HP ProBook 5220m Notebook PC

Maintenance and Service Guide

SUMMARY

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

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First Edition: May 2010

Document Part Number: 600137-001

Safety warning notice

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

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1 Product description

Category	Description
Product Name	HP ProBook 5220m Notebook PC
Processors	**Intel® Celeron®**
	• Intel Celeron U3400 1.06-GHz
	Intel® Arrandale™
	• Intel Arrandale i3-350M, 2.26-GHz, 3-MB L3 cache, 4 threads (35 W)
	• Intel Arrandale i5-450M, 2.4-GHz (Turbo up to 2.66 GHz), 3-MB L3 Cache, 4 threads (35W)
	• Intel Arrandale i5-520M, 2.4-GHz (Turbo up to 2.93 GHz), 3-MB L3 cache, 4 threads
	• Intel Arrandale i5-540M, 2.53-GHz (Turbo up to 3.06 GHz), 3-MB L3 cache, 4 threads
Chipset	Intel HM57 Express
Graphics	Intel HD Graphics Universal Memory Architecture (UMA) graphics subsystem integrated with shared video memory (dynamically allocated)
Panels	All display panel assemblies support privacy filter
	LED backlight
	• **30.734-cm** (12.1-in) AntiGlare (1280x800)
	• **30.734-cm** (12.1-in) AntiGlare (1280x800) with webcam
	• **30.734-cm** (12.1-in) AntiGlare (1280x800) with webcam for use with WWAN
	• **30.734-cm** (12.1-in) BrightView (1280x800)
	• **30.734-cm** (12.1-in) BrightView (1280x800) with webcam
Memory	2 customer-accessible/upgradable SODIMM memory module slots
	Supports dual-channel memory
	Supports up to 8 GB of system memory
	DDR3 PC3-10600 SDRAM (1333 MHz)

Category	Description
	Supports the following configurations: • 8192-MB total system memory (4096-MB × 2, dual-channel) • 4096-MB total system memory (4096-MB × 1) • 4096-MB total system memory (2048-MB × 2, dual-channel) • 3072-MB total system memory (2048-MB + 1024-MB, dual-channel) • 2048-MB total system memory (2048-MB × 1) • 2048-MB total system memory (1024-MB × 2, dual-channel) • 1024-MB total system memory (1024-MB × 1)
Hard drives	Supports **9.5-mm, 6.35-cm** (2.5-in) hard drives
	Customer-accessible
	Serial ATA (SATA)
	Supports the following hard drives: • 640-GB, 7200-rpm • 500-GB, 7200-rpm • 320-GB, 7200-rpm • 250-GB, 7200-rpm Supports the following solid-state drive: • 80-GB
	HP 3D DriveGuard (not available on Linux)
Audio/Visual	HD audio - IDT 92HD80
	Integrated microphone
	Two stereo speakers
	Integrated 2.0-megapixel webcam (fixed focus)
Modem	High-speed 56k modem
	Modem cable not included
	Supports no-modem option
Ethernet	10/100/1000 Ethernet network interface card (NIC)
	S3/S4/S5 wake on LAN (AC only mode)
Wireless	**Integrated WLAN options by way of wireless module:**
	Support for the following WLAN formats: • Intel Wi-Fi Link 1000 802.11b/g/n • Intel WiFi Link 6200 802.11 a/b/g/n • Broadcom 4322 802.11a/b/g/n Wi-Fi Adapter • Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter

Category	Description
	2 WLAN antennas built into display assembly
	Support for no-WLAN option
	Integrated personal area network (PAN) options by way of Bluetooth® module:
	Support for no-WPAN option
	Broadcom Bluetooth 2.1 + Enhanced Data Rate (EDR)
	Integrated WWAN options by way of WWAN module:
	WWAN module Universal Notebook Data Platform (UNDP) with 2 antennas
	Subscriber identity module (SIM) security (customer-accessible in battery bay)
External media cards	Media Card Reader supporting Memory Stick (MS), Memory Stick Pro (MSP), Secure Digital (SD) Memory Card, Secure Digital High Capacity (SDHC) Memory Card, MultiMediaCard (MMC), and xD-Picture Card formats
Ports	Audio-in/Audio-out (stereo microphone/headphone)
	RJ-11 (modem)
	RJ-45 (Ethernet, includes link and activity lights)
	USB 2.0 (3)
	Combo eSATA/USB 2.0 (1)
	HDMI
	VGA (Dsub 15-pin) supporting 1600×1200 external resolution at 75 GHz (hot plug/unplug with auto-detect)
	Multi-pin AC power
Keyboard and pointing devices	Keyboard with TouchPad
	TouchPad with 2 TouchPad buttons and vertical scrolling (taps enabled as default)
Power requirements	65-W AC adapter with localized cable plug support (3-wire plug with ground pin)
	4-cell, 41-Wh 2.8-Ah Li-ion battery
	6-cell, 62-Wh 2.8-Ah Li-ion battery
Security	Supports Kensington security lock
	Intel AT support
	Integrated fingerprint reader

Category	Description
Operating systems	**Preinstalled:** • Windows Vista® Home Basic (Japan only) • Windows Vista Business 32-bit (Japan only) • Windows® 7 Home Premium 32-bit (Japan only) • Windows 7 Home Premium 64-bit (Japan only) • Windows 7 Professional 32-bit (Japan only) • Windows 7 Professional 64-bit (Japan only) • Genuine Windows XP Professional available through downgrade rights from Windows 7 (Japan only) • FreeDos • SuSE Linux (SLED11) • Red Flag Linux (People's Republic of China only)

Category	Description
	Microsoft Office preinstalled: • Windows Vista Home Basic 32-bit with Office Ready 2007 (excludes Japan) • Windows Vista Business 32-bit with Office Ready 2007 (excludes Japan) • Windows Vista Business 32-bit with Office Personal (Japan only) • Windows Vista Business 32-bit with Office Personal with PowerPoint (Japan only) • Windows 7 Home Basic 32-bit with Office Ready 2007 (selected localizations only) • Windows 7 Home Premium 32-bit with Office Ready 2007 (excludes Japan) • Windows 7 Home Premium 32-bit with Office Personal (Japan only) • Windows 7 Home Premium 32-bit with Office Personal with PowerPoint (Japan only) • Windows 7 Home Pemium 64-bit with Office Ready 2007 (excludes Japan) • Windows 7 Home Premium 64-bit with Office Personal (Japan only) • Windows 7 Home Premium 64-bit with Office Personal with PowerPoint (Japan only) • Windows 7 Professional 32-bit with Office Ready 2007 (excludes Japan) • Windows 7 Professional 32-bit with Office Personal (Japan only) • Windows 7 Professional 32-bit with Office Personal with PowerPoint (Japan only) • Windows 7 Professional 64-bit with Office Ready 2007 (excludes Japan) • Windows 7 Professional 64-bit with Office Personal (Japan only) • Windows 7 Professional 64-bit with Office Personal with PowerPoint (Japan only) • Genuine Windows XP Professional 32-bit available through downgrade rights from Windows 7 Professional 32-bit with Office Ready 2007 (excludes Japan) • Genuine Windows XP Professional 32-bit available through downgrade rights from Windows 7 Professional 32-bit with Office Personal (Japan only) • Genuine Windows XP Professional 32-bit available through downgrade rights from Windows 7 Professional 32-bit with Office Personal with PowerPoint (Japan only)

Category	Description
	Restore media: • Windows Vista Home Basic • Windows Vista Business 32-bit • Windows XP Professional • Windows 7 Home Basic 32-bit • Windows 7 Home Premium 32-bit • Windows 7 Home Premium 64-bit (not available with < 2 GB Memory) • Windows 7 Professional 32-bit • Windows 7 Professional 64-bit (not available with < 2 GB Memory) • Microsoft® Office Ready Restore • DRDVD Windows Vista • DRDVD Windows XP Professional • DRDVD Windows 7 • Microsoft WHQL • SuSE Linux/Novell
	Web-only support: • Windows Vista Enterprise 32-bit and 64-bit • Windows 7 Enterprise 32-bit and 64-bit • Windows 7 Ultimate 32-bit and 64-bit
Serviceability	**End-user replaceable parts:** • AC adapter • Battery (system) • Bluetooth module • Keyboard • Hard drive • Memory module • WLAN module • WWAN module

2 External component identification

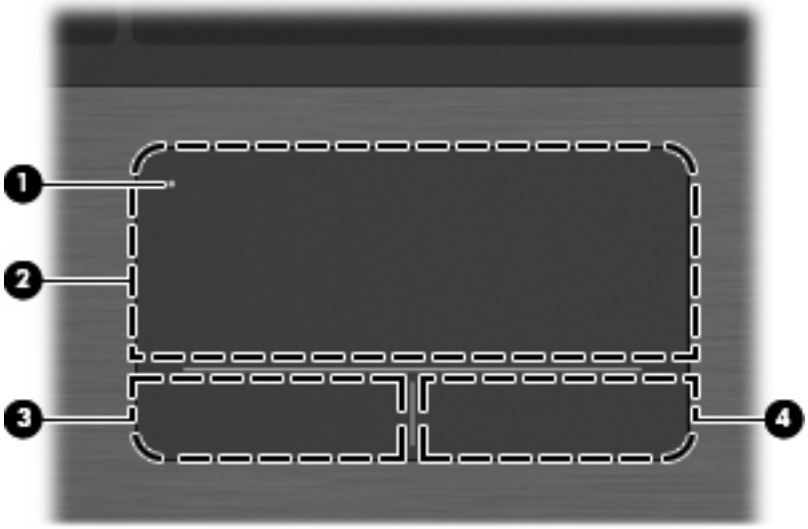
Identifying hardware

Components included with the computer may vary by region and model. The illustrations in this chapter identify the standard features on most computer models.

NOTE: Your computer may look slightly different from the illustrations in this section.

Top components

TouchPad



Component		Description
(1)	TouchPad off indicator	To turn the TouchPad on and off, quickly double-tap the TouchPad off indicator. **NOTE:** When the TouchPad is on, the light is off.
(2)	TouchPad	Moves the pointer and selects or activates items on the screen.
(3)	Left TouchPad control	Functions like the left button on an external mouse.
(4)	Right TouchPad control	Functions like the right button on an external mouse.

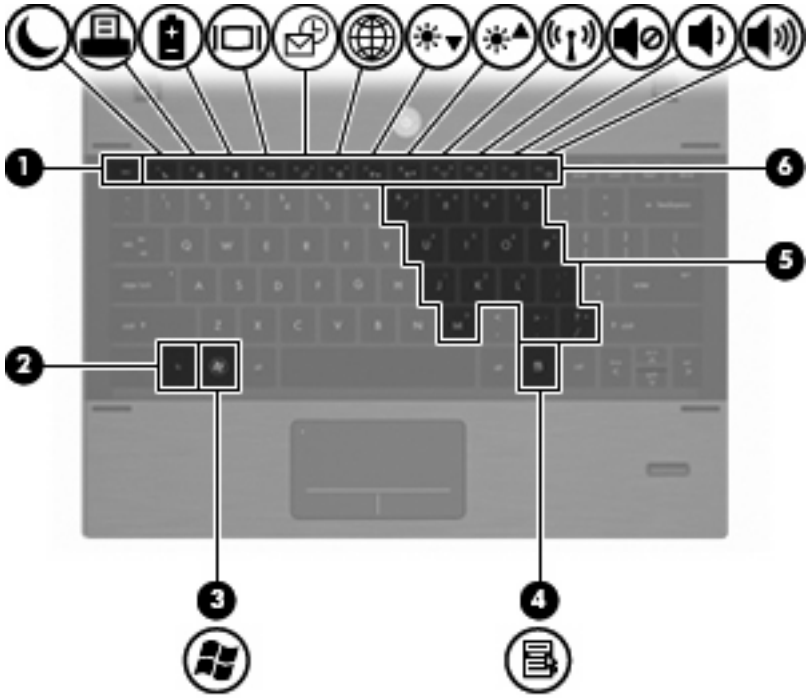
Lights

Component		Description
(1)	TouchPad off indicator	• Off: the TouchPad is on. • Amber: the TouchPad is off. To switch between active and inactive, quickly double-tap the TouchPad off indicator.
(2)	Caps lock light	On: Caps lock is on.
(3)	HP QuickLook light	• On: QuickLook is on. • Off: QuickLook is off.
(4)	HP QuickWeb light	• On: QuickWeb is on. • Off: QuickWeb is off.
(5)	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state. • Off: The computer is off or in Hibernation.
(6)	Wireless light	• White: An integrated wireless device, such as a wireless local area network (WLAN) device, HP Mobile Broadband Module (select models only), and/or a Bluetooth® device (select models only), is on. • Amber: All wireless devices are off.
(7)	Sound mute light	• On: The speaker sound is muted. • Off: The speaker sound is not muted.

Power button and fingerprint reader

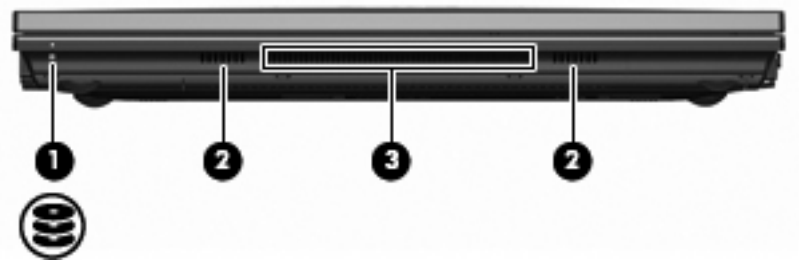
Component		Description
(1)	Power button	• When the computer is off, press the button to turn on the computer. • When the computer is on, press the button to shut down the computer. **NOTE:** Although you can shut down the computer with the power button, the recommended procedure is to use the Windows Shut Down command. • 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. 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.
(2)	Fingerprint reader (select models only)	Allows a fingerprint logon to Windows, instead of a password logon.

Keys



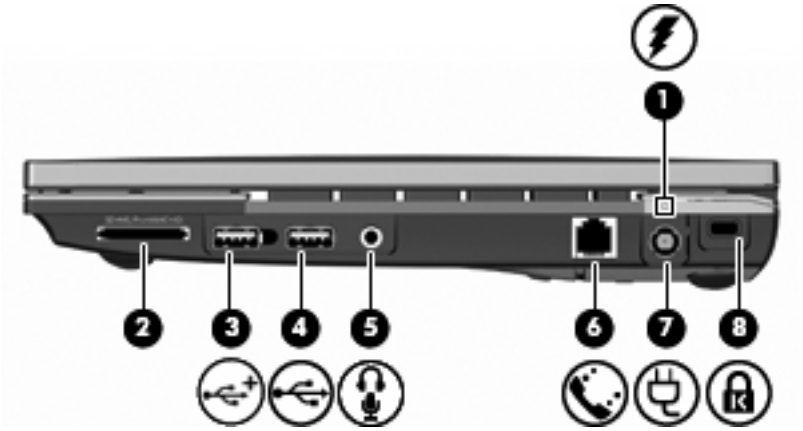
Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with a function key or the esc key.
(3)	Windows logo key	Displays the Windows Start menu. **NOTE:** This feature does not exist if you are using the Linux operating system.
(4)	Windows applications key	Displays a shortcut menu for items beneath the pointer. **NOTE:** This feature does not exist if you are using the Linux operating system.
(5)	Embedded numeric keypad keys	When the keypad has been enabled, it can be used like the keys on an external numeric keypad.
(6)	Function keys	Execute frequently used system functions when pressed in combination with the fn key.

Front components



Component		Description
(1)	Drive light	• White: The hard drive is being accessed. • Amber: HP 3D DriveGuard has temporarily parked the hard drive.
(2)	Speakers (2)	Produce sound.
(3)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.

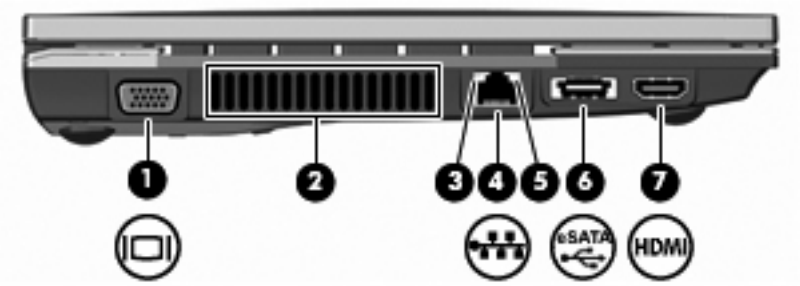
Right-side components



Component		Description
(1)	Battery light	• Amber: A battery is charging. • White: A battery is close to full charge capacity. • Off: If the computer is plugged into an external power source, the light turns off when the battery is fully charged. If the computer is not plugged into an external power source, the light stays off until the battery reaches a low battery level.
(2)	Media Card Reader	Supports the following optional digital card formats: • Memory Stick (MS) • Memory Stick Pro (MSP) • Memory Stick Duo (adapter required) • Memory Stick Duo Pro (adapter required) • MultiMediaCard (MMC) • MultiMediaCard Plus • Secure Digital (SD) Memory Card • SD High Capacity (HC) Memory Card • microSD Memory Card (adapter required) • xD-Picture Card (XD)
(3)	Powered USB port	Provides power to a USB device, such as an optional external MultiBay or an optional external optical drive, if used with a powered USB cable.
(4)	USB port	Connects optional USB devices.

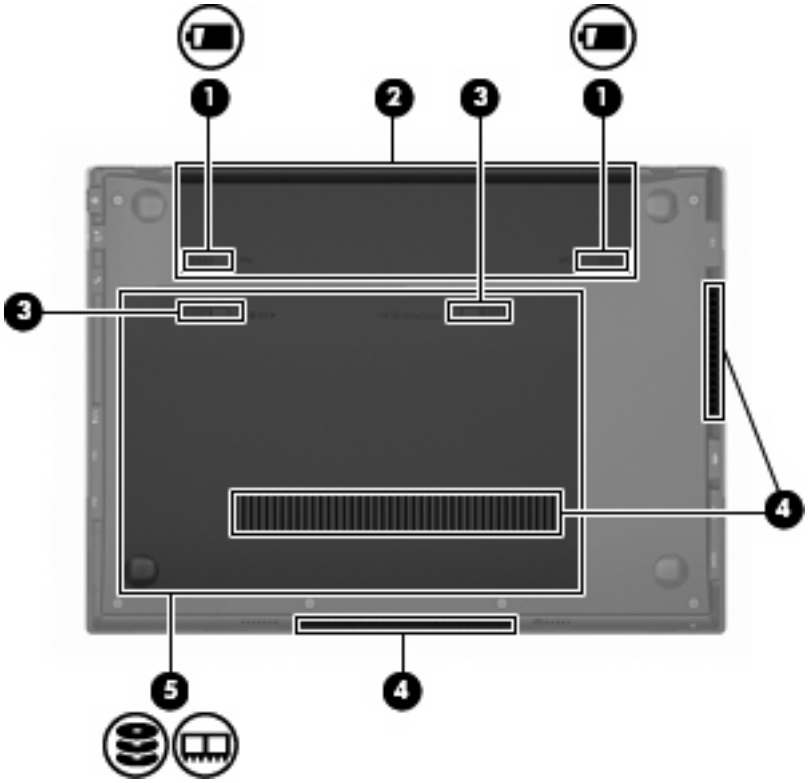
Component		Description
(5)	Audio-out (headphone)/Audio-in (microphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. Also connects an optional headset microphone. **NOTE:** When a device is connected to the headphone jack, the computer speakers are disabled. **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*.
(6)	RJ-11 (modem) jack	Connects a modem cable.
(7)	Power connector	Connects an AC adapter.
(8)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left-side components



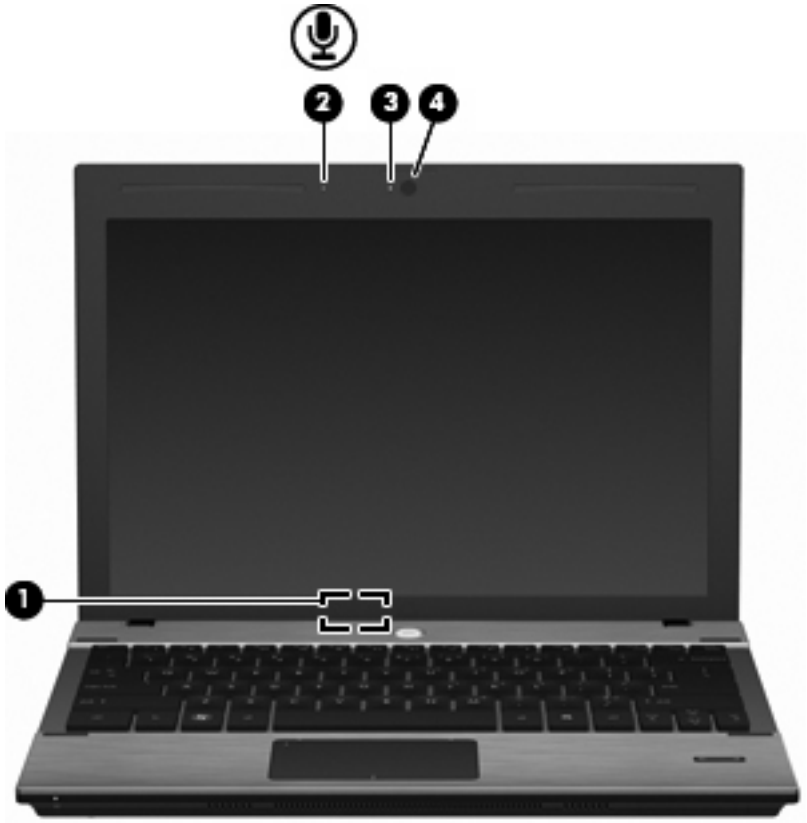
Component		Description
(1)	External monitor port	Connects an external VGA monitor or projector.
(2)	Vent	Enables airflow to cool internal components. **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	Network activity light	Amber: Data is being transmitted over the network.
(4)	RJ-45 (network) jack	Connects a network cable.
(5)	Network connection light	Green: The computer is connected to the network.
(6)	USB/eSATA port	Connects a high-performance eSATA component, such as an eSATA external hard drive, or connects an optional USB device.
(7)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.

Bottom components



Component		Description
(1)	Battery release latches (2)	Release the battery from the battery bay.
(2)	Battery bay	Holds the battery and the subscriber identity module (SIM).
(3)	Service access door release latches (2).	Release the service access door.
(4)	Vents (3)	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)	Service access bay	Provides access to the hard drive, 2 memory module slots, the wireless local area network (WLAN) module, and the HP Mobile Broadband Module (select models only; not supported by the Linux operating system).

Display components



Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.
(2)	Internal microphone	Records sound.
(3)	Webcam light (select models only)	On: The webcam is in use.
(4)	Webcam (select models only)	Records audio and video and captures still photographs.

Wireless antennas

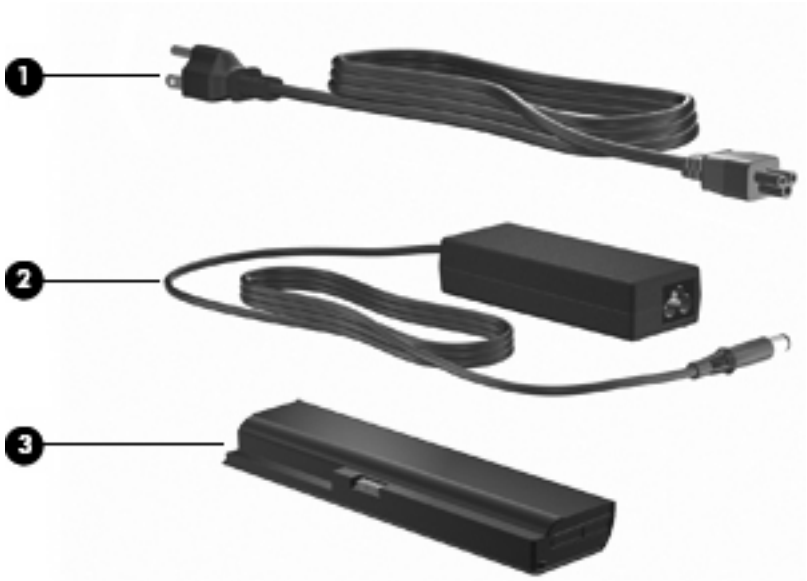
Your computer has at least two antennas that send and receive signals from one or more wireless devices.

Component		Description
(1)	WWAN antennas (2)* (select models only)	Send and receive wireless signals to communicate with wireless wide area networks (WWANs).
(2)	WLAN antennas (2)*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).

* For optimal transmission, keep the area 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.

Additional hardware components



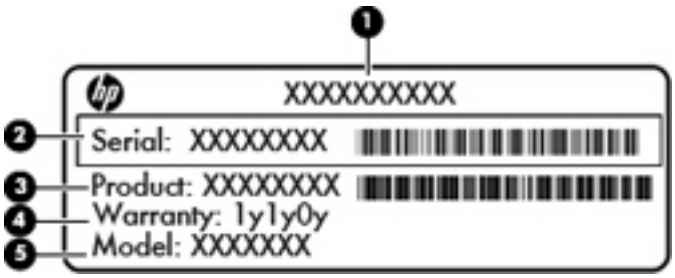
Component		Description
(1)	Power cord*	Connects an AC adapter to an AC outlet.
(2)	AC adapter	Converts AC power to DC power.
(3)	Battery	Powers the computer when the computer is not plugged into external power.

*Power cords vary in appearance by country or region.

3 Illustrated parts catalog

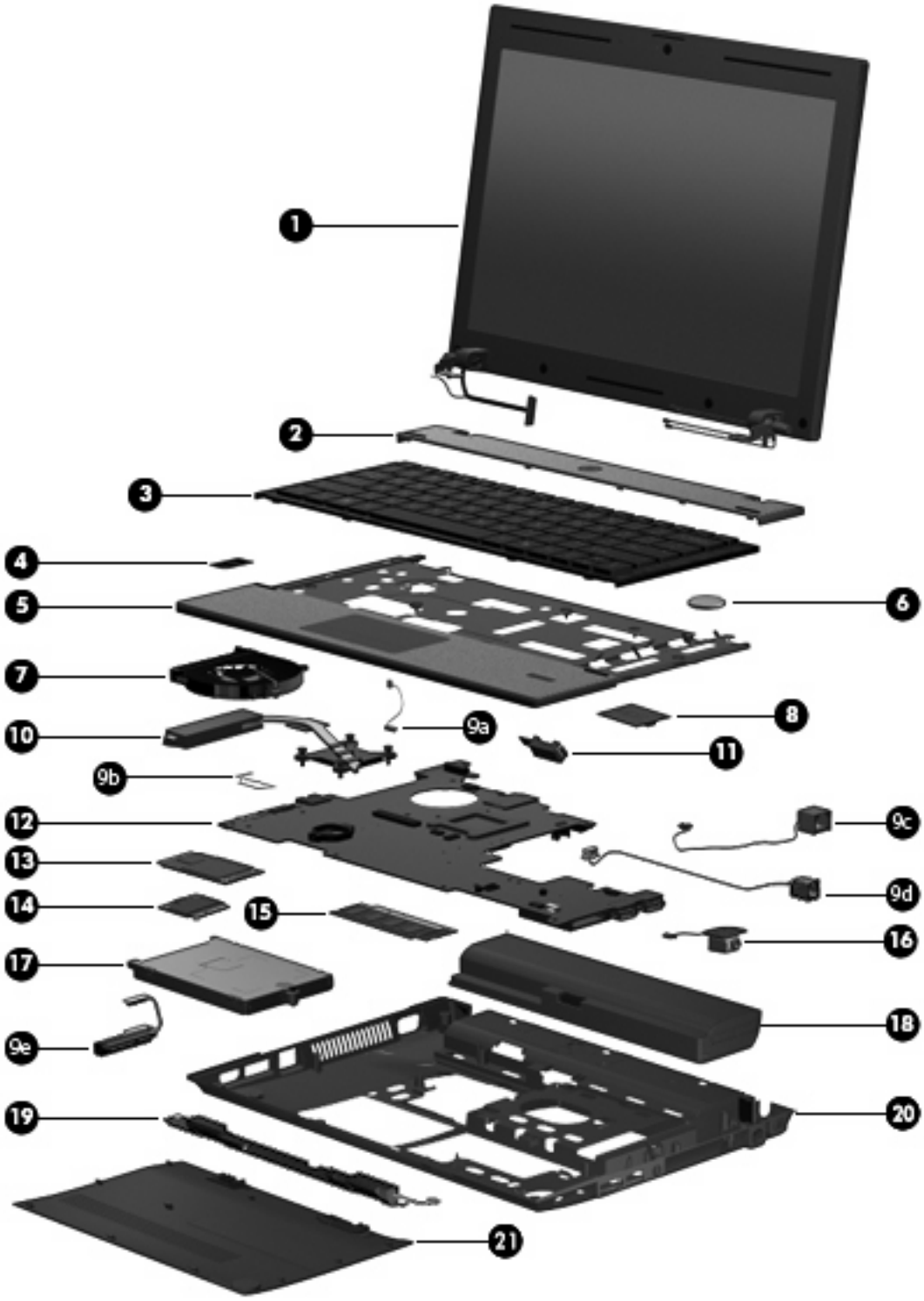
Serial number label location

When you order parts or request information, the serial number label, located inside the battery bay, provides important information that you may need when contacting technical support.



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

Computer major components

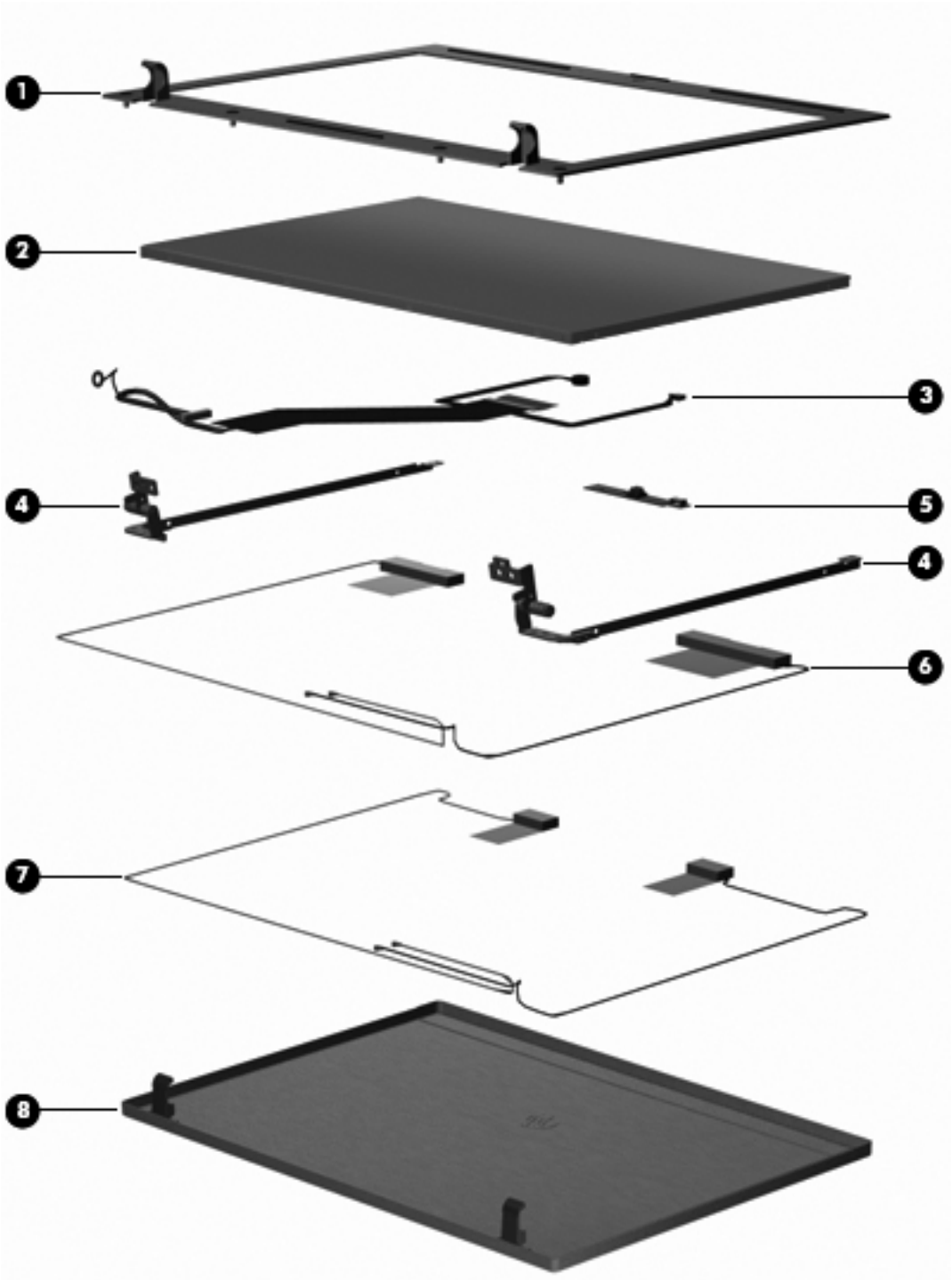


Item	Description	Spare part number
(1)	**30.734-cm (12.1-in) Display assembly** (includes 2 WLAN antennas and cables and, on select computer models, 2 WWAN antennas and cables) **NOTE:** WWAN is available only on select models.	
	• WXGA AntiGlare display assembly without webcam	610807-001
	• WXGA AntiGlare display assembly with webcam	610808-001
	• WXGA AntiGlare display assembly with webcam and WWAN	610809-001
	• WXGA BrightView display assembly without webcam	610810-001
	• WXGA BrightView display assembly with webcam	610811-001
(2)	**Switch cover**	610832-001
(3)	**Keyboard**	
	• For use in Japan	610826-291
	• For use in South Korea	610826-AD1
	• For use in Taiwan	610826-AB1
	• For use in Thailand	610826-281
	• For use in the United States	610826-001
(4)	**SIM** (provided by your wireless vendor for use with WWAN option)	
(5)	**Top cover**	
	For use with models with fingerprint readers (includes TouchPad assembly)	610833-001
	For use with models without fingerprint readers (includes TouchPad assembly)	610834-001
(6)	**RTC battery**	599516-001
(7)	**Fan**	610824-001
(8)	**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 610806-001. See Cable Kit on page 27 for more Cable Kit spare part information.	
	High-speed 56K modem	510100-011
	Cable Kit	610806-001
(9a)	Bluetooth module cable	
(9b)	TouchPad cable	
(9c)	Power connector cable	
(9d)	RJ-11 (modem) cable	
(9e)	Hard drive connector cable	
(10)	**Heat sink**	610825-001

Item	Description	Spare part number
(11)	**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, part number 610806-001. See Cable Kit on page 27 for more Cable Kit spare part information.	537921-001
(12)	**System board** (includes processor and replacement thermal material)	
	• Includes Intel Celeron U3400 1.06-GHz processor	614536-001
	• Includes Intel Arrandale I3-350M 2.26-GHz processor	610803-001
	• Includes Intel Arrandale I5-450M 2.4-GHz processor	614534-001
	• Includes Intel Arrandale I5-520M 2.4-GHz processor	614535-001
	• Includes Intel Arrandale I5-540M 2.53-GHz processor	611373-001
(13)	**WWAN module, EVDO Birlion HSPA**	531993-001
(14)	**WLAN module**	
	Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 For use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam	593065-001
	Intel WiFi Link 6200 802.11a/b/g/n For use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam	572509-001
	Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter For use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam	593836-001
	Broadcom 4322 802.11a/b/g/n 2x2 WiFi Adapter For use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, Fiji, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam	518434-002
(15)	**Memory module** (DDR3 PC3-10600 SDRAM, 1333 MHz, shared)	
	4096-MB	599092-001
	2048-MB	581096-001
	1024-MB	598859-001
(16)	**Audio board** (includes cable)	610805-001
(17)	**Hard drive** (includes hard drive bracket)	

Item	Description	Spare part number
	SATA, 9.5-mm, 6.35-cm (2.5-in) hard drives	
	640-GB, 7200-rpm	610821-001
	500-GB, 7200-rpm	610820-001
	320-GB, 7200-rpm	610819-001
	250-GB, 7200-rpm	610818-001
	4.57-cm (1.8-in) solid-state drive	
	80-GB	610823-001
(18)	**Battery**	
	4-cell, 41-Wh (2.8-Ah) Li-on	535630-001
	6-cell, 62-Wh (2.8-Ah) Li-ion	596236-001
(19)	**Speakers**	610831-001
(20)	**Base enclosure**	610801-001
(21)	**Service access door** **NOTE:** The service access door is included in the Plastics Kit, spare part number 610828-001. See Plastics Kit on page 26 for more Plastics Kit spare part information.	

Display assembly components



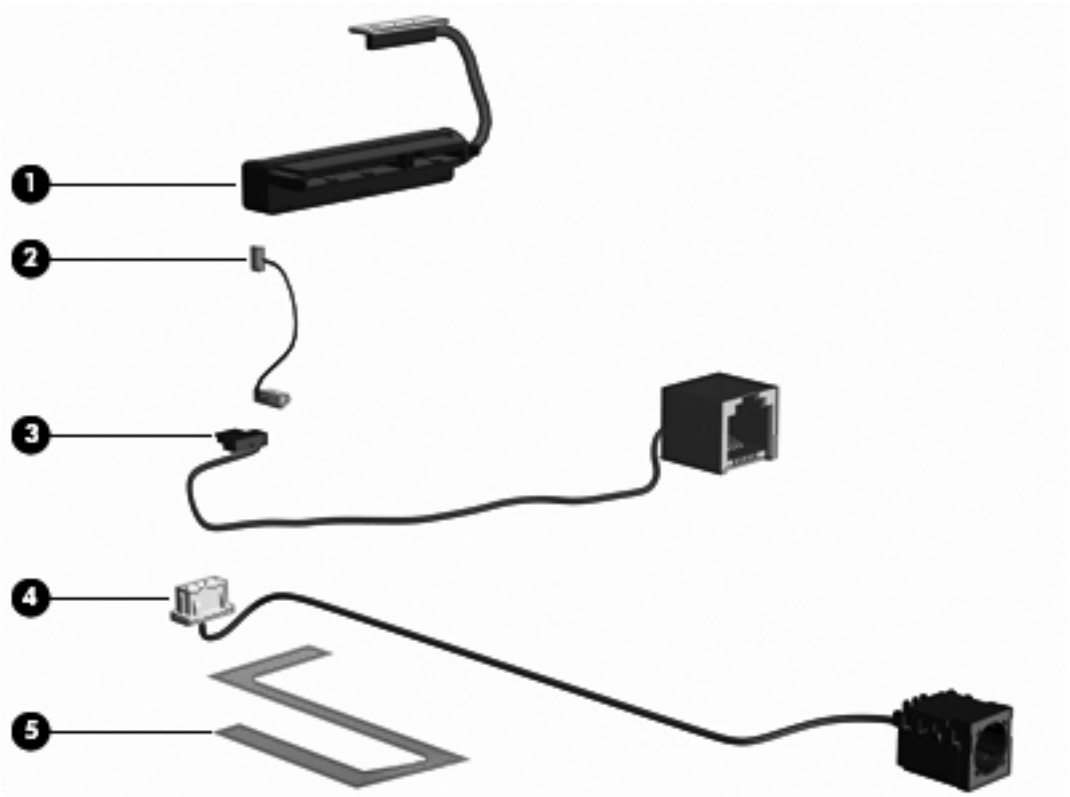
Item	Description	Spare part number
(1)	**Display bezel**	
	• For displays with webcam	610814-001
	• For displays without webcam	610815-001

Item	Description	Spare part number
(2)	**Display panel**	
(3)	**Display cable** (includes microphone and, on select models, webcam connector)	
	• For displays with webcam	610816-001
	• For displays without webcam	614742-001
(4)	**Display Hinge Kit** (includes left and right display hinges)	610817-001
(5)	**Webcam module**	610835-001
(6)	**WWAN antennas and cables** (included with display back cover used with WWAN option)	
(7)	**WLAN antennas and cables** (included with display back cover)	
(8)	**Display back cover**	
	• For displays without WWAN	610812-001
	• For displays with WWAN	610813-001

Plastics Kit

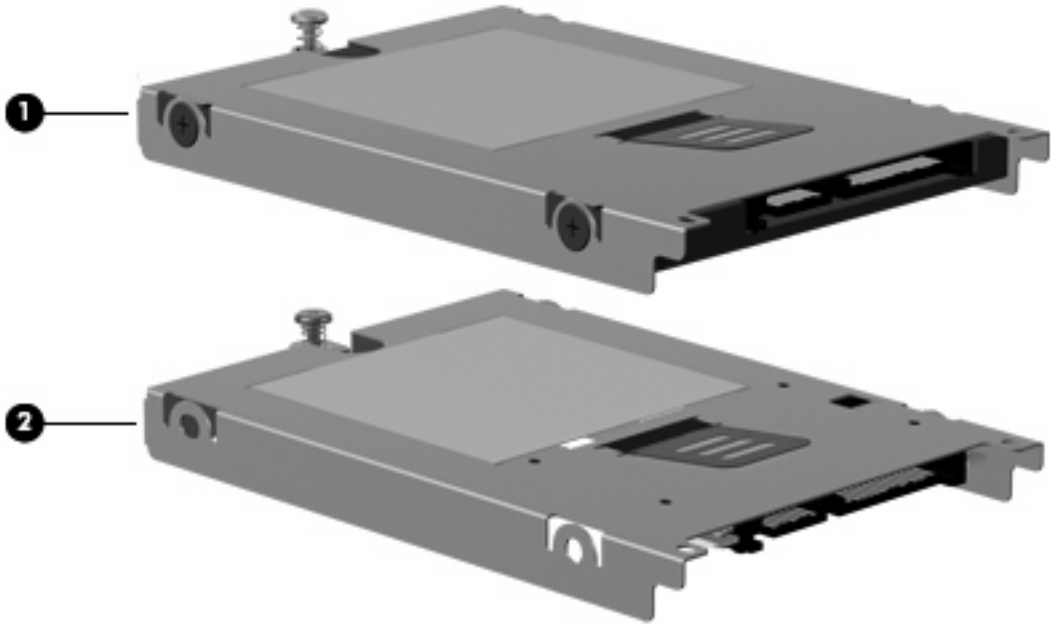
Item	Description	Spare part number
	Plastics Kit:	610828-001
	Service access door	

Cable Kit



Item	Description	Spare part number
	Cable Kit:	610806-001
(1)	Hard drive connector cable	
(2)	Bluetooth cable	
(3)	RJ-11 (modem) jack cable	
(4)	Power cable	
(5)	TouchPad cable	

Mass storage devices



Item	Description	Spare part number
(1)	**Hard drive** (includes bracket)	
	640-GB, 7200-rpm	610821-001
	500-GB, 7200-rpm	610820-001
	320-GB, 7200-rpm	610819-001
	250-GB, 7200-rpm	610818-001
(2)	**Solid-state drive** (includes bezel)	
	80-GB	610823-001

Miscellaneous parts

Description	Spare part number
AC adapters	
65-W, 3-pin Smart AC Adapter for use in all countries and regions except India	609939-001
65-W, 3-pin Smart AC Adapter for use only in India	609948-001
Power cords (AC power, 3-pin, black, **1.83-m**)	
• For use in Australia	490371-011
• For use in India	490371-D61
• For use in Japan	490371-291
• For use in North America	490371-001
• For use in the People's Republic of China	490371-AA1
• For use in South Korea	490371-AD1
• For use in Taiwan	490371-AB1
Rubber Kit (includes 4 base enclosure feet, display screw covers, and Bluetooth rubber cage)	610829-001
Screw kit–includes:	610830-001
• Phillips M2.5x5.0	
• Phillips M2.0x3.0	
• Phillips M2.0x2.5	
• Phillips M3.0x3.5	

Sequential part number listing

Spare part number	Description
490371-001	Power cord (AC power, 3-pin, black, **1.83-m**), for use in North America
490371-011	Power cord (AC power, 3-pin, black, **1.83-m**), for use in Austria
490371-291	Power cord (AC power, 3-pin, black,**1.83-m**), for use in Japan
490371-AA1	Power cord (AC power, 3-pin, black, **1.83-m**), for use in the People's Republic of China
490371-AB1	Power cord (AC power, 3-pin, black, **1.83-m**), for use in Taiwan
490371-AD1	Power cord (AC power, 3-pin, black,**1.83-m**), for use in South Korea
490371-D61	Power cord (AC power, 3-pin, black, **1.83-m**), for use in India
510100-011	High-speed 56K modem
518434-002	Broadcom 4322 802.11a/b/g/n 2x2 WiFi Adapter
531993-001	WWAN module, EVDO Birlion HSPA
535630-001	Battery, 4-cell, 41-Wh (2.8-Ah) Li-ion
537921-001	Bluetooth module (without cable). The Bluetooth cable is included in the Cable Kit, spare part number 610806-001.
572509-001	Intel WiFi Link 6200 802.11a/b/g/n for use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam
581096-001	Memory module (DDR3 PC3-10600 SDRAM, 1333 MHz, shared), 2048-MB
593065-001	Intel Centrino Wireless-N 1000 802.11b/g/n 1x2 for use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam
593836-001	Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter for use in Australia, Bangladesh, Bhutan, Brunei, Cambodia, East Timor, Fiji, Hong Kong, India, Indonesia, Japan, Kiribati, Laos, Malaysia, Maldives, Marshall Islands, Micronesia, Nauru, Nepal, New Zealand, Pakistan, Palau, Papua New Guinea, the People's Republic of China, the Philippines, Samoa, Singapore, Solomon Islands, South Korea, Sri Lanka, Taiwan, Thailand, Tonga, Tuvalu, and Vietnam
596236-001	Battery, 6-cell, 62-Wh (2.8-Ah) Li-ion
598859-001	Memory module (DDR3 PC3-10600 SDRAM, 1333 MHz, shared), 1024-MB
599092-001	Memory module (DDR3 PC3-10600 SDRAM, 1333 MHz, shared), 4096-MB
599516-001	RTC battery
609939-001	65-W, 3-pin Smart AC adapter for use in all countries and regions except India
609948-001	65-W, 3-pin Smart AC adapter for use only in India
610801-001	Base enclosure
610803-001	System board (includes Intel Arrandale i3-350M 2.26-GHz processor and replacement thermal material)
610805-001	Audio board (includes cable)

Spare part number	Description
610806-001	Cable Kit (See Cable Kit on page 27 for more Cable Kit spare part information.)
610807-001	Display assembly, WXGA AntiGlare without webcam
610808-001	Display assembly, WXGA AntiGlare with webcam
610809-001	Display assembly, WXGA AntiGlare with webcam and WWAN
610810-001	Display assembly, BrightView without webcam
610811-001	Display assembly, BrightView with webcam
610812-001	Display back cover for displays without WWAN
610813-001	Display back cover for displays with WWAN
610814-001	Display bezel for displays with webcam
610815-001	Display bezel for displays without webcam
610816-001	Display cable for displays with webcam (includes microphone and webcam connector)
610817-001	Display Hinge Kit (includes left and right display hinges)
610818-001	Hard drive, 250-GB, 7200-rpm (includes hard drive bracket)
610819-001	Hard drive, 320-GB, 7200-rpm (includes hard drive bracket)
610820-001	Hard drive, 500-GB, 7200-rpm (includes hard drive bracket)
610821-001	Hard drive, 640-GB, 7200-rpm (includes hard drive bracket)
610823-001	Solid-state drive, **4.57-cm** (1.8-in), 80-GB (includes hard drive bracket)
610824-001	Fan
610825-001	Heat sink
610826-001	Keyboard for use in the United States
610826-281	Keyboard for use in Thailand
610826-291	Keyboard for use in Japan
610826-AB1	Keyboard for use in Taiwan
610826-AD1	Keyboard for use in South Korea
610828-001	Plastics Kit (includes service access door)
610829-001	Rubber Kit (includes 4 base enclosure feet, display screw covers, and Bluetooth rubber cage)
610830-001	Screw Kit (See Miscellaneous parts on page 29 for more Screw Kit spare part information.)
610831-001	Speaker assembly
610832-001	Switch cover
610833-001	Top cover, for use with models with fingerprint readers (includes TouchPad assembly)
610834-001	Top cover, for use with models without fingerprint readers (includes TouchPad assembly)
610835-001	Webcam module
611373-001	System board (includes Intel Arrandale i5-540M 2.53-GHz processor and replacement thermal material)
614534-001	System board (includes Intel Arrandale i5-450M 2.4-GHz processor and replacement thermal material)

Spare part number	Description
614535-001	System board (includes Intel Arrandale i5-520M 2.4-GHz processor and replacement thermal material)
614536-001	System board (includes Intel Celeron U3400 1.06-GHz processor and replacement thermal material)
614742-001	Display cable for displays without webcam (includes microphone)

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
- P0 and P1 screwdrivers

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

Avoid exposing 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, 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

	Relative humidity		
Event	**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 ±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

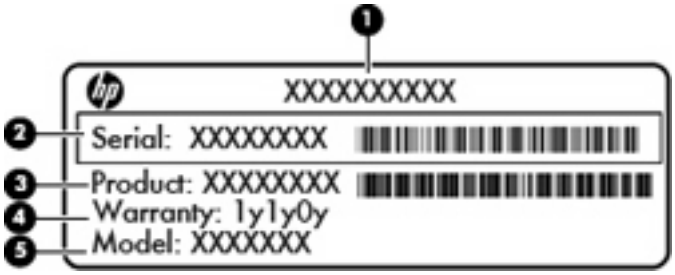
Component replacement procedures

This section provides removal and replacement procedures.

There are as many as 57 screws, in 5 different sizes, that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw size and location during removal and replacement.

Service tag

When you order parts or request information, provide the computer serial number and model number provided on the service tag, located inside the battery bay.

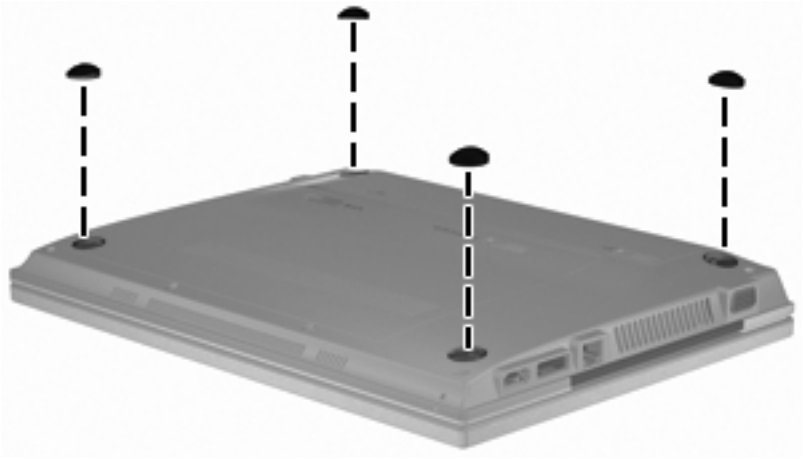


	Component	Description
(1)	Part number	The number that provides specific information about the product's hardware components. The part number helps a service technician to determine what components and parts are needed.
(2)	Serial number	An alphanumeric number that is unique to each product.
(3)	Product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

Computer feet

Description	Spare part number
Rubber Kit (includes computer feet)	610829-001

The computer feet are adhesive-backed rubber pads. There are 4 rubber feet that attach to the base enclosure in the locations shown in the following illustration.



Battery

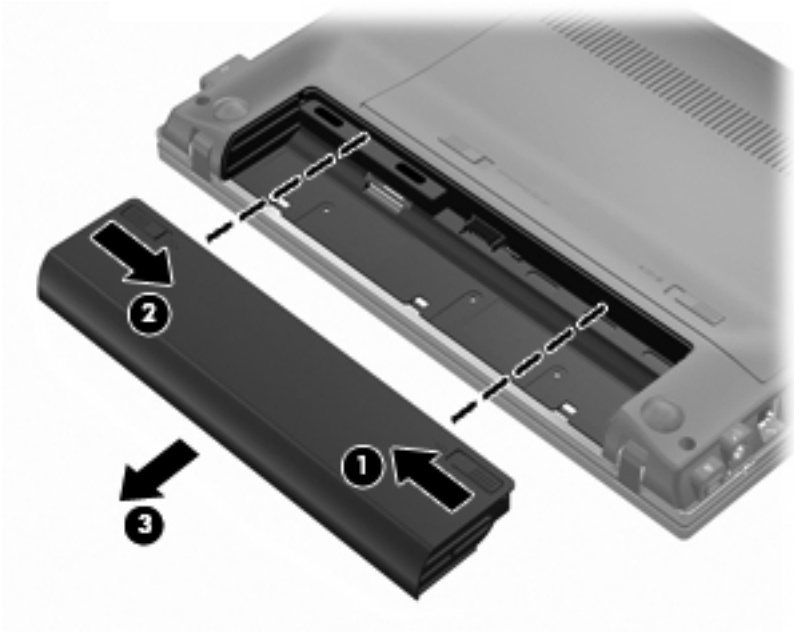
Description	Spare part number
4-cell, 41-Wh (2.8-Ah) Li-on battery	535630-001
6-cell, 62-Wh (2.8-Ah) Li-ion battery	596236-001

Before removing the battery, follow these steps:

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

Remove the battery:

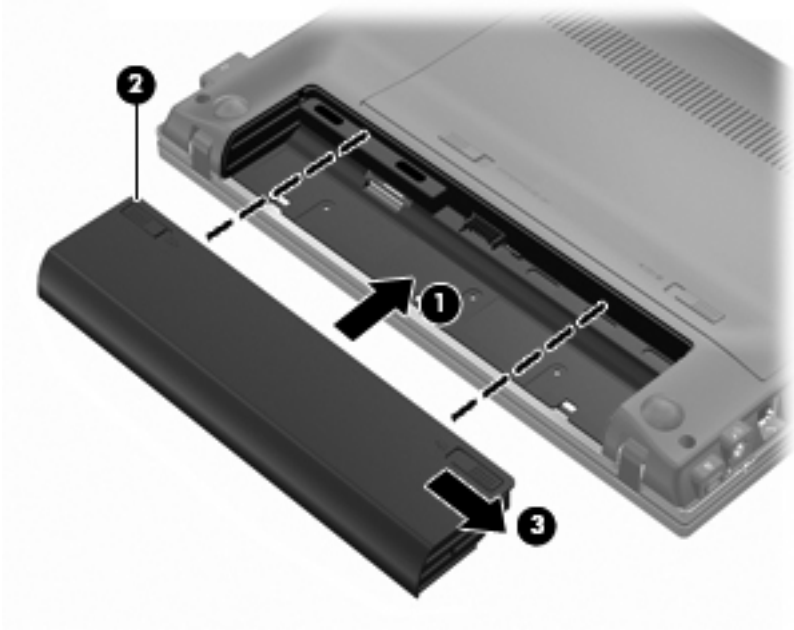
1. Position the computer upside down on a flat surface with the battery bay toward you.
2. Slide the right lock latch **(1)** inward. The latch opening is marked red to indicate that the latch is unlocked.
3. Slide the left release latch **(2)** inward and hold it in place as you slide and remove the battery **(3)**.



To insert the battery:

1. Turn the computer upside down on a flat surface, with the battery bay toward you.
2. Slide the battery into the battery bay **(1)** until the battery release latch **(2)** clicks.

3. Slide the battery lock **(3)** to the right to lock the battery into place.



SIM

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

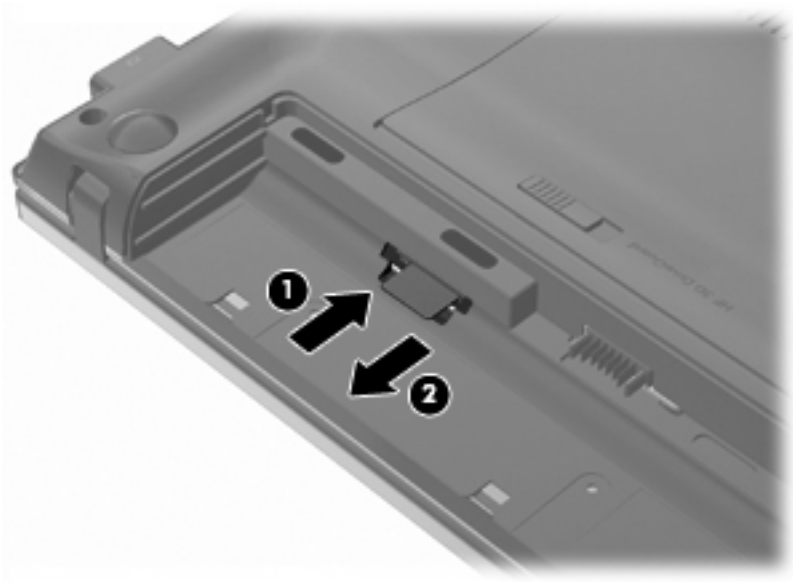
NOTE: If there is a SIM inserted in the SIM slot, it must be removed before disassembling the computer. Be sure that the SIM is reinserted in the SIM slot after reassembling the computer.

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 40).

Remove the SIM:

1. Position the computer upside down with the battery bay toward you.
2. Press in on the SIM **(1)** to release it from the SIM slot.
3. Remove the SIM **(2)** from the computer.



Install the SIM by inserting it into the SIM slot until you hear a click. To prevent damage to the connectors, use minimal force when inserting a SIM.

△ **CAUTION:** If a SIM is inserted backwards or upside down, the battery may not snap into place properly and could damage the SIM and the SIM connector.

WLAN module

Description	Spare part number
Intel Centrino Wireless-N 1000 802.11b/g/n 1x2	593065-001

Description	Spare part number
Intel WiFi Link 6200 802.11 a/b/g/n	572509-001
Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter	593836-001
Broadcom 4322 802.11a/b/g/n 2x2 WiFi Adapter	518434-002

△ **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.

Before removing the WLAN module, follow these steps:

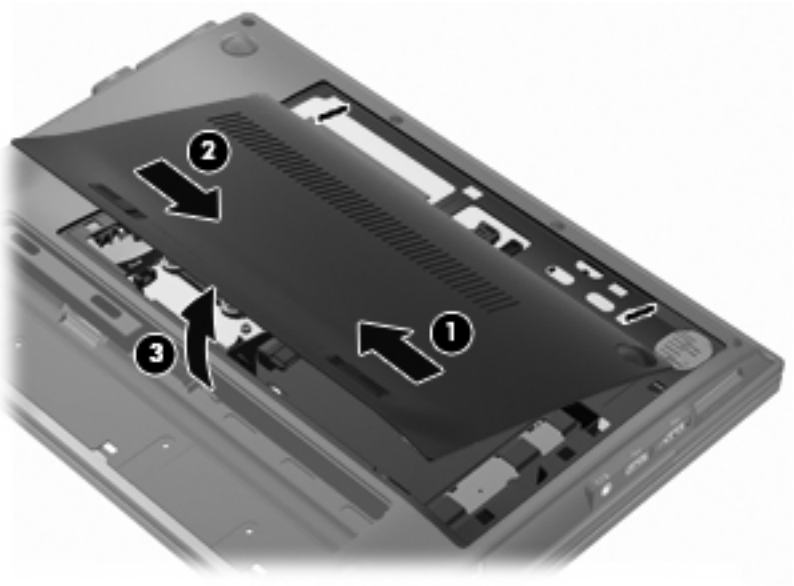
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the WLAN module:

1. Position the computer upside down with the battery bay toward you.
2. Slide the lock latch **(1)** on the service access door inward. The latch opening is marked red to indicate that the latch is unlocked.
3. Slide the left release latch **(2)** inward and hold it in place as you slide the door toward the battery bay.

4. Release the latch and remove the service access door **(3)**.

NOTE: The service access door is available in the Plastics Kit, part number 610828-001.



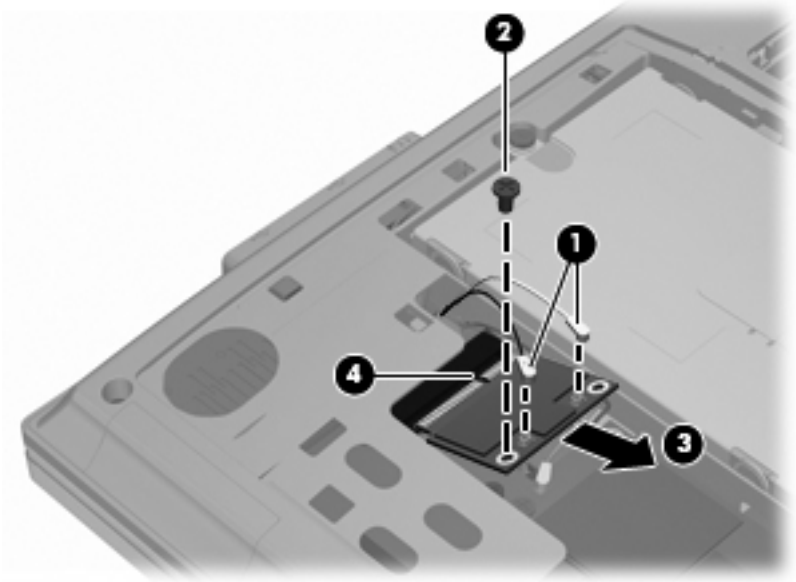
5. Disconnect the WLAN antenna cables **(1)** from the terminals on the WLAN module.

NOTE: The black WLAN antenna cable is connected to the WLAN module “Main” terminal. The white WLAN antenna cable is connected to the WLAN module “Aux” terminal.

6. Remove the PM2.0×3.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

7. 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.



Reverse this procedure to install the WLAN module.

WWAN module

NOTE: Only select models include a WWAN module (see Product description on page 1).

Description	Spare part number
EVDO Birlion HSPA	531993-001

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

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 40).
5. Remove the service access door (see WLAN module on page 42).

Remove the WWAN module:

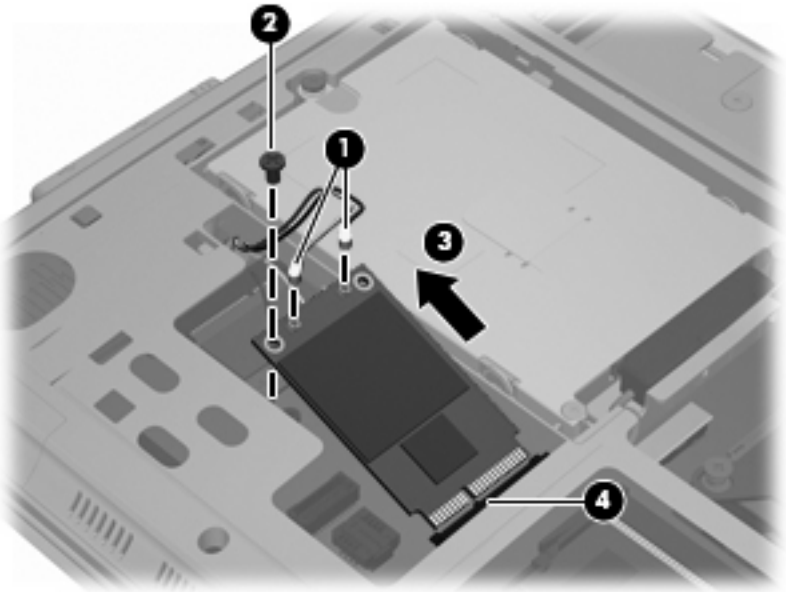
1. Position the computer upside down with the front toward you.
2. Disconnect the WWAN antenna cables **(1)** from the terminals on the WWAN module.

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

3. Remove the PM2.0×3.0 screw **(2)** that secures the WWAN module to the system board. (The WWAN module tilts up.)

4. 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.



Reverse this procedure to install the WWAN module.

Memory module

Description	Spare part number
Memory module (DDR3 PC3-10600 SDRAM, 1333 MHz, shared)	
1024-MB	598859-001
2048-MB	581096-001
4096-MB	599092-001

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 40).
5. Remove the service access door (see WLAN module on page 42).

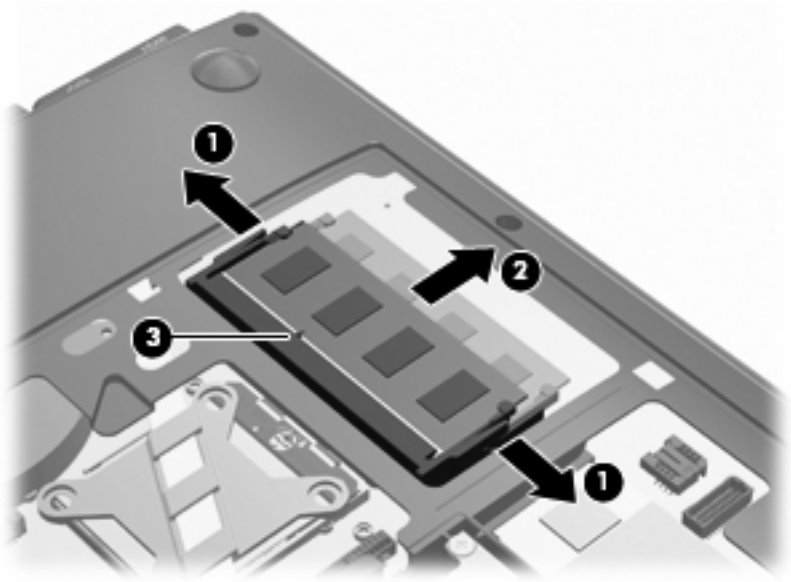
Remove the memory module:

1. Position the computer upside down with the front toward you.
2. Pull away the retention clips **(1)** on each side of the memory module to release the memory module. (The memory module tilts up.)

△ **CAUTION:** To prevent damage to the memory module, hold it by the edges only. Do not touch the components on the memory module.

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.



Reverse this procedure to install a memory module.

Hard drive

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

Description	Spare part number
SATA, 9.5-mm, 6.35-cm (2.5-in) hard drives:	
250-GB 7200-rpm hard drive	610818-001
320-GB 7200-rpm hard drive	610819-001
500-GB 7200-rpm hard drive	610820-001
640-GB 7200-rpm hard drive	610821-001
4.57-cm (1.8-in) solid-state drive:	
80-GB	610823-001

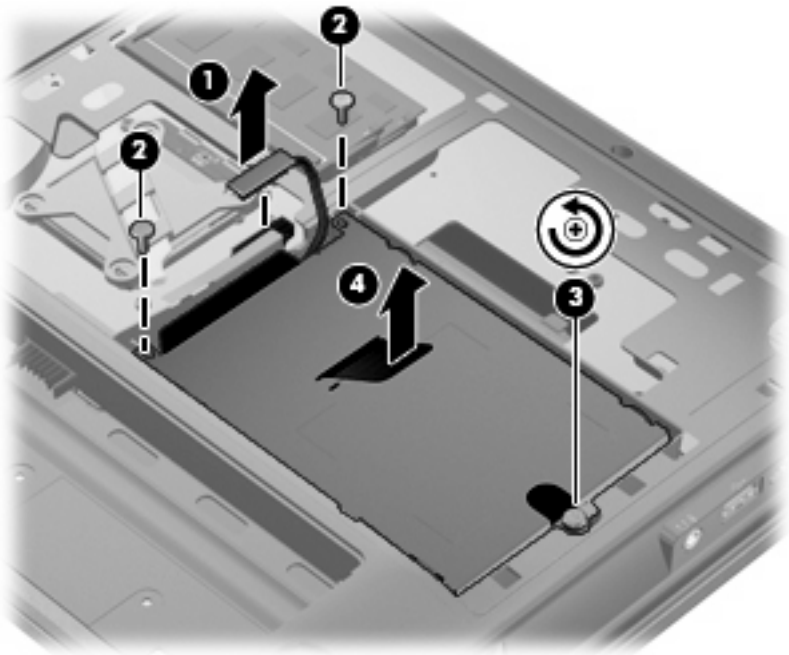
Before removing the hard drive, follow these steps:

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

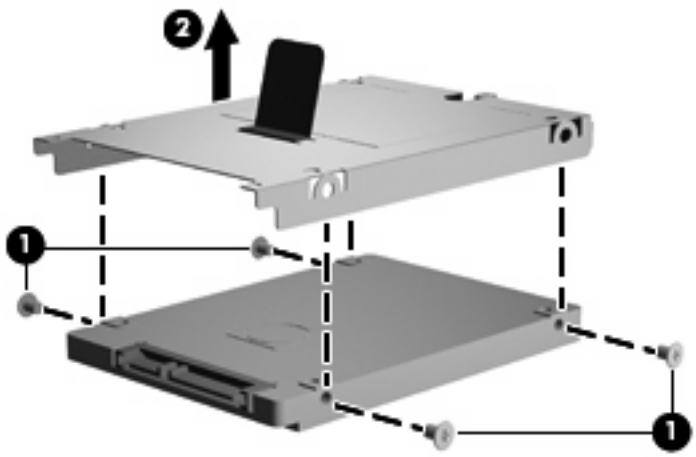
4. Remove the battery (see Battery on page 40).
5. Remove the service access door (see WLAN module on page 42).

Remove the hard drive:

1. Position the computer upside down with the front toward you.
2. Disconnect the hard drive connector cable **(1)**.
3. Remove the two PM2.0x3.0 screws **(2)** and loosen the PM2.5×10.0 captive screw **(3)** that secures the hard drive to the computer.
4. Grasp the Mylar tab **(4)** on the hard drive and lift the hard drive out of the hard drive bay.



5. If it is necessary to replace the hard drive bracket, follow these steps:
   a. Remove the two PM3.0×3.5 hard drive bracket screws **(1)** from each side of the hard drive.
   b. Lift the bracket **(2)** straight up to remove it from the hard drive.



Reverse this procedure to reassemble and install the hard drive.

Switch cover

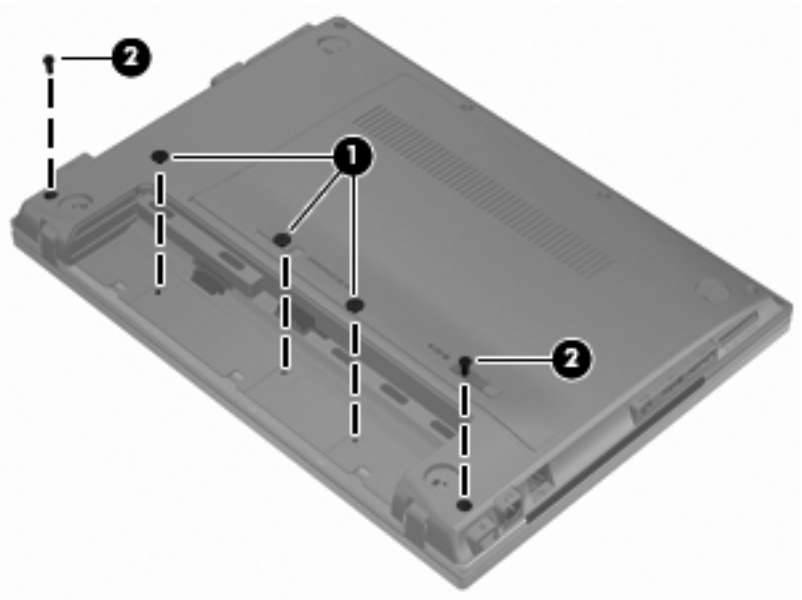
Description	Spare part number
Switch cover	610832-001

Before removing the switch 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 40).

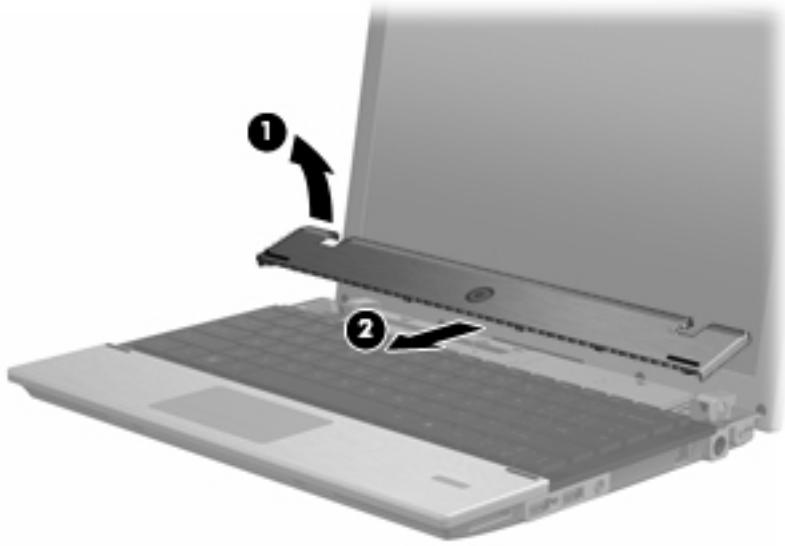
Remove the switch cover:

1. Position the computer upside down with the battery bay toward you.
2. Remove the three PM2.0x2.5 screws **(1)** inside the battery bay.
3. Remove the two PM2.5x6.5 screws **(2)** located outside the battery bay.



4. Position the computer right-side up with the front toward you, and open the computer.
5. Using a flat-bladed screwdriver, pry up the front edge of the switch cover from the keyboard.

6. To prevent the tabs on the rear edge from breaking, lift the front edge **(1)** of the switch cover at an angle, and then pull the switch cover **(2)** toward you to remove it from the computer.



Reverse this procedure to install the switch cover.

Keyboard

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

Description	Spare part number
Keyboard	
For use in Japan	610826-291
For use in South Korea	610826-AD1
For use in Taiwan	610826-AB1
For use in Thailand	610826-281
For use in United States	610826-001

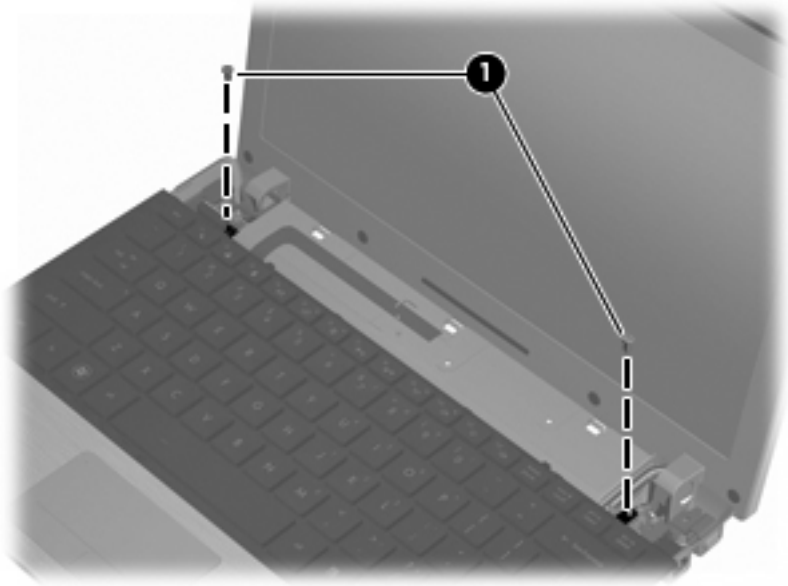
Before removing the keyboard, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the switch cover (see Switch cover on page 51).

Remove the keyboard:

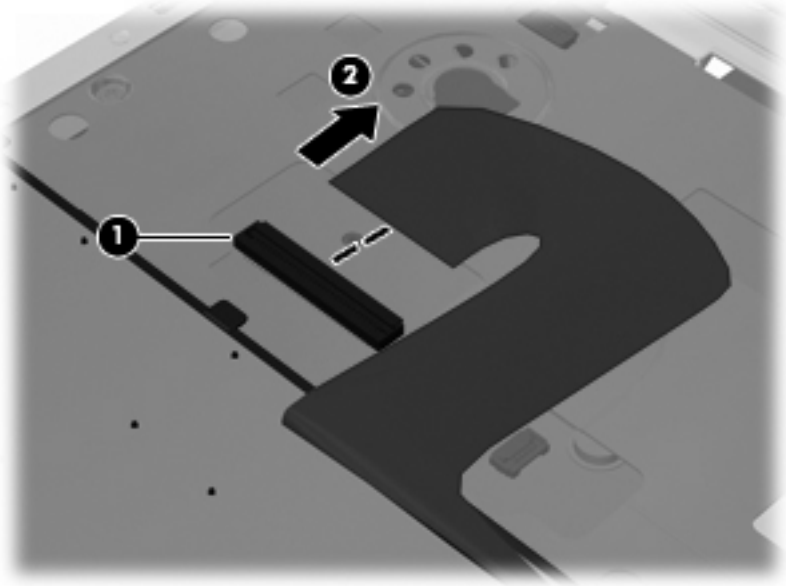
1. Position the computer right-side up with the front toward you.
2. Open the computer as far as possible.

3. Remove the two PM2.0x5.0 screws **(1)** that secure the keyboard to the computer.



4. Gently slide the keyboard back toward the display **(1)** until you hear the locking tabs release.
5. Lift the rear edge of the keyboard **(2)** and rotate it toward you until it rests at an angle.

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



7. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover

Description	Spare part number
Top cover	
NOTE: The top cover kit includes the TouchPad assembly.	
For use with models with fingerprint readers	610833-001
For use with models without fingerprint readers	610834-001

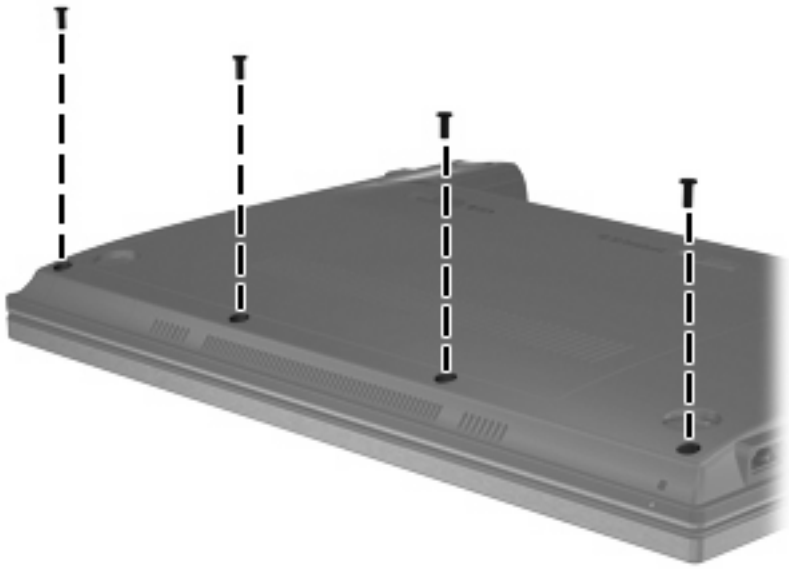
Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. WLAN cables (see WLAN module on page 42)
   d. WWAN cables (see WWAN module on page 45)

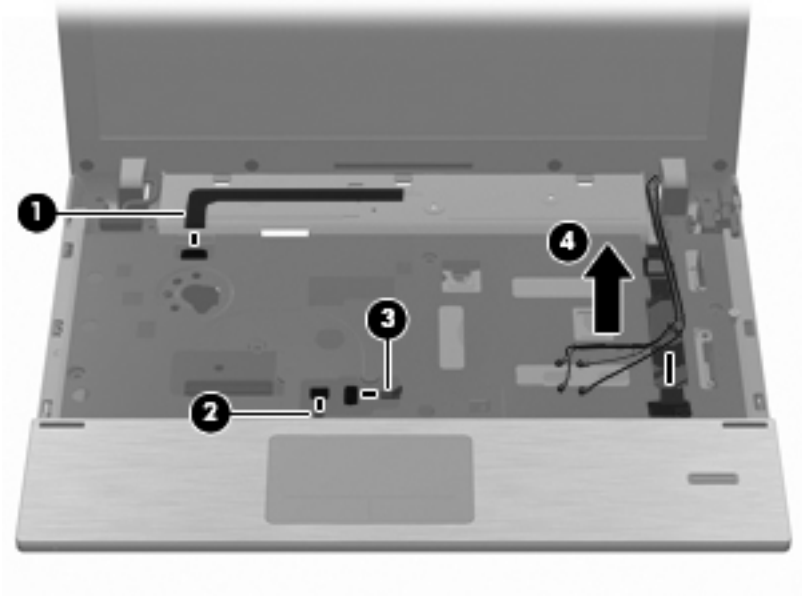
Remove the top cover:

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

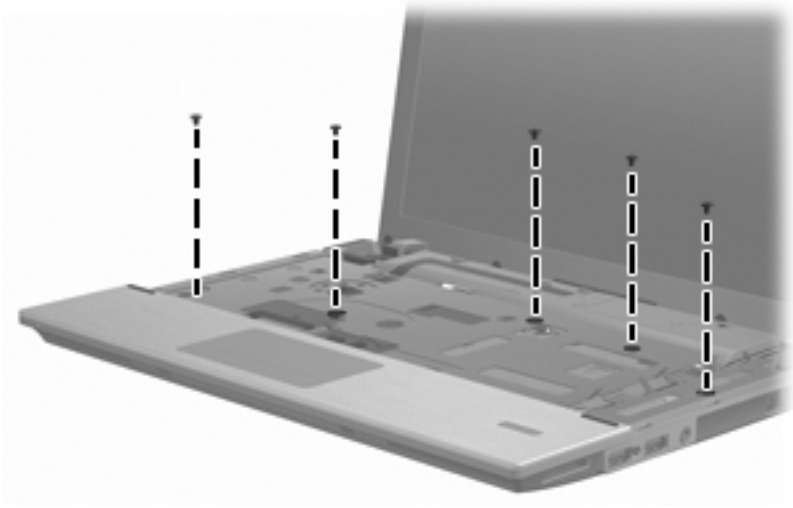
2. Remove the four PM2.5x5.0 screws along the front edge.



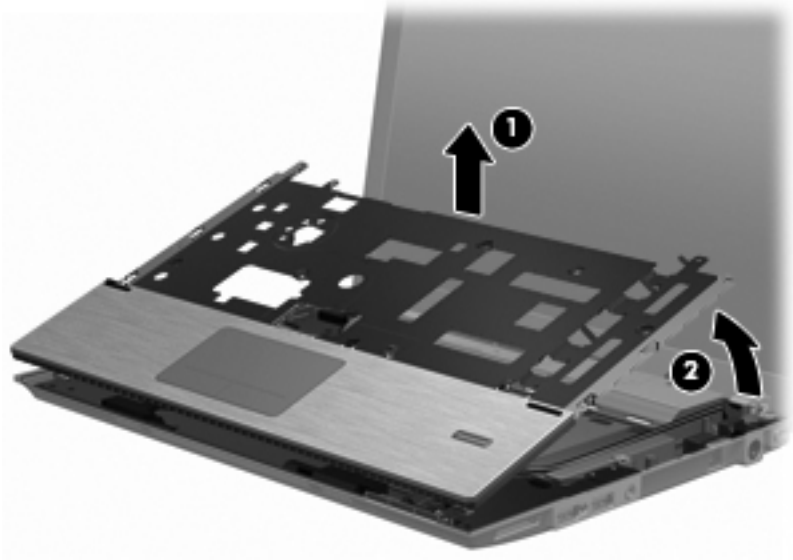
3. Position the computer right-side up with the front toward you, and open the display as far as possible.
4. Release and disconnect the following zero insertion force (ZIF) connector cables from the system board:
   a. Power cable **(1)**
   b. TouchPad cable **(2)**
   c. Fingerprint reader cable **(3)**
5. Remove the WLAN cables **(4)** from the routing channel.



6. Remove the five PM2.5x5.0 screws that secure the keyboard to the base enclosure.



7. Lift the rear edge **(1)** of the top cover until it rests at an angle and you hear the locking tabs release.
8. Remove the top cover **(2)** by lifting first one side, then the other, until the top cover is released from the enclosure.



Reverse this procedure to install the top cover.

Display assembly

Description	Spare part number
Display assembly (includes 2 WLAN antennas and cables and, on select computer models, 2 WWAN antennas and cables)	
• WXGA AntiGlare display assembly without webcam	610807-001
• WXGA AntiGlare display assembly with webcam	610808-001
• WXGA AntiGlare display assembly with webcam and WWAN	610809-001
• WXGA BrightView display assembly without webcam	610810-001
• WXGA BrightView display assembly with webcam	610811-001
Display bezel	
• For use with displays with webcam	610814-001
• For use with displays without webcam	610815-001
Webcam module	610835-001
Display panel	
Display Hinge Kit	
• Display Hinge Kit (includes left and right display hinges)	610817-001
Display cable	
• Display cable for use with displays with webcam (includes microphone and webcam connector)	610816-001
• Display cable for use with displays without webcam (includes microphone)	614742-001
WLAN antennas and cables (included with display back cover)	
WWAN antennas and cables (included with display back cover used with WWAN option)	
Display back cover	
• For use with displays without WWAN	610812-001
• For use with displays with WWAN	610813-001

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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)

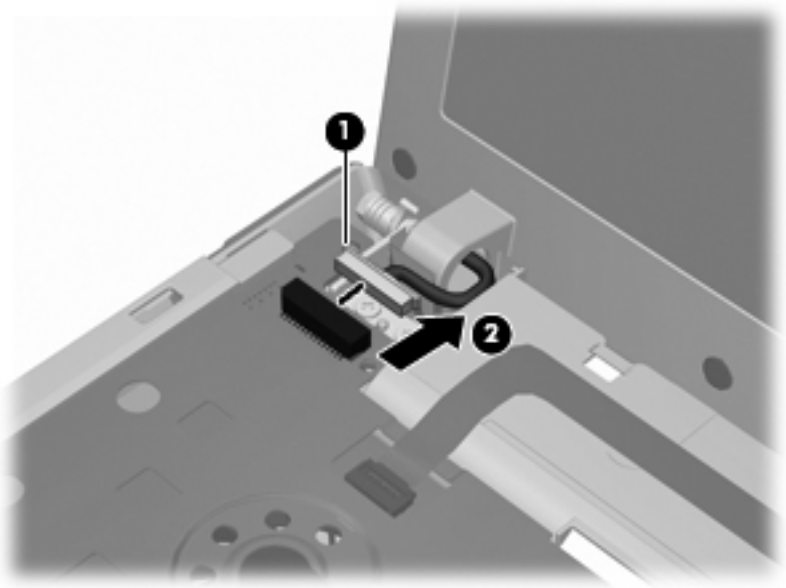
c. WWAN cables (see WWAN module on page 45)

d. WLAN cables (see WLAN module on page 42)

e. Top cover (see Top cover on page 56)

Remove the display assembly:

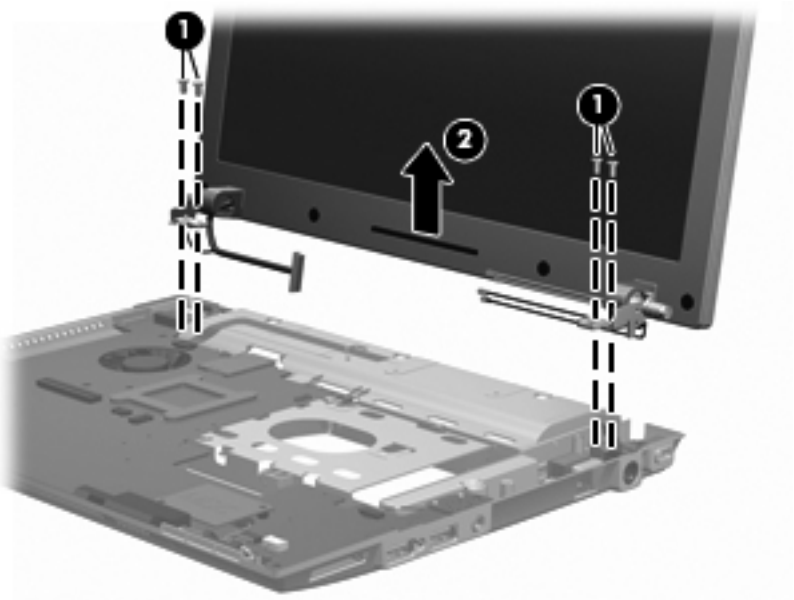
1. Disconnect the display cable **(1)** from the system board **(2)**.



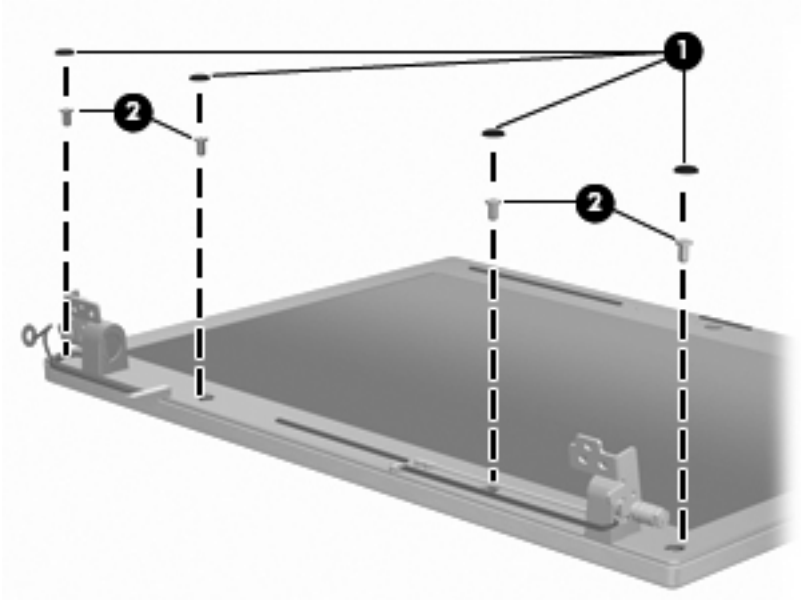
△ **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

2. Remove the four PM2.5×5.0 screws **(1)** that secure the display assembly to the base enclosure.

3. Lift the display assembly **(2)** straight up and remove it from the base enclosure.



4. If it is necessary to replace the display bezel, display enclosure, or display hinges, remove the four Mylar screw covers **(1)** and the four PM2.5×5.0 screws **(2)** that secure the display bezel to the display assembly. The screw covers are available in the Rubber Kit, spare part number 610829-001.



5. Remove the bezel:

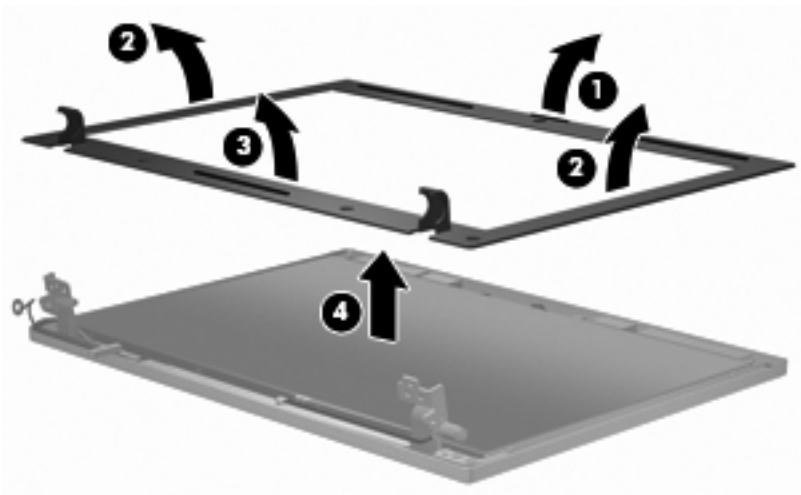
   a. Flex the top **(1)** of the bezel from the inside edge until it disengages from the display back cover.

   b. Flex the inside edge of the left side and the right side **(2)** of the bezel until it disengages from the display back cover.

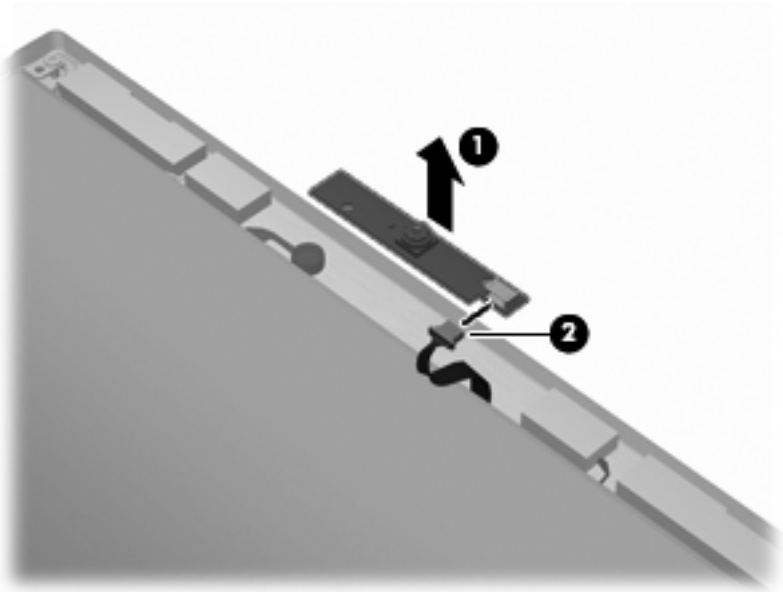
   c. Flex the bottom **(3)** of the bezel from the inside edge until it disengages from the display back cover.

   d. Remove the display bezel from the display back cover **(4)**.

NOTE: While removing the display bezel, gently remove the double-sided tape that attaches the bezel to the display panel.



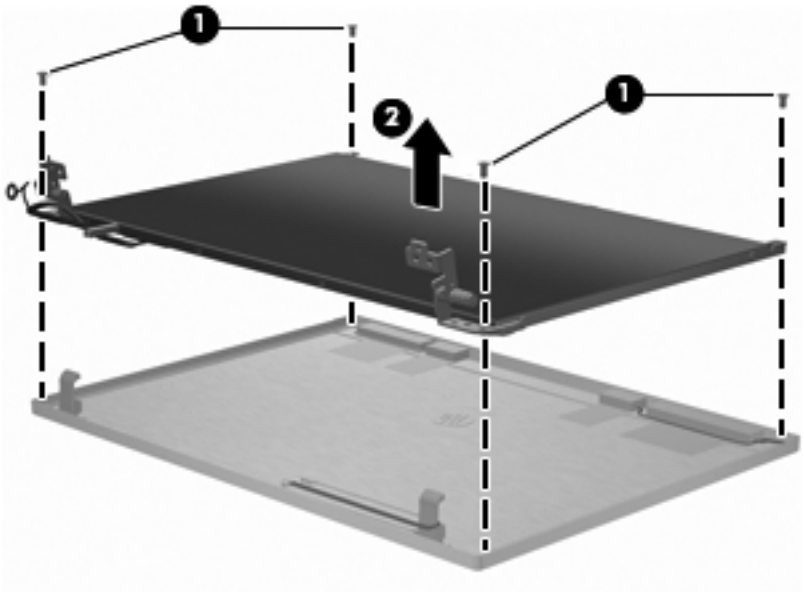
6. If it is necessary to replace the webcam module, gently pull the webcam module away from the double-sided tape on the display back cover **(1)**, disconnect the webcam cable from the module **(2)**, and then remove the webcam.



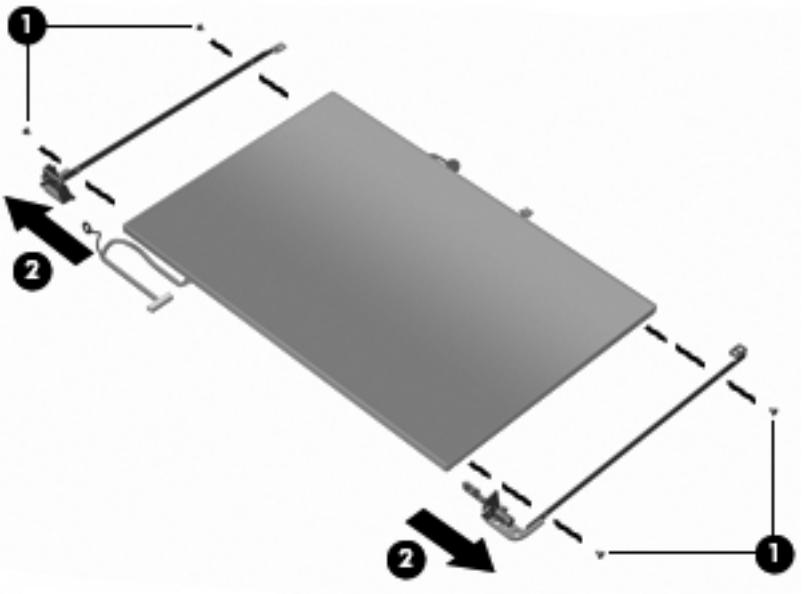
NOTE: To replace the webcam module in the display enclosure, align the holes on the webcam module with the pins on the display enclosure and press onto the double-sided tape.

7. If it is necessary to replace the display hinges, remove the display panel by removing the two PM2.5×5.0 screws and the two PM2.5×3.0 screws **(1)** that secure the panel to the display back cover.

8. Remove the display panel **(2)**.



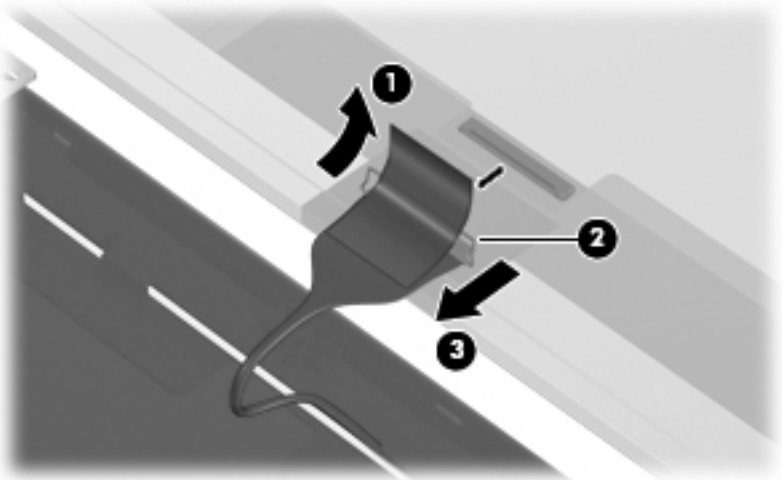
9. Remove the four PM2.0×3.0 screws **(1)** that secure the display hinges to the display panel, and then remove the display hinges **(2)**. The left and right display hinges are available in the Display Hinge Kit, spare part number 610817-001.



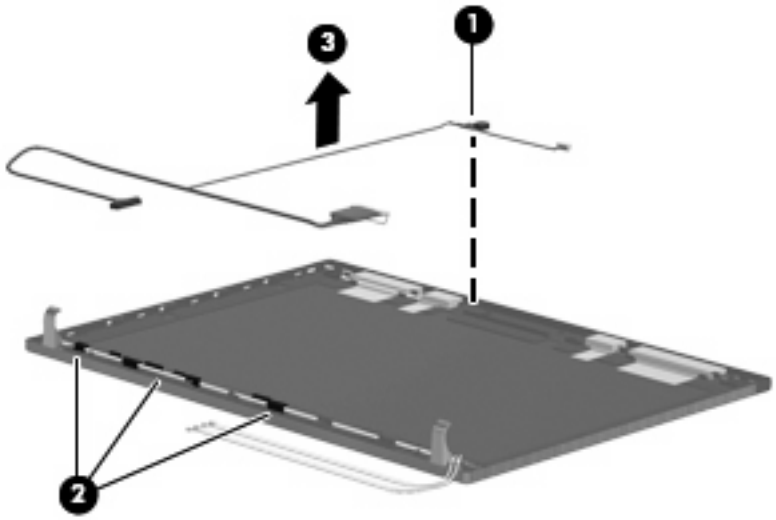
10. If it is necessary to replace the display/webcam cable, turn the display panel upside down and peel back the tape that secures the display cable to the display panel **(1)**, and then release the connector locking bar **(2)**.

11. Release the cable from the display panel connector **(3)**.

NOTE: The display cable includes the microphone and, on select models, the webcam connector.

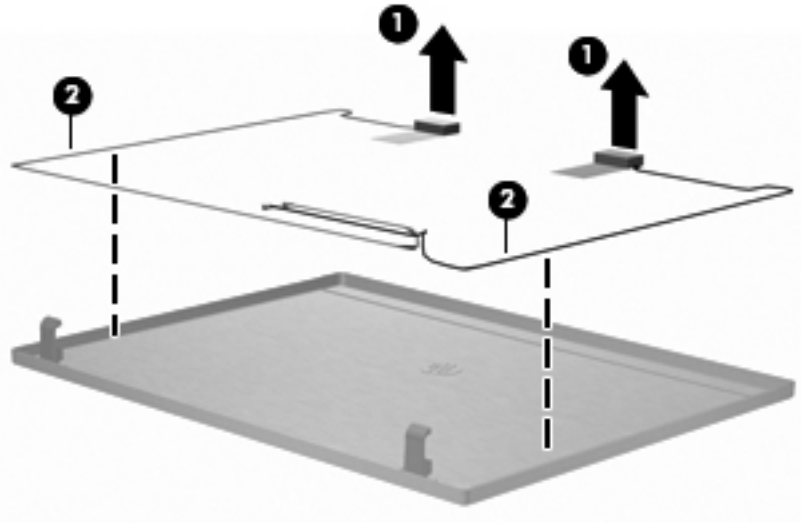


12. Gently pull the integrated microphone **(1)** from the clips at the top of the display back cover, remove the display cable from the clips and routing channels **(2)** along the bottom of the display back cover, and then remove the display cable **(3)**.



13. If it is necessary to remove the wireless antennas and cables:

    a. Detach the WLAN antennas and the WWAN antennas **(1)** from the adhesive on the back cover, and then route the cables through the clips **(2)** that secure the antenna cables to the display back cover.



    b. Remove the wireless antennas and cables.

Reverse this procedure to reassemble and install the display assembly.

Modem module

Description	Spare part number
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, 610806-001. See Cable Kit on page 27 for more Cable Kit spare part information.	
High-speed 56K modem	510100-011

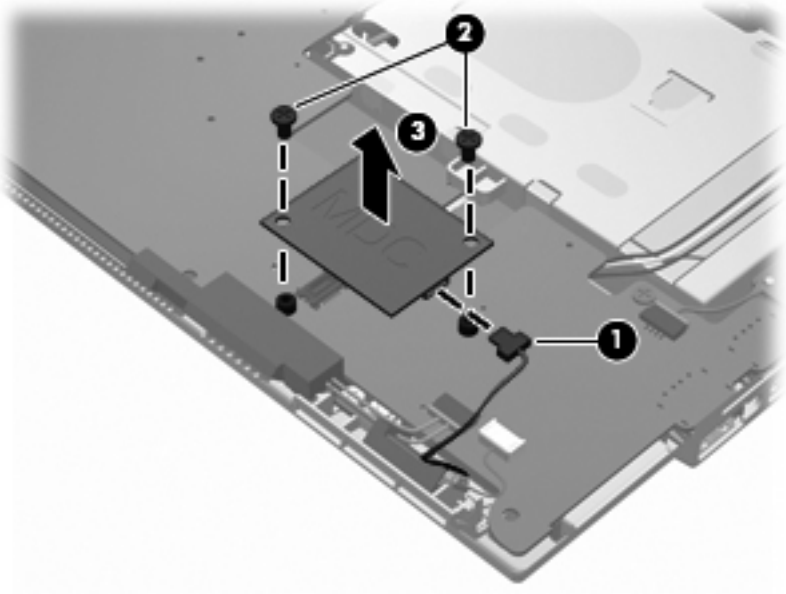
Before removing the modem module, follow these steps:

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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)

Remove the modem module:

1. Position the computer right-side up with the front toward you.
2. Disconnect the modem module cable **(1)**.
3. Remove the two PM2.0×3.0 screws **(2)** that secure the modem module to the system board.

4. Lift the modem module **(3)** straight up to disconnect it from the system board.



5. Remove the modem module.

Reverse this procedure to install the modem module.

Bluetooth module

Description	Spare part number
Bluetooth module	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 610806-001. See Cable Kit on page 27) for more Cable Kit spare part information.	

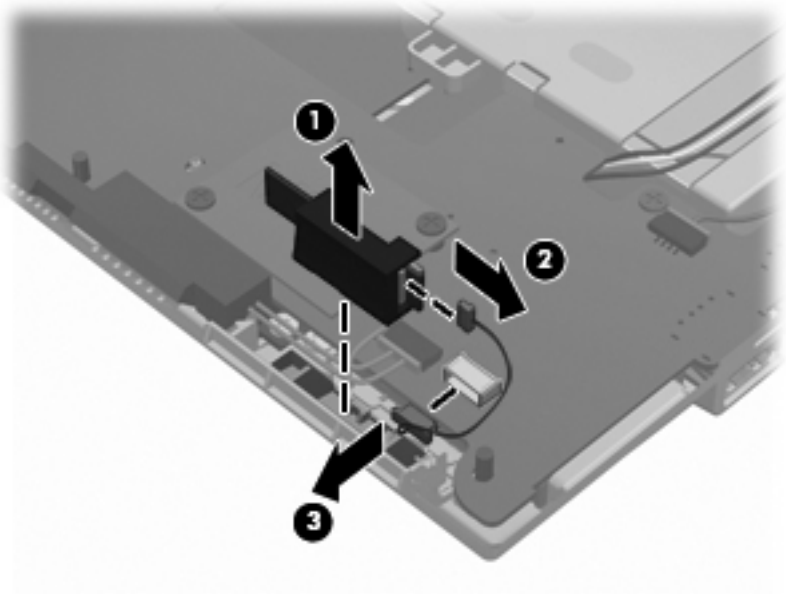
Before removing the Bluetooth module, follow these steps:

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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)

Remove the Bluetooth module:

1. Position the computer right-side up with the front toward you.
2. Remove the Bluetooth module from the base enclosure **(1)**.
3. Disconnect the Bluetooth module cable **(2)**, and then remove the Bluetooth module.

4. Remove the Bluetooth module cable **(3)** from the system board.



Reverse this procedure to install the Bluetooth module.

Audio board

Description	Spare part number
Audio board (includes cable)	610805-001

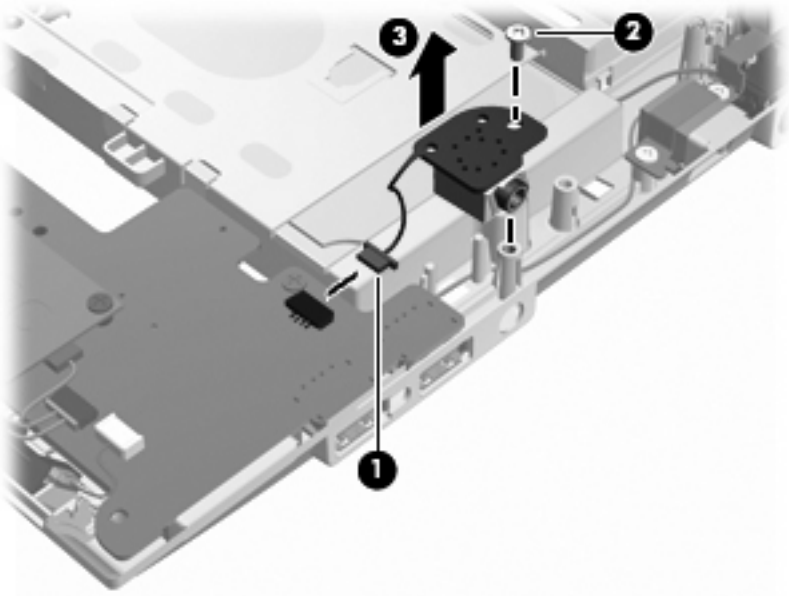
Before removing the audio board, follow these steps:

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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)

Remove the audio board:

1. Disconnect the audio board cable **(1)** from the system board.
2. Remove the PM 2.5x5.0 screw **(2)**.

3. Lift the audio board **(3)** straight up from the base enclosure.



Reverse this procedure to install the audio board.

RTC battery

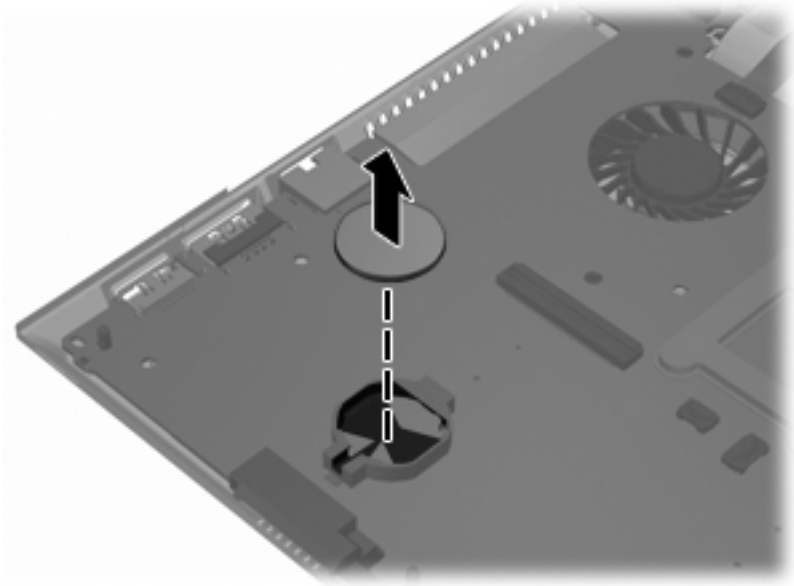
Description	Spare part number
RTC battery	599516-001

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 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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)

Remove the RTC battery:

1. Use a sharp, non-conductive tool to release the clip that secures the battery to the system board.
2. Lift the battery out of the computer.



To install the RTC battery, press it down into the socket until it is seated.

System board

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

Description	Spare part number
System board (includes replacement thermal material)	
• Includes Intel Arrandale I3-350M 2.26-GHz processor	610803-001
• Includes Intel Arrandale I5-540M 2.53-GHz processor	611373-001
• Includes Intel Arrandale I5-450M 2.4-GHz processor	614534-001
• Includes Intel Arrandale I5-520M 2.4-GHz processor	614535-001
• Includes Intel Celeron U3400 1.06-GHz processor	614536-001

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 40).
5. Remove the following components:
   a. SIM (see SIM on page 42)
   b. Switch cover (see Switch cover on page 51)
   c. Keyboard (see Keyboard on page 53)
   d. WWAN module (see WWAN module on page 45)
   e. Bluetooth module and cable (see Bluetooth module on page 67)
   f. WLAN module (see WLAN module on page 42)
   g. Hard drive (see Hard drive on page 48)
   h. Top cover (see Top cover on page 56)

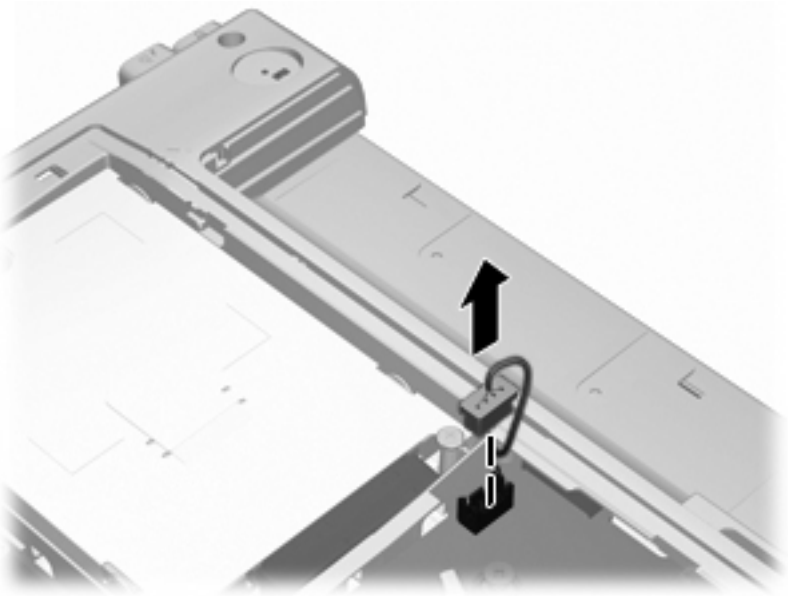
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see Memory module on page 47)
- WLAN module (see WLAN module on page 42)
- WWAN module (see WWAN module on page 45)
- Modem module (see Modem module on page 65)
- SIM (see SIM on page 42)

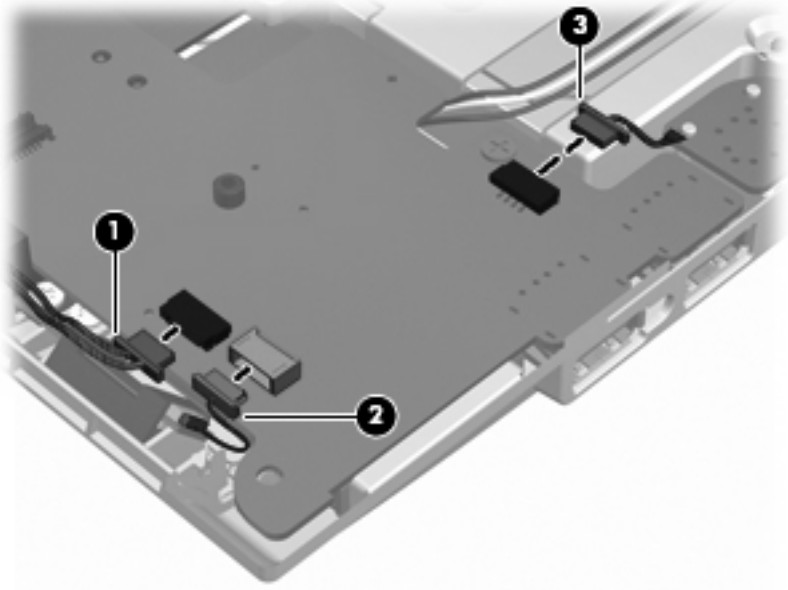
- Fan and heat sink (see Fan and heat sink on page 75)
- RTC battery (see RTC battery on page 70)

Remove the system board:

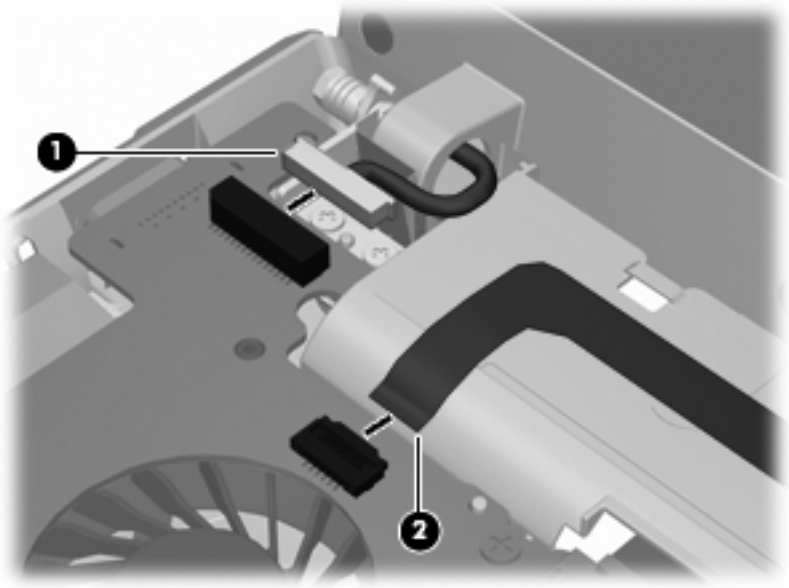
1. Position the computer upside down with the rear toward you.
2. Disconnect the power connector cable from the system board.



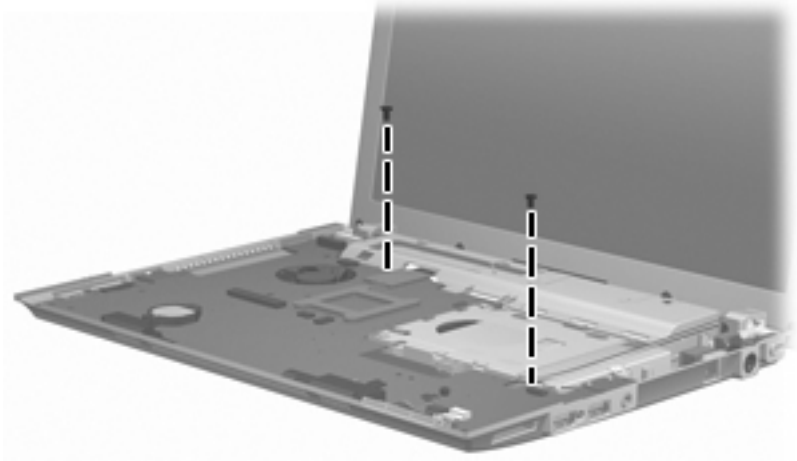
3. Position the computer right-side up with the front toward you.
4. Disconnect the speaker cable **(1)** from the system board.
5. Disconnect the Bluetooth cable **(2)** from the system board.
6. Disconnect the audio board cable **(3)** from the system board.



7. Disconnect the display panel cable **(1)** from the system board.
8. Disconnect the power button ZIF cable **(2)** from the system board.

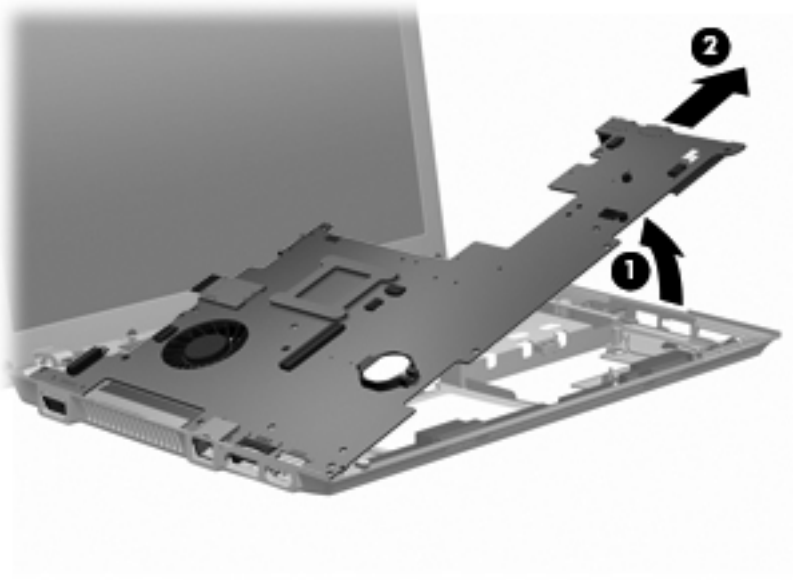


9. Remove the two PM2.5×5.0 screws that secure the system board to the base enclosure.



10. Lift the right side of the system board from the base enclosure **(1)**.

11. Lift the system board up and to the right to remove the system board **(2)**.



Reverse this procedure to install the system board.

Fan and heat sink

NOTE: The heat sink spare part kit includes replacement thermal material.

Description	Spare part number
Fan	610824-001
Heat sink	610825-001

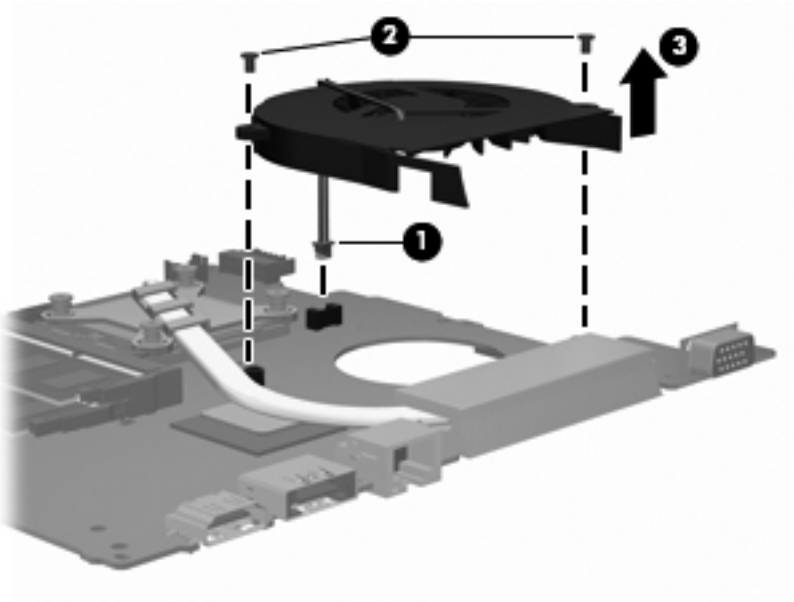
Before removing the heat sink, follow these steps:

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 40).
5. Remove the following components:
   a. SIM (see SIM on page 42)
   b. Switch cover (see Switch cover on page 51)
   c. Keyboard (see Keyboard on page 53)
   d. WWAN module (see WWAN module on page 45)
   e. Bluetooth module (see Bluetooth module on page 67)
   f. WLAN module (see WLAN module on page 42)
   g. Hard drive (see Hard drive on page 48)
   h. Top cover (see Top cover on page 56)
   i. System board (see System board on page 71)

Remove the heat sink:

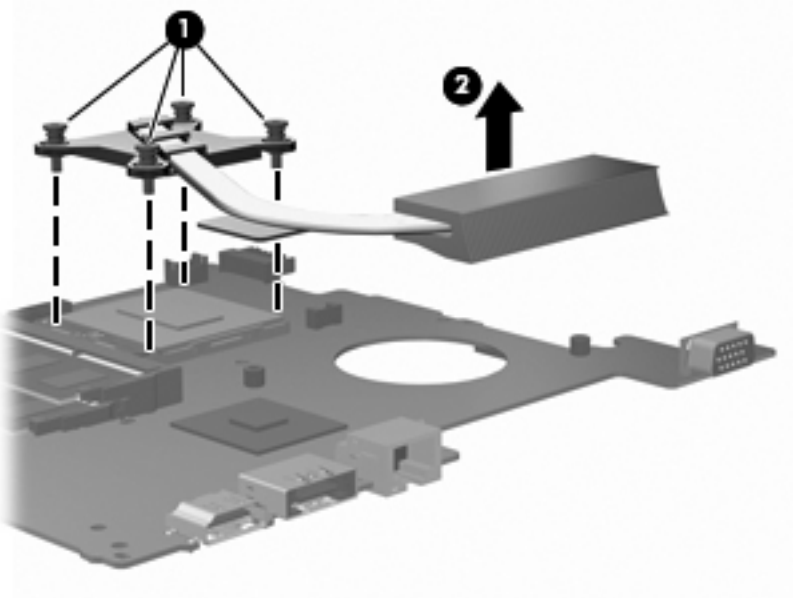
1. Position the system board upside down on a flat surface.
2. Disconnect the fan cable from the system board **(1)**.

3. Loosen the two PM2.0×5.0 captive screws **(2)** from the system board, and then remove the fan **(3)**.

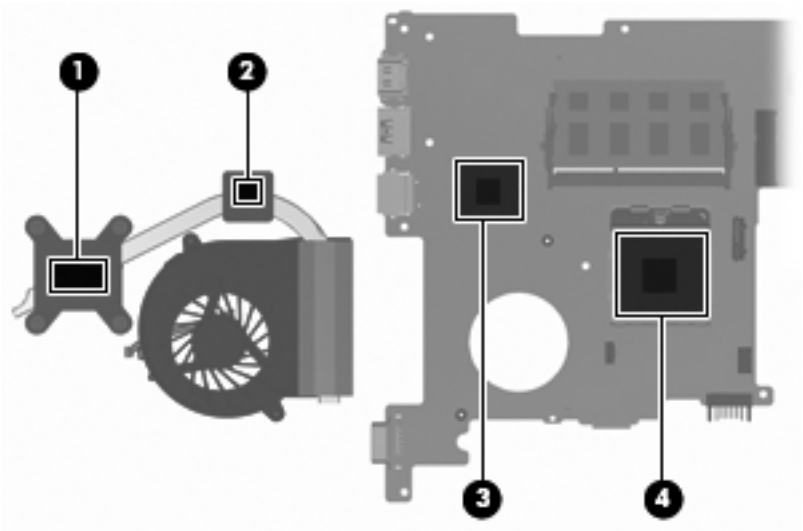


4. Following the sequence stamped into the heat sink, loosen the four PM2.5×10.0 captive screws **(1)** that secure the heat sink to the processor.

5. Lift the heat sink off the processor **(2)**.



NOTE: The thermal material must be thoroughly cleaned from the surfaces of the heat sink components **(1)** and **(2)**, and the system board components **(3)** and **(4)**, each time the heat sink is removed. Replacement thermal material is included with all heat sink and system board spare part kits.



Reverse this procedure to install the heat sink and fan.

Speakers

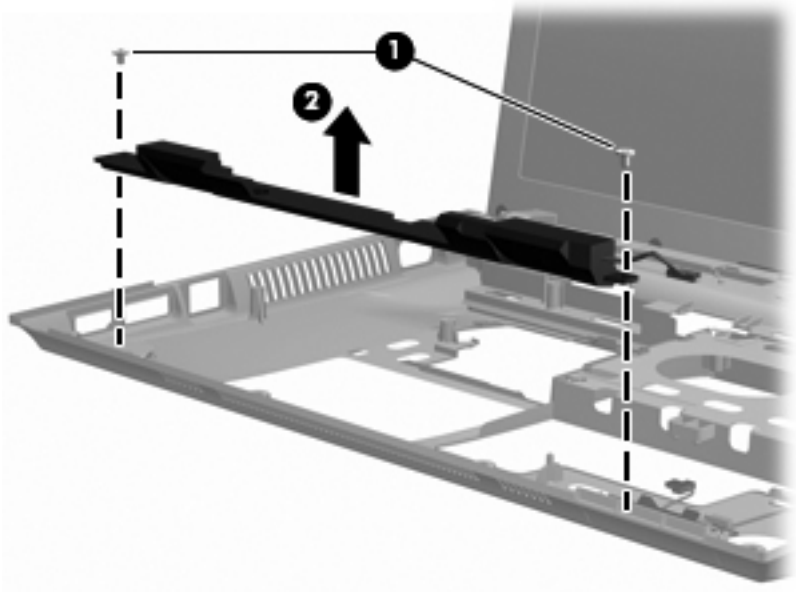
Description	Spare part number
Speakers	610831-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)
   d. System board (see System board on page 71)

Remove the speakers:

1. Position the computer right-side up with the front toward you.
2. Remove the two PM2.0×3.0 screws **(1)** that secure the speakers to the base enclosure.
3. Remove the speakers from the computer **(2)**.



Reverse this procedure to install the speakers.

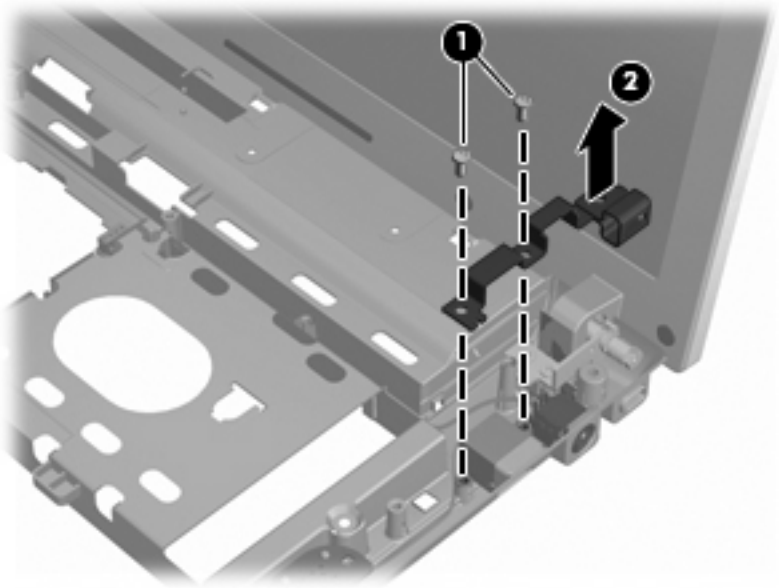
Security cable slot bracket

Before removing the security cable slot bracket, 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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)
   d. System board (see System board on page 71)

Remove the security cable slot bracket:

1. Position the computer right-side up with the right side toward you.
2. Remove the two PM2.0x5.0 screws **(1)** that secure the security cable slot bracket to the base enclosure.
3. Lift the bracket **(2)** from the rear at an angle up and out.



4. Disconnect the bracket from the power connector.

Reverse this procedure to install the security cable slot bracket.

Power connector cable

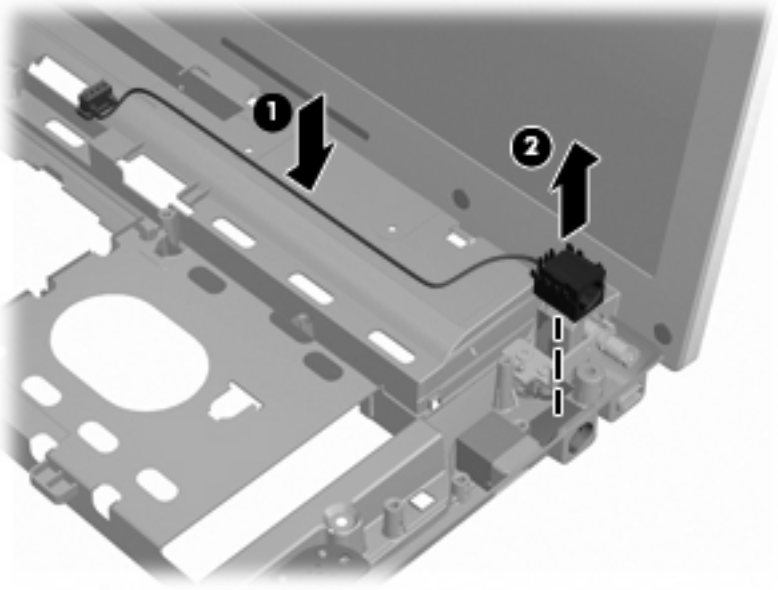
NOTE: The power connector cable is included in the Cable Kit on page 27, part number 610806-001.

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see Battery on page 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Top cover (see Top cover on page 56)
   d. System board (see System board on page 71)
   e. Security cable slot bracket (see Security cable slot bracket on page 79)

Remove the power connector cable.

1. Position the computer right-side up with the front toward you.
2. Remove the power connector cable **(1)** from the routing in the base enclosure.
3. Remove the power connector cable from the base enclosure **(2)**.



Reverse this procedure to install the power connector cable.

Modem module cable

NOTE: The modem module cable with RJ-11 connector is included in the Cable Kit on page 27, part number 610806-001.

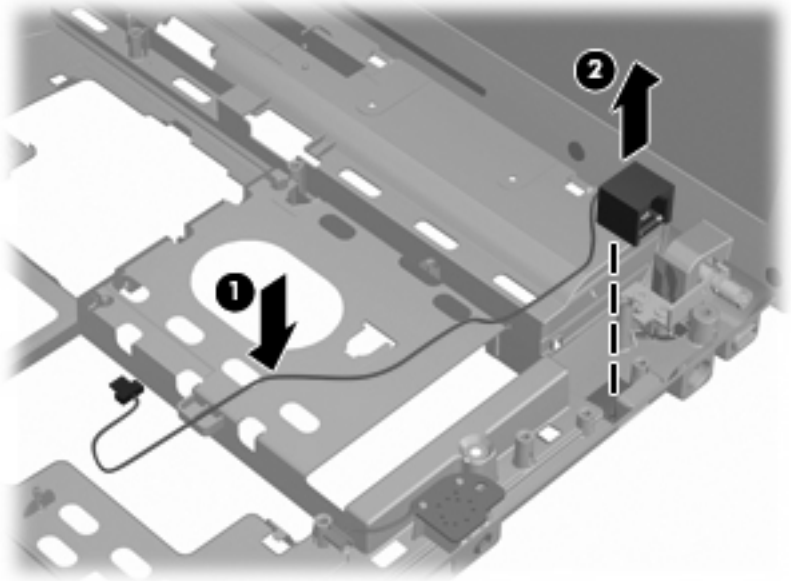
Before removing the modem module cable, follow these steps:

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 40).
5. Remove the following components:
   a. Switch cover (see Switch cover on page 51)
   b. Keyboard (see Keyboard on page 53)
   c. Speakers (see Speakers on page 78)
   d. Hard drive (see Hard drive on page 48)
   e. Display assembly (see Display assembly on page 59)
   f. Top cover (see Top cover on page 56)
   g. System board (see System board on page 71)
   h. Security cable slotbracket (see Security cable slot bracket on page 79)

Remove the modem cable.

1. Position the computer right-side up with the front toward you.
2. Release the modem RJ-11 connector from the base enclosure clips **(1)**.

3. Remove the modem cable **(2)** from the routing in the base enclosure.



Reverse this procedure to install the modem cable.

5 Computer Setup

Computer Setup in Windows 7

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer.

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 BIOS Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

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 BIOS Setup.
3. Select the **File**, **Security**, **Diagnostics**, or **System Configuration** menu.

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.

  – or –

- 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 BIOS 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.

Computer Setup menus

The menu tables in this section provide an overview of Computer Setup options.

NOTE: Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

File menu

Select	To do this
System Information	• View identification information for the computer and the batteries in the system. • View specification information for the processor, memory size, system ROM, video revision, keyboard controller version, and wireless identification numbers.
Set System Date and Time	Set or change the date and time on the computer.
System Diagnostic	Display the following information: • System Information ◦ Identification information for the computer and the batteries in the system. ◦ Specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version. • Start-up Test: verifies the system components needed for starting the computer. • Run-In Test: runs a comprehensive check on system memory. • Hard Disk Test: runs a comprehensive self-test on any hard drive in the system. • Memory Test: runs a comprehensive test on any memory installed in the computer. • Battery Test: runs a comprehensive test on any batteries installed in the computer. • Error Log: displays a log file if any errors have occurred.
Restore Defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Hard drive mode, password settings, and security settings are not changed when you restore the factory settings.)
Reset BIOS security to factory default	Resets password to the factory default in case of a forgotten password.
Ignore Changes and Exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save Changes and Exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

NOTE: Some of the menu items listed in this section may not be supported by your computer.

Select	To do this
Setup BIOS Administrator Password	Set up a BIOS administrator password.
User Management (requires a BIOS administrator password)	• Create a new BIOS user account. • View a list of HP ProtectTools users.
Password Policy (requires a BIOS administrator password)	Revise password policy criteria.
HP SpareKey	Enable/disable HP SpareKey (enabled by default).
Always Prompt for HP SpareKey Enrollment	Enable/disable HP SpareKey enrollment (enabled by default).
Anti Theft (select models only)	Enable/disable anti-theft protection.
Fingerprint Reset on Reboot (If Present)	Reset/clear the fingerprint reader ownership (disabled by default).
Allow reset of HP ProtectTools security keys	Enable/disable reset of HP ProtectTools security keys.
Change Password	Enter, change, or delete a BIOS administrator password.
HP SpareKey Enrollment	Enroll or reset HP SpareKey, which is a set of security questions and answers used if you forget your password.
DriveLock Passwords	• Enable/disable DriveLock on any computer hard drive (enabled by default). • Change a DriveLock user password or master password. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Automatic DriveLock	Enable/disable Automatic DriveLock support.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. **CAUTION:** If you run Disk Sanitizer, the data on the selected drive is destroyed permanently.
System IDs	Enter a user-defined computer asset tracking number and ownership tag.

System Configuration menu

NOTE: Some of the listed System Configuration options may not be supported by your computer.

Select	To do this
Language	Change the Computer Setup language.

Select	To do this
Boot Options	• Set a Startup Menu delay (in seconds). • Set the MultiBoot Express Boot Popup delay in seconds. • Enable/disable Custom Logo (disabled by default). • Enable/disable Display Diagnostic URL (enabled by default). • Enable/disable CD-ROM boot (enabled by default). • Enable/disable SD Card boot (enabled by default). • Enable/disable floppy boot (enabled by default). • Enable/disable PXE Internal NIC boot (enabled by default). • Enable/disable Unified Extensible Firmware Interface (UEFI) Boot Mode (disabled by default). • Set the Express Boot Popup delay in seconds. • Set the boot order.
Device Configurations	• Enable/disable USB legacy support (enabled by default). When enabled, USB legacy support allows the following: ◦ Use of a USB keyboard in Computer Setup even when a Windows® operating system is not running. ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or external optical drive connected by a USB port to the computer. • Enable/disable fan always on while connected to an AC outlet (enabled by default). • Enable/disable Data Execution Prevention. When enabled, the processor can disable some virus code execution, which helps to improve computer security. • Enable/disable LAN Power Save (select models only). When enabled, saves power by turning off the LAN when not in use (enabled by default). • SATA (Serial Advanced Technology Attachment) device mode. The following options are available: ◦ AHCI (Advanced Host Controller Interface) ◦ IDE (Integrated Drive Electronics)

Select	To do this
	NOTE: Availability of the options above varies by computer model. • Enable/disable HP DayStarter (enabled by default). • Enable/disable HP QuickLook (enabled by default). • Enable/disable Preboot Authentication on HP QuickLook Boot (disabled by default). • Enable/disable Virtualization Technology (select models only; disabled by default). • Enable/disable HP QuickWeb (enabled by default). • Enable/disable HP QuickWeb write protect (disabled by default). • Enable/disable Multi Core CPU (enabled by default). • Enable/disable Intel® HT Technology (enabled by default). • Enable/disable wake on USB (enabled by default). • Enable/disable Unified Extensible Firmware Interface (UEFI) mode (disabled by default). • Turn the Numlock state at boot on or off.

Select	To do this
Built-In Device Options	• Enable/disable the wireless button state (enabled by default). • Enable/disable the embedded WLAN device (enabled by default). • Enable/disable embedded WWAN device radio (select models only; enabled by default). • Enable/disable embedded Bluetooth® device radio (enabled by default). • Enable/disable the Network Interface Controller (LAN) (enabled by default). • Enable/disable LAN/WLAN switching (disabled by default). • Set the wake on LAN state. Options include the following: ◦ Disabled ◦ Boot to Network (set by default) ◦ Follow Boot Order • Enable/disable the fingerprint device (enabled by default). • Enable/disable a modem device (enabled by default). • Enable the ambient light sensor (enabled by default). • Enable/disable the Notebook MultiBay device (enabled by default). • Enable/disable the integrated camera (select models only; enabled by default). • Enable/disable the power monitor circuit (enabled by default). • Enable/disable the audio device (enabled by default). • Enable/disable optical disc drive (enabled by default). • Enable/disable internal microphone (enabled by default). • Enable/disable the internal speakers (enabled by default).
Port Options (all are enabled by default)	**NOTE:** All port options are enabled by default. • Enable/disable the Smart Card slot. • Enable/disable the flash media reader. • Enable/disable the USB port. **CAUTION:** Disabling the USB port also disables MultiBay devices on the advanced port replicator. • Enable/disable the 1394 port. • Enable/disable the eSATA port.

Select	To do this
Set Security Level	Change, view, or hide security levels for all BIOS menu items.
Restore Security Defaults	Restore the default security settings.

Computer Setup in Windows Vista and Windows XP

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer.

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 BIOS Setup.

Using Computer Setup

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

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 BIOS Setup.
3. Select the **File**, **Security**, **Diagnostics**, or **System Configuration** menu.

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.

  – or –

- 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 BIOS 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.

Computer Setup menus

The menu tables in this section provide an overview of Computer Setup options.

NOTE: Some of the Computer Setup menu items listed in this chapter may not be supported by your computer.

File menu

Select	To do this
System Information	• View identification information for the computer and the batteries in the system. • View specification information for the processor, memory size, system ROM, video revision, keyboard controller version, and wireless identification numbers.
Set System Date and Time	Set or change the date and time on the computer.
System Diagnostic	Display the following information: • System Information ◦ Identification information for the computer and the batteries in the system. ◦ Specification information for the processor, cache and memory size, system ROM, video revision, and keyboard controller version. • Start-up Test: verifies the system components needed for starting the computer. • Run-In Test: runs a comprehensive check on system memory. • Hard Disk Test: runs a comprehensive self-test on any hard drive in the system. • Memory Test: runs a comprehensive test on any memory installed in the computer. • Battery Test: runs a comprehensive test on any batteries installed in the computer. • Error Log: displays a log file if any errors have occurred.
Restore Defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Hard drive mode, password settings, and security settings are not changed when you restore the factory settings.)
Reset BIOS security to factory default	Resets password to the factory default in case of a forgotten password.
Ignore Changes and Exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save Changes and Exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

NOTE: Some of the menu items listed in this section may not be supported by your computer.

Select	To do this
Setup BIOS Administrator Password	Set up a BIOS administrator password.
User Management (requires a BIOS administrator password)	• Create a new BIOS user account. • View a list of HP ProtectTools users.
Password Policy (requires a BIOS administrator password)	Revise password policy criteria.
HP SpareKey	Enable/disable HP SpareKey (enabled by default).
Always Prompt for HP SpareKey Enrollment	Enable/disable HP SpareKey enrollment (enabled by default).
Anti Theft (select models only)	Enable/disable anti-theft protection.
Fingerprint Reset on Reboot (If Present)	Reset/clear the fingerprint reader ownership (disabled by default).
Allow reset of HP ProtectTools security keys	Enable/disable reset of HP ProtectTools security keys.
Change Password	Enter, change, or delete a BIOS administrator password.
HP SpareKey Enrollment	Enroll or reset HP SpareKey, which is a set of security questions and answers used if you forget your password.
DriveLock Passwords	• Enable/disable DriveLock on any computer hard drive (enabled by default). • Change a DriveLock user password or master password. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
Automatic DriveLock	Enable/disable Automatic DriveLock support.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. **CAUTION:** If you run Disk Sanitizer, the data on the selected drive is destroyed permanently.
System IDs	Enter a user-defined computer asset tracking number and ownership tag.

System Configuration menu

NOTE: Some of the listed System Configuration options may not be supported by your computer.

Select	To do this
Language	Change the Computer Setup language.

Select	To do this
Boot Options	• Set a Startup Menu delay (in seconds). • Set the MultiBoot Express Boot Popup delay in seconds. • Enable/disable Custom Logo (disabled by default). • Enable/disable Display Diagnostic URL (enabled by default). • Enable/disable CD-ROM boot (enabled by default). • Enable/disable SD Card boot (enabled by default). • Enable/disable floppy boot (enabled by default). • Enable/disable PXE Internal NIC boot (enabled by default). • Enable/disable Unified Extensible Firmware Interface (UEFI) Boot Mode (disabled by default). • Set the Express Boot Popup delay in seconds. • Set the boot order.
Device Configurations	• Enable/disable USB legacy support (enabled by default). When enabled, USB legacy support allows the following: ◦ Use of a USB keyboard in Computer Setup even when a Windows® operating system is not running. ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or external optical drive connected by a USB port to the computer. • Enable/disable fan always on while connected to an AC outlet (enabled by default). • Enable/disable Data Execution Prevention. When enabled, the processor can disable some virus code execution, which helps to improve computer security. • Enable/disable LAN Power Save (select models only). When enabled, saves power by turning off the LAN when not in use (enabled by default). • SATA (Serial Advanced Technology Attachment) device mode. The following options are available: ◦ AHCI (Advanced Host Controller Interface) ◦ IDE (Integrated Drive Electronics)

Select	To do this
	NOTE: Availability of the options above varies by computer model. • Enable/disable HP DayStarter (enabled by default). • Enable/disable HP QuickLook (enabled by default). • Enable/disable Preboot Authentication on HP QuickLook Boot (disabled by default). • Enable/disable Virtualization Technology (select models only; disabled by default). • Enable/disable HP QuickWeb (enabled by default). • Enable/disable HP QuickWeb write protect (disabled by default). • Enable/disable Multi Core CPU (enabled by default). • Enable/disable Intel® HT Technology (enabled by default). • Enable/disable wake on USB (enabled by default). • Enable/disable Unified Extensible Firmware Interface (UEFI) mode (disabled by default). • Turn the Numlock state at boot on or off.

Select	To do this
Built-In Device Options	• Enable/disable the wireless button state (enabled by default). • Enable/disable the embedded WLAN device (enabled by default). • Enable/disable embedded WWAN device radio (select models only; enabled by default). • Enable/disable embedded Bluetooth® device radio (enabled by default). • Enable/disable the Network Interface Controller (LAN) (enabled by default). • Enable/disable LAN/WLAN switching (disabled by default). • Set the wake on LAN state. Options include the following: ◦ Disabled ◦ Boot to Network (set by default) ◦ Follow Boot Order • Enable/disable the fingerprint device (enabled by default). • Enable/disable a modem device (enabled by default). • Enable the ambient light sensor (enabled by default). • Enable/disable the Notebook MultiBay device (enabled by default). • Enable/disable the integrated camera (select models only; enabled by default). • Enable/disable the power monitor circuit (enabled by default). • Enable/disable the audio device (enabled by default). • Enable/disable optical disc drive (enabled by default).. • Enable/disable internal microphone (enabled by default). • Enable/disable the internal speakers (enabled by default).
Port Options (all are enabled by default)	**NOTE:** All port options are enabled by default. • Enable/disable the Smart Card slot. • Enable/disable the flash media reader. • Enable/disable the USB port. **CAUTION:** Disabling the USB port also disables MultiBay devices on the advanced port replicator. • Enable/disable the 1394 port. • Enable/disable the eSATA port.

Select	To do this
Set Security Level	Change, view, or hide security levels for all BIOS menu items.
Restore Security Defaults	Restore the default security settings.

Computer Setup in Linux

Starting Computer Setup

Computer Setup is a preinstalled, ROM-based utility that can be used even when the operating system is not working or will not load.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer or your operating system.

NOTE: Pointing devices are not supported in Computer Setup. You must use the keyboard to navigate and make selections.

NOTE: An external keyboard connected by USB 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.
2. Before your operating system opens and while the “F10=ROM Based Setup” message is displayed in the lower-left corner of the screen, press f10.

Using Computer Setup

Navigating and selecting in Computer Setup

The information and settings in Computer Setup are accessed from the File, Security, Diagnostics, and System Configuration menus.

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.

   Because Computer Setup is not operating system based, it does not support the TouchPad. Navigation and selection are by keystroke:

   - To choose a menu or a menu item, use the arrow keys.
   - To select an item, press enter.
   - To close open dialog boxes and return to the main Computer Setup screen, press esc.
   - To view navigation information, press f1.
   - To change the language, press f2.

2. Select the **File**, **Security**, **Diagnostics**, or **System Configuration** menu.
3. To exit Computer Setup, choose one of the following methods:

   - To exit Computer Setup without saving your preferences, use the arrow keys to select **File > Ignore Changes And Exit**. Then follow the instructions on the screen.
   - To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes And Exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

Restoring factory settings in Computer Setup

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

1. Open Computer Setup by turning on or restarting the computer, and then pressing f10 while the "F10 = ROM Based Setup" message is displayed in the lower-left corner of the screen.
2. Use the arrow keys to select **File > Restore Defaults**, and then press enter.
3. When the confirmation dialog box opens, press f10.
4. To save your preferences and exit Computer Setup, use the arrow keys to select **File > Save Changes And Exit**. Then follow the instructions on the screen.

Your preferences go into effect when the computer restarts.

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

Computer Setup menus

The menu tables in this section provide an overview of Computer Setup options.

NOTE: Some of the Computer Setup menu items listed in this guide may not be supported by your computer or your operating system.

File menu

NOTE: Some of the menu items listed in this section may not be supported by your computer or your operating system.

Select	To do this
System information	• View identification information for the computer. • View specification information for the processor, cache and memory size, and system ROM.
Restore Defaults	Replace the configuration settings in Computer Setup with the original factory settings. (Password settings and security settings are not changed when you restore the factory settings.)
Ignore Changes And Exit	Cancel any changes entered during the current session. Then exit and restart the computer.
Save Changes And Exit	Save any changes entered during the current session. Then exit and restart the computer. Your changes go into effect when the computer restarts.

Security menu

NOTE: Some of the menu items listed in this section may not be supported by your computer or your operating system.

Select	To do this
Setup Password	Enter, change, or delete a setup password.

Select	To do this
Password Options	• Enable/disable stringent security. • Enable/disable the password requirement on computer restart.
DriveLock Passwords	• Enable/disable DriveLock on any computer hard drive. • Enter, change, or disable DriveLock on an optional MultiBay hard drive. **NOTE:** DriveLock settings are accessible only when you enter Computer Setup by turning on (not restarting) the computer.
System IDs	Enter a user-defined computer asset tracking number and ownership tag.
Disk Sanitizer	Run Disk Sanitizer to destroy all existing data on the primary hard drive. The following options are available: • Fast: Runs the Disk Sanitizer erase cycle once. • Optimum: Runs the Disk Sanitizer erase cycle 3 times. • Custom: Allows you to select the desired number of Disk Sanitizer erase cycles from a list. **CAUTION:** If you run Disk Sanitizer, the data on the primary hard drive is destroyed permanently.

Diagnostics menu

NOTE: Some of the menu items listed in this section may not be supported by your computer or your operating system.

Select	To do this
HDD Self-Test Options	Run a comprehensive self-test on any hard drive in the system or on any optional MultiBay hard drive.
Memory Check	Run a comprehensive check on system memory.

System Configuration menu

NOTE: Some of the menu items listed in this section may not be supported by your computer or your operating system.

Select	To do this
Language	Change the Computer Setup language.
Boot options	• Set an f9, f10, and f12 delay when starting up. • Enable/disable CD-ROM boot. • Enable/disable floppy boot. • Enable/disable internal network adapter boot. • Enable/disable MultiBoot, which sets a boot order that can include most boot devices in the system. • Set the Express Boot Popup delay in seconds. • Set the boot order. ◦ 1st boot device: USB CD-ROM ◦ 2nd boot device: USB floppy ◦ 3rd boot device: USB SuperDisk ◦ 4th boot device: Notebook hard drive ◦ 5th boot device: USB hard disk ◦ 6th boot device: Network controller
Device Configurations	• Swap the functions of the fn key and left ctrl key. • Enable/disable USB legacy support. When enabled, USB legacy support allows the following: ◦ Use of a USB keyboard in Computer Setup even when a your operating system is not running. ◦ Startup from bootable USB devices, including a hard drive, diskette drive, or optical drive connected by a USB port to the computer. • Enable/disable BIOS DMA data transfers. • Enable/disable fan always on while connected to an AC outlet. • Enable/disable data execution prevention. • Enable/disable LAN power saving mode. • Enable/disable SATA Native Mode. • Enable/disable Dual Core CPU. • Enable/disable HDD translation mode.

Select	To do this
Built-in device options	• Enable/disable embedded WLAN Device Radio. • Enable/disable embedded Bluetooth Device Radio. • Enable/disable Network Interface Controller (NIC) • Enable/disable LAN/WLAN Switching. • Enable/disable Wake on LAN. • Enable/disable the integrated camera (webcam)
Port options	• Enable/disable USB port. • Enable/disable ExpressCard slot.

6 Specifications

Computer specifications

Dimensions	
Depth	**21.2** cm (8.3 in)
Width	**29.0 cm** (11.4 in)
Height (front to rear)	**2.43 mm** (0.96 in)
Weight	
• With 4-cell battery, no WWAN, no Bluetooth, no modem and one memory module **NOTE:** Weight varies by configuration and components.	< **2.50 kg** (3.3 lbs)
Input power	
Operating voltage	18.5 V dc @ 4.74 A – 90 W
Operating current	4.74 A
Temperature	
Operating (not writing to optical disc)	**0°C to 35°C** (32°F to 95°F)
Operating (writing to optical disc)	**5°C to 35°C** (41°F to 95°F)
Nonoperating	**-20°C to 60°C** (-4°F to 140°F)
Relative humidity	
Operating	10% to 90%
Nonoperating	5% to 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
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.	

30.7-cm (12.1-in) WXGA AntiGlare display specifications

Dimensions	
Height	**16.3 cm** (6.4 in)
Width	**26.1 cm** (10.3 in)
Diagonal	**30.7 cm** (12.1 in)
Number of colors	Up to 16.8 million
Contrast ratio	300:1 (typical)
Brightness	200 nits (typical)
Pixel resolution	
Pitch	0.204 × 0.204 mm
Format	SD: 1280×800
Configuration	RGB vertical stripe
Backlight	LED
Character display	80 × 25
Total power consumption	4.0 W
Viewing angle	±30° horizontal, ±10° vertical (minimum)

30.7-cm (12.1-in) WXGA BrightView display specifications

Dimensions	
Height	**16.3 cm** (6.4 in)
Width	**26.1 cm** (10.3 in)
Diagonal	**30.7 cm** (12.1 in)
Number of colors	Up to 16.8 million
Contrast ratio	300:1 (typical)
Brightness	200 nits (typical)
Pixel resolution	
Pitch	0.204 × .204 mm
Format	HD 1280x800
Configuration	RGB vertical stripe
Backlight	LED
Character display	80 × 25
Total power consumption	4.0 W
Viewing angle	±30° horizontal, ±10° vertical (minimum)

Hard drive specifications

	500-GB*	320-GB*	250-GB*	80-GB SSD*
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	115 g	115 g	86 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	2.0 ms	2.0 ms	2.0 ms	
Average	12.0 ms	12.0 ms	12.0 ms	
Maximum	22.0 ms	22.0 ms	22.0 ms	
Logical blocks	976,773,168	625,142,448	488,397,168	156,301,488
Disc rotational speed	7200 rpm	7200 rpm	7200 rpm	
Operating temperature	**0°C to 60°C** (32°F to 140°F)	**0°C to 60°C** (32°F to 140°F)	**0°C to 60°C** (32°F to 140°F)	**0°C to 70°C** (32°F to 158°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.

7 Backup and recovery

Windows 7 backup and 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), 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)
- Backing up individual files and folders
- 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.

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

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create system repair discs (select models only) 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.

  To create a screen shot:

  1. Display the screen you want to save.
  2. Copy the screen image:

     To copy only the active window, press **alt+fn+prt sc**.

     To copy the entire screen, press **fn+prt sc**.
  3. Open a word-processing document, and then select **Edit > Paste**.

     The screen image is added to the document.
  4. Save the document.

- 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 attached to 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 external optical drive attached to your computer.

To create a backup using Backup and Restore, follow these steps:

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).

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 Windows Help and Support for more information.

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 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 the “Using a Windows 7 operating system DVD (purchased separately)” section in this guide.

Using the Windows recovery tools

To recover information you previously backed up, follow these steps:

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.

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 Windows Help and Support for more information.

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, select **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 the “Using a Windows 7 operating system DVD (purchased separately)” section in this guide.

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

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.

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: select **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 the “Using a Windows 7 operating system DVD (purchased separately)” section in this guide.

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)

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. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. To order a Windows 7 operating system DVD, go to http://www.hp.com/support, select your country or region, and then 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, follow these steps:

NOTE: This process takes several minutes. Before rebooting, make sure you have changed the legacy boot order in the F10 utility so that the USB CD-ROM drive is the first choice.

1. If possible, back up all personal files.
2. Restart the computer, and then insert the Windows 7 operating system DVD into the external 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.

Windows Vista backup and recovery

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), create system repair discs (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:

- Creating a system repair disc (select models only)
- 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.

Backing up your information

Recovery after a system failure is as complete as your most current backup. You should create system repair discs (select models only) 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 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.

  To create a screen shot:

  1. Display the screen you want to save.
  2. Copy the screen image:

     To copy only the active window, press alt+fn+prt sc.

     To copy the entire screen, press fn+prt sc.

3. Open a word-processing document, and then select **Edit > Paste**.

   The screen image is added to the document.

4. Save the document.

- 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 connected to 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 external optical drive.

To create a backup using Backup and Restore Center, follow these steps:

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 set up your backup, create a system image (select models only), or create a system repair disc (select models only).

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.

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 and you cannot use the system repair discs you previously created (select models only), you must purchase a Vista operating system DVD to reboot the computer and repair the operating system. For additional information, refer to the “Using a Vista operating system DVD (purchased separately)” section in this guide.

Using the Windows recovery tools

To recover information you previously backed up, follow these steps:

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

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.

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 are not listed, 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 the “Using a Windows Vista operating system DVD (purchased separately)” section in this guide.
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 is not listed, 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 the “Using a Windows Vista operating system DVD (purchased separately)” section in this guide.
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)

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. Make sure that your most recent backup (stored on discs or on an external drive) is easily accessible. 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, follow these steps:

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.

Windows XP backup and recovery

To protect your information, use the Windows Backup utility (select models only) to back up files and folders or create recovery points. In case of system failure, you can use the backup files to restore your computer.

Windows provides the following options:

- Backing up individual files and folders
- Backing up all files and folders
- Scheduling automatic backups
- Creating recovery points
- Recovering information

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.

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 individual files or folders to an optional external hard drive or to a network drive.

Note the following when backing up:

- Store personal files in the My Documents folder, and back it up periodically.
- Back up templates 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.

  To copy the screen and paste it into a word-processing document:

  a. Display the screen you want to save.

  b. Copy the screen image:

  To copy only the active window, press alt+fn+prt sc.

  To copy the entire screen, press fn+prt sc.

  c. Open a word-processing document, click **Edit > Paste**.

  The screen image is added to the document.

  d. Save the document.

To create a backup using the Windows Backup utility (select models only), follow these steps:

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. Click **Start > All Programs > Accessories > System Tools > Backup**.
2. Follow the on-screen instructions.

Performing a recovery

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

- Windows recovery tools (select models only): You can use the Windows Backup utility to recover information you have previously backed up.
- *Operating System* and *Driver Recovery* discs (included with your computer): You can use the discs to recover your operating system and programs installed at the factory.

Recovering your information

To recover information you previously backed up, follow these steps:

1. If possible, back up all personal files.
2. Click **Start > All Programs > Accessories > System Tools > Backup**.

   The Backup or Restore Wizard opens.
3. Click **Restore files and settings**, and then click **Next**.
4. Follow the on-screen instructions.

NOTE: For additional information on initiating a recovery in Windows, perform a search for this topic in Help and Support.

Recovering the operating system and programs

CAUTION: The recovery process reformats and completely erases the hard drive. All files you have created and any software installed on the computer are permanently removed. The recovery process reinstalls the original operating system as well as software and drivers. Software, drivers, and updates not installed by HP must be manually reinstalled. Personal files must be restored from a backup.

To recover your operating system and programs, follow these steps:

1. If possible, back up all personal files.
2. Insert the *Operating System* disc into the optical drive.
3. Shut down the computer.
4. Turn on the computer.
5. Follow the on-screen instructions to install the operating system.
6. After the operating system is installed, remove the *Operating System* disc and insert the *Driver Recovery* disc.
7. Follow the on-screen instructions to install the drivers and programs.

Linux backup and recovery

Use the instructions in this section if SUSE Linux SLED 11 is installed on your computer.

To protect your information, back up your files and folders. Then if the system fails, you can restore your important files from copies. You can also use the options listed in this section to restore the operating system and programs that were installed at the factory.

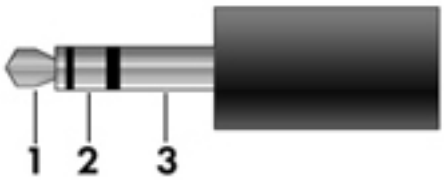
△ **CAUTION:** Using f11 completely erases hard drive contents and reformats the hard drive. All files you have created and any software installed on the computer are permanently removed. The f11 recovery tool reinstalls the original operating system and HP programs and drivers that were installed at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

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

1. If possible, back up all personal files.
2. Restart the computer, and then press f11 while the “Press <F11> for recovery” message is displayed on the screen.
3. Follow the on-screen instructions.

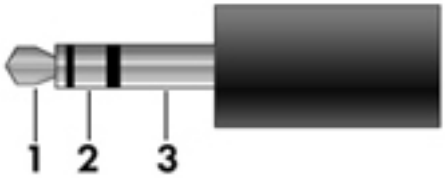
8 Connector pin assignments

Audio-in (microphone)



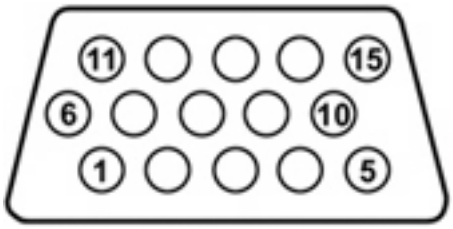
Pin	Signal
1	Audio signal in
2	Audio signal in
3	Ground

Audio-out (headphone)



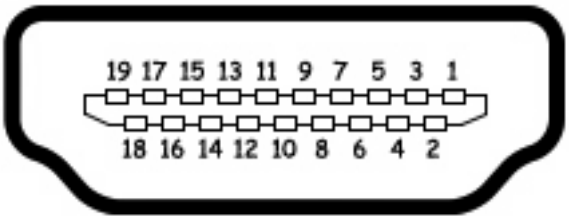
Pin	Signal
1	Audio out, left channel
2	Audio out, right channel
3	Ground

External monitor



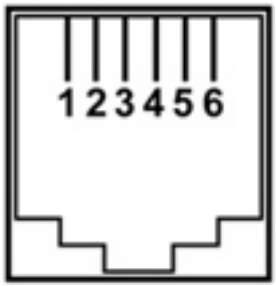
Pin	Signal
1	Red analog
2	Green analog
3	Blue analog
4	Not connected
5	Ground
6	Ground analog
7	Ground analog
8	Ground analog
9	+5 VDC
10	Ground
11	Monitor detect
12	DDC 2B data
13	Horizontal sync
14	Vertical sync
15	DDC 2B clock

HDMI



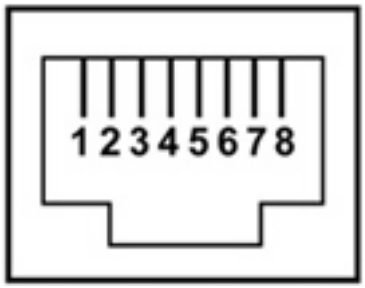
Pin	Signal
1	Transition minimized differential signal (TMDS) data 2+
2	TMDS data 2 shield
3	TMDS data 2–
4	TMDS data 1+
5	TMDS data 1 shield
6	TMDS data 1–
7	TMDS data 0+
8	TMDS data 0 shield
9	TMDS data 0–
10	TMDS clock+
11	TMDS clock shield
12	TMDS clock-
13	Consumer electronic control (CEC)
14	Not connected
15	DDC clock
16	DDC data
17	Ground
18	+5V power
19	Hot plug detect

RJ-11 (modem)



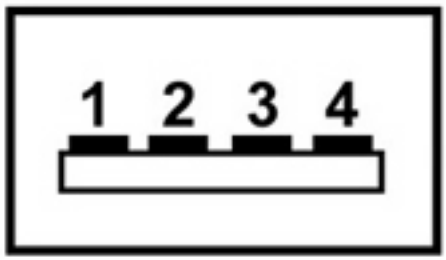
Pin	Signal
1	Unused
2	Tip
3	Ring
4	Unused
5	Unused
6	Unused

RJ-45 (network)



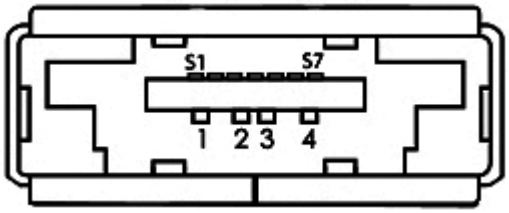
Pin	Signal
1	Transmit +
2	Transmit -
3	Receive +
4	Unused
5	Unused
6	Receive -
7	Unused
8	Unused

Universal Serial Bus



Pin	Signal
1	+5 VDC (4.75 V minimum under a continuous 0.5-A load)
2	Data -
3	Data +
4	Ground

eSATA/USB



Pin	Signal
1	USB +5 VDC
2	USB Data -
3	USB Data +
4	USB Ground
S1	eSATA Ground
S2	eSATA Transmit Data A+
S3	eSATA Transmit Data A-
S4	eSATA Ground
S5	eSATA Receive Data B-
S6	eSATA Transmit Data B+
S7	eSATA Ground

9 Power cord set requirements

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

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

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

Requirements for all countries 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.

10 Recycling

Battery

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

Display

⚠ **WARNING!** The backlight contains mercury. 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 liquid crystal display (LCD) panel and the backlight. When you remove these components, handle them carefully.

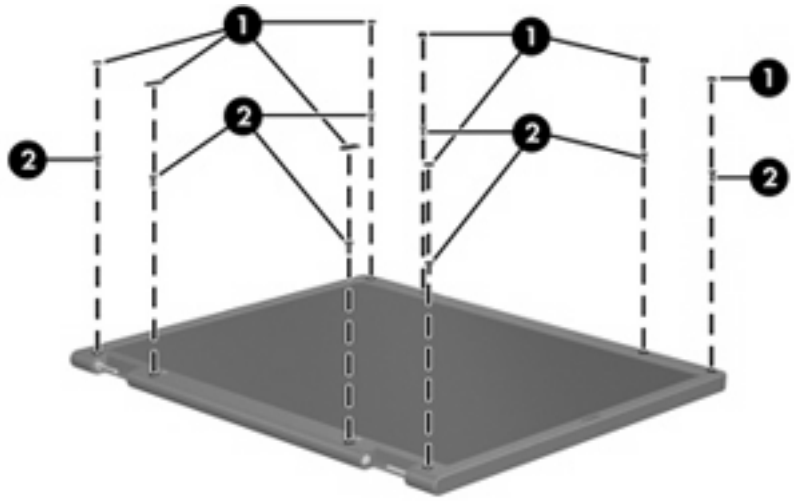
NOTE: **Materials Disposal**. This HP product contains mercury in the backlight in the display assembly that might require special handling at end-of-life. Disposal of mercury may be regulated because of environmental considerations. For disposal or recycling information, contact your local authorities, or see the Electronic Industries Alliance (EIA) Web site at http://www.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)**.

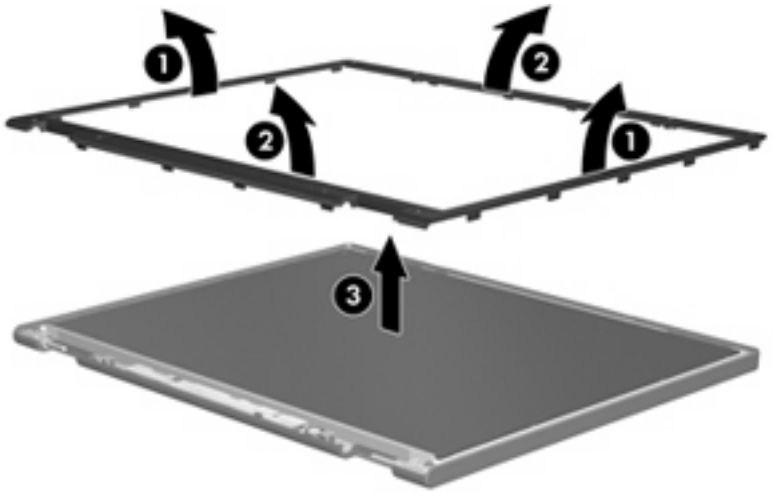
NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps to disassemble the display assembly:

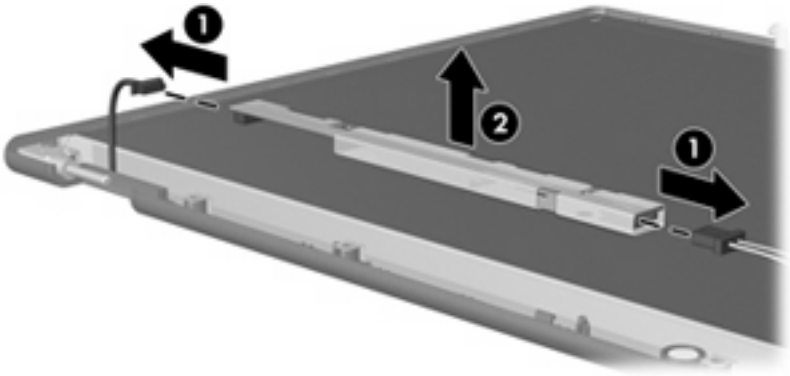
1. Remove all screw covers **(1)** and screws **(2)** that secure the display bezel to the display assembly.



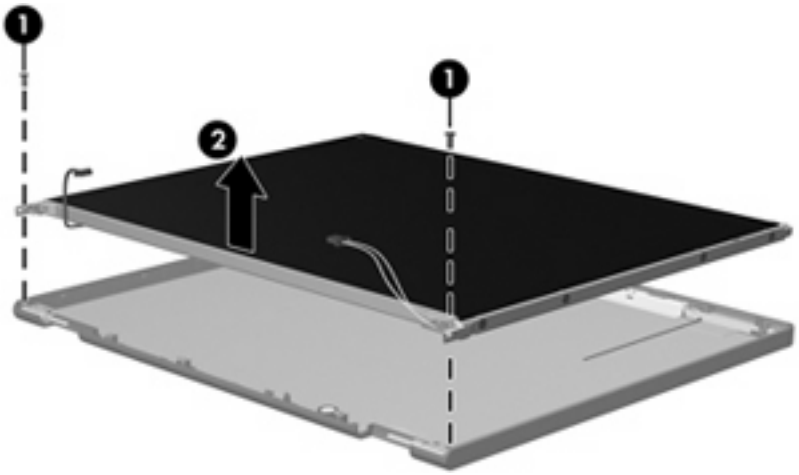
2. Lift up and out on the left and right inside edges **(1)** and the top and bottom inside edges **(2)** of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel **(3)**.



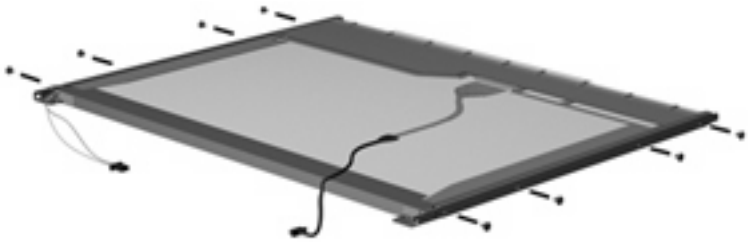
4. Disconnect all display panel cables **(1)** from the display inverter and remove the inverter **(2)**.



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

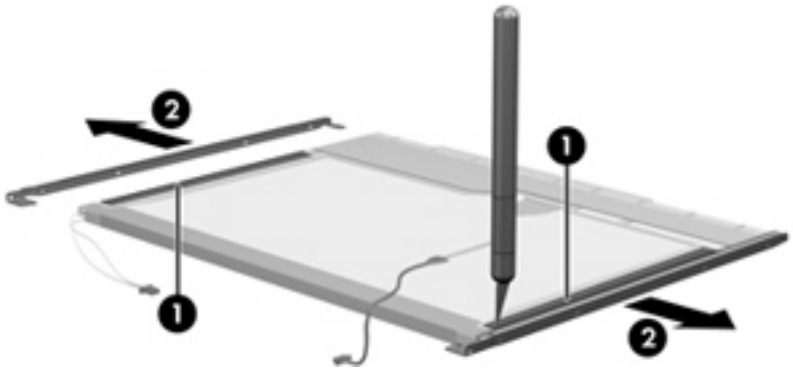


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.

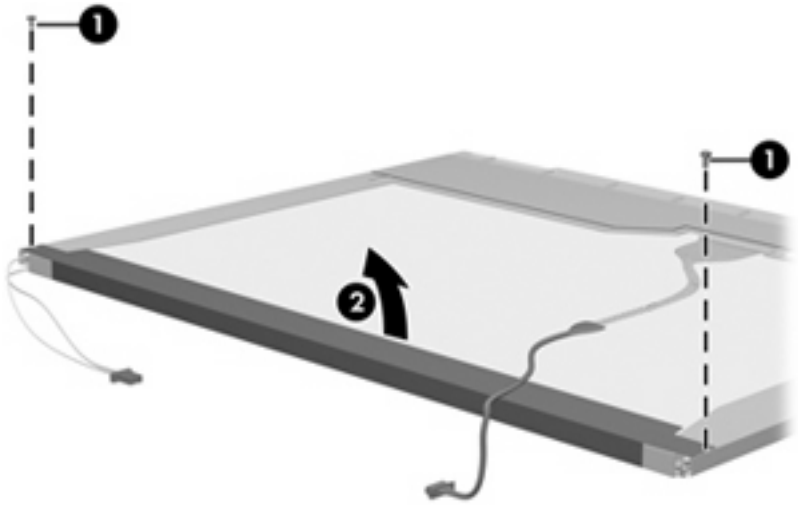


9. Use a sharp-edged tool to cut the tape **(1)** that secures the sides of the display panel to the display panel frame.

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

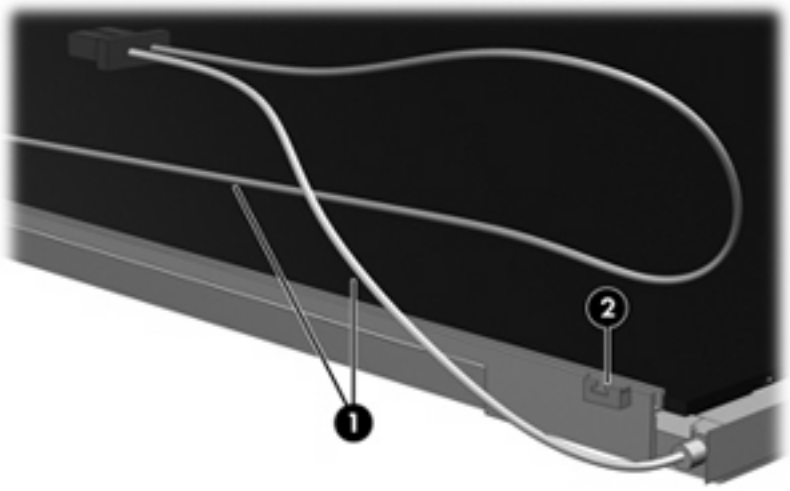


11. Remove the screws **(1)** that secure the backlight cover to the display panel.
12. Lift the top edge of the backlight cover **(2)** and swing it outward.



13. Remove the backlight cover.
14. Turn the display panel right-side up.

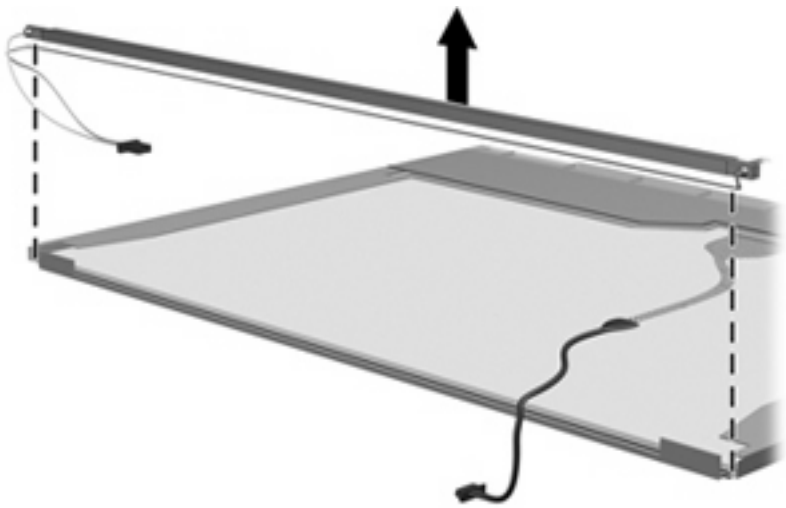
15. Remove the backlight cables **(1)** from the clip **(2)** in the display panel.



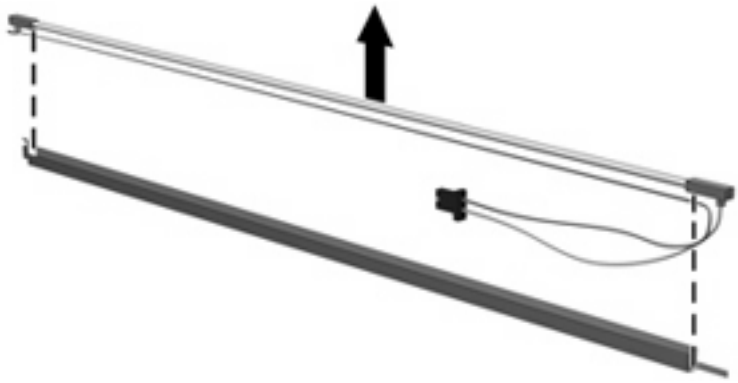
16. Turn the display panel upside down.

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

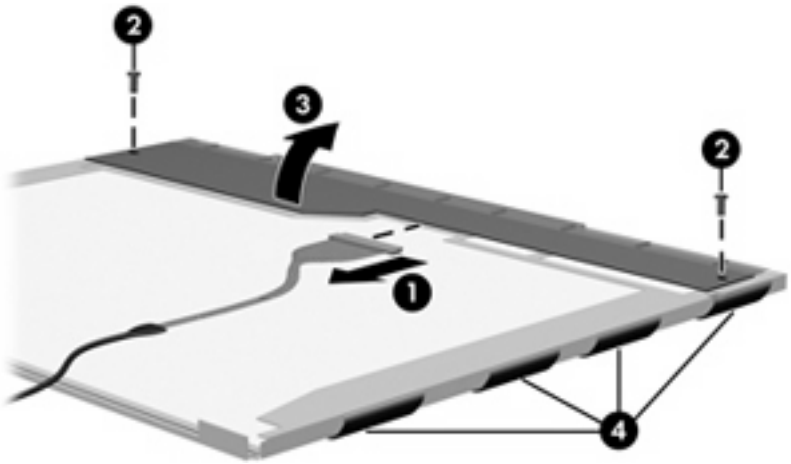
17. Remove the backlight frame from the display panel.



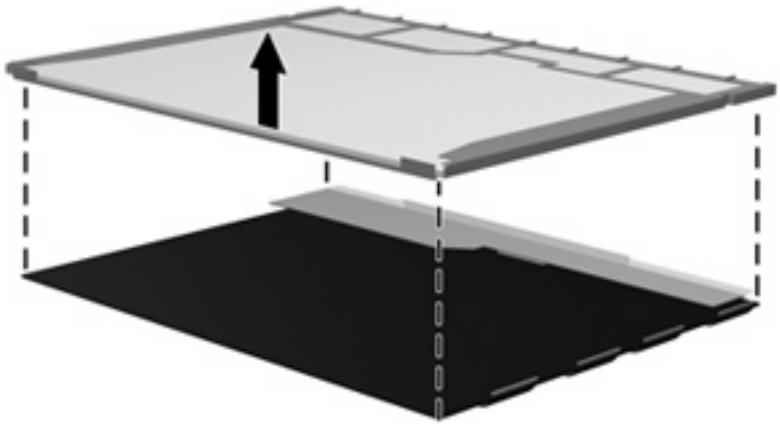
18. Remove the backlight from the backlight frame.



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



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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