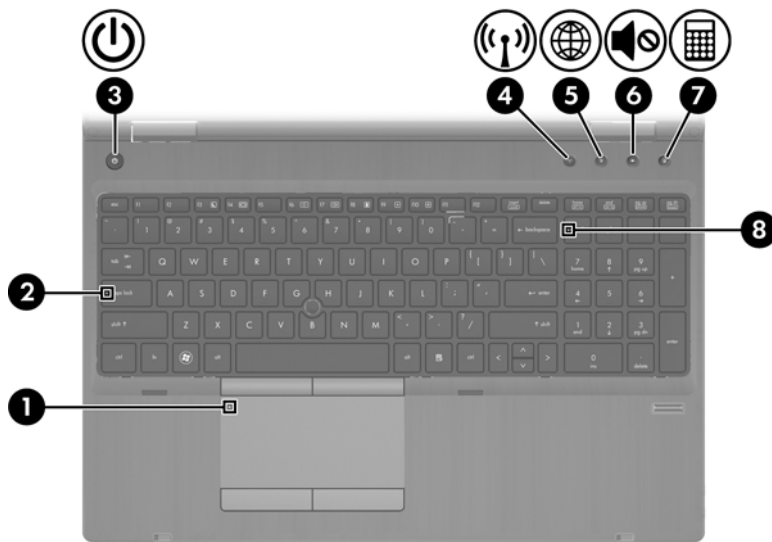
Top






TouchPad



Component	Description
(1) Pointing stick (select models only)	Moves the pointer and selects or activates items on the screen.
(2) Left pointing stick button	Can be used with the pointing stick and functions like the left button on an external mouse.
(3) TouchPad on/off button	Turns the TouchPad on and off.
(4) TouchPad zone	Moves the pointer and selects or activates items on the screen. NOTE: Vertical scrolling is supported on the right edge of the TouchPad.
(5) Left TouchPad button	Functions like the left button on an external mouse.
(6) Right pointing stick button	Can be used with the pointing stick and functions like the right button on an external mouse.
(7) Right TouchPad button	Functions like the right button on an external mouse.



Lights






Component	Description
(1) TouchPad light	<ul style="list-style-type: none"> Amber: The TouchPad is off. Off: The TouchPad is on.
(2) Caps lock light	On: Caps lock is on.
(3)  Power light	<ul style="list-style-type: none"> On: The computer is on. Blinking: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(4)  Wireless light	<ul style="list-style-type: none"> White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. Amber: All wireless devices are off.
(5)  QuickWeb light	<ul style="list-style-type: none"> On: The computer is on. Off: The computer is off or in Hibernation. <p>NOTE: For more information, refer to the HP Quickweb software Help</p>
(6)  Mute light	<ul style="list-style-type: none"> Amber: Computer sound is off. Off: Computer sound is on.
(7)  Calculator light	<ul style="list-style-type: none"> On: The Windows® calculator function is on. Blinking: The Windows calculator has been activated.
(8) Num lock light	On: Num lock is on.

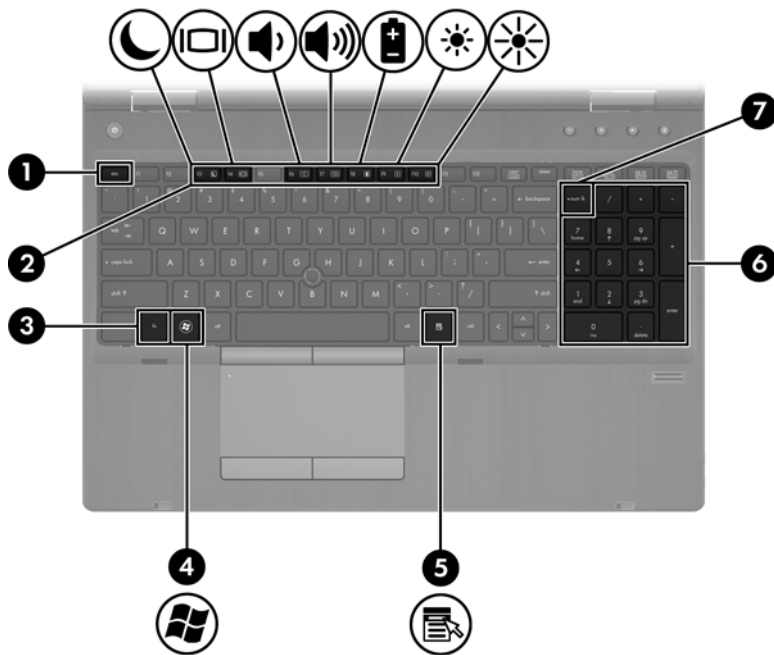
Buttons and fingerprint reader





Component	Description
(1) TouchPad on/off button	Turns the TouchPad on and off.
(2)  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:</p> <ul style="list-style-type: none"> • Windows 7—Select Start > Control Panel > System and Security > Power Options. – or – • Windows Vista—Select Start > Control Panel > System and Maintenance > Power Options • Or refer to the <i>HP Notebook Reference Guide</i>.
(3)  Wireless button	Turns the wireless feature on or off but does not establish a wireless connection.

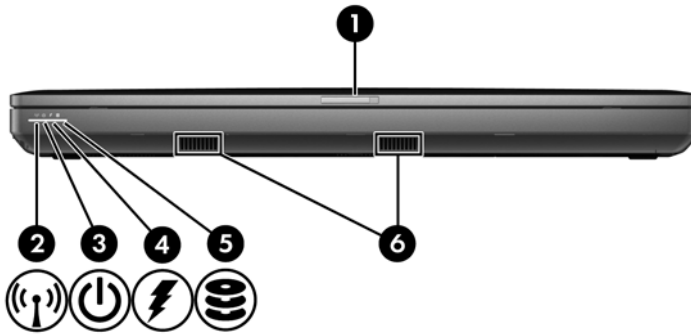
Component		Description
(4)	 QuickWeb button	<ul style="list-style-type: none"> • When the computer is off or in Hibernation, press the button to open HP QuickWeb. • When the computer is in Microsoft Windows, press the button to open the default Web browser. • When the computer is in HP QuickWeb, press the button to open the default Web browser. <p>NOTE: For more information, refer to the HP QuickWeb software Help. If your computer does not have HP QuickWeb software, the button does not perform any action or function.</p>
(5)	 Volume mute button	Mutes and restores speaker sound.
(6)	 Calculator button (select models only)	Opens the Windows calculator function.
(7)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.




Keys



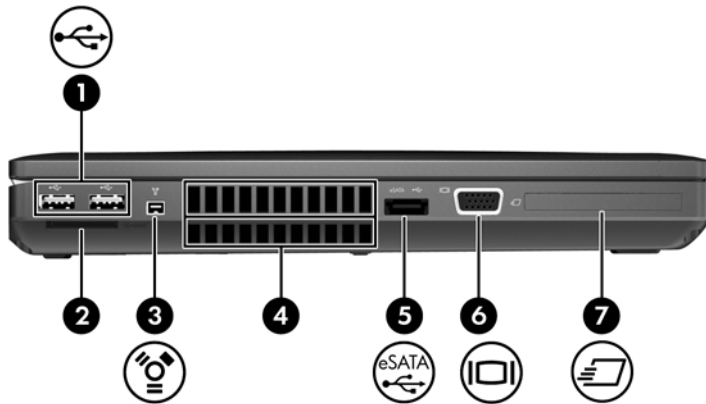
Component	Description
(1) esc key	Displays system information when pressed in combination with the fn key.
(2) Function keys	Execute frequently used system functions when pressed in combination with the fn key.
(3) fn key	Executes frequently used system functions when pressed in combination with a function key, the num lk key, or the esc key.
(4)  Windows logo key	Displays the Windows Start menu.
(5)  Windows applications key	Displays a shortcut menu for items beneath the cursor.
(6) Integrated numeric keypad	When the keypad has been enabled, the keys can be used like an external numeric keypad.
(7) num lk key	Turns the integrated numeric keypad on and off when pressed in combination with the fn key.






Front



Component	Description
(1)	Display release latch Opens the computer.
(2) 	Wireless light <ul style="list-style-type: none"> White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. Amber: All wireless devices are off.
(3) 	Power light <ul style="list-style-type: none"> On: The computer is on. Blinking: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(4)	Battery light <ul style="list-style-type: none"> Amber: The computer is connected to external power and the battery is charged from 0 to 90%. White: The computer is connected to external power and the battery is charged from 90 to 99%. Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly. Off: The battery is fully charged.
(5) 	Hard drive light <ul style="list-style-type: none"> Blinking turquoise: The hard drive or optical drive is being accessed. Amber: HP 3D DriveGuard has temporarily parked the hard drive. <p>NOTE: For information on HP 3D DriveGuard, refer to the <i>HP Notebook Reference Guide</i>.</p>
(6)	Speakers (2) Produce sound. <p>NOTE: To use the SRS Premium sound software, select Start > All Programs > SRS Premium Sound.</p>





Left



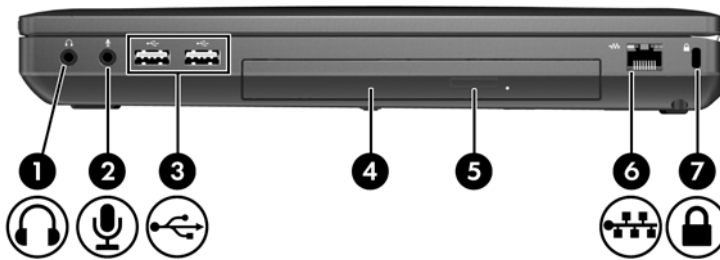
Component	Description
(1) 	USB 2.0 ports (2) Connects an optional USB device.
(2)	Media Card Reader Supports the following digital card formats: <ul style="list-style-type: none"> Secure Digital (SD) Memory Card MultiMediaCard (MMC)
(3) 	1394 port Connects an optional IEEE 1394 or 1394a device, such as a camcorder.
(4)	Vents (2) Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(5) 	eSATA/USB 2.0 combo port Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.
(6) 	External monitor port Connects an external VGA monitor or projector.
(7) 	ExpressCard slot or smart card reader (depending on configuration) Supports optional ExpressCards or smart cards.






Rear



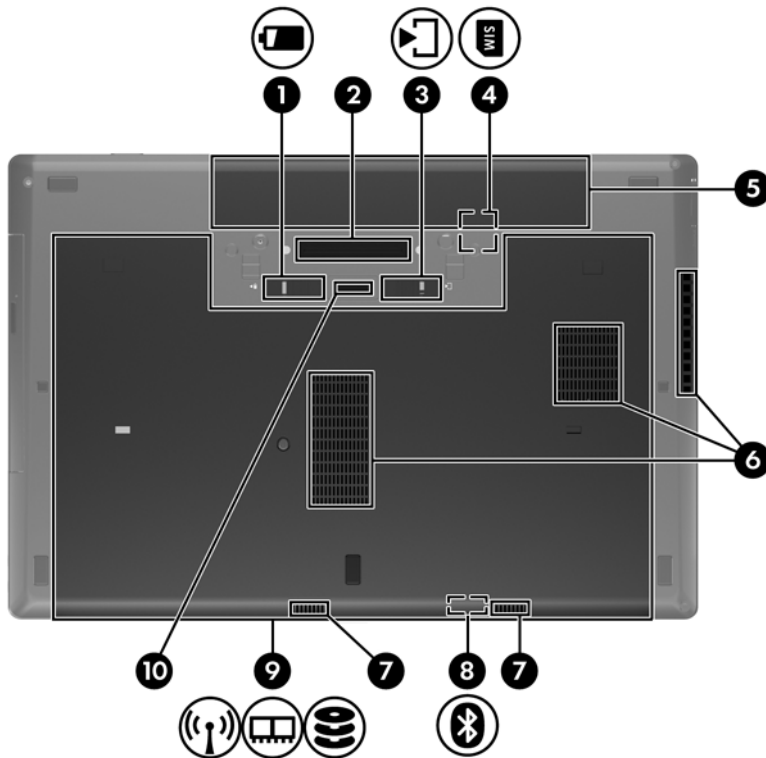
Component	Description
(1)  RJ-11 (modem) jack	Connects a modem cable.
(2)  Serial port	Connects an optional device such as a serial modem, mouse, or printer.
(3)  Power connector	Connects an AC adapter.
(4)  DisplayPort	Connects an optional digital display device, such as a high-performance monitor or projector.





Right




Component	Description
(1)  Audio-out (headphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or television audio. 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 <i>Regulatory, Safety, and Environmental Notices</i> . NOTE: When a device is connected to the headphone jack, the computer speakers are disabled.
(2)  Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(3)  USB 2.0 ports (2)	Connect optional USB devices.
(4) Upgrade bay (optical drive shown)	An optical drive installed in the bay (select models only) reads and writes to an optical disc. NOTE: The upgrade bay can hold either a hard drive, an optical drive, or a weight saver option.
(5) Optical drive eject button (select models only)	Ejects the optical drive disc tray.
(6)  RJ-45 (network) jack	Connects a network cable.
(7)  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



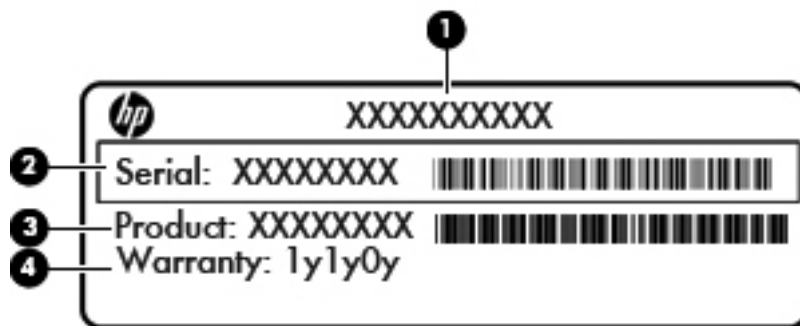
Component	Description
(1) 	Battery release latch Releases the battery from the battery bay.
(2)	Docking connector Connects an optional docking device.
(3) 	Bottom cover release latch Releases or locks the bottom cover.
(4) 	SIM slot Supports a wireless subscriber identity module (SIM). The SIM slot is located inside the battery bay.
(5)	Battery bay Holds the battery.
(6)	Vents (3) 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.
(7)	Speakers (2) Produce sound.
(8) 	Bluetooth compartment Contains a Bluetooth device.

Component	Description
(9)  Wireless and memory module compartments and hard drive bay	Holds the wireless LAN module slot, the WWAN module slot, the memory module slots, and the hard drive. CAUTION: To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact technical support through Help and Support.
(10) Accessory battery connector	Connects an optional accessory battery.

3 Illustrated parts catalog

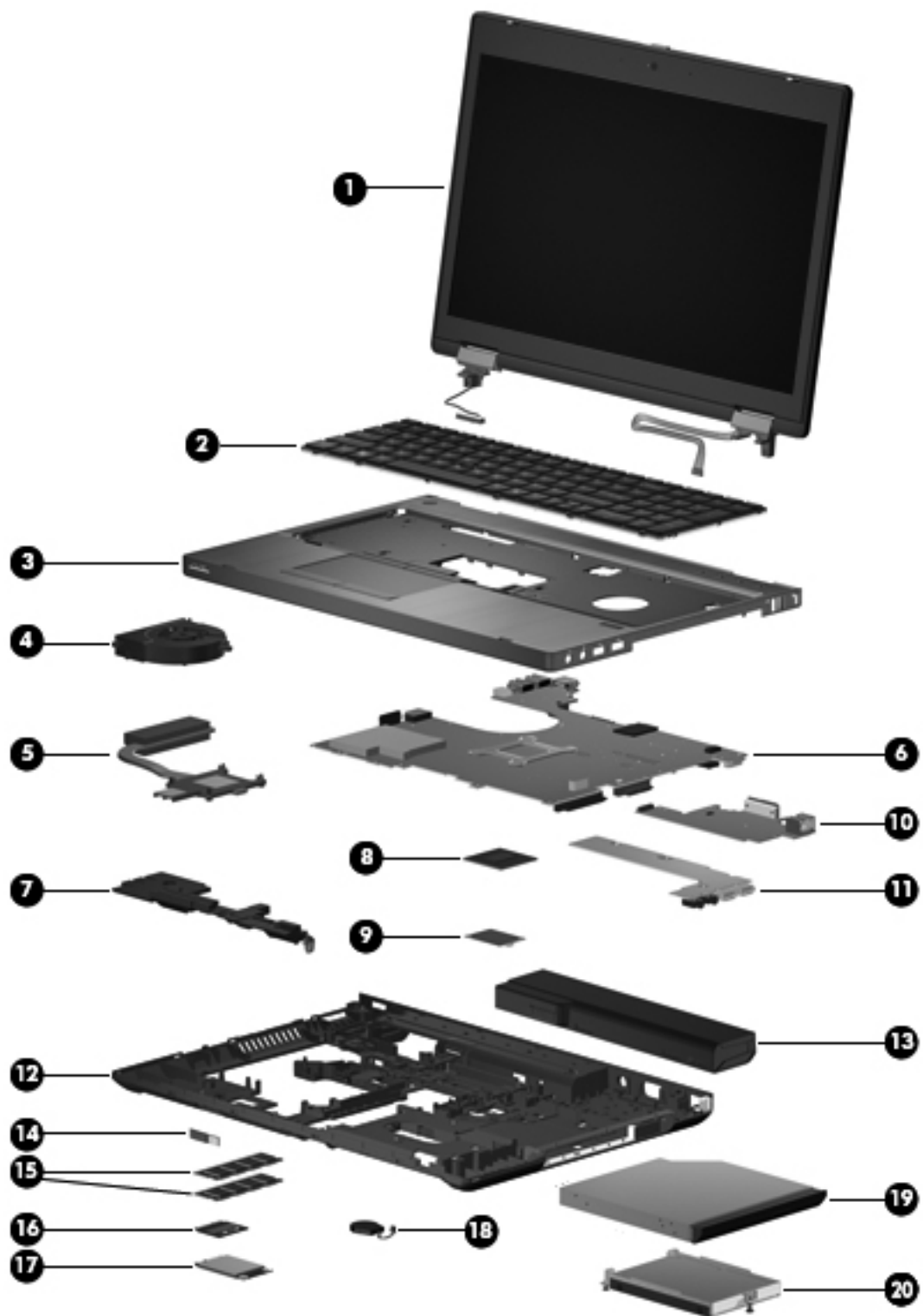
Service tag

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



- Product name **(1)**. This is the product name affixed to the front of the computer.
- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.
- Part number/Product number (p/n) **(3)**. This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.

Computer major components

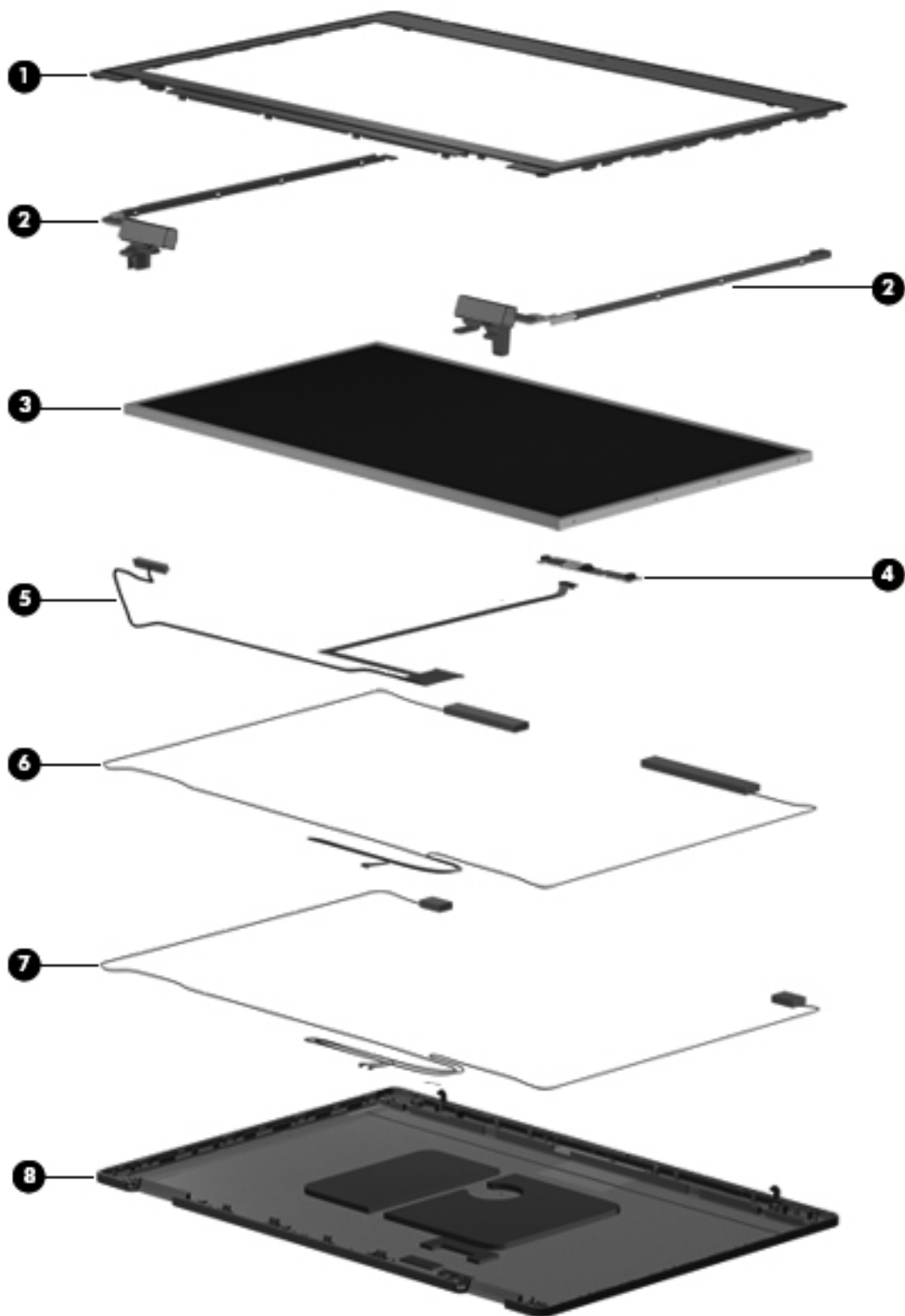


Item	Description	Spare part number
(1)	Display assembly NOTE: For a list of individual parts spared in the display panel, see Display components on page 25 .	not spared
(2)	Keyboard (includes cable) NOTE: For a detailed list of available keyboards, see Sequential part number listing on page 30 .	
	For use in models without a pointing stick	641180-xxx
	For use in models with a pointing stick	641179-xxx
(3)	Top cover	
	<ul style="list-style-type: none"> For use on models that include a fingerprint reader, without a pointing stick For use on models that include a fingerprint reader and a pointing stick For use on models that include a pointing stick, without a fingerprint reader 	641204-001 641205-001 641206-001
(4)	Fan	641183-001
(5)	Heat sink (includes replacement thermal pads and grease)	658140-001
(6)	System board (includes thermal pad)	
	For use in models with WWAN	658143-001
	For use in models without WWAN	665718-001
(7)	Speaker assembly	641186-001
(8)	Processor (APU)	
	AMD Quad-Core A8-3510M (2.5-GHz/1.5-GHz, 4-MB L2 cache, 45W)	653358-001
	AMD Quad-Core A6-3410M (2.3-GHz/1.6-GHz, 4-MB L2 cache, 45W)	653357-001
	AMD Dual-Core A4-3310M (2.5-GHz/2.1-GHz, 2-MB L2 cache, 45W)	653356-001
	AMD Dual Core E2-3000M (2.4-GHz/1.8-GHz, 1-MB L2 cache, 35W)	653351-001
(9)	Modem module NOTE: The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646968-001. See Cable Kit on page 27 for more Cable Kit spare part number information.	628824-001
(10)	Function board	658142-001
(11)	USB board (includes Mylar)	658141-001
(12)	Bottom cover (includes rubber feet) NOTE: Make sure to remove the modem plug from the slot in the bottom cover if the repaired unit includes a modem.	644695-001
(13)	Battery, Li-ion	
	9-cell (100 WHr, 3.0 Ah)	631243-001
	6-cell (62 WHr, 2.8 Ah)	628668-001
	6-cell (55 WHr, 2.8 Ah, long life)	628670-001
	3-cell (31 WHr, 2.8 Ah)	628664-001

Item	Description	Spare part number
(14)	Bluetooth module (does not include Bluetooth module cable)	537921-001
	NOTE: The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 646968-001. See Cable Kit on page 27 for more Cable Kit spare part number information.	
(15)	Memory modules (PC3-10600, 1333-MHz, DDR3)	
	8-GB	634091-001
	4-GB	621569-001
	2-GB	621565-001
	1-GB	639736-001
(16)	WLAN module	
	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, 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, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, 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, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593836-001
	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States	582564-001

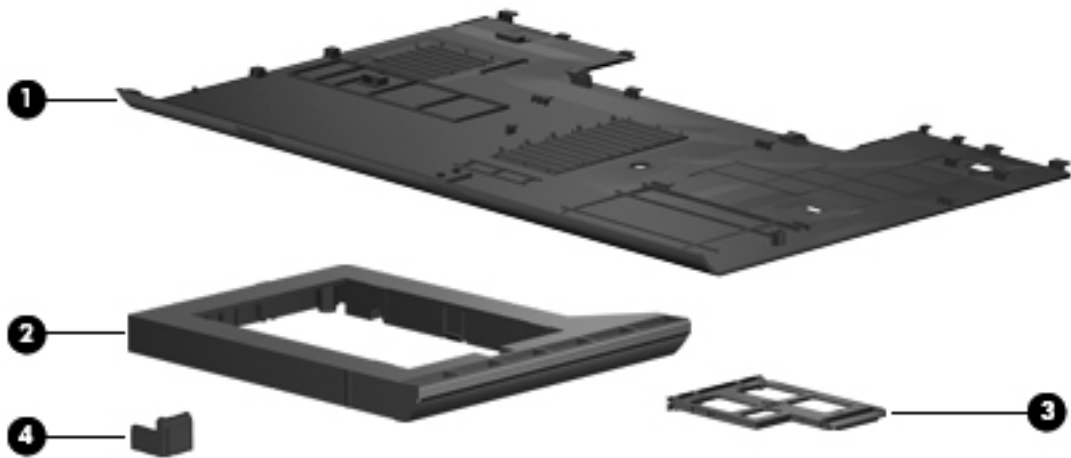
Item	Description	Spare part number
	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, 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-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002
(17)	WWAN modules	
	HP hs2340 HSPA+ Mobile Broadband Module	632155-001
	HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001
(18)	RTC battery	641200-001
(19)	Optical drive (includes bracket, bezel, and screws)	
	<ul style="list-style-type: none"> Blu-ray ROM DVD±RW SuperMulti DL Drive 	664019-001
	<ul style="list-style-type: none"> DVD±RW and CD-RW SuperMulti DL Combo Drive 	664018-001
	<ul style="list-style-type: none"> DVD-ROM Drive 	664017-001
	Cable Kit (not illustrated; see Cable Kit on page 27 for more Cable Kit spare part number information)	646968-001
(20)	Hard drive	
	750-GB, 7200-rpm	633252-001
	500-GB, 7200-rpm	634926-001
	320-GB, 7200-rpm, Self-Encrypting Drive (SED)	641674-001
	320-GB, 7200-rpm	641672-001
	Solid-state drive, 128-GB	662394-001
	Bottom door blank	670434-001

Display components



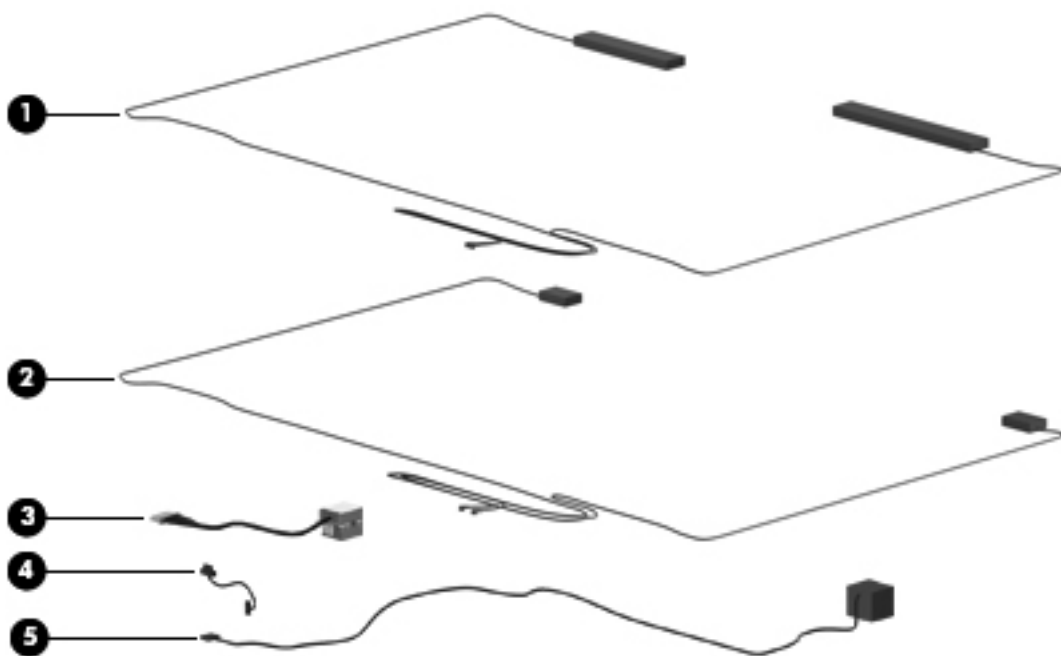
Item	Description	Spare part number
(1)	Display bezel	
	For use with models with a webcam	660276-001
	For use with models without a webcam	660277-001
(2)	Display hinges (includes left and right hinges, brackets, and covers)	647677-001
(3)	Display panel	
	39.6-cm (15.6-in), HD+, anti-glare, LED, WVA	662395-001
	39.6-cm (15.6-in), HD anti-glare, LED, SVA for use in models without WWAN	646978-001
	39.6-cm (15.6-in), HD anti-glare, SVA for use in models with WWAN	662393-001
(4)	Webcam module	647599-001
	Microphone module	647600-001
(5)	Display Cable Kit	
	For use in models with HD displays	646969-001
	For use in models with HD+ displays	646970-001
(6)	WLAN antennas	
	Included in Cable Kit	646968-001
	Included in Display Panel Support Kit	657831-001
(7)	WWAN antennas	
	Included in Cable Kit	646968-001
	Included in Display Panel Support Kit	657831-001
(8)	Display enclosure	
	Enclosure	641202-001
	Included in Display Panel Support Kit	657831-001
	Display Panel Support Kit (includes WLAN antennas, WWAN antennas, and display enclosure)	657831-001

Plastics Kit



Item	Description	Spare part number
	Plastics Kit	646971-001
(1)	Bottom door	
(2)	Optical drive protective insert	
(3)	ExpressCard slot protective insert	
(4)	RJ-11 cover	

Cable Kit



Item	Description	Spare part number
	Cable Kit:	646968-001
(1)	WWAN antennas	
(2)	WLAN antennas	
(3)	Power connector cable	
(4)	Bluetooth module cable	
(5)	RJ-11 jack cable	

Mass storage devices

Description	Spare part number
Optical drive	
Blu-ray Disc ROM with SuperMulti DVD±R/RW DL Drive	664019-001
DVD±RW and CD-RW SuperMulti DL Combo Drive	664018-001
DVD-ROM Drive	664017-001
Hard drive	
750-GB, 7200-rpm	633252-001
500-GB, 7200-rpm	634926-001
320-GB, 7200-rpm, Self-Encrypting Drive (SED)	641674-001
320-GB, 7200-rpm	641672-001
Solid-state drive, 128-GB	662394-001

Miscellaneous parts

Description	Spare part number
AC adapters	
90-W AC adapter	609940-001
90-W AC adapter for use in India	609947-001
Power cords:	
For use in Argentina	490371-D01
For use in Brazil	490371-202
For use in the United States	490371-001
Rubber Kit (includes rubber feet and display rubber covers)	646608-001
Screw Kit	646972-001
Cradle, hard drive	652688-001
Mouse , optical, 2-button	390632-001
HP optical travel mouse	434594-001
HP basic carrying case	455084-001
Professional slim, top load case	592923-001
Notebook combination lock	591699-001
Nylon case	612757-001

Sequential part number listing

Spare part number	Description
390632-001	Mouse, optical, 2-button
434594-001	HP USB optical travel mouse
455084-001	HP basic carrying case
490371-001	Power cord for use in North America
490371-202	Power cord for use in Brazil
490371-D01	Power cord for use in Argentina
537921-001	Bluetooth module
582564-001	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States
582564-002	Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, 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-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
591699-001	Combination lock
592923-001	Professional, slim top load case

Spare part number	Description
593836-001	Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, 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, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, 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, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe
609940-001	90-W AC adapter
609947-001	90-W AC adapter for use in India
612757-001	Nylon case
621565-001	2-GB memory module (PC3-10600, 1333-MHz, DDR3)
621569-001	4-GB memory module (PC3-10600, 1333-MHz, DDR3)
628664-001	3-cell, 31 WHr, 2.8 Ah Li-ion battery
628668-001	6-cell (62 WHr, 2.8 Ah)
628670-001	6-cell, 55 WHr, 2.8 Ah, long life Li-ion battery
628824-001	Modem module NOTE: The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646968-001. See Cable Kit on page 27 for more Cable Kit spare part number information.
632155-001	HP hs2340 HSPA+ Mobile Broadband Module
633252-001	750-GB, 7200-rpm hard drive
631243-001	9-cell, 100 WHr, 3.0 Ah Li-ion battery
634091-001	8-GB memory module (PC3-10600, 1333-MHz, DDR3)
634400-001	HP un2430 EV-DO/HSPA Mobile Broadband Module
634926-001	500-GB, 7200-rpm hard driv
639736-001	1-GB memory module (PC3-10600, 1333-MHz, DDR3)
641179-001	Keyboard with pointing stick for use in the United States (includes keyboard and pointing stick cables)
641179-121	Keyboard with pointing stick for use in French Canada (includes keyboard and pointing stick cables)
641179-161	Keyboard with pointing stick for use in Latin America (includes keyboard and pointing stick cables)

Spare part number	Description
641179-201	Keyboard with pointing stick for use in Brazil (includes keyboard and pointing stick cables)
641180-001	Keyboard without pointing stick for use in the United States (includes keyboard cable)
641180-121	Keyboard without pointing stick for use in French Canada (includes keyboard cable)
641180-161	Keyboard without pointing stick for use in Latin America (includes keyboard cable)
641180-201	Keyboard without pointing stick for use in Brazil (includes keyboard cable)
641183-001	Fan
641186-001	Speaker assembly
641200-001	RTC battery
641202-001	Display enclosure
641204-001	Top cover for use on models that include a fingerprint reader, without a pointing stick
641205-001	Top cover for use on models that include a fingerprint reader and a pointing stick
641206-001	Top cover for use on models that include a pointing stick, without a fingerprint reader
641672-001	320-GB, 7200-rpm hard drive
641674-001	320-GB, 7200-rpm hard drive (Self-Encrypting Drive (SED))
644695-001	Bottom cover (includes rubber feet)
646608-001	Rubber Kit (includes rubber feet and display rubber covers)
646968-001	Cable Kit (see Cable Kit on page 27 for more Cable Kit spare part information)
646969-001	Display Cable Kit for use in models with HD displays
646970-001	Display Cable Kit for use in models with HD+ displays
646971-001	Plastics Kit (see Plastics Kit on page 27 for more Plastics Kit spare part information)
646972-001	Screw Kit
646978-001	Display panel, 39.6-cm (15.6-in), HD anti-glare, LED, SVA for use in models without WWAN
647599-001	Webcam module
647600-001	Microphone module
647677-001	Display hinges (includes left and right hinges, brackets, and covers)
652688-001	Cradle, hard drive
653351-001	AMD Dual Core E2-3000M (2.4-GHz/1.8-GHz, 1-MB L2 cache, 35W) APU
653356-001	AMD Dual-Core A4-3310M processor (2.5-GHz/2.1-GHz, 2-MB L2 cache, 45W) APU
653357-001	AMD Quad-Core A6-3410M processor (2.3-GHz/1.6-GHz, 4-MB L2 cache, 45W) APU
653358-001	AMD Quad-Core A8-3510M processor (2.5-GHz/1.5-GHz, 4-MB L2 cache, 45W) APU
657831-001	Display Panel Support Kit
658140-001	Heat sink (includes replacement thermal pads and grease)
658141-001	USB 2.0 board (includes Mylar)
658142-001	Function board

Spare part number	Description
658143-001	System board for use in models with WWAN (includes thermal pad)
660276-001	Display bezel for use with models with a webcam
660277-001	Display bezel for use with models without a webcam
662393-001	Display panel, 39.6-cm (15.6-in), HD anti-glare, SVA for use in models with WWAN
662394-001	Solid-state drive, 128-GB
662395-001	Display panel, 39.6-cm (15.6-in), HD+, anti-glare, LED
664017-001	DVD-ROM drive
664018-001	DVD±RW and CD-RW SuperMulti DL combo drive
664019-001	Blu-ray ROM DVD±RW SuperMulti DL Drive
665718-001	System board for use in models without WWAN (includes thermal pad)
670434-001	Bottom door blank

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
- Phillips P0 and P1 screwdrivers
- Torx T8 screwdriver

Service considerations

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



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

Plastic parts



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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

Use nonmagnetic tools.

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

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

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

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

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

Typical electrostatic voltage levels			
Event	Relative humidity		
	10%	40%	55%
Walking across carpet	35,000 V	15,000 V	7,500 V
Walking across vinyl floor	12,000 V	5,000 V	3,000 V
Motions of bench worker	6,000 V	800 V	400 V
Removing DIPS from plastic tube	2,000 V	700 V	400 V
Removing DIPS from vinyl tray	11,500 V	4,000 V	2,000 V
Removing DIPS from Styrofoam	14,500 V	5,000 V	3,500 V
Removing bubble pack from PCB	26,500 V	20,000 V	7,000 V
Packing PCBs in foam-lined box	21,000 V	11,000 V	5,000 V

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

- To avoid hand contact, transport products in static-safe tubes, bags, or boxes.
- Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.
- Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.
- Place items on a grounded surface before removing items from their containers.
- Always be properly grounded when touching a component or assembly.
- Store reusable ESD-sensitive parts from assemblies in protective packaging or nonconductive foam.
- Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screwdrivers, and vacuums.
- When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.
- Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.
- Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.
- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

Grounding equipment must include either a wrist strap or a foot strap at a grounded workstation.

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm $\pm 10\%$ resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.
- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive strips must be worn in contact with the skin.

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

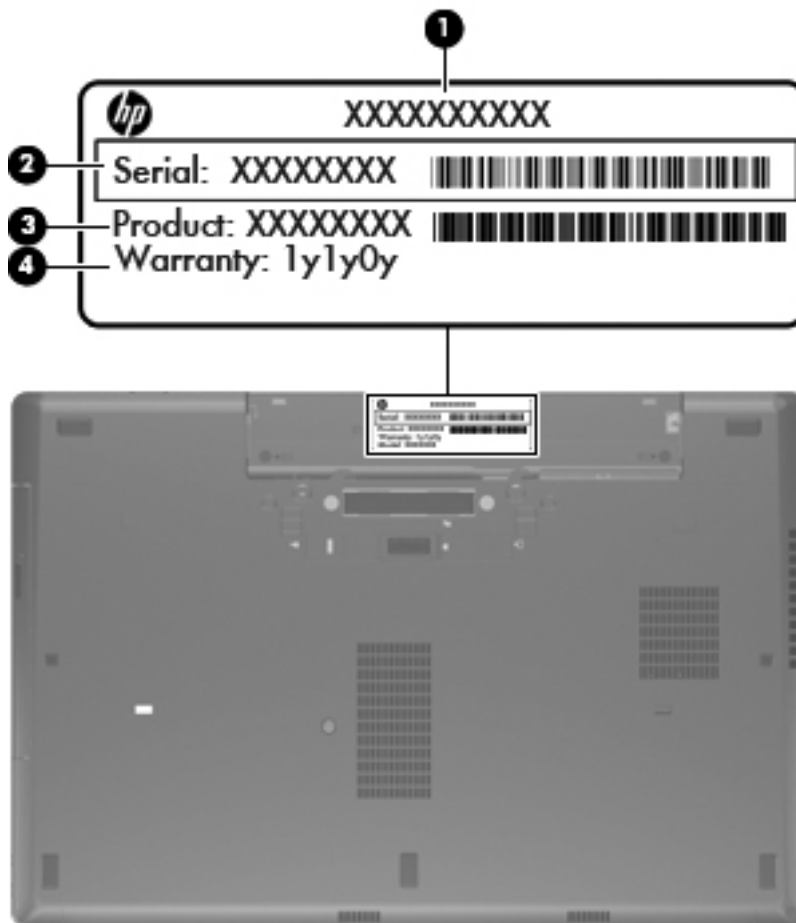
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 95 screws and screw locks, in 15 different sizes, 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 description provided on the service tag.



- Product name **(1)**. This is the product name affixed to the front of the computer.
- Serial number (s/n) **(2)**. This is an alphanumeric identifier that is unique to each product.
- Part number/Product number (p/n) **(3)**. This number provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
- Warranty period **(4)**. This number describes the duration (in years) of the warranty period for the computer.

Rubber screw covers

Three bottom screws have rubber covers. The screw covers are included in the Rubber Kit, spare part number 646608-001, and attach to the base enclosure in the locations illustrated below.



Battery

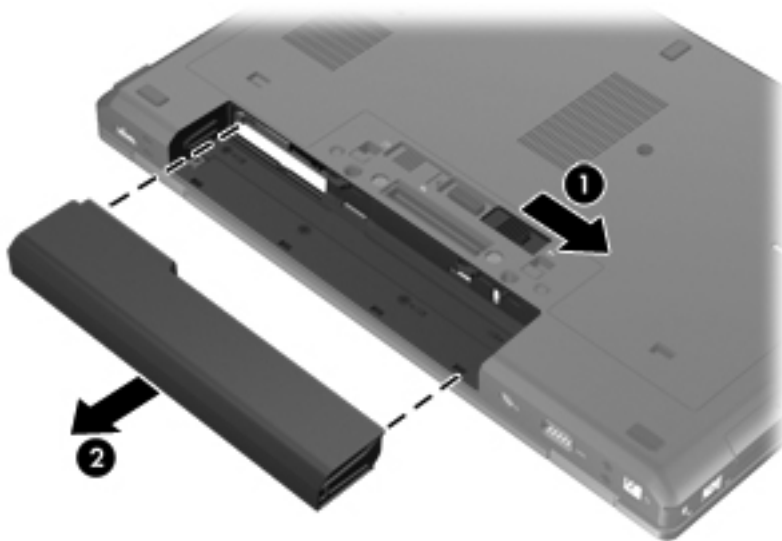
Description	Spare part number
9-cell, 100 WHr, 3.0 Ah Li-ion battery	631243-001
6-cell (62 WHr, 2.8 Ah)	628668-001
6-cell, 55 WHr, 2.8 Ah, long life Li-ion battery	628670-001
3-cell, 31 WHr, 2.8 Ah Li-ion battery	628664-001

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. Position the computer upside-down on a flat surface, with the battery bay toward you.
2. Slide the battery release latch **(1)** to release the battery.
3. Remove the battery **(2)** from the computer.



Install the battery by inserting it into the battery bay until you hear a click.

Display assembly (panel, bezel, webcam, microphone)

All display assemblies include WLAN antenna transceivers and cables. WWAN models include 2 WWAN antenna transceivers and cables.



NOTE: Full hinge-up displays are not spared.

This section describes removing components that do not require that you entirely remove the display assembly from the computer. You can remove the display bezel, webcam/microphone module, and display panel with the display assembly still attached to the computer.

To remove the remaining display components, including the display brackets, antennas, cable, and enclosure, you must remove the entire display assembly from the computer. See [Display assembly and components \(whole hinge-up, cable, antennas, hinges, enclosure\) on page 89](#) for more information about removing the remaining components.

Description	Spare part number
Display panels	
39.6-cm (15.6-in), HD+, anti-glare, LED, WVA	662395-001
39.6-cm (15.6-in), HD anti-glare, LED, SVA for use in models without WWAN	646978-001
39.6-cm (15.6-in), HD anti-glare, SVA for use in models with WWAN	662393-001
Display bezels	
For use in models with a webcam	660276-001
For use in models without a webcam	660277-001
Webcam module	647599-001
Microphone module	647600-001

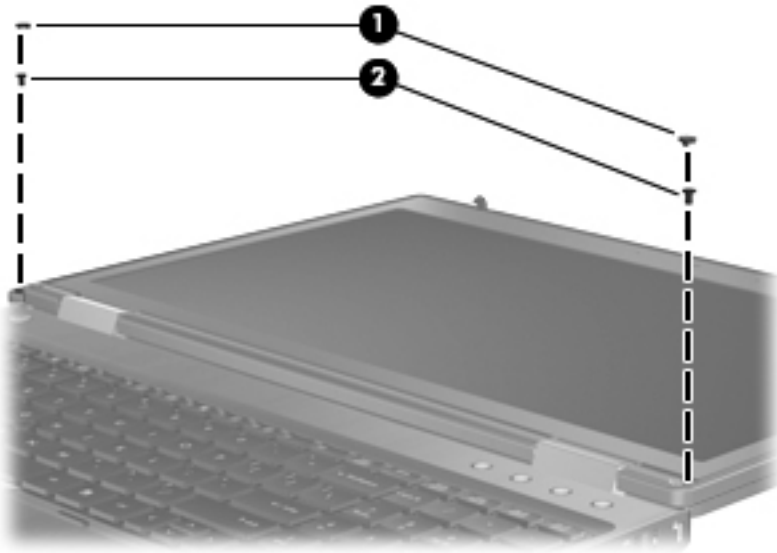
Before removing the display assembly, follow these steps:

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 41](#)).

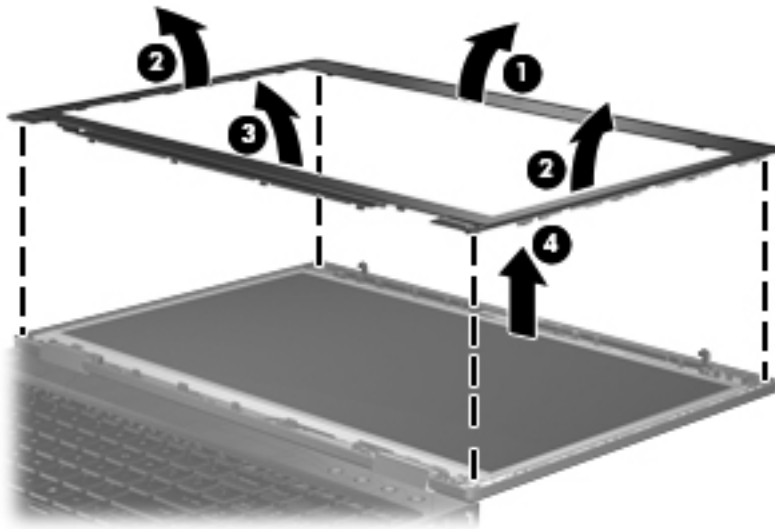
Remove the display assembly:

1. Position the computer right-side up with the front toward you.
2. Open the computer as far as possible.

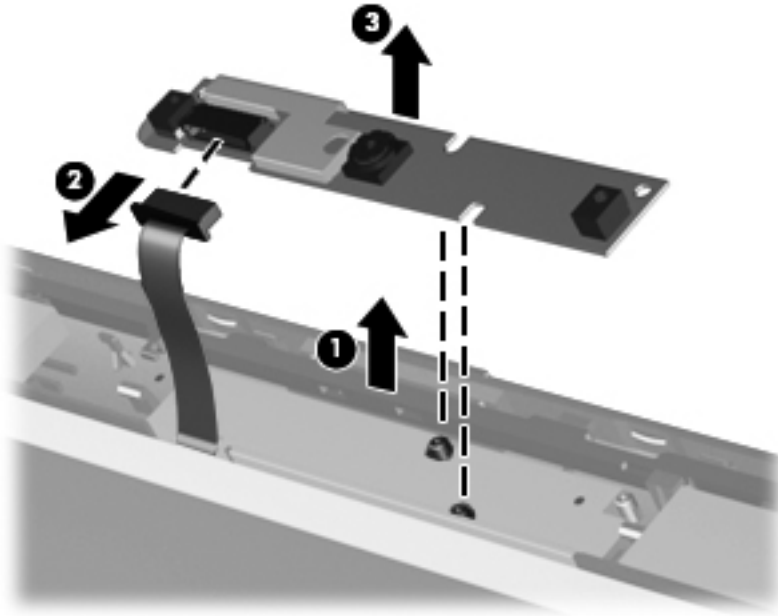
3. To replace the display bezel, remove the two rubber screw covers (1) and the two Phillips PM2.5×5.0 screws (2) in the bottom corners of the display bezel.



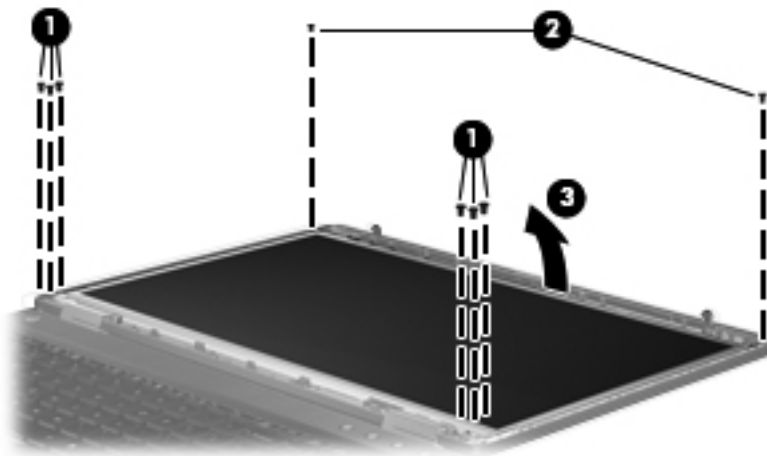
4. Flex the top (1) of the bezel, the inside edges of the left and right sides (2), and then the bottom (3) of the bezel until it disengages from the display enclosure.
5. Remove the display bezel (4).



6. If it is necessary to replace the webcam module from the display enclosure, gently pull the webcam module away from the double-sided tape on the display enclosure (1), disconnect the webcam cable from the module (2), and then remove the webcam (3).

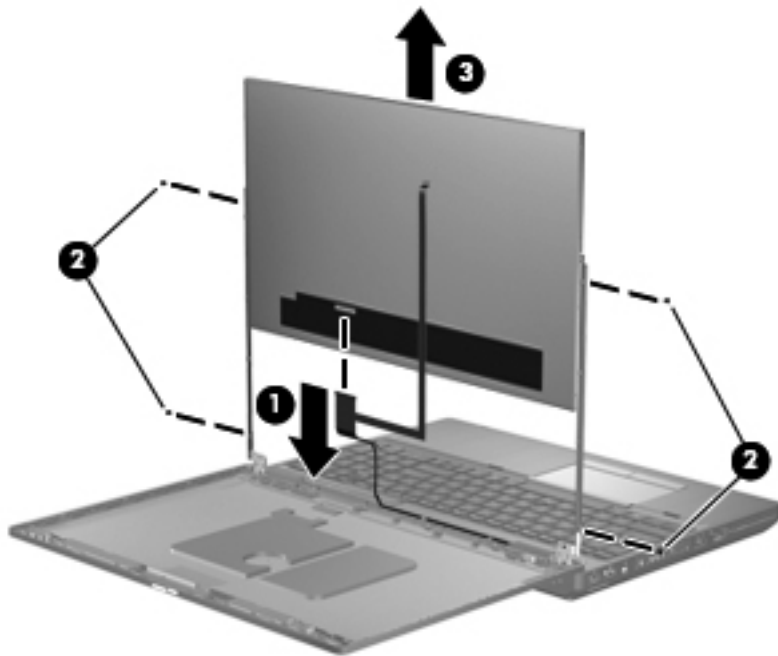


7. If it is necessary to replace the display panel, remove the six Phillips PM2.5×5.0 screws (1) at the bottom and two Phillips PM2.5×5.0 screws (2) at the top that secure the panel to the display enclosure.
8. Pivot the display panel upward until it sits at a 90 degree angle (3).




9. Disconnect the display panel cable from the back of the display panel (1).
10. Remove the four Phillips PM2.5×4.0 screws (2) that secure the display panel to the brackets.


11. Slide the display panel up and out of the hinges (3).



Reverse this procedure to reassemble and install the display assembly.

SIM

 **NOTE:** This section applies only to computer models with WWAN capability.

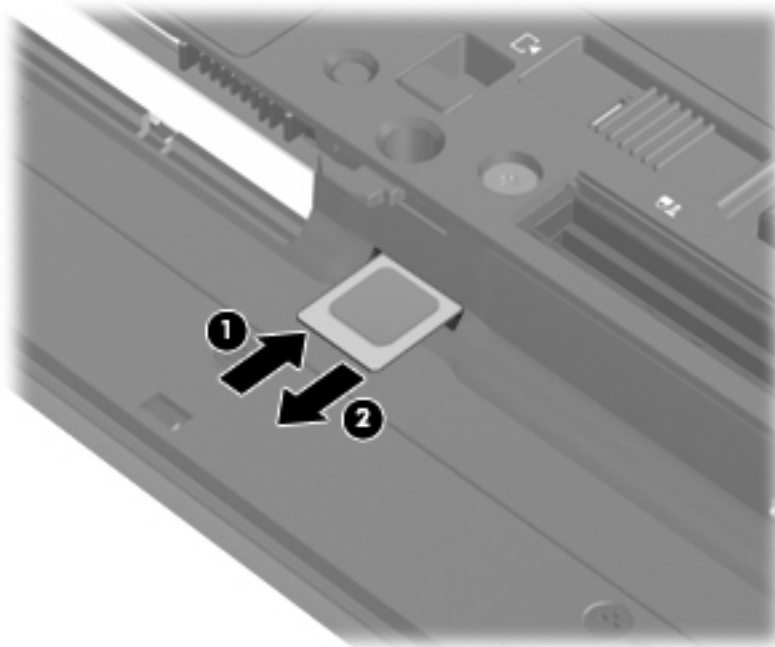
 **NOTE:** If there is a SIM inserted in the SIM slot, it must be removed before disassembling the computer. Be sure that the SIM is reinserted in the SIM slot after reassembling the computer.

Before removing the SIM, 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 41](#)).

Remove the SIM:

1. Press in on the SIM **(1)**. (The module is partially ejected from the SIM slot.)
2. Remove the SIM **(2)** from the SIM slot.



Reverse this procedure to install the SIM.

Bottom door

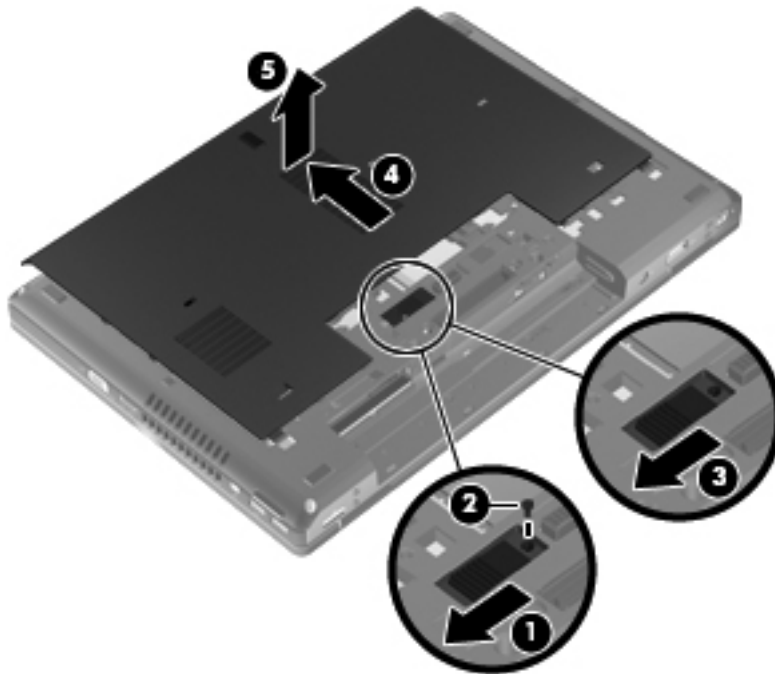
The bottom door is available in the Plastics Kit, spare part number 646971-001.

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.
4. Remove the battery (see [Battery on page 41](#)).

Remove the bottom door:

1. Position the computer upside-down on a flat surface, with the battery bay toward you.
2. Slide the release latch **(1)** and remove the locking screw (if installed) **(2)**.
3. Slide the release latch **(3)** to disengage the door from the computer.
4. Slide the door toward the front of the computer **(4)**, and then lift the door off the computer **(5)**.



Reverse the removal procedures to install the bottom door.

Optical drive



NOTE: All optical drive spare part kits include an optical drive bezel.

Description	Spare part number
Blu-ray ROM DVD±RW SuperMulti DL Drive	664019-001
DVD±RW and CD-RW SuperMulti DL Combo Drive	664018-001
DVD-ROM Drive	664017-001

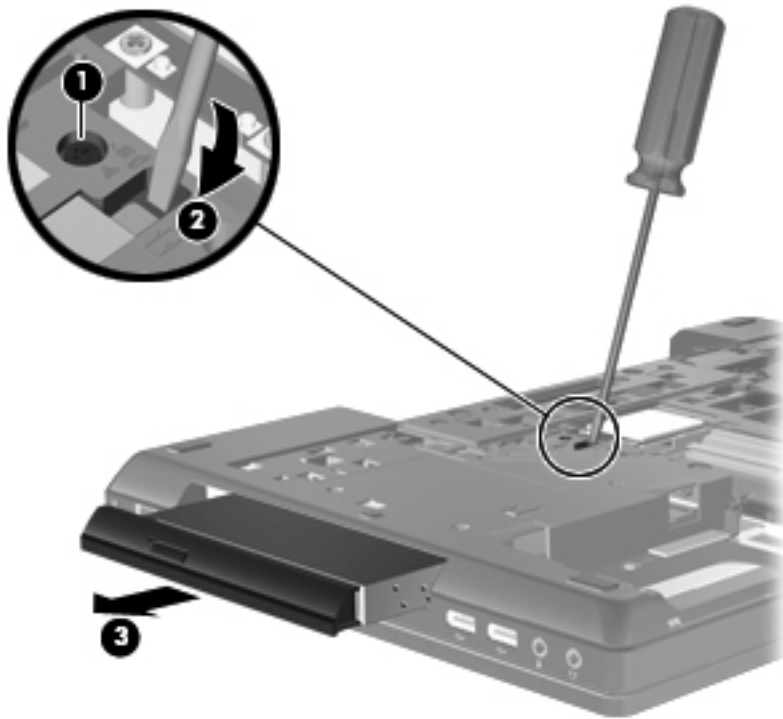
Before removing the optical drive, follow these steps:

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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

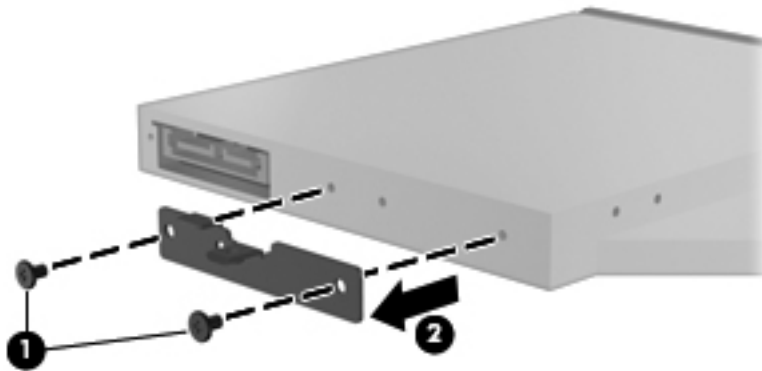
Remove the optical drive:

1. Position the computer upside-down with the right side toward you.
2. Loosen the captive Phillips screw **(1)** that secures the optical drive to the computer.
3. Push the optical drive tab **(2)** to release the optical drive from the computer.

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



5. If it is necessary to replace the optical drive bracket, position the optical drive with the rear toward you.
6. Remove the two Phillips PM2.0×3.0 screws (1) that secure the optical drive bracket to the optical drive.
7. Remove the optical drive bracket (2).



Reverse this procedure to install an optical drive.

Upgrade bay

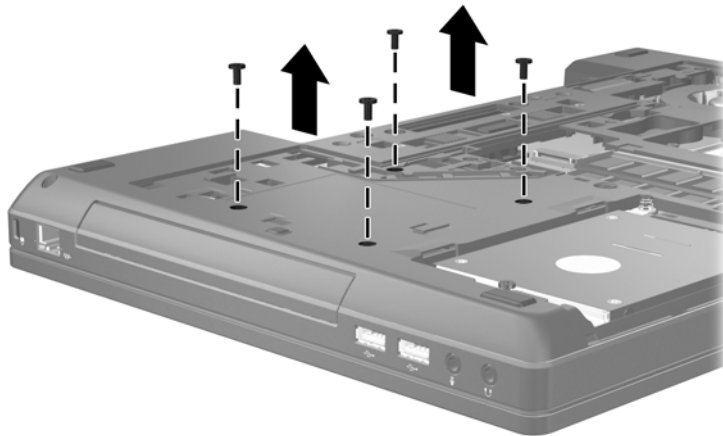
Description	Spare part number
500-GB, 7200-rpm hard drive	634926-001

Before removing a drive from the upgrade bay, 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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the drive from the upgrade bay:

1. Position the computer upside-down with the right side toward you.
2. Remove the four Phillips PM2.0×4.0 screws that secure the drive assembly into the upgrade bay.



3. Loosen the captive Phillips screw that secures the drive in the bay **(1)**.
4. Push the drive tab **(2)** to release the drive from the computer.

5. Remove the drive assembly (3) from the computer.



Reverse this procedure to install the drive into the upgrade bay.

Hard drive



NOTE: All hard drive spare part kits include a hard drive bracket and screws.

Description	Spare part number
750-GB, 7200-rpm hard drive	633252-001
500-GB, 7200-rpm hard drive	634926-001
320-GB, 7200-rpm hard drive	641672-001
320-GB, 7200-rpm hard drive (Self-Encrypting Drive (SED))	641674-001
Solid-state drive, 128-GB	662394-001

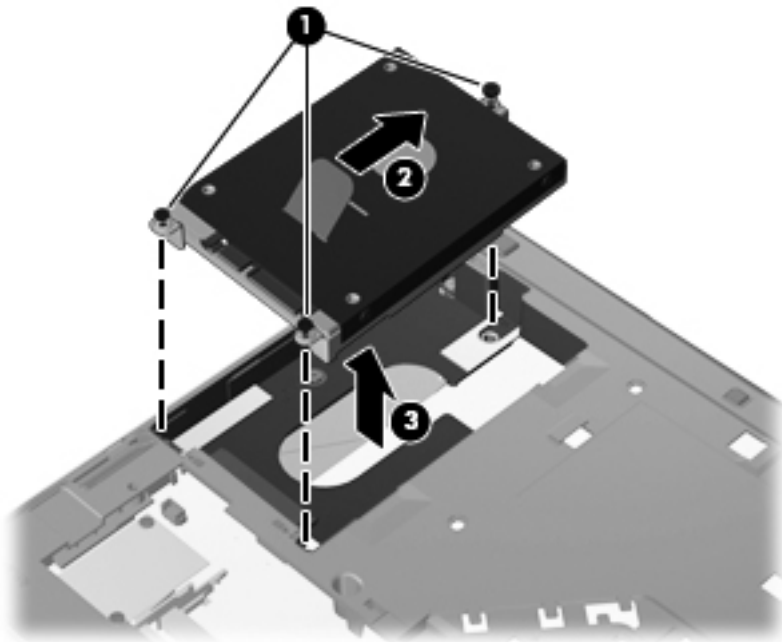
Before disassembling the computer, follow these steps:

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.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

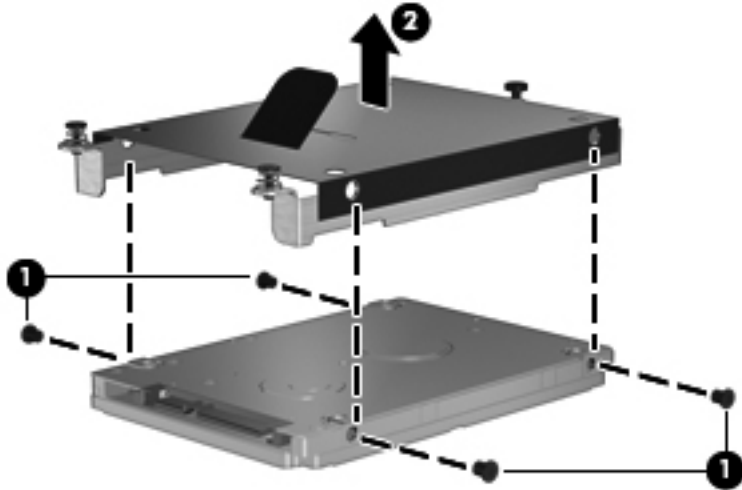
Remove the hard drive:

1. Position the computer upside-down, with the battery bay toward you.
2. Loosen the three captive Phillips screws **(1)** that secure the hard drive to the computer.
3. Grasp the Mylar tab on the hard drive and slide the hard drive to the right **(2)** to disconnect it from the system board connector.

4. Remove the hard drive (3) from the hard drive bay.



5. If it is necessary to replace the hard drive bracket, remove the two Phillips PM3.0×5.0 hard drive bracket screws (1) from each side of the hard drive (4 total screws).
6. Lift the bracket (2) straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

RTC battery

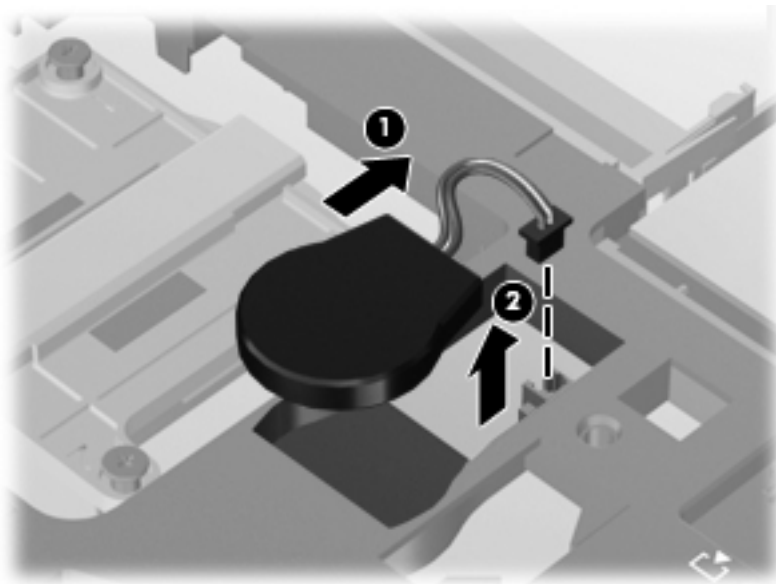
Description	Spare part number
RTC battery	641200-001

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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the RTC battery:

1. Position the computer upside-down, with the front toward you.
2. Remove the battery from the slot as far as the attached cable will allow **(1)**.
3. Disconnect the battery cable from the system board **(2)**.



Reverse this procedure to install the RTC battery.

Memory modules



NOTE: Primary and expansion memory is installed in a stacked configuration in the bottom of the computer.

Description	Spare part number
1-GB (PC3-10600, 1333-MHz, DDR3)	639736-001
2-GB (PC3-10600, 1333-MHz, DDR3)	621565-001
4-GB (PC3-10600, 1333-MHz, DDR3)	621569-001
8-GB (PC3-10600, 1333-MHz, DDR3)	634091-001

Update BIOS before adding memory modules

Before adding new memory, make sure you update the computer to the latest BIOS.



CAUTION: Failure to update the computer to the latest BIOS prior to installing new memory may result in various system problems.

To update BIOS:


1. Navigate to www.hp.com.
2. Click **Support & Drivers** > click **Drivers & Software**.
3. In the **Enter a product name/number** box, type the computer model information, and then click **Search**.
4. Click the link for the computer model.
5. Select the operating system, and then click **Next**.
6. Under **Step 2: Select a Download**, click the **BIOS** link.
7. Click the link for the most recent BIOS.
8. Click the **Download** button, and then follow the on-screen instructions.


Before removing the memory module, follow these steps:

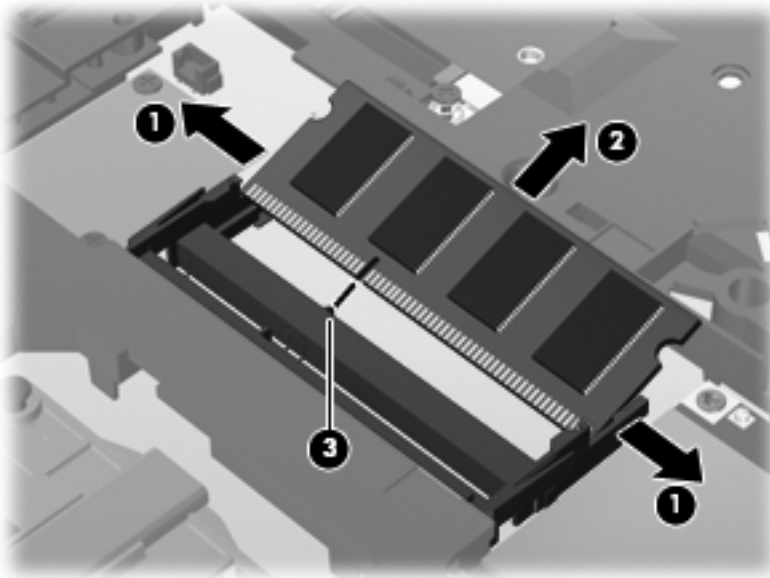
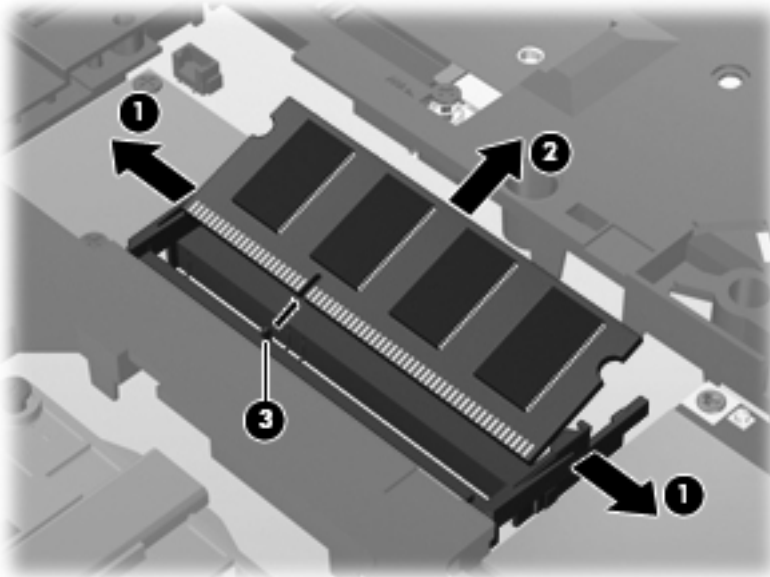
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the memory module:

1. Position the computer upside-down with the battery bay toward you.
2. Spread the retaining tabs **(1)** on each side of the memory module slot to release the memory module. (The edge of the module opposite the slot rises away from the computer.)
3. Remove the memory module **(2)** by pulling the module 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.

 **NOTE:** The computer uses two memory slots. The top slot houses the expansion memory module and is shown in the first image below. The bottom slot houses the primary memory module and is shown in the second image below.



Reverse this procedure to install a memory module.

WWAN module

 **CAUTION:** The WWAN module and the WLAN module are not interchangeable.

Description	Spare part number
HP hs2340 HSPA+ Mobile Broadband Module	632155-001
HP un2430 EV-DO/HSPA Mobile Broadband Module	634400-001

Before removing the WWAN 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 41](#)).
5. Remove the SIM (see [SIM on page 46](#)).
6. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the WWAN module:

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



NOTE: The red WWAN antenna cable is connected to the WWAN module “Main” terminal. The blue WWAN antenna cable is connected to the WWAN module “Aux” terminal.

2. Remove the two Phillips PM2.0×3.0 screws **(2)** that secure the WWAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

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


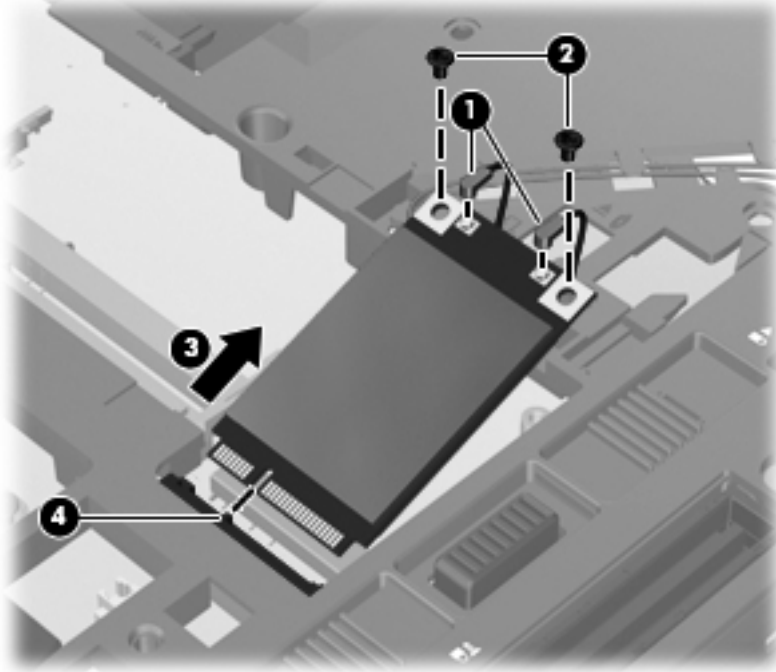

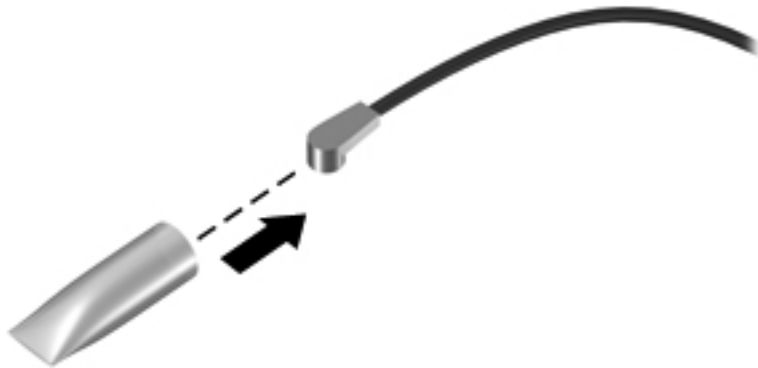
 **NOTE:** WWAN modules are designed with a notch (4) to prevent incorrect insertion.

Figure 4-1 Removing the WWAN module




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



Reverse this procedure to install the WWAN module.

WLAN module

 **CAUTION:** The WLAN module and the WWAN module are not interchangeable.

Description	Spare part number
Broadcom 4313AGN 802.11a/b/g/draft-n WiFi Adapter for use in Afghanistan, Albania, Algeria, Andorra, Angola, Antigua and Barbuda, Argentina, Armenia, Aruba, Australia, Austria, Azerbaijan, 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, Canada, Cape Verde, the Cayman Islands, Central African Republic, Chad, People's Republic of China, Colombia, Comoros, 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, Guam, Guatemala, Guinea, Guinea-Bissa, Guyana, Haiti, Honduras, Hong Kong, Hungary, Iceland, India, Iraq, Ireland, Israel, Italy, Ivory Coast, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Martinique, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, 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, Puerto Rico, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russia, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Swaziland, Sweden, Switzerland, Syria, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, Ukraine, the United Arab Emirates, the United Kingdom, Uruguay, the United States, the US Virgin Islands, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	593836-001
Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Antigua and Barbuda, Aruba, the Bahamas, Barbados, Belize, Canada, Guam, Guinea, Haiti, Jamaica, the Nether Antilles, Puerto Rico, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, the US Virgin Islands, and the United States	582564-001
Broadcom 43224AGN 802.11a/b/g/draft-n WiFi Adapter for use in Albania, Algeria, Andorra, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Belarus, Belgium, Benin, Bermuda, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, the British Virgin Islands, Brunei, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, the Cayman Islands, Central African Republic, Chad, Chile, People's Republic of China, Colombia, Comoros, 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-Bissa, Honduras, Hong Kong, Hungary, Iceland, India, Ireland, Italy, Ivory Coast, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia Maldives, Mali, Malta, Marshall Islands, Martinique, Mauritania, Mauritius, Mexico, Micronesia, Monaco, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, South Korea, Spain, Sri Lanka, Swaziland, Sweden, Switzerland, Taiwan, Tajikistan, Tanzania, Thailand, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, United Kingdom, Uruguay, Uzbekistan, Vanuatu, Venezuela, Vietnam, Yemen, Zaire, Zambia, and Zimbabwe	582564-002

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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the WLAN module:


1. Position the computer right-side up with the battery bay toward you.
2. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

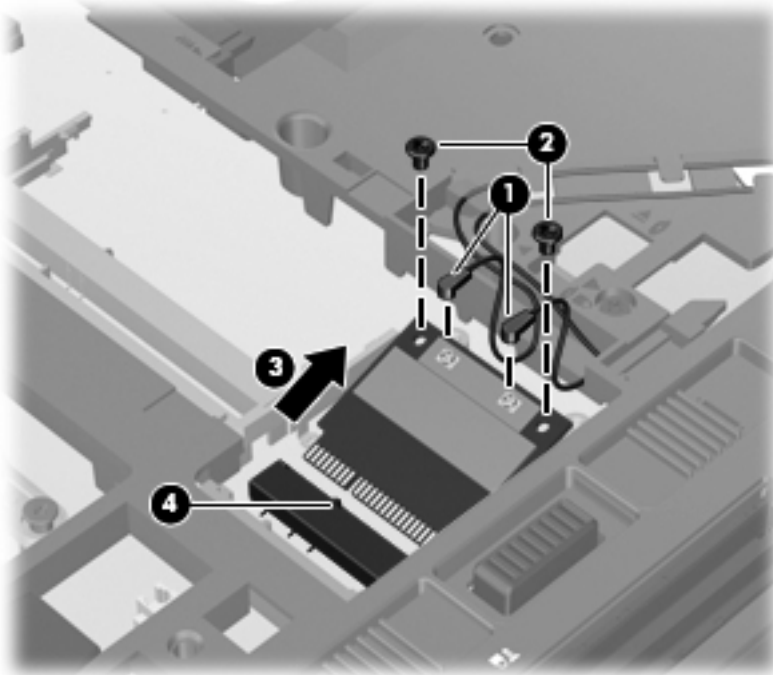



NOTE: The WLAN antenna cable labeled “1” connects to the WLAN module “Main” terminal labeled “1”. The WLAN antenna cable labeled “2” connects to the WLAN module “Aux” terminal labeled “2”. If the computer is equipped with an 802.11a/b/g/n WLAN module, the yellow WLAN antenna cable connects to the middle terminal on the WLAN module.

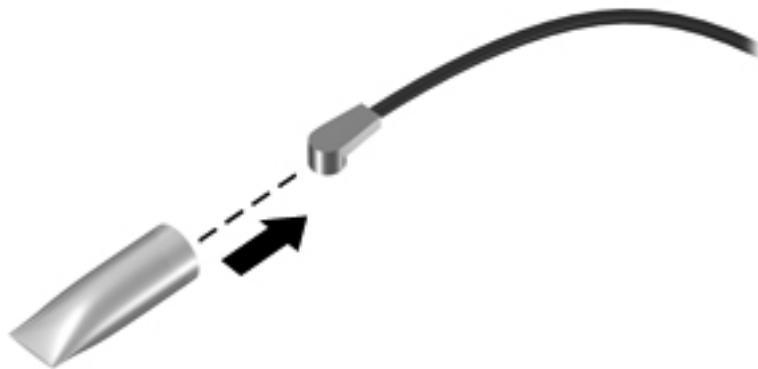
3. Remove the two Phillips PM2.0×3.0 screws **(2)** that secure the WLAN module to the computer. (The edge of the module opposite the slot rises away from the computer.)

4. 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.




 **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.

Bluetooth module

 **NOTE:** The Bluetooth module spare part kit does not include a Bluetooth module cable. The Bluetooth module cable is included in the Cable Kit, spare part number 646968-001. See [Cable Kit on page 27](#) for more Cable Kit spare part number information.

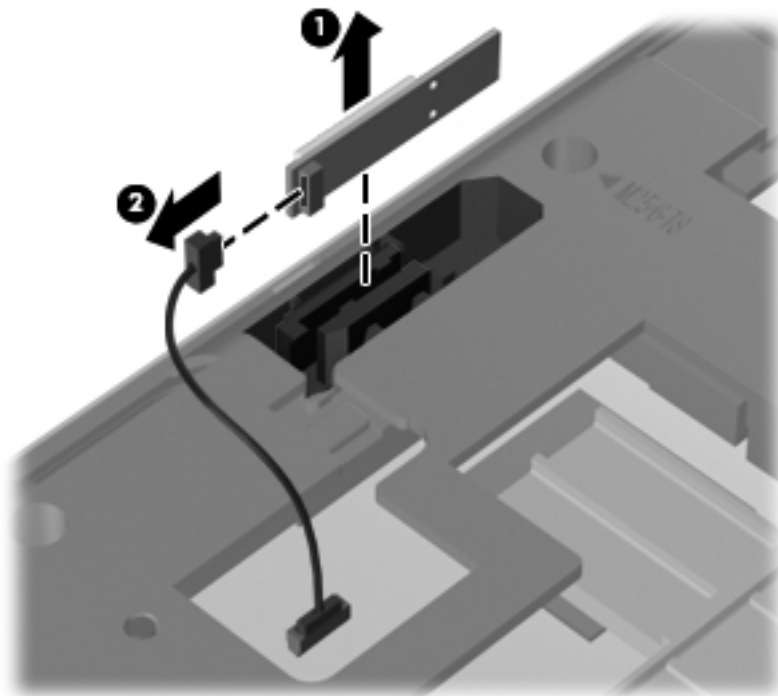
Description	Spare part number
Bluetooth module	537921-001

Before removing the Bluetooth 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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the Bluetooth module:

1. Position the computer upside-down with the front toward you.
2. Lift the module straight up out of the computer (1), and then disconnect the cable (2) from the module.



3. Remove the module from the computer.

Reverse this procedure to install the Bluetooth module.

Modem module



NOTE: The modem module spare part kit does not include a modem module cable. The modem module cable is included in the Cable Kit, spare part number 646968-001. See [Cable Kit on page 27](#) for more Cable Kit spare part number information.

Description	Spare part number
Modem module	628824-001

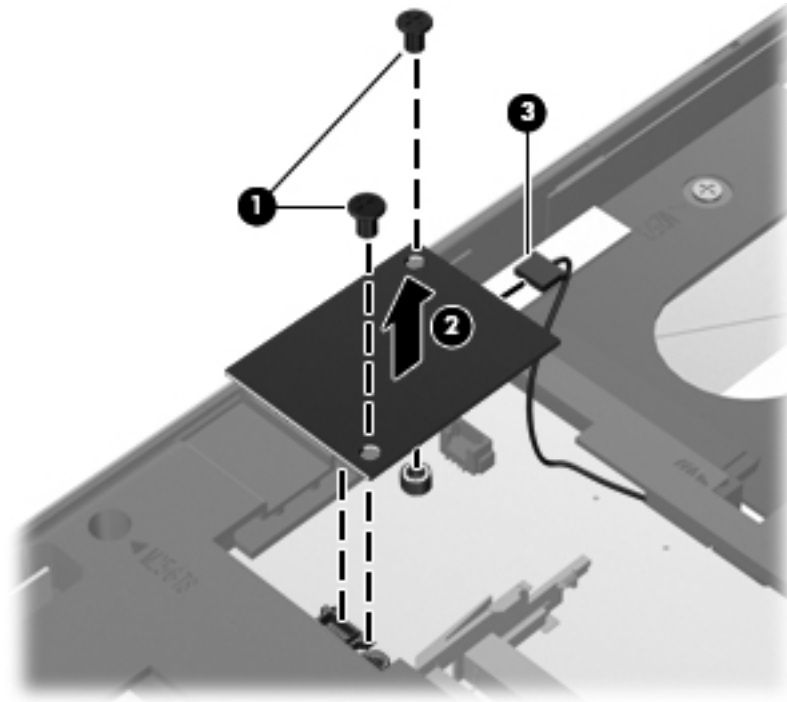
Before removing the modem module, follow these steps:

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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the modem module:

1. Position the computer upside-down with the front toward you.
2. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the modem module to the system board.
3. Disconnect the modem module **(2)** from the system board by lifting it straight up.

4. Disconnect the modem module cable (3) from the modem module.



Reverse this procedure to install the modem module.

Fan

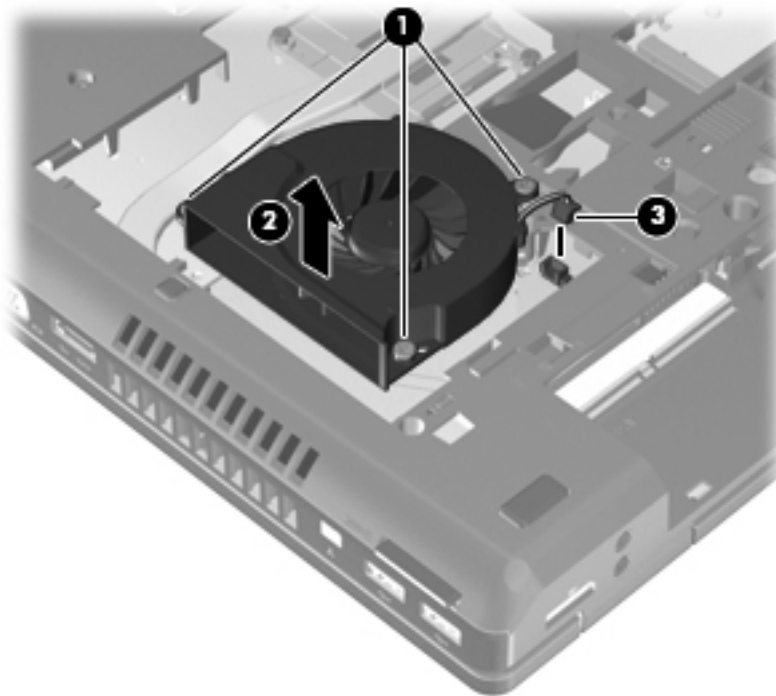
Description	Spare part number
Fan	641183-001

Before removing the fan, 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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).

Remove the fan:

1. Position the computer upside-down with the front toward you.
2. Loosen the three captive Phillips screws (1) that secure the fan to the base enclosure.
3. Lift the fan straight up (2) to gain access to the system board connector.
4. Disconnect the fan cable (3) from the system board.



Reverse this procedure to install the fan.



NOTE: To properly ventilate the computer, allow at least a 7.6-cm (3-in) 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.

Heat sink

All heat sink spare part kits include replacement thermal material, including thermal grease and pads.

Description	Spare part number
Heat sink	658140-001

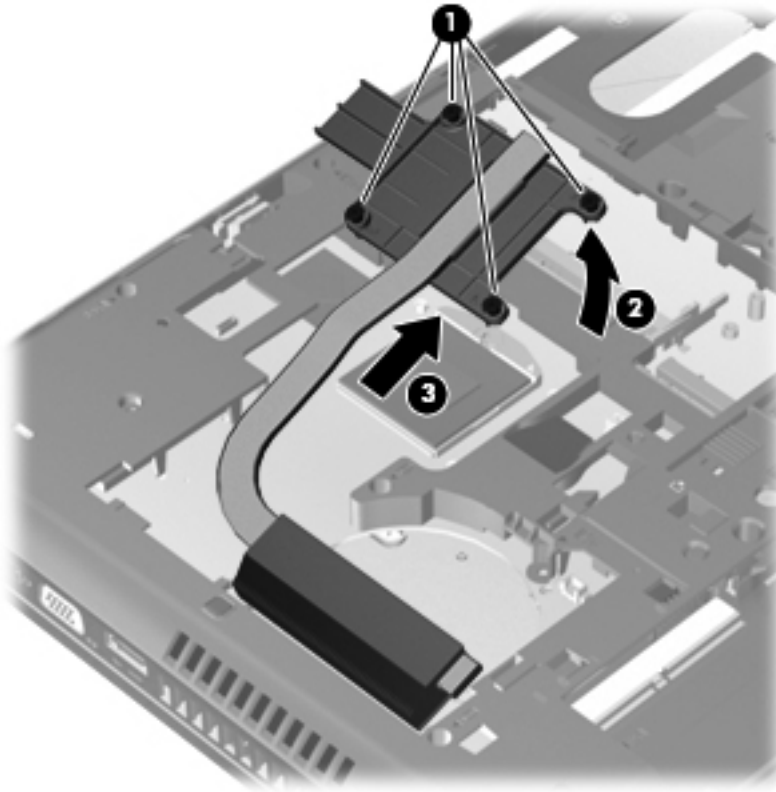
Before removing the heat sink, follow these steps:


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 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).
6. Remove the fan (see [Fan on page 65](#)).

Remove the heat sink:

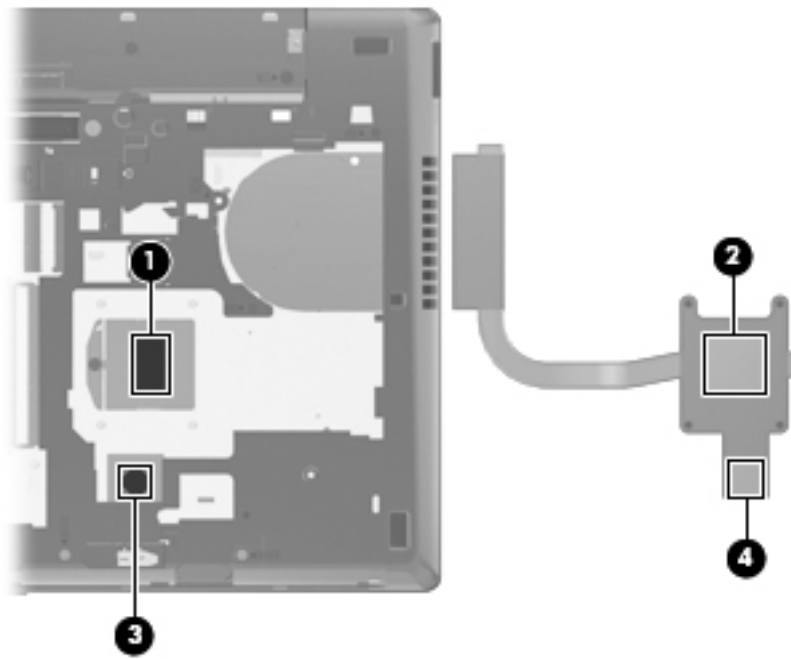
1. Position the computer upside-down with the front toward you.
2. In the order indicated, loosen the captive Phillips screws **(1)** that secure the heat sink to the system board.
3. Lift the heat sink up at an angle **(2)**.

4. Pull the heat sink away from the side of the computer to remove it (3).



 **NOTE:** Thoroughly clean thermal material from the surfaces of the system board (1)(3) and heat sink (2)(4) each time you remove the heat sink. All heat sink and processor spare part kits include thermal material.

In the following illustration, the location denoted by callout (2) on the heat sink uses thermal grease. The location denoted by callout (4) on the heat sink uses a PCH thermal pad.



Reverse this procedure to install the heat sink.

Processor



NOTE: All processor spare part kits include replacement thermal material, including thermal grease and pads.

Description	Spare part number
AMD Quad-Core A8-3510M (2.5-GHz/1.5-GHz, 4-MB L2 cache, 45W) APU	653358-001
AMD Quad-Core A6-3410M (2.3-GHz/1.6-GHz, 4-MB L2 cache, 45W) APU	653357-001
AMD Dual-Core A4-3310M (2.5-GHz/2.1-GHz, 2-MB L2 cache, 45W) APU	653356-001
AMD Dual Core E2-3000M (2.4-GHz/1.8-GHz, 1-MB L2 cache, 35W)	653351-001


Before removing the processor, follow these steps:

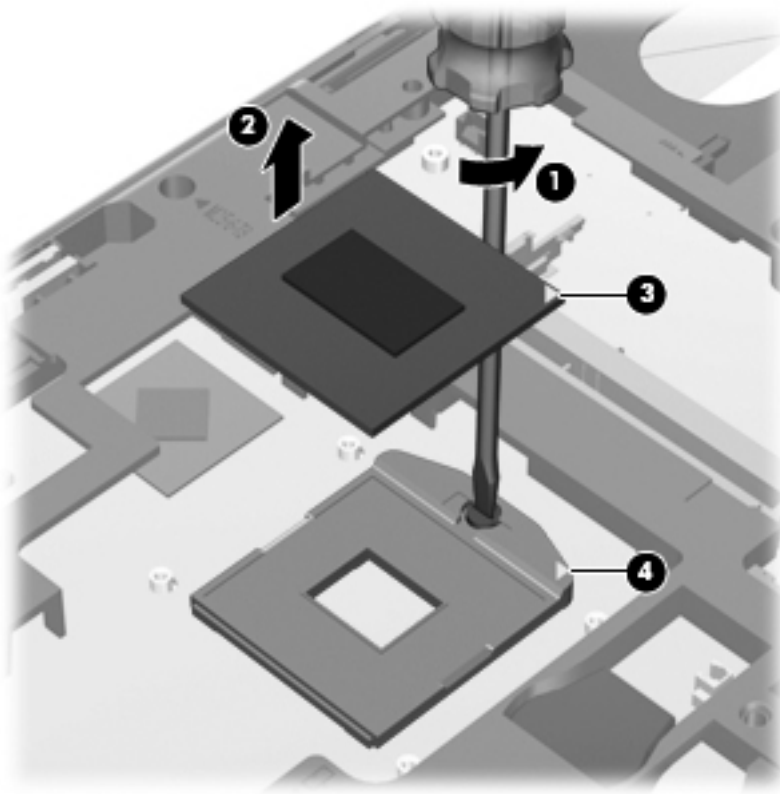
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).
6. Remove the fan (see [Fan on page 65](#)).
7. Remove the heat sink (see [Heat sink on page 66](#)).

Remove the processor:

1. Position the computer upside-down with the front toward you.
2. Use a flat-bladed screwdriver to turn the processor locking screw **(1)** one-half turn counterclockwise until you hear a click.


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

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



Reverse this procedure to install the processor.

Keyboard

 **NOTE:** For a detailed list of available keyboards, see [Sequential part number listing on page 30](#).

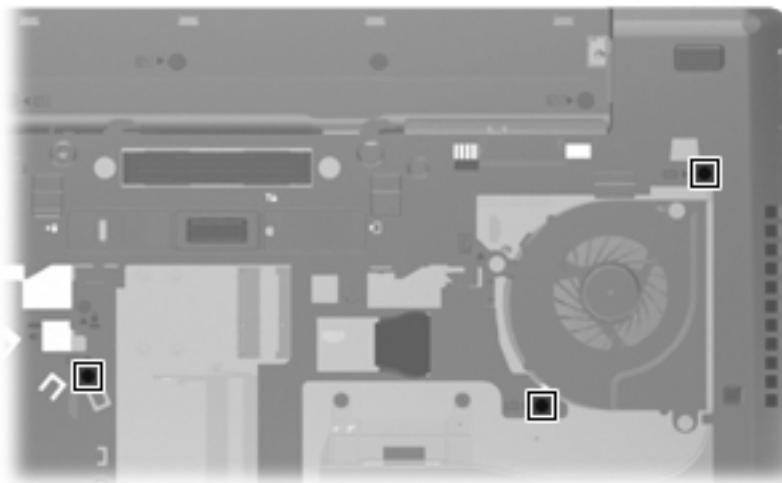
Description	Spare part number
Keyboard for use in models without a pointing stick	641180-xxx
Keyboard for use in models with a pointing stick	641179-xxx

Before removing the keyboard, follow these steps:

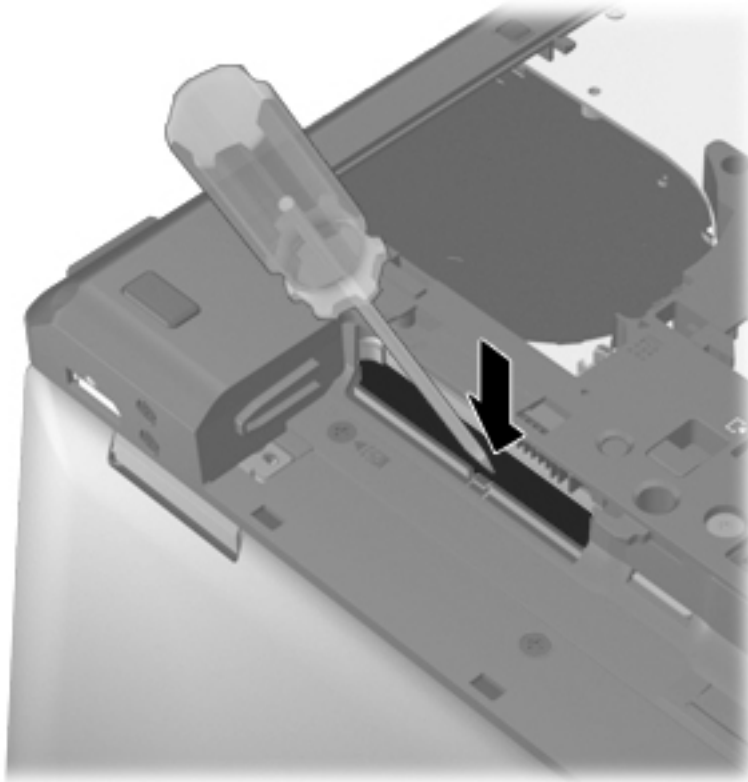
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the bottom door (see [Bottom door on page 47](#)).
6. Remove the fan (see [Fan on page 65](#)).
7. Remove the heat sink (see [Heat sink on page 66](#)).

Remove the keyboard:

1. Position the computer upside-down with the battery bay toward you.
2. Loosen the three Phillips captive screws that secure the keyboard to the computer.




3. Using a screwdriver or similar tool, press in the gap in the left side of the battery bay to disengage the keyboard.

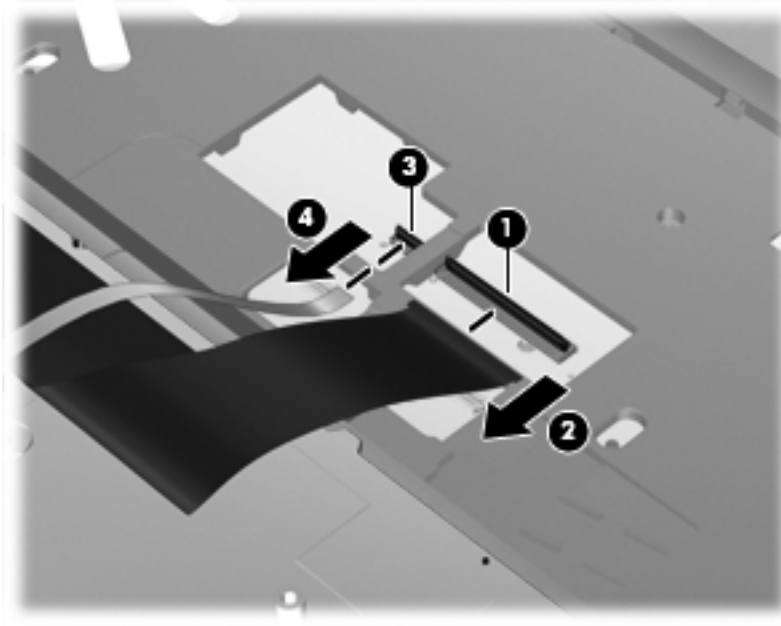


4. Position the computer right-side up with the front toward you.
5. Open the computer as far as possible.
6. Open the computer as far as possible.
7. Lift and rotate the keyboard upward to gain access to the cables.



8. Lift the keyboard connector latch (1), and then disconnect the keyboard cable from the system board (2).
9. If applicable, lift the pointing stick connector latch (3), and then disconnect the pointing stick cable from the system board (4).


 **NOTE:** Some models are not equipped with a pointing stick.




10. Remove the keyboard.

Reverse this procedure to install the keyboard.

Bottom cover

 **NOTE:** The bottom covers includes rubber feet.

 **NOTE:** Make sure to remove the modem plug from the slot in the bottom cover if the repaired unit includes a modem.

Description	Spare part number
Bottom cover	644695-001
Top cover for use on models that include a fingerprint reader, without a pointing stick	641204-001
Top cover for use on models that include a fingerprint reader and a pointing stick	641205-001
Top cover for use on models that include a pointing stick, without a fingerprint reader	641206-001

Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Modem module (see [Modem module on page 63](#))
 - g. Fan (see [Fan on page 65](#))
 - h. Heat sink (see [Heat sink on page 66](#))
 - i. Keyboard (see [Keyboard on page 71](#))

Remove the bottom cover:

1. Position the computer upside-down with the front toward you.

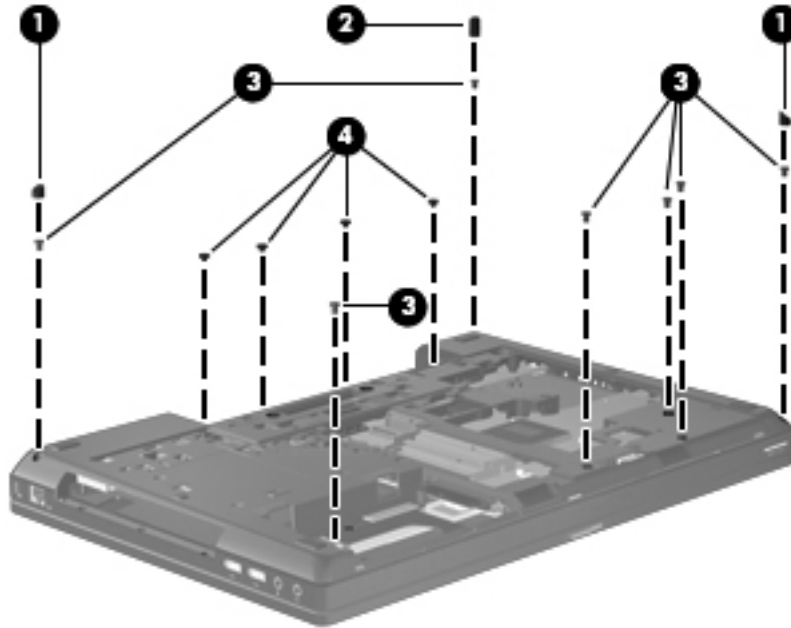
2. Remove the following covers and screws that secure the bottom cover to the computer:

(1) 2 small rubber screw covers

(2) 1 large rubber screw cover

(3) 7 Torx T8M2.5×6.0 screws

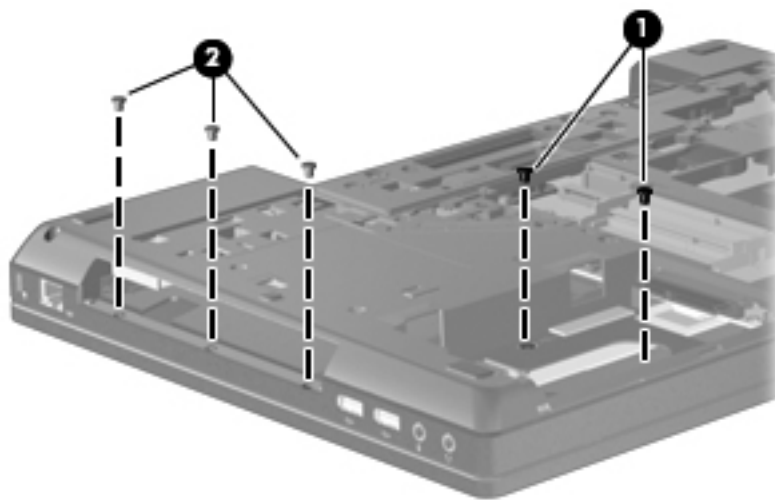
(4) 4 Phillips PM2.5×3.0 screws from the battery bay



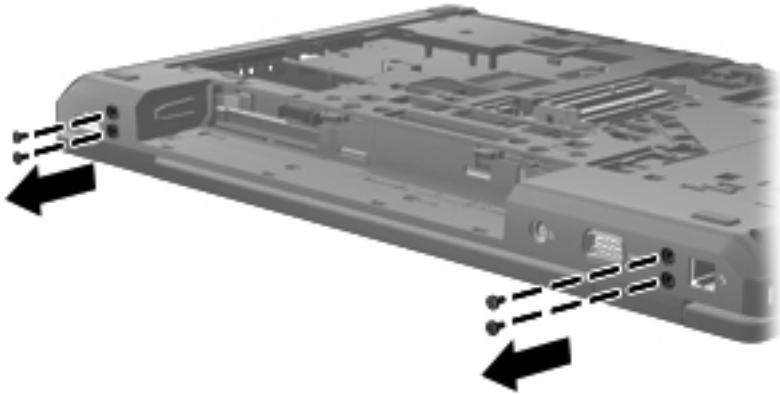
3. Remove the following screws that secure the bottom cover to the computer:

(1): 2 Phillips PM2.5×3.0 screws from the hard drive bay

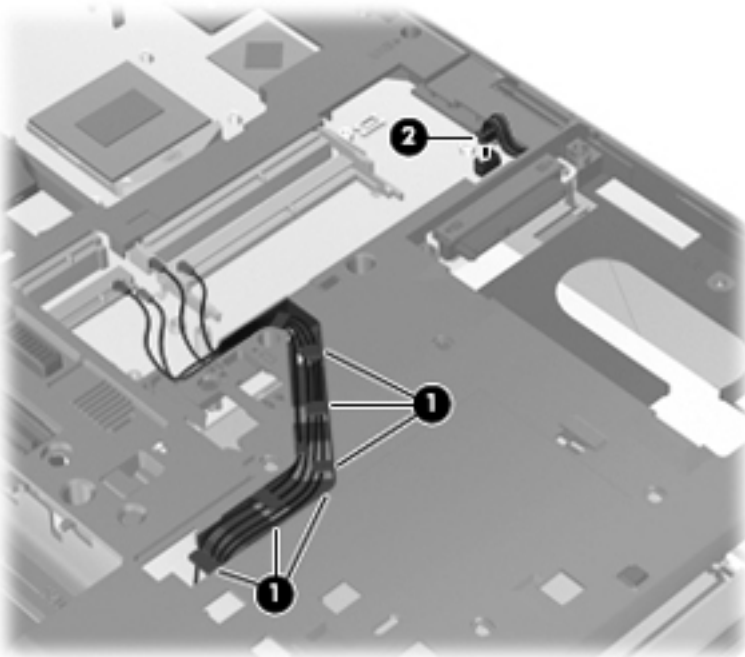
(2): 3 Phillips PM2.0×3.0 screws from the optical drive bay



4. Remove the 4 Torx T8M2.5×5.0 screws from the rear of the computer.

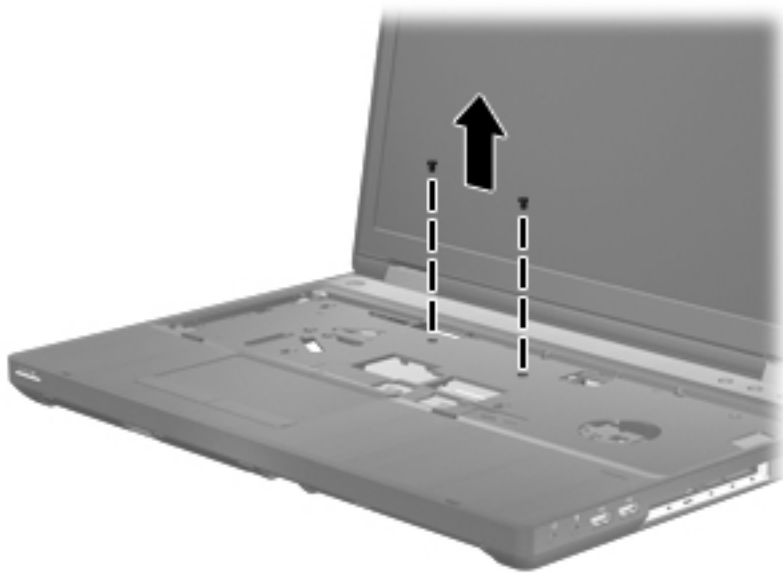


5. Remove the wireless cables from their routing path on the bottom cover (1), and disconnect the speaker cable from the system board (2).

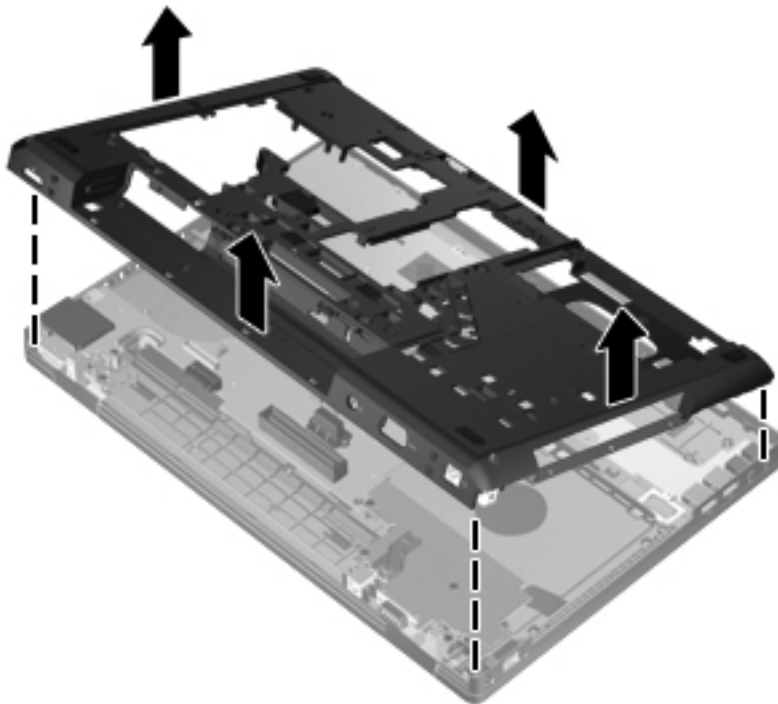


6. Position the computer upright with the front toward you.
7. Open the computer as far as possible.


8. Remove the 2 Phillips PM2.0×6.0 screws from the top of the computer.



9. Pry up on the edges of the bottom cover to disengage the cover from the computer.
10. Remove the bottom cover from the computer.



Reverse this procedure to install the bottom cover.

 **NOTE:** When replacing the bottom cover, make sure to remove the modem plug from the slot in the bottom cover if the repaired unit includes a modem.

Speaker assembly

Description	Spare part number
Speaker assembly	641186-001

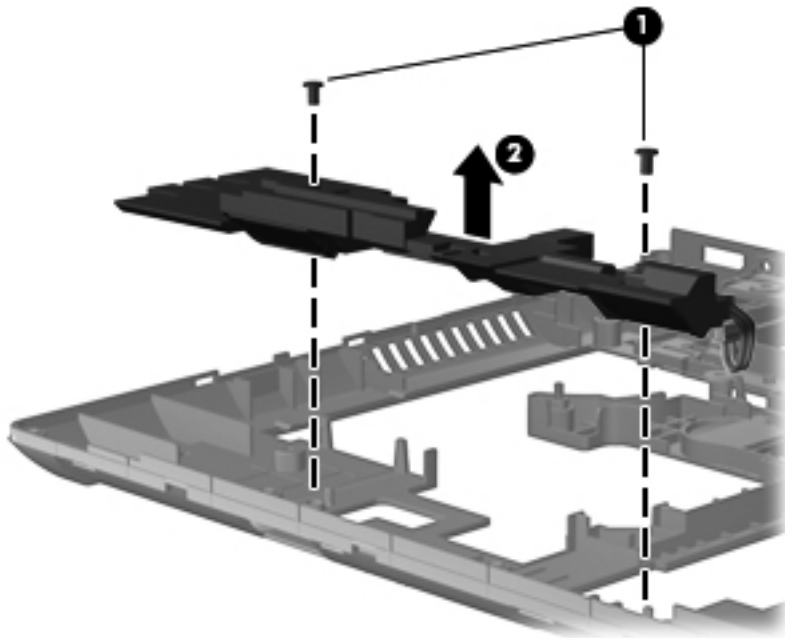
Before removing the speaker assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet, and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Fan (see [Fan on page 65](#))
 - g. Heat sink (see [Heat sink on page 66](#))
 - h. Keyboard (see [Keyboard on page 71](#))
 - i. Top cover (see [Bottom cover on page 73](#))

Remove the speaker assembly:

1. Position the top cover with the front toward you.
2. Remove the two Phillips PM2.0×3.0 screws **(1)** that secure the speaker assembly to the top cover.

3. Remove the speaker assembly (2) from the top cover.



Reverse this procedure to install the speaker assembly.

RJ-11 jack cable



NOTE: The RJ-11 jack cable is included in the Cable Kit, spare part number 646968-001.

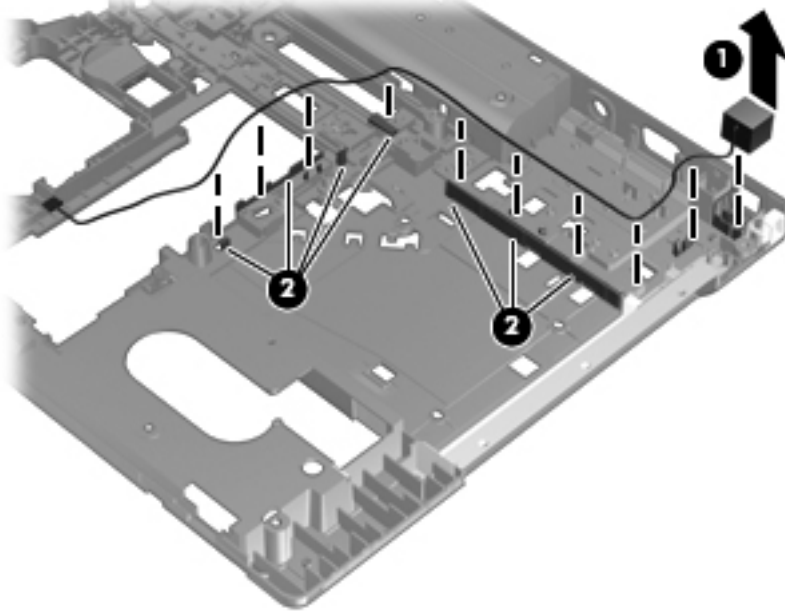
Before removing the RJ-11 jack cable, follow these steps:

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 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Modem module (see [Modem module on page 63](#))
 - g. Fan (see [Fan on page 65](#))
 - h. Heat sink (see [Heat sink on page 66](#))
 - i. Keyboard (see [Keyboard on page 71](#))
 - j. Top cover (see [Bottom cover on page 73](#))

Remove the RJ-11 jack cable:

1. Position the top cover with the front toward you.
2. Remove the RJ-11 jack **(1)** from the clip built into the base enclosure.

3. Remove the RJ-11 jack cable from the clips and routing channel **(2)** built into the base enclosure.



4. Remove the RJ-11 jack cable from the top cover.
Reverse this procedure to install the RJ-11 jack cable.

Function board

Description	Spare part number
Function board	658142-001

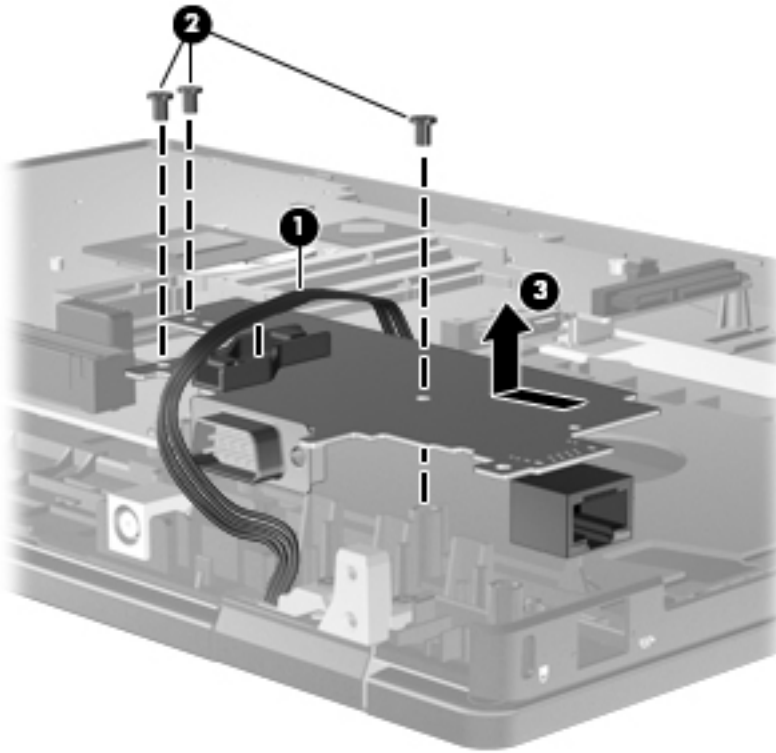
Before removing the function board, follow these steps:

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 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Fan (see [Fan on page 65](#))
 - g. Heat sink (see [Heat sink on page 66](#))
 - h. Keyboard (see [Keyboard on page 71](#))
 - i. Top cover (see [Bottom cover on page 73](#))

Remove the function board:


1. Position the computer upside-down with the front toward you.
2. Remove the wireless cable from atop the board **(1)**.

3. Remove the three Phillips PM2.5×7.0 screws (2) that secure the board to the computer, and then slide the board away from the side and lift it out of the computer (3).



Reverse this procedure to install the function board.

System board

 **NOTE:** All system board spare part kits include thermal pads.

Description	Spare part number
System board for use in models with WWAN	658143-001
System board for use in models without WWAN	665718-001

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 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. Modem module (see [Modem module on page 63](#))
 - e. Fan (see [Fan on page 65](#))
 - f. Heat sink (see [Heat sink on page 66](#))
 - g. Keyboard (see [Keyboard on page 71](#))
 - h. Top cover (see [Bottom cover on page 73](#))
 - i. Function board (see [Function board on page 82](#))

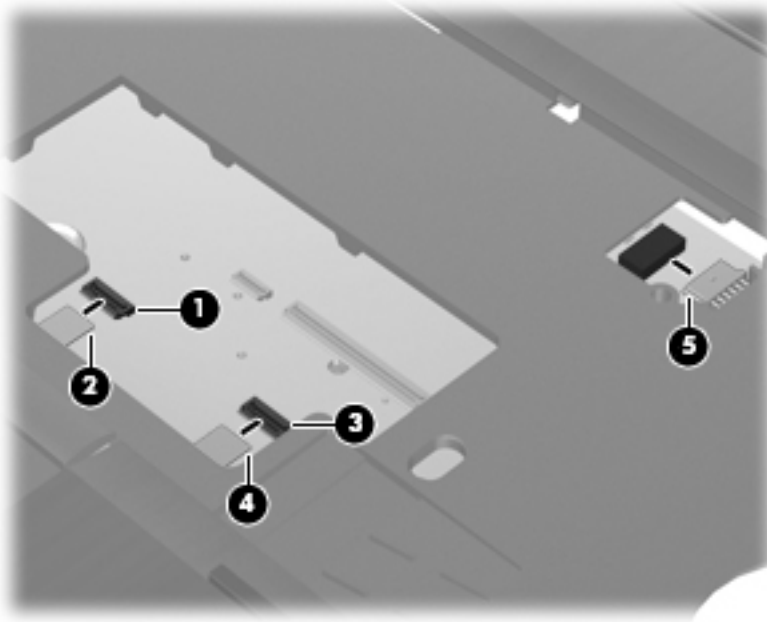
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- SIM (see [SIM on page 46](#))
- Memory module (see [Memory modules on page 55](#))
- WLAN module (see [WLAN module on page 59](#))
- WWAN module (see [WWAN module on page 57](#))
- Modem module (see [Modem module on page 63](#))
- Processor (see [Processor on page 69](#))

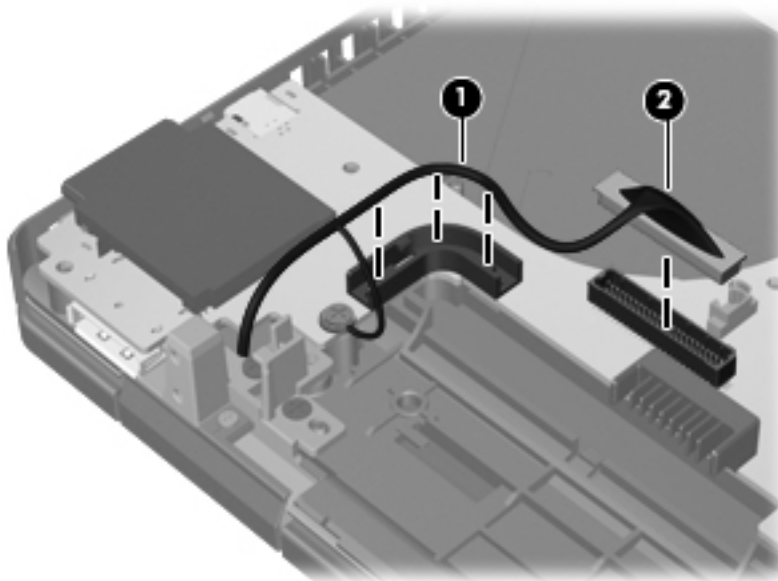
Remove the system board:

1. Position the computer right-side up, with the front toward you.
2. Lift the Touchpad connector latch **(1)** and disconnect the Touchpad cable **(2)**.
3. Lift the fingerprint reader connector latch **(3)** and disconnect the fingerprint reader cable **(4)**.


4. Disconnect the power connector cable (5).

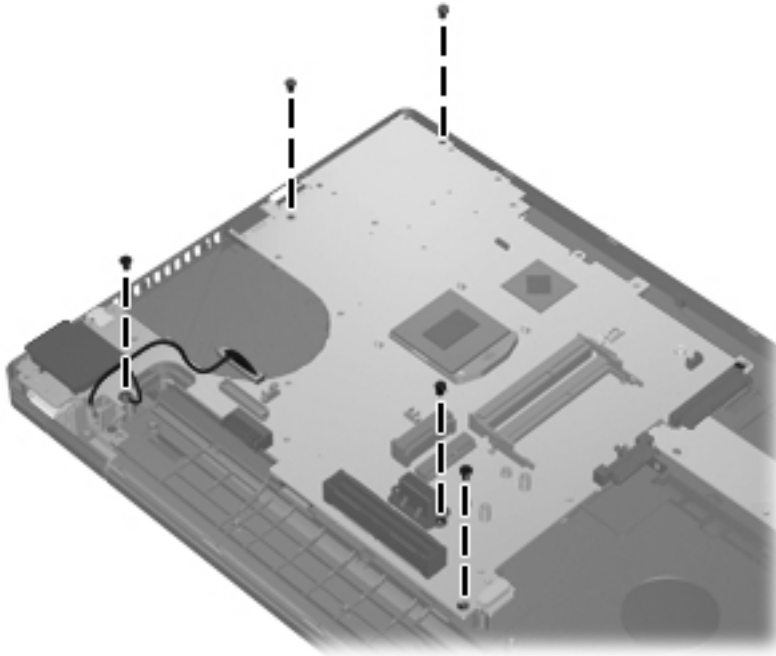


5. Position the computer upside-down with the rear toward you.
6. Remove the display cable from the rubber routing path mounted on the computer (1).
7. Disconnect the display cable from the system board (2).

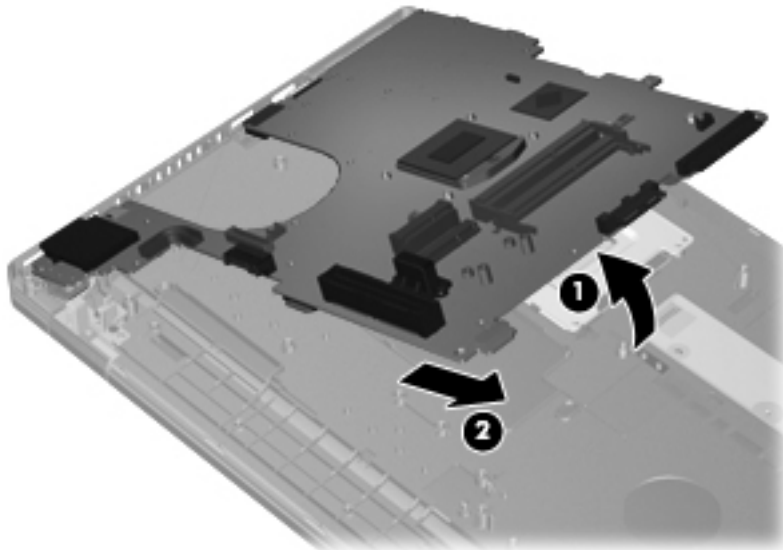


8. Remove the five Phillips PM2.5×5.0 screws that secure the system board to the base enclosure.

 **NOTE:** For system board replacement, note the location of the screw with the ground.




9. Lift the system board up at an angle (1), and then lift the system board up and out of the computer (2).



10. Remove the system board from the chassis.

Reverse this procedure to install the system board.

 **NOTE:** Make sure you install the display cable ground with the correct system board screw when replacing the system board.

USB board

Description	Spare part number
USB 2.0 board (includes Mylar)	658141-001

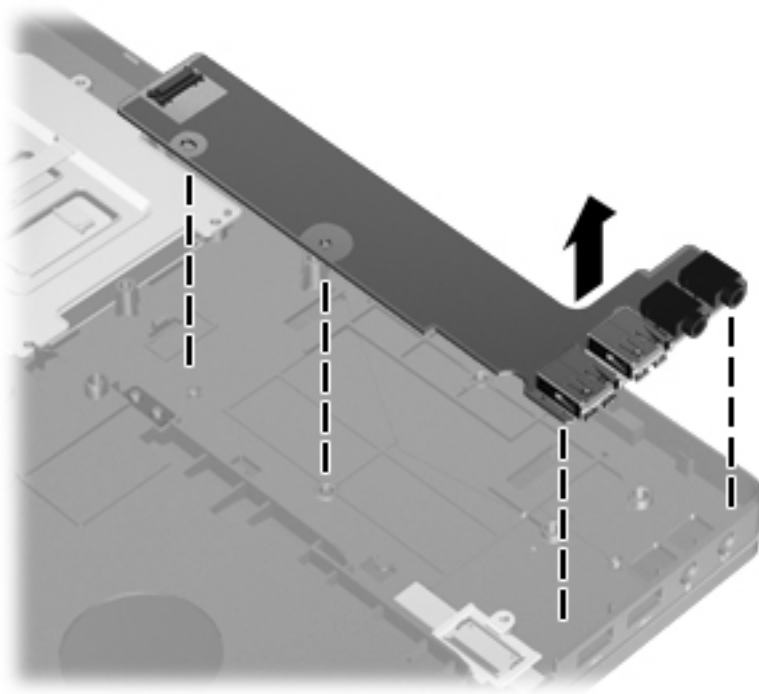
Before removing the USB board, follow these steps:

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 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Fan (see [Fan on page 65](#))
 - g. Heat sink (see [Heat sink on page 66](#))
 - h. Keyboard (see [Keyboard on page 71](#))
 - i. Top cover (see [Bottom cover on page 73](#))
 - j. Function board (see [Function board on page 82](#))
 - k. System board (see [System board on page 83](#))

Remove the USB board:


1. Position the computer upside-down with the front toward you.

2. Lift the board straight up out of the computer.



Reverse this procedure to install the USB board.

Display assembly and components (whole hinge-up, cable, antennas, hinges, enclosure)

 **NOTE:** This section describes removing components that require you to completely remove the display panel. For more information about removing display components that do not require that you remove the assembly from the computer, see [Display assembly \(panel, bezel, webcam, microphone\) on page 42](#).

All display assemblies include WLAN antenna transceivers and cables. WWAN models include 2 WWAN antenna transceivers and cables.

For a complete list of individual display spare parts, see [Display components on page 25](#).

Description	Spare part number
Display bezel	
For use with models with a webcam	660276-001
For use with models without a webcam	660277-001
Display hinges (includes left and right hinges, brackets, and covers)	647677-001
Display Cable Kit	
For use in models with HD displays	646969-001
For use in models with HD+ displays	646970-001
WLAN antennas	
Included in Cable Kit	646968-001
Included in Display Panel Support Kit	657831-001
WWAN antennas	
Included in Cable Kit	646968-001
Included in Display Panel Support Kit	657831-001
Display enclosure	
Enclosure	641202-001
Included in Display Panel Support Kit	657831-001
Display Panel Support Kit (includes WLAN antennas, WWAN antennas, and display enclosure)	657831-001

For a list of display spare parts, see [Display components on page 25](#).

Before removing the display assembly, follow these steps:

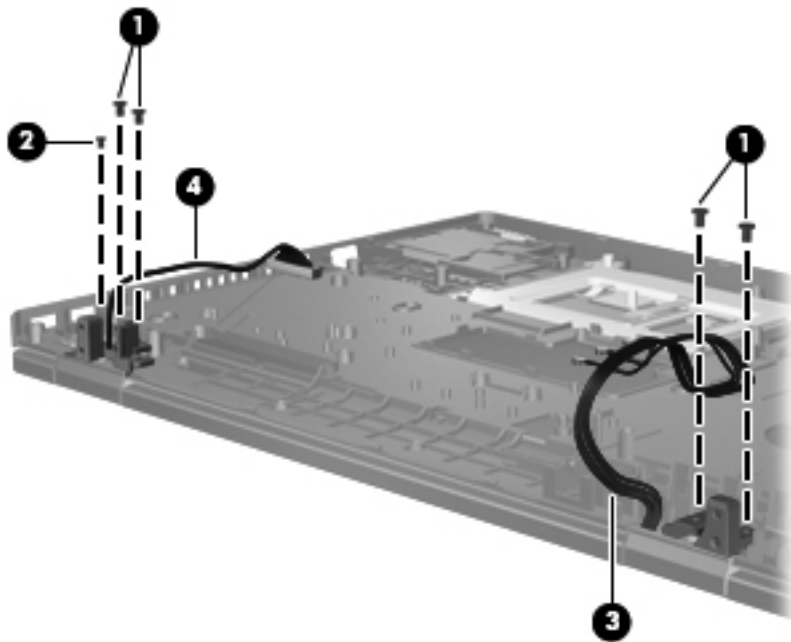
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

4. Remove the battery (see [Battery on page 41](#)).
5. Remove the following components:
 - a. Bottom door (see [Bottom door on page 47](#)).
 - b. Hard drive (see [Hard drive on page 52](#))
 - c. Optical drive (see [Optical drive on page 48](#))
 - d. WLAN module (see [WLAN module on page 59](#))
 - e. WWAN module (see [WWAN module on page 57](#))
 - f. Fan (see [Fan on page 65](#))
 - g. Heat sink (see [Heat sink on page 66](#))
 - h. Modem module (see [Modem module on page 63](#))
 - i. Keyboard (see [Keyboard on page 71](#))
 - j. Top cover (see [Bottom cover on page 73](#))
 - k. Function board (see [Function board on page 82](#))
 - l. System board (see [System board on page 83](#))

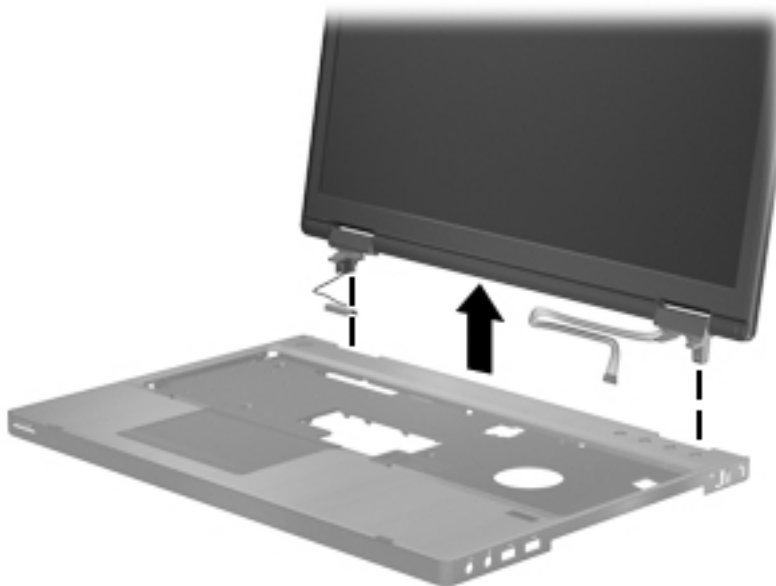
Remove the display assembly:

1. Position the computer right-side up with the front toward you.
2. Open the computer as far as possible.
3. Remove the four Phillips PM2.5×7.0 screws (1) and the Phillips PM2.5×4.5 screw that secures the display to the computer.

4. For reassembly, note the routing path of the wireless antennas (3) and the display cable (4).



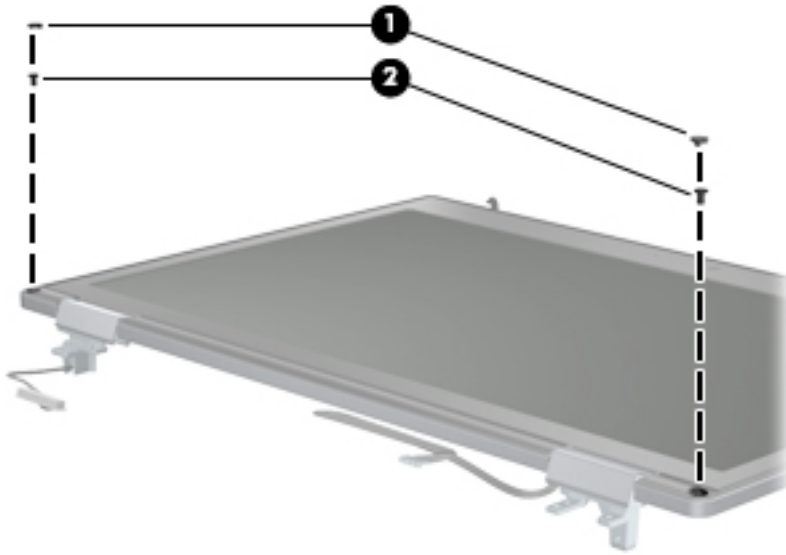
5. Lift the display assembly straight up and remove it.



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

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

6. To replace the display bezel, remove the two rubber screw covers **(1)** and the two Phillips PM2.5×5.0 screws **(2)** in the bottom corners of the display bezel.

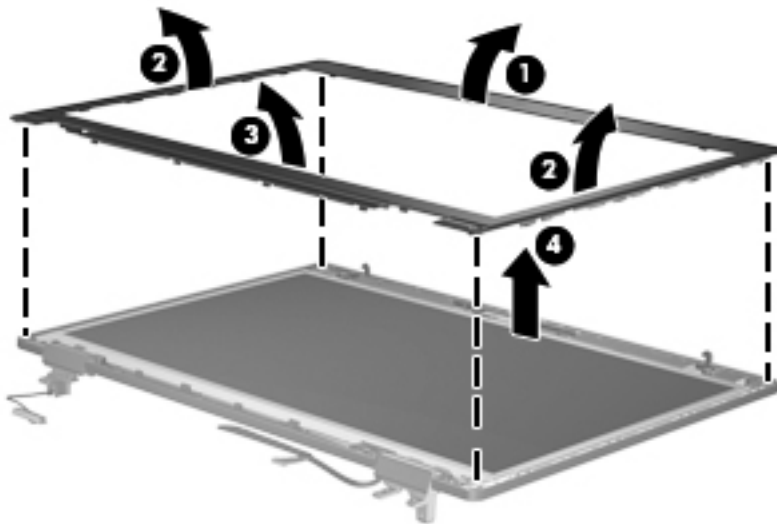


7. Flex the top **(1)** of the bezel, the inside edges of the left and right sides **(2)**, and then the bottom **(3)** of the bezel until it disengages from the display enclosure.
8. Remove the display bezel **(4)**.

Display bezels are available using the following spare part numbers:

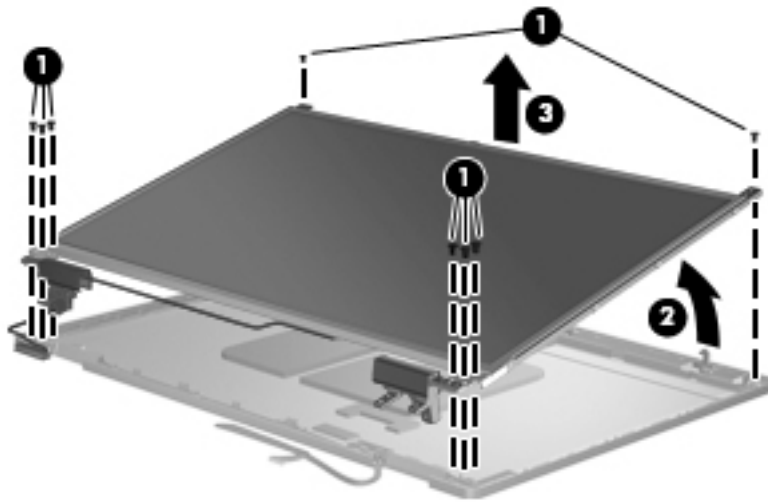
660276-001 for use in models with a webcam

660277-001 for use in models without a webcam



9. To remove the display panel, remove the eight Phillips PM2.5×4.0 screws **(1)** that secure the display panel to the brackets.
10. Rotate the top of the panel upward **(2)**.

11. Lift the display panel as far as the display panel cable allows (3).

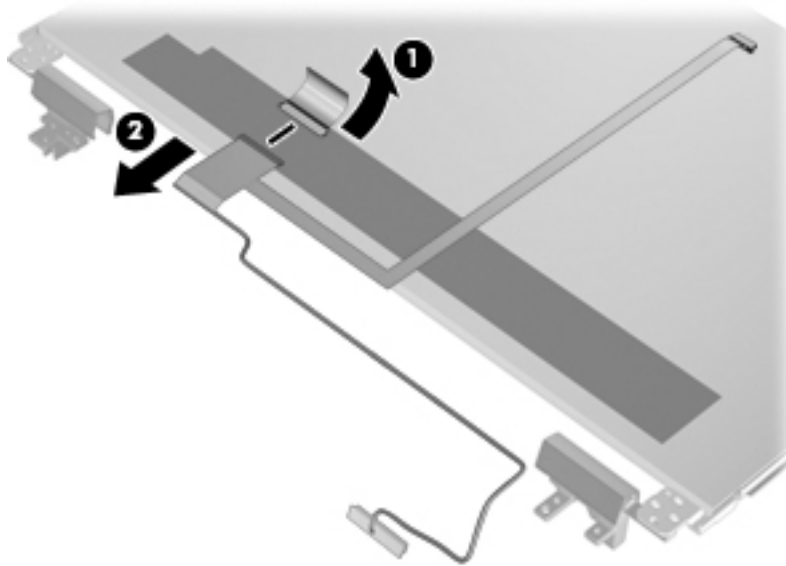


12. Disconnect the display panel cable from the back of the display panel by lifting the tape over the connector (1), and then disconnecting the cable from the panel (2).

The display cable is available using spare part numbers:

646969-001: HD models

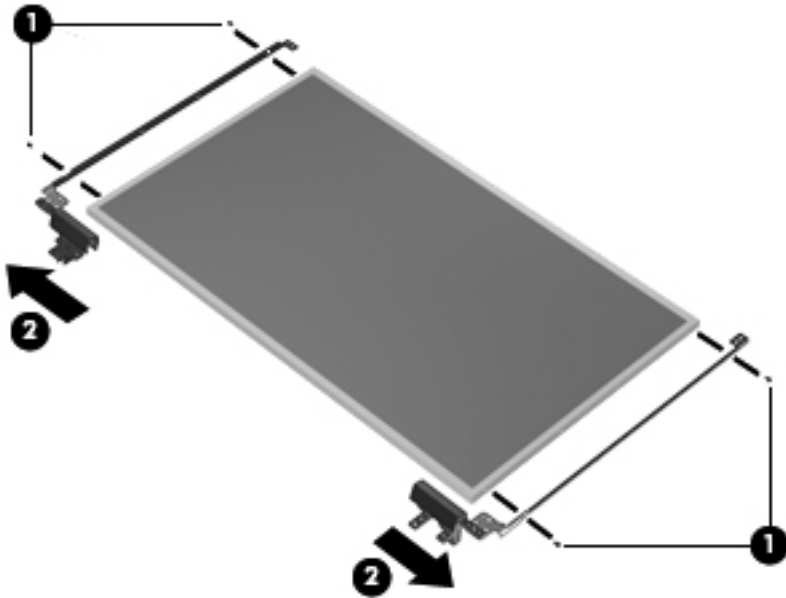
646970-001: HD+ models



13. If it is necessary to replace the display hinges, remove the four Phillips PM2.5×3.0 screws (1) that secure each display hinge to the display panel.

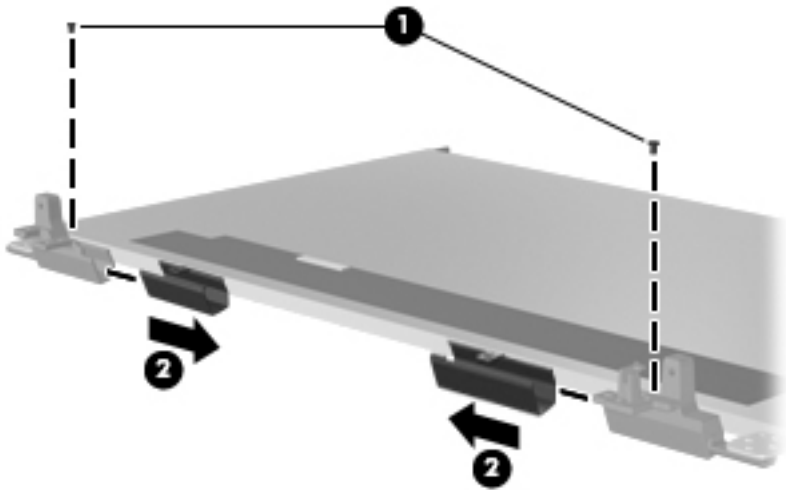
14. Remove the display hinges (2).

Display hinges are available using spare part number 647677-001.



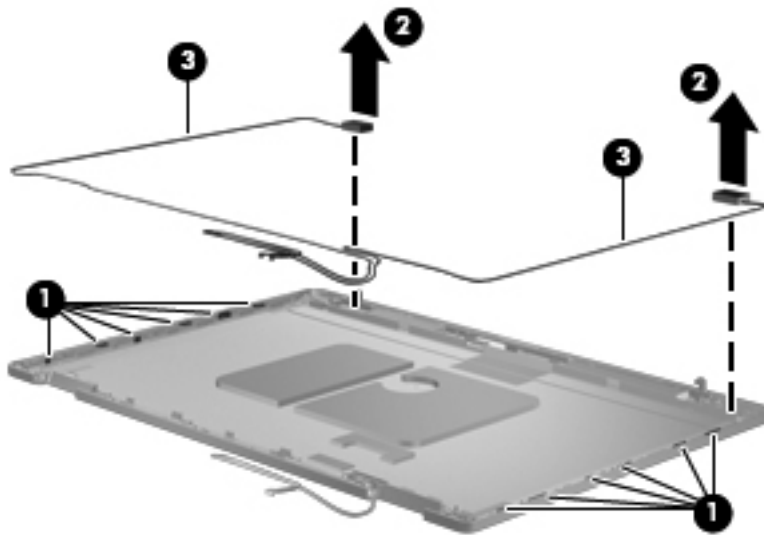
15. If you need to remove the hinge covers from the display hinges, remove the screws that secure the hinge covers (1), and then pull the hinges toward one another (2) to remove them.

Display hinge covers are available in the Display Hinge Kit, spare part number 647677-001.



16. If you need to remove the WLAN antennas, remove the antenna cables from the clips (1) and routing paths built into the display enclosure.

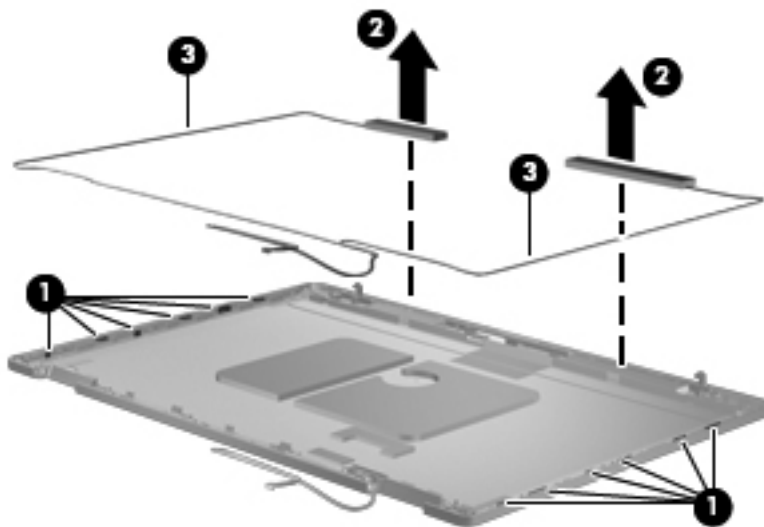
17. Lift the antennas (2) and cables (3) straight up out of the display enclosure.



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

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

18. If you need to remove the WWAN antennas, remove the antenna cables from the clips (1) and routing paths built into the display enclosure.
19. Lift the antennas (2) and cables (3) straight up out of the display enclosure.

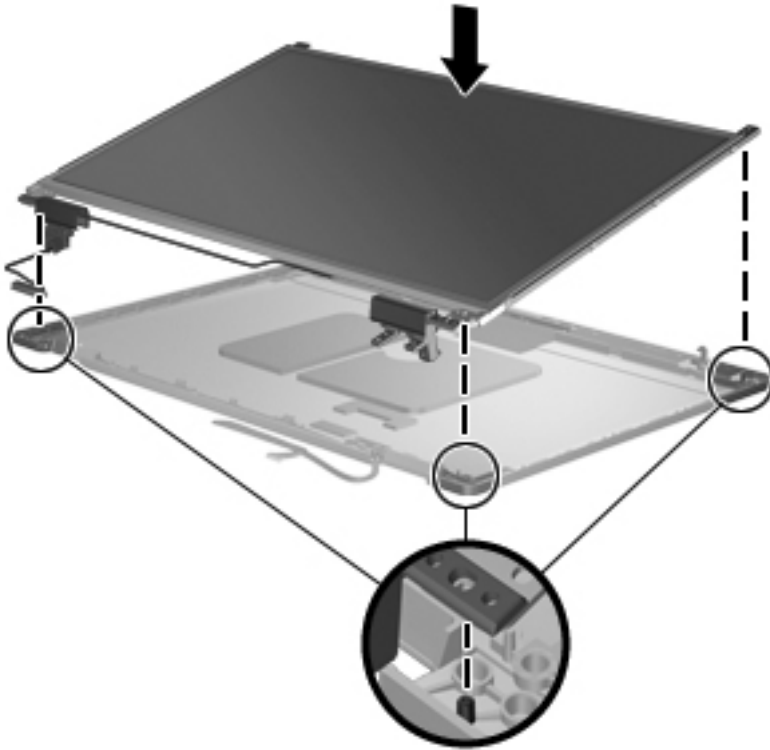


CAUTION: When installing the display assembly, be sure that the wireless antenna cables are routed and arranged properly.

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

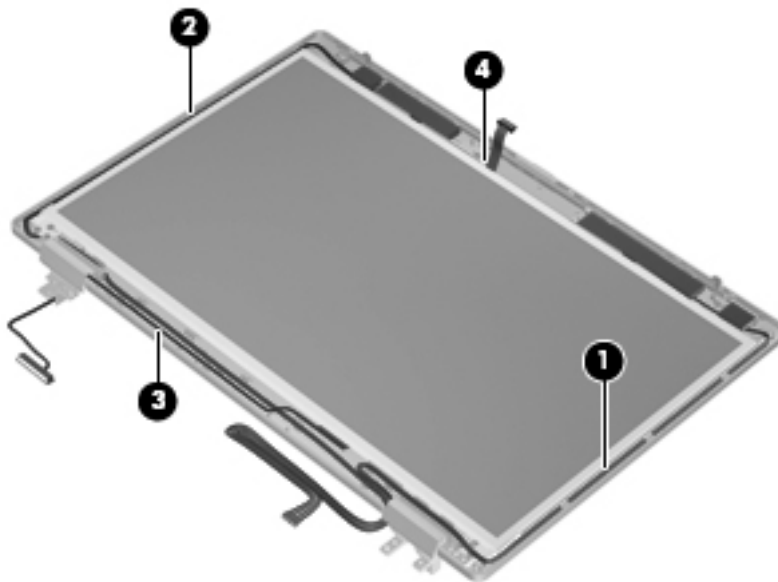
Reverse this procedure to reassemble and install the display assembly.

When replacing the display panel, use the following image to determine the correct locations to insert the hinges into the display enclosure.

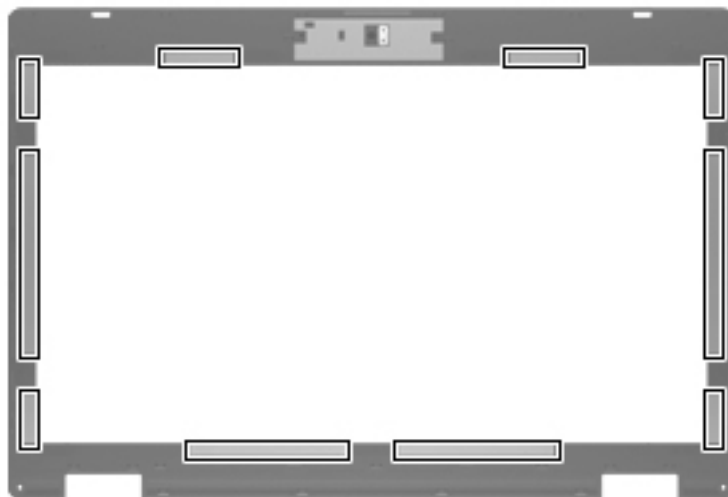


Use the following image as a reference for display cable and antenna installation:

- (1) Wireless antennas
- (2) Wireless antennas
- (3) Display cable
- (4) Webcam cable




10 pieces of double-sided tape are mounted on the inside of the bezel. Note tape locations according to the following image.




5 Computer Setup (BIOS) and System Diagnostics

Using Computer Setup

Computer Setup, 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). Computer Setup includes settings for the types of devices installed, the startup sequence of the computer, and the amount of system and extended memory.

 **NOTE:** Use extreme care when making changes in Computer Setup. Errors can prevent the computer from operating properly.

Starting Computer Setup

 **NOTE:** An external keyboard or mouse connected to a USB port can be used with Computer Setup only if USB legacy support is enabled.


To start Computer Setup, follow these steps:

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

Navigating and selecting in Computer Setup

To navigate and select in Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press **esc** while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
 - To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press **enter**, or use a pointing device to click the item.
 - To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key.
 - To close open dialog boxes and return to the main Computer Setup screen, press **esc**, and then follow the on-screen instructions.

 **NOTE:** You can use either a pointing device (TouchPad, pointing stick, or USB mouse) or the keyboard to navigate and make selections in Computer Setup.

2. Press **f10** to enter Computer Setup.

To exit Computer Setup menus, choose one of the following methods:

- To exit Computer Setup menus without saving your changes:

Click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press [enter](#).

- To save your changes and exit Computer Setup menus:

Click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.

Restoring factory settings in Computer Setup



NOTE: Restoring defaults will not change the hard drive mode.

To return all settings in Computer Setup to the values that were set at the factory, follow these steps:

1. Turn on or restart the computer, and then press [esc](#) while the “Press the ESC key for Startup Menu” message is displayed at the bottom of the screen.
2. Press [f10](#) to enter Computer Setup.
3. Use a pointing device or the arrow keys to select **File > Restore Defaults**.
4. Follow the on-screen instructions.
5. To save your changes and exit, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the arrow keys to select **File > Save Changes and Exit**, and then press [enter](#).

Your changes go into effect when the computer restarts.



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

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 Computer Setup.

1. Start Computer Setup.
2. Use a pointing device or the arrow keys to select **File > System Information**.
3. To exit Computer Setup without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.

Downloading a BIOS update

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


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

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

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

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

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


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

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

1. Open Windows Explorer by selecting **Start > Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).
3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*).

The BIOS installation begins.

5. Complete the installation by following the on-screen instructions.

 **NOTE:** After a message on the screen reports a successful installation, you can delete the downloaded file from your hard drive.

Using System Diagnostics


System Diagnostics allows you to run diagnostic tests to determine if the computer hardware is functioning properly. The following diagnostic tests are available in System Diagnostics:

- **Start-up test**—This test analyzes the main computer components that are required to start the computer.
- **Run-in test**—This test repeats the start-up test and checks for intermittent problems that the start-up test does not detect.
- **Hard disk test**—This test analyzes the physical condition of the hard drive, and then checks all data in every sector of the hard drive. If the test detects a damaged sector, it attempts to move the data to a good sector.
- **Memory test**—This test analyzes the physical condition of the memory modules. If it reports an error, replace the memory modules immediately.
- **Battery test**—This test analyzes the condition of the battery. If the battery fails the test, contact HP Customer Support to report the issue and purchase a replacement battery.

You can also view system information and error logs in the System Diagnostics window.

To start System Diagnostics:

1. Turn on or restart the computer. While the “Press the ESC key for Startup Menu” message is displayed in the lower-left corner of the screen, press **esc**. When the Startup Menu is displayed, press **f2**.
2. Click the diagnostic test you want to run, and then follow the on-screen instructions.

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

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions		
Length	25.1 cm	9.9 in
Width	37.4 cm	14.7 in
Height (front to rear)	3.4 to 3.6 cm	1.35 to 1.43 in
Weight (equipped with UMA graphics, optical drive, 1 SODIMM, hard drive, WLAN module, 3 cell battery)	2.61 kg	5.76 lbs
Input power		
Operating voltage	19.0 V dc @ 4.74 A – 90 W	
Operating current	4.74 A	
Temperature		
Operating	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	-15 m to 3,048 m	50 ft to 10,000 ft
Nonoperating	-15 m to 12,192 m	-50 ft to 40,000 ft
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	

	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.

39.6-cm (15.6-in), HD display specifications

	Metric	U.S.
Dimensions		
Height	21.0 cm	8.25 in
Width	35.9 cm	14.15 in
Diagonal	39.6 cm	15.6 in
Surface treatment	Anti-glare	
Contrast ratio	300:1 (typical)	
Refresh rate	60 Hz	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	0.252 mm	
Format	1366 × 768	
Configuration	RGB stripe	
Backlight	LED	
PPI	101 ppi	
Viewing angle	+/-30 horizontal (minimum), +/-10° vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

39.6-cm (15.6-in), HD+ display specifications

	Metric	U.S.
Dimensions		
Height	20.9 cm	8.25 in
Width	35.9 cm	14.15 in
Diagonal	39.6 cm	15.6 in
Surface treatment	Anti-glare	
Contrast ratio	300:1 (typical)	
Refresh rate	60 Hz	
Brightness	200 nits (typical)	
Pixel resolution		
Pitch	0.2151 mm	
Format	1600 × 900	
Configuration	RGB stripe	
Backlight	LED	
PPI	118 ppi	
Viewing angle	30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	

Hard drive specifications

	750-GB*	500-GB*	320-GB*	250-GB*
Dimensions				
Height	9.5 mm	9.5 mm	9.5 mm	9.5 mm
Width	70 mm	70 mm	70 mm	70 mm
Weight	115 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)				
Single track	1.5 ms	3 ms	3 ms	3 ms
Average	11 ms	13 ms	13 ms	13 ms
Maximum	14 ms	24 ms	24 ms	24 ms
Logical blocks	1,465,149,168	1,048,576,000	625,141,400	488,397,168
Disc rotational speed	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 BD-R/RE + DVDSM DL Drive

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 (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, BD-ROM, BD-R, BD-RE	CD-R, CD-RW, DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM, BD-R, BD-RE	
Access time	CD	DVD	BD-ROM
Random	<180 ms	<180 ms	<230 ms
Maximum Media Capacity (read)	50 GB		
Maximum Media Capacity (write)	8.5 GB		
Data transfer rate			
24X CD-ROM	3,600 KB/sec		
8X DVD	10,800 KB/sec		
2X BD-ROM	9,000 KB/sec		
16X CD-R	3,600 KB/sec		
16X CD-RW	2,400 KB/sec		
8X DVD+R	10,800 KB/sec		
6X DVD+RW	8,100 KB/sec		
8X DVD-R	10,800 KB/sec		
6X DVD-RW	8,100 KB/sec		
4X DVD+R Dual Layer	5,400 KB/sec		
4X DVD-R Dual Layer	5,400 KB/sec		
5X DVD-RAM	6,750 KB/sec		
2X BD-R	9,000 KB/sec		
2X BD-RE	9,000 KB/sec		

DVD±RW and CD-RW SuperMulti DL Combo Drive specifications

Applicable disc	Read: CD-DA, CD+(E)G, CD-MIDI, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM	Write: CD-R and CD-RW DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 μm	
Access time	CD	DVD
Random	< 175 ms	< 230 ms
Full stroke	< 285 ms	< 335 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	2 MB	
Data transfer rate		
24X CD-ROM	3,600 KB/sec	
8X DVD-ROM	10,800 KB/sec	
24X CD-R	3,600 KB/sec	
16X CD-RW	2,400 KB/sec	
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	
Startup time	< 15 seconds	
Stop time	< 6 seconds	

Blu-ray ROM DVD±RW SuperMulti DL Drive

Applicable disc	Read:	Write:		
	CD-DA, CD+(E)G, CD-MIDI, CDTEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVDROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM, HD-ROM (Single Layer), HD-ROM (Dual Layer), HD DVD-R, HD DVD-R for Dual Layer, HD DVD-RW	CD-R and CD-RW DVD+R, DVD+R(9), DVD+RW, DVD-R, DVD-R(9), DVD-RW, DVD-RAM		
Access time	CD	DVD	HD	
Random	170 ms	170 ms	230 ms	
Cache buffer	8 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			
1X BD-ROM	4,500 KB/sec			
1X BD-R read	4,500 KB/sec			
1X BD-RE read	4,500 KB/sec			
Transfer mode	Multiword DMA Mode			

DVD-ROM Drive specifications

Applicable disc	DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18, CD-ROM (Mode 1 and 2), CD Digital Audio, CD-XA ready (Mode 2, Form 1 and Form 2), CD-I (Mode 2, Form 1 and Form 2), CD-R, CD-RW, Photo CD (single and multisession), CD-Bridge	
Center hole diameter	1.5 cm (0.59 in)	
Disc diameter		
Standard disc	12 cm (4.72 in)	
Mini disc	8 cm (3.15 in)	
Disc thickness	1.2 mm (0.047 in)	
Track pitch	0.74 μ m	
Access time	CD	DVD
Random	< 100 ms	< 125 ms
Full stroke	< 175 ms	< 225 ms
Audio output level	Line-out, 0.7 Vrms	
Cache buffer	512 KB	
Data transfer rate		
CD-R (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
CD-RW (10X)	1500 KB/s (150 KB/s at 1X CD rate)	
CD-ROM (24X)	3600 KB/s (150 KB/s at 1X CD rate)	
DVD (8X)	10,800 KB/s (1,352 KB/s at 1X DVD rate)	
Multiword DMA mode 2	16.6 MB/s	
Startup time	< 10 seconds	
Stop time	< 3 seconds	

Specification information in Device Manager

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

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



NOTE: Windows 7 and Windows Vista include the User Account Control feature to improve the security of your computer. You may be prompted for your permission or password for tasks such as installing software, running utilities, or changing Windows settings. Refer to Windows Help and Support for more information.

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

To access Device Manager in Windows 7:

1. Select **Start > Computer > System properties**.
2. In the left pane, click **Device Manager**.

To access Device Manager in Windows Vista:

1. Select **Start > Computer > System properties**.
2. In the left pane, click **Device Manager**.

To access Device Manager in Windows XP:

1. Select **Start > My Computer**.
2. In the left pane of the System Tasks window, select **View system information**.
3. Select **Hardware tab > Device Manager**.

7 Backup and recovery


Windows 7

- [Backing up your information](#)
- [Performing a system recovery](#)


To protect your information, use Windows Backup and Restore to back up individual files and folders, back up your entire hard drive (select models only), create system repair discs (select models only) by using the installed optical drive (select models only) or an optional external optical drive, or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

Windows Backup and Restore provides the following options:

- Creating a system repair disc (select models only) by using the installed optical drive (select models only) or an optional external optical drive
- Backing up your information
- Creating a system image (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools

 **NOTE:** For detailed instructions, perform a search for these topics in Help and Support.

In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

 **NOTE:** Windows includes the User Account Control feature to improve the security of your 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.

Backing up your information


Recovery after a system failure is as good as your most recent backup. You should create system repair discs (select models only) by using the installed optical drive (select models only) or an optional external optical drive, and your initial backup 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. The system repair discs (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

You can back up your information to an optional external hard drive, a network drive, or discs.


Note the following when backing up:


- Store personal files in the Documents library, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear 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.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of external optical drive you are using.

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

- When backing up to discs, number each disc before inserting it into the external drive.

To create a backup using Backup and Restore:

 **NOTE:** Be sure that the computer is connected to AC power before you start the backup process.


 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to set up your backup, create a system image (select models only), or create a system repair disc (select models only).

Performing a system recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.


 **NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair discs you previously created (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system. For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 114](#).

Using the Windows recovery tools

To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore**.
2. Follow the on-screen instructions to recover your system settings, your computer (select models only), or your files.


To recover your information using Startup Repair, follow these steps:

 **CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.


1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition and the HP Recovery partition.

To check for the Windows partition, select **Start > Computer**.


To check for the HP Recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

 **NOTE:** If the Windows partition and the HP Recovery partition are not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 114](#).

3. If the Windows partition and the HP Recovery partition are listed, restart the computer, and then press **f8** before the Windows operating system loads.
4. Select **Startup Repair**.
5. Follow the on-screen instructions.


 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.

Using f11 recovery tools

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled.

To recover the original hard drive image using **f11**:


1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition: click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**.

 **NOTE:** If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows 7 operating system DVD \(purchased separately\) on page 114](#).


3. If the HP Recovery partition is listed, 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.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Using a Windows 7 operating system DVD (purchased separately)

To order a Windows 7 operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

 **CAUTION:** Using a Windows 7 operating system DVD completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows 7 operating system DVD:

 **NOTE:** This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

After the repair is completed:


1. Eject the Windows 7 operating system DVD, and then insert the *Driver Recovery* disc.
2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.


Windows Vista


To protect your information, use the Backup and Restore Center to back up individual files and folders, back up your entire hard drive (select models only), or create system restore points. In case of system failure, you can use the backup files to restore the contents of your computer.

The Backup and Restore Center provides the following options:

- Backing up individual files and folders
- Backing up the entire hard drive (select models only)
- Scheduling automatic backups (select models only)
- Creating system restore points
- Recovering individual files
- Restoring the computer to a previous state
- Recovering information using recovery tools

 **NOTE:** For detailed instructions, perform a search for these topics in Help and Support.

 **NOTE:** In case of system instability, HP recommends that you print the recovery procedures and save them for later use.

 **NOTE:** Windows® includes the User Account Control feature to improve the security of your 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.


Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create your initial backup 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.

You can back up your information to an optional external hard drive, a network drive, or discs.


Note the following when backing up:


- Store personal files in the Documents folder, and back it up regularly.
- Back up templates that are stored in their associated programs.
- Save customized settings that appear 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.
- When backing up to discs, use any of the following types of discs (purchased separately): CD-R, CD-RW, DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive installed in your computer.

 **NOTE:** DVDs and DVDs with double-layer (DL) support store more information than CDs, so using them for backup reduces the number of recovery discs required.

- When backing up to discs, number each disc before inserting it into the optical drive of the computer.

To create a backup using Backup and Restore Center:

 **NOTE:** Be sure that the computer is connected to AC power before you start the backup process.


 **NOTE:** The backup process may take over an hour, depending on file size and the speed of the computer.

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to back up your entire computer (select models only) or your files.

Performing a recovery

In case of system failure or instability, the computer provides the following tools to recover your files:

- Windows recovery tools: You can use the Backup and Restore Center to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.
- **f11** recovery tools: You can use the **f11** recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.


 **NOTE:** If you are unable to boot (start up) your computer, you must purchase a Windows Vista® operating system DVD to reboot the computer and repair the operating system. For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 117](#).

Using the Windows recovery tools


To recover information you previously backed up:

1. Select **Start > All Programs > Maintenance > Backup and Restore Center**.
2. Follow the on-screen instructions to recover your entire computer (select models only) or your files.

To recover your information using Startup Repair, follow these steps:


 **CAUTION:** Using Startup Repair completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process restores the operating system, as well as the drivers, software, and utilities from the backup used for recovery.

1. If possible, back up all personal files.
2. If possible, check for the presence of the Windows partition and the HP Recovery partition. To find the partitions, select **Start > Computer**.


 **NOTE:** If the Windows partition and the HP Recovery partition have been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 117](#).


3. Restart the computer, and then press **f8** before the Windows operating system loads.

4. Select **Repair your computer**.
5. Follow the on-screen instructions.

 **NOTE:** For additional information on recovering information using the Windows tools, perform a search for these topics in Help and Support.


Using f11 recovery tools

 **CAUTION:** Using **f11** completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The **f11** recovery tool reinstalls the operating system and HP programs and drivers that were installed at the factory. Software not installed at the factory must be reinstalled. Personal files must be restored from a backup.

 **NOTE:** If your computer includes a solid-state drive (SSD), you may not have a recovery partition. Recovery discs have been included for computers that do 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 > Computer**. If the partition is present, an HP Recovery drive is listed in the Hard Disk Drives section of the window.

To recover the original hard drive image using **f11**, follow these steps:


1. If possible, back up all personal files.
2. If possible, check for the presence of the HP Recovery partition. To find the partition, select **Start > Computer**.

 **NOTE:** If the HP Recovery partition has been deleted, you must recover your operating system and programs using the Windows Vista operating system DVD and the *Driver Recovery* disc (both purchased separately). For additional information, refer to [Using a Windows Vista operating system DVD \(purchased separately\) on page 117](#).

3. 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.
4. Press **f11** while the “Press <F11> for recovery” message is displayed on the screen.
5. Follow the on-screen instructions.

Using a Windows Vista operating system DVD (purchased separately)

To order a Windows Vista operating system DVD, go to <http://www.hp.com/support>, select your country or region, and follow the on-screen instructions. You can also order the DVD by calling technical support. For contact information, refer to the *Worldwide Telephone Numbers* booklet included with the computer.

 **CAUTION:** Using a Windows Vista operating system DVD completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. When reformatting is complete, the recovery process helps you restore the operating system, as well as drivers, software, and utilities.

To initiate recovery using a Windows Vista operating system DVD:



NOTE: This process takes several minutes.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows Vista operating system DVD into the optical drive before the Windows operating system loads.
3. When prompted, press any keyboard key.
4. Follow the on-screen instructions.
5. Click **Next**.
6. Select **Repair your computer**.
7. Follow the on-screen instructions.

8 Power cord set requirements

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

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

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

Requirements for all countries and regions

The requirements listed below 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	CCC	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.

9 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. Exercise caution 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 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.eiae.org>.

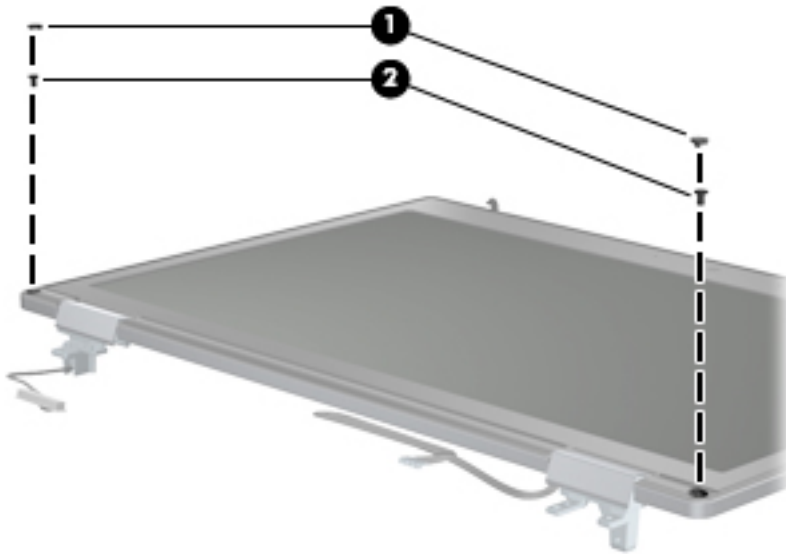
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight (1) and the liquid crystal display (LCD) panel (2).



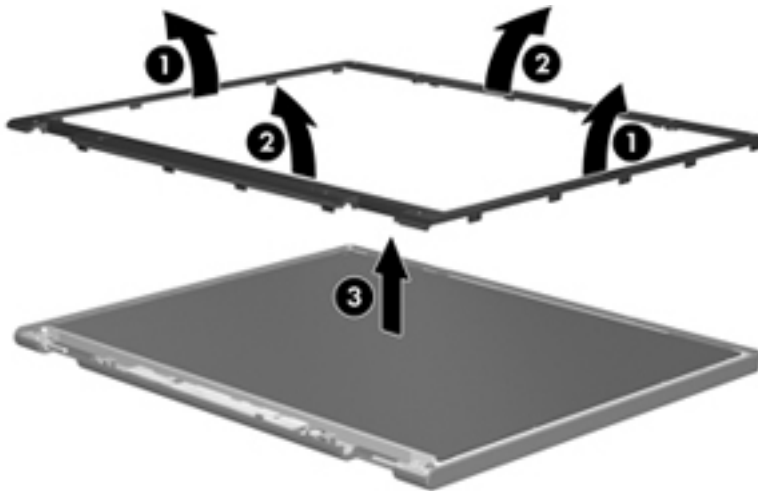
📝 NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

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

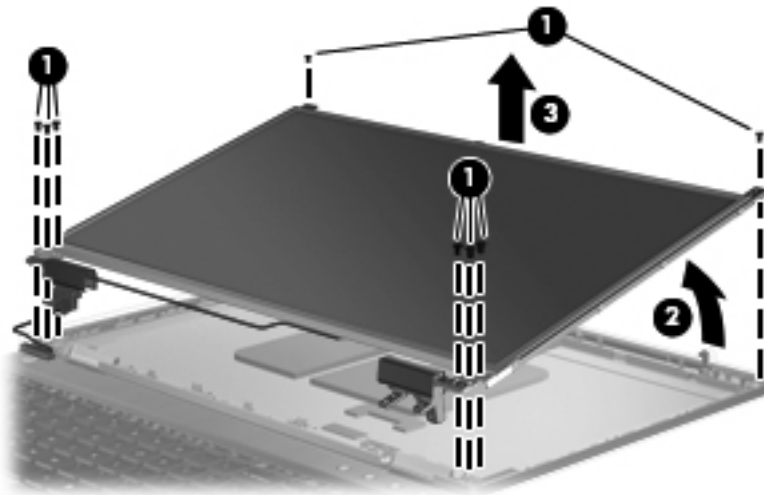


2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel (3).

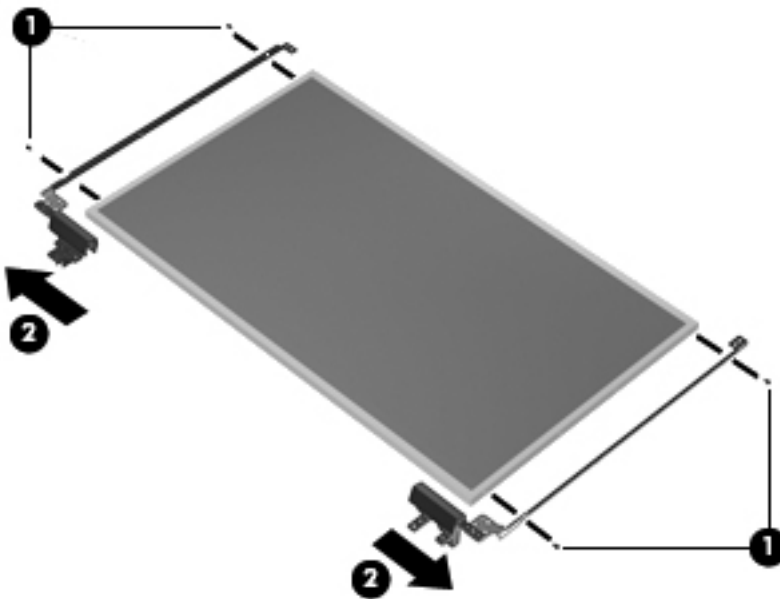


4. Remove all screws (1)(2) that secure the display panel assembly to the display enclosure.

5. Remove the display panel assembly (3) from the display enclosure.

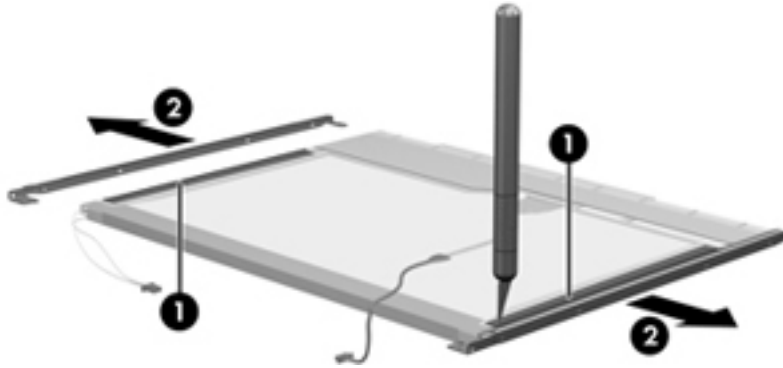


6. Position the display panel assembly upside-down.
7. Remove all screws that secure the display panel frame to the display panel.

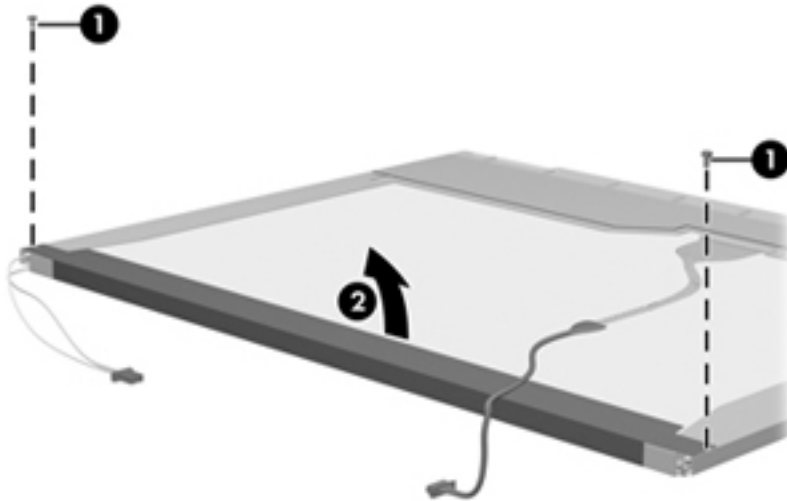


8. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

9. Remove the display panel frame (2) from the display panel.

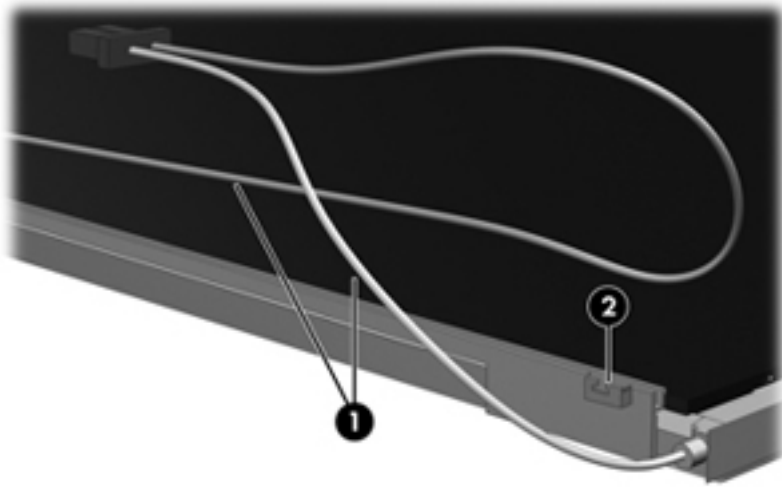


10. Remove the screws (1) that secure the backlight cover to the display panel.
11. Lift the top edge of the backlight cover (2) and swing it outward.



12. Remove the backlight cover.
13. Position the display panel right-side up.

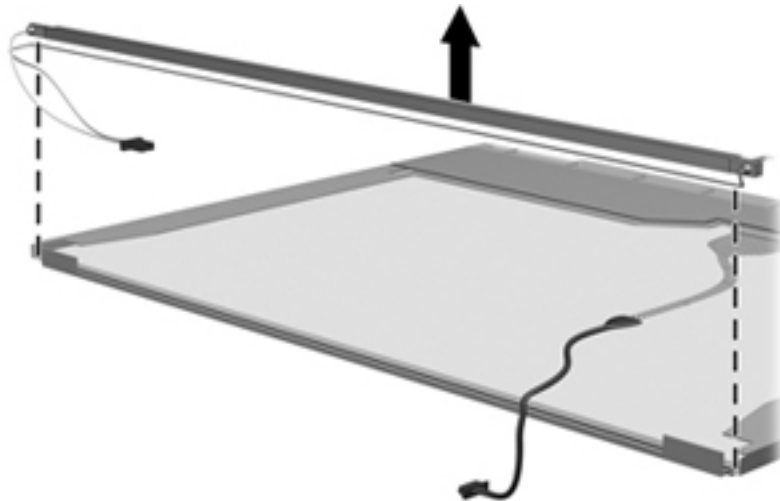
14. Remove the backlight cables (1) from the clip (2) in the display panel.



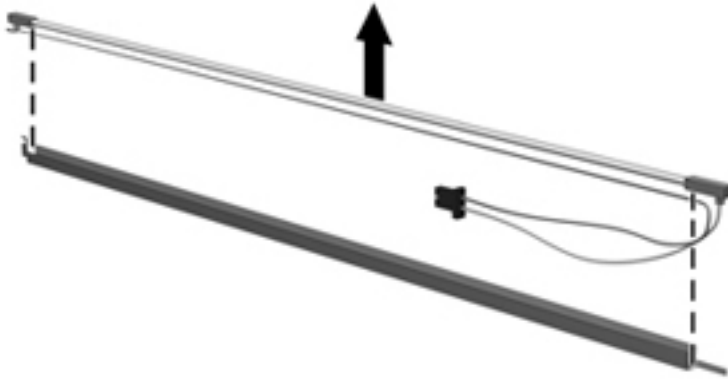
15. Position the display panel upside-down.

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

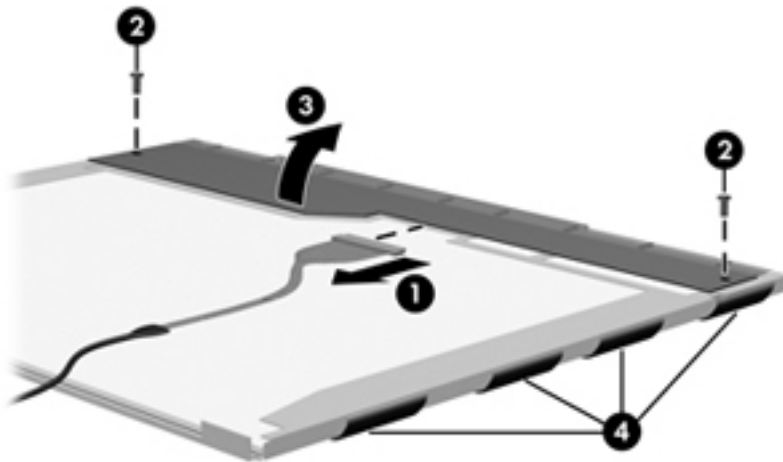
16. Remove the backlight frame from the display panel.



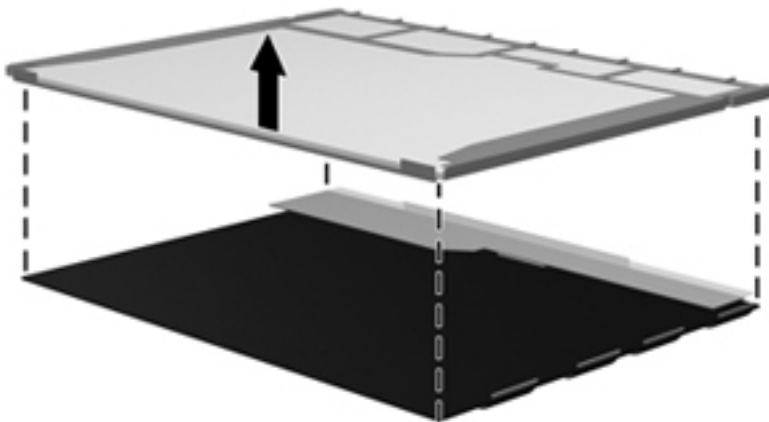
17. Remove the backlight from the backlight frame.



18. Disconnect the display panel cable (1) from the LCD panel.
19. Remove the screws (2) that secure the LCD panel to the display rear panel.
20. Release the LCD panel (3) from the display rear panel.
21. Release the tape (4) that secures the LCD panel to the display rear panel.



22. Remove the LCD panel.



23. Recycle the LCD panel and backlight.

Index

Symbols/Numerics

1394 port, identifying 15

A

AC adapter, spare part numbers
29, 31

accessory battery connector,
identifying 19

antennas

disconnecting 57, 60

audio, product description 2

audio-in (microphone) jack 17

audio-out (headphone) jack 17

B

Backup and Restore 112

Backup and Restore Center 115,
116

battery

removal 41

spare part number 22, 41

battery bay 18

battery light 14

battery release latch 18

BIOS

determining version 100

downloading an update 100

updating 100

Blu-ray BD-R/RE + DVDSM DL
Drive 106

Blu-ray Disc ROM with SuperMulti
DVD±R/RW DL Drive
specifications 108

Blu-ray ROM DVD±RW SuperMulti
DL Drive
removal 48
spare part number 24, 29, 33,
48

Bluetooth cable, illustrated 28

Bluetooth compartment,
identifying 18

Bluetooth module

removal 62

spare part number 23, 30, 62

bottom cover

removal 73

spare part number 22, 32, 73

bottom cover release latch,

identifying 18

bottom door

illustrated 27

removal 47

spare part number 47

buttons

calculator 12

left pointing stick button 9

left TouchPad 9

optical drive eject 17

power 11

QuickWeb 12

right pointing stick button 9

right TouchPad 9

TouchPad 11

TouchPad on/off 9

volume mute 12

wireless 11

C

Cable Kit

contents 28

spare part number 24, 28, 32

cables, service considerations 35

calculator button, identifying 12

calculator light 10

caps lock light, identifying 10

chipset, product description 1

components

bottom 18

display 7

front 14

left side 15

rear 16

right side 17

top 9

Computer Setup

navigating and selecting 98

restoring factory settings 99

computer specifications 102

connector, power 16

connectors, service

considerations 35

covers

locations 40

cradle (hard drive), spare part
number 29, 32

D

display assembly

removal 42, 89

spare part numbers 42, 89

display bezel

removal 43, 92

spare part numbers 26, 33, 89

display component recycling 121

display components, spare part
numbers 25

display enclosure, spare part
number 26, 32, 89

display hinge

removal 93

spare part number 32

Display Hinge Kit

spare part number 26, 89

display panel

product description 1

removal 92

spare part number 26, 33

Display Panel Support Kit, spare part number 26, 89
display release latch 14
display specifications 103, 104
DisplayPort, identifying 16
docking support, product description 4
drives
 preventing damage 35
DVD-ROM Drive
 precautions 35
 removal 48
 spare part number 24, 29, 33, 48
 specifications 109
DVD±RW and CD-RW SuperMulti DL Combo Drive
 precautions 35
 removal 48
 spare part number 24, 29, 33, 48

E
electrostatic discharge 36
eSATA port, identifying 15
esc key, identifying 13
Ethernet, product description 3
ExpressCard slot 15
ExpressCard slot insert, illustrated 27
external media cards, product description 3
external monitor port 15

F
f11 recovery 113, 117
fan
 removal 65
 spare part number 22, 32, 65
fingerprint reader, identifying 12
fn key, identifying 13
function board
 removal 82
 spare part number 22, 32, 82
function keys
 identifying 13

G
graphics, product description 1
grounding equipment and methods 38

H
hard drive
 precautions 35
 product description 2
 removal 52
 spare part numbers 24, 29, 32, 52
 specifications 105
hard drive bracket, removal 53
hard drive light 14
hard drive recovery 113, 117
heat sink
 removal 66
 spare part number 22, 32, 66
hinge
 removal 93
 spare part number 32
HP QuickWeb light 10

I
integrated numeric keypad, identifying 13
integrated webcam light, identifying 7
internal display switch 7
internal microphones, identifying 7

J
jacks
 audio-in (microphone) 17
 audio-out (headphone) 17
 network 17
 RJ-11 (modem) 16
 RJ-45 (network) 17

K
keyboard
 product description 4
 removal 71
 spare part numbers 22, 31, 32, 71
keypad, integrated numeric 13
keys
 esc 13
 fn 13
 function 13
 num lk 13
 Windows applications 13
 Windows logo key 13

L
latch, battery release 18
legacy support, USB 98
lights
 battery 14
 calculator 10
 caps lock 10
 hard drive 14
 HP QuickWeb 10
 mute 10
 num lock 10
 power 10, 14
 TouchPad on/off 10
 webcam 7
 wireless 10, 14

M
mass storage devices, spare part numbers 29
Media Card Reader, identifying 15
memory module
 product description 1
 removal 55
 spare part numbers 23, 55
memory module compartment, identifying 19
microphone (audio-in) jack
 product description 2
model name 1
modem module
 product description 3
 removal 63
 spare part number 22, 31, 63
mute light, identifying 10

N
network jack, identifying 17
num lk key, identifying 13
num lock light 10

O
operating system, product description 4
optical drive
 precautions 35
 product description 2
 removal 48
 spare part numbers 24, 29, 48
 specifications 106, 107, 108, 109

- optical drive eject button, identifying 17
 - optical drive protective insert illustrated 27
 - optical drive, identifying 17
- P**
- packing guidelines 37
 - plastic parts 34
 - Plastics Kit, spare part number 27, 32
 - pointing device, product description 4
 - pointing stick 9
 - ports
 - 1394 15
 - DisplayPort 16
 - eSATA 15
 - external monitor 15
 - product description 3
 - serial 16
 - USB 15, 17
 - power button, identifying 11
 - power connector cable, illustrated 28
 - power connector, identifying 16
 - power cord
 - set requirements 119
 - spare part numbers 29, 30
 - power light 10, 14
 - power requirements, product description 4
 - processor
 - product description 1
 - removal 69
 - spare part numbers 22, 69
 - product description
 - audio 2
 - chipset 1
 - display panel 1
 - docking support 4
 - Ethernet 3
 - external media cards 3
 - graphics 1
 - hard drives 2
 - keyboard 4
 - memory module 1
 - microphone 2
 - modem module 3
 - operating system 4
 - optical drives 2
 - pointing devices 4
 - ports 3
 - power requirements 4
 - processors 1
 - product name 1
 - security 4
 - serviceability 5
 - webcam 2
 - wireless 3
 - product name 1
- Q**
- QuickWeb button, identifying 12
- R**
- reader
 - smart card 15
 - recovery partition 113, 117
 - removal/replacement preliminaries 34
 - procedures 39
 - restoring the hard drive 113, 117
 - RJ-11 (modem) jack, identifying 16
 - RJ-11 cover, illustrated 27
 - RJ-11 jack cable illustrated 28
 - removal 80
 - RJ-45 (network) jack, identifying 17
 - RTC battery
 - removal 54
 - spare part number 24, 32, 54
 - Rubber Kit, spare part number 32
 - rubber screw covers
 - spare part number 40
- S**
- screw covers
 - locations 40
 - spare part number 40
 - Screw Kit, spare part number 29, 32
 - security cable slot, identifying 17
 - security, product description 4
 - serial port, identifying 16
 - service considerations 34
 - service tag 20, 39
 - serviceability, product description 5
 - setup utility
 - navigating and selecting 98
 - restoring factory settings 99
 - SIM slot, identifying 18
 - SIM, removal 46
 - slots
 - ExpressCard 15
 - security cable 17
 - smart card slot 15
 - speaker assembly
 - removal 78
 - spare part number 22, 32, 78
 - speakers, identifying 14
 - specifications
 - Blu-ray BD-R/RE + DVDSM DL Drive 106
 - Blu-ray ROM DVD±RW SuperMulti DL Drive 108
 - computer 102
 - display 103, 104
 - DVD-ROM Drive 109
 - DVD±RW and CD-RW SuperMulti DL Combo Drive 107
 - hard drive 105
 - static-shielding materials 38
 - system board
 - removal 83
 - spare part numbers 22, 33, 83
 - system repair disc 111
 - system restore points 111
- T**
- thermal material, replacement 67
 - tools required 34
 - top cover
 - spare part number 22, 32
 - TouchPad
 - buttons 9
 - TouchPad light 10
 - TouchPad on/off button 9
 - identifying 11
 - TouchPad zone, identifying 9
 - transporting guidelines 37
- U**
- upgrade bay 17
 - removal 50
 - spare part number 50

- USB board
 - removal 87
 - spare part number 22, 87
- USB legacy support 98
- USB ports, identifying 15, 17

V

- vents, identifying 15, 18
- volume mute button, identifying 12

W

- webcam 8
 - product description 2
 - spare part number 26, 32
- webcam light, identifying 7
- webcam, identifying 8
- Windows 7 operating system
 - DVD 114
- Windows applications key, identifying 13
- Windows Backup and Restore 111
- Windows logo key, identifying 13
- Windows Vista operating system
 - DVD 117
- wireless antennas
 - disconnecting 57, 60
 - identifying 7
- wireless button, identifying 11
- wireless lights 10, 14
- wireless module, identifying 19
- wireless, product description 3
- WLAN antennas
 - illustrated 28
 - spare part number 26, 89
- WLAN antennas, identifying 7
- WLAN module
 - removal 59
 - spare part number 59
 - spare part numbers 23
- workstation guidelines 37
- WWAN antennas
 - identifying 7
 - illustrated 28
 - spare part number 26, 89
- WWAN module
 - removal 57
 - spare part number 24, 31, 57