



HP Pavilion G4 Notebook PC

Maintenance and Service Guide

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Safety warning notice

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

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1 Product description

Category	Description
Product Name	HP Pavilion g4 Notebook PC
Processors	AMD® E2-1800 processor (1.7 GHz, 1333MHz, dual core, 18 W)
	AMD Fusion E-450 1.65-GHz processor (dual core, 18 W)
	AMD Fusion E-350 1.60-GHz processor (dual core, 18 W)
	AMD A8-3520M 2.50-GHz processor (1.6-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
	AMD A8-3500M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
	AMD A6-3420M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
	AMD A6-3400M 2.30-GHz processor (1.4-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
	AMD A4-3320M 2.60-GHz processor (2.0-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)
	AMD A4-3305M 2.50-GHz processor (1.9-GHz FSB, 2.0-MB L2 cache, dual core, 45 W)
	AMD A4-3300M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)
	AMD E2-3000M 2.40-GHz processor (1.8-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
	AMD Athlon II P360 2.30-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)
	AMD Athlon II P340 2.20-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)
	AMD Phenom II N970 2.20-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, quad core, 35 W)
	AMD Phenom II N870 2.30-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)
	AMD Phenom II N850 2.20-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)
	AMD Phenom II N660 3.00-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, dual core, 35 W)
	AMD Phenom II P960 1.80-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, quad core, 25 W)
	AMD Phenom II P860 2.00-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 25 W)
	AMD Phenom II P650 2.60-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, triple core, 25 W)
	AMD Turion II P560 2.50-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, dual core, 25 W)
	AMD V160 2.40-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)
	AMD V140 2.30-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)
Chipset	AMD A50M FCH

Category	Description
Graphics	<p>Internal graphics:</p> <ul style="list-style-type: none"> • AMD Radeon™ HD 7340 graphics used in E2-1800 processor (APU), supports HD decode, DX 11, and HDMI • AMD Radeon HD 6620M graphics used in A8-3520M processor (APU) • AMD Radeon HD 6520M graphics used in A6-3420M processor (APU) • AMD Radeon HD 6480M graphics used in A4-3305M and 3320M processors (APUs) • AMD Radeon HD 6380M graphics used in E2-3000M processor (APU) • AMD Radeon HD 6310 discrete class graphics supporting DX11 • AMD Mobility Radeon HD 4250 graphics supporting DX10.1
	<p>Switchable discrete graphics:</p> <ul style="list-style-type: none"> • AMD Radeon HD7450M with 1024-MB of dedicated video memory (128 MB×16 DDR3 @ 900 MHz × 4 modules); support for Blu-ray and/or HD-DVD playback with HD decode • AMD Radeon HD6470M with 1024-MB of dedicated video memory (128 MB×16 DDR3 @ 900 MHz × 4 modules); support for Blu-ray and/or HD-DVD playback with HD decode • AMD Radeon HD6470M with 512-MB of dedicated video memory (64 MB×16 DDR3 @ 900 MHz × 4 modules); support for Blu-ray and/or HD-DVD playback with HD decode • DX11 support on computer models equipped with an AMD A8, A6, or A4 processor • DX10 support on computer models equipped with an AMD Athlon, Phenom, or Turion processor and a graphics subsystem with UMA memory
Panel	<p>14.0-in, high-definition (HD), light-emitting diode (LED), SVA BrightView (1366×768) display; typical brightness: 200 nits</p> <p>All display assemblies include 2 wireless local area network (WLAN) antenna cables</p> <p>Supports 16:9 wide aspect ratio</p> <p>Lighted logo on top bezel</p>
Memory	2 customer-accessible/upgradable memory module slots
	Supports single-channel memory
	Supports up to 8 GB of system RAM
	DDR3/1333-MHz
	<p>Supports the following configurations:</p> <ul style="list-style-type: none"> • 8192-MB total system memory (4096×2; not supported with Windows® 7 32-bit operating system) • 6144-MB total system memory (4096×1 + 2048×1; not supported with Windows® 7 32-bit operating system) • 4096-MB total system memory (4096×1 or 2048×2) • 2048-MB total system memory (2048×1)
Hard drives	Supports 6.35-cm (2.5-in) hard drives in 9.5-mm (.37-in) and 7.0-mm (.28-in) thicknesses
	Customer-accessible
	Serial ATA (SATA)

Category	Description
	<p>Supports the following single hard drive configurations:</p> <ul style="list-style-type: none"> • 750 GB, 7200 rpm, 9.5 mm • 750 GB, 5400 rpm, 9.5 mm • 640 GB, 5400 rpm, 9.5 mm • 500 GB, 7200 rpm, 9.5 mm • 500 GB, 5400 rpm, 9.5 mm • 320 GB, 7200 rpm, 7.0 mm
Optical drive	<p>Fixed</p> <p>SATA</p> <p>12.7-mm tray load</p> <p>Supports Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive</p> <p>Supports DVD±RW and CD-RW Super Multi Double-Layer Combo Drive</p> <p>Supports zero-power optical drive</p>
Audio and video	<p>One digital microphone</p> <p>HD audio</p> <p>Supports SRS Premium Sound</p> <p>2 Pavilion-branded Altec Lansing speakers</p> <p>Low-light HD VGA webcam (fixed, no tilt) with activity LED, 640×480 by 24 frames per second</p>
Ethernet	<p>Integrated 10/100 network interface card (NIC)</p>
Wireless	<p>Integrated wireless local area network (WLAN) options by way of wireless module</p> <p>Two WLAN antennas built into display assembly</p> <p>Support for the following WLAN formats:</p> <ul style="list-style-type: none"> • Qualcomm Atheros AR9485 802.11b/g/n 1x1 WiFi and AR3012 Bluetooth 4.0 Combo Adapter • Atheros 9285G 802.11b/g/n 1x1 WiFi Adapter • Atheros AR8002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready) • Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter • Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter • Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter • Ralink RT5390 802.11 b/g/n 1x1 WiFi Adapter • Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (Bluetooth 3.0+HS ready) • Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (Bluetooth 3.0+HS ready) • Realtek 8188BC8 802.11a/b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter • Realtek RTL8188CE 802.11 b/g/n 1x1 WiFi Adapter

Category	Description
External media card	<p>HP Multi-Format Digital Media Reader supports the following digital card formats:</p> <ul style="list-style-type: none"> • MultiMediaCard • Secure Digital (SD) Memory Card • Secure Digital High Capacity Memory card • Secure Digital Extended Capacity Memory Card with support of UHS104
Ports	<ul style="list-style-type: none"> • 3-pin AC power • Audio-in (mono microphone) • Audio-out (stereo headphone) • HDMI version 1.4 supporting up to 1080p, 1920×1200 @ 60Hz • RJ-45 (Ethernet, includes link and activity lights) • USB 2.0 (3 ports) • VGA (Dsub 15 pin) supporting: <ul style="list-style-type: none"> ◦ 2048×1536 external resolution @ 85Hz (on computer models equipped with an AMD Athlon, Phenom, Turion, or V-series processor) ◦ 2048×1536 external resolution @ 60Hz (on computer models equipped with an AMD E450 or E350 processor) ◦ 1920×1600 external resolution @ 60Hz (on computer models equipped with an AMD A8, A6, A4, or E2 processor) ◦ Hot plug and unplug and auto-detection for correct output to wide-aspect vs. standard aspect video
Keyboard/pointing devices	<p>Full-size, pocket keyboard</p> <ul style="list-style-type: none"> • Textured • Painted <p>TouchPad with gesture support</p> <p>Taps enabled by default</p>
Power requirements	<p>90W slim travel AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector)</p> <p>65W slim travel AC adapter with localized cable plug support (3-wire plug with ground pin, supports 3-pin DC connector)</p> <p>Support for the following batteries:</p> <ul style="list-style-type: none"> • 9-cell, 3.00-Ah (100-Wh) Li-ion battery • 6-cell, 2.80-Ah (62-Wh) Li-ion battery • 6-cell, 2.55-Ah (55-Wh) Li-ion battery • 6-cell, 2.20-Ah (47-Wh) Li-ion battery <p>Supports fast charge on 6-cell batteries</p>
Security	Security cable slot

Category	Description
Operating system	Preinstalled: <ul style="list-style-type: none">• Windows 7 Professional (32-bit and 64-bit)• Windows 7 Home Basic 64-bit• Windows 7 Home Premium 64-bit• Windows 7 Starter (32-bit; only with 500 GB and smaller hard drives; 2 GB and less of system memory; Atom, Celeron, or Pentium processor (up to P6200 only); AMD Brazos, V-series, or Athlon processor; cannot support switchable graphics)• SUSE Linux (does not support Blu-ray disc optical drive)• FreeDOS
Serviceability	End-user replaceable parts: <ul style="list-style-type: none">• AC adapter• Battery• Hard drive• Memory modules (2)• Optical drive• WLAN module

2 External component identification

Display



Item	Component	Description
(1)	WLAN antennas (2)*	Send and receive wireless signals to communicate with WLAN devices.
(2)	Webcam light	On: The webcam is in use.
(3)	Webcam	Records video and captures still photographs. To use the webcam, select Start > All Programs > CyberLink YouCam > CyberLink YouCam .
(4)	Internal microphone	Records sound.

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

Top Button

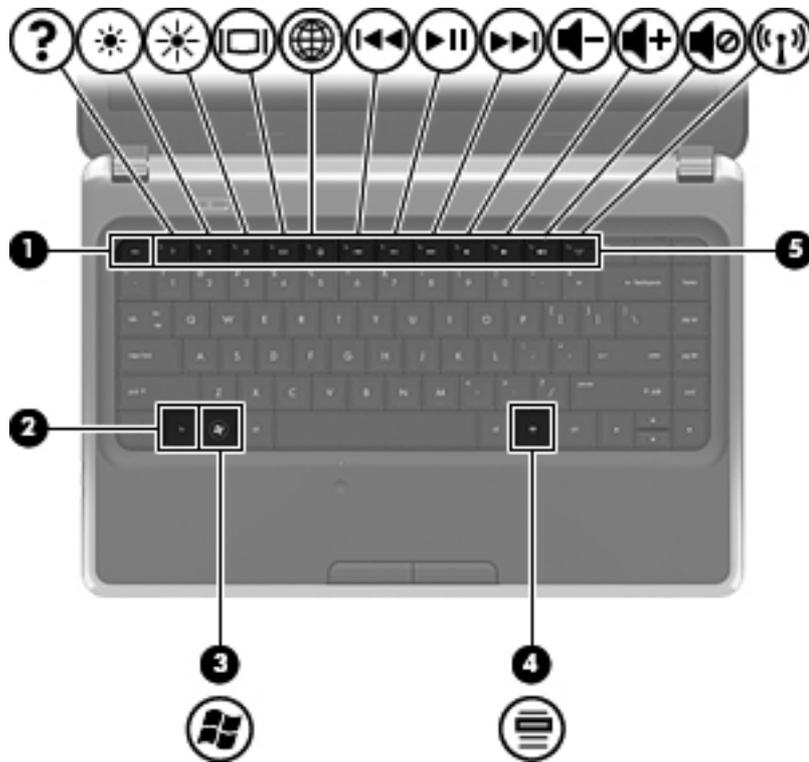


Component	Description
Power button*	<ul style="list-style-type: none">• When the computer is off, press the button to turn on the computer.• When the computer is on, press the button briefly to initiate Sleep.• When the computer is in the Sleep state, press the button briefly to exit Sleep.• When the computer is in Hibernation, press the button briefly to exit Hibernation.

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.

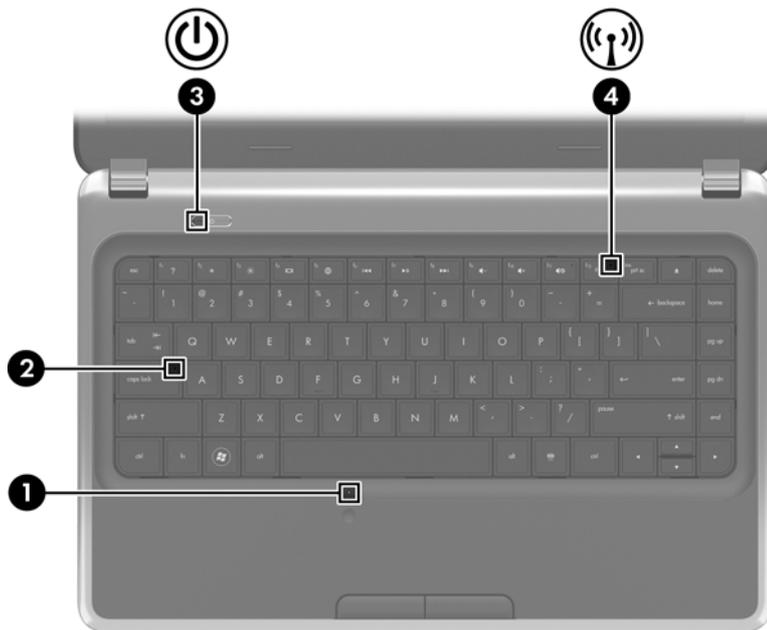
To learn more about your power settings, select **Start > Control Panel > System and Security > Power Options**, or refer to the *HP Notebook Reference Guide*.

Keys



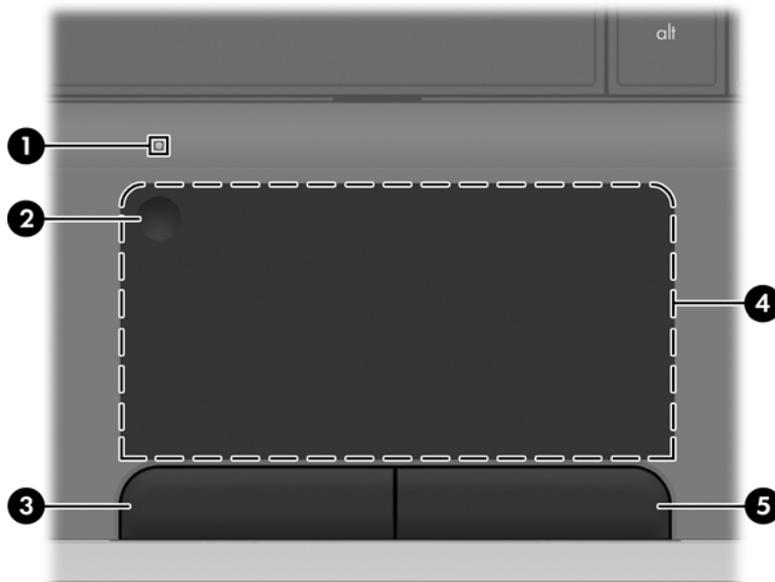
Item	Component	Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Displays system information when pressed in combination with the esc key.
(3)	Windows logo key	Displays the Windows Start menu.
(4)	Windows applications key	Displays a shortcut menu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

Lights



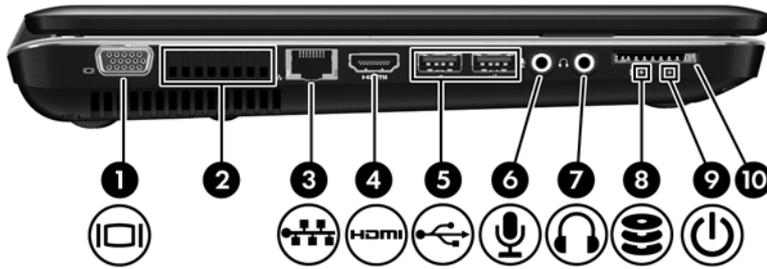
Item	Component	Description
(1)	TouchPad light	<ul style="list-style-type: none"> Off: The TouchPad is on. Amber: The TouchPad is off.
(2)	Caps lock light	<ul style="list-style-type: none"> White: Caps lock is on. Off: Caps lock is off.
(3)	Power light	<ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(4)	Wireless light	<ul style="list-style-type: none"> White: An integrated wireless device, such as a WLAN device and/or a Bluetooth device, is on. Amber: All wireless devices are off.

TouchPad



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

Left side



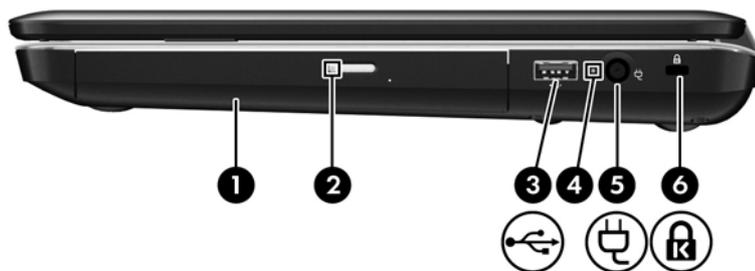
Item	Component	Description
(1)	External monitor port	Connects an external VGA monitor or projector.
(2)	Vents (2)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(3)	RJ-45 (network) jack	Connects a network cable.
(4)	HDMI port	Connects an optional video or audio device, such as a high-definition television, or any compatible digital or audio component.
(5)	USB ports (2)	Connect optional USB devices.
(6)	Audio-in (microphone) jack	Connects an optional computer headset microphone, stereo array microphone, or monaural microphone.
(7)	Audio-out (headphone) jack	Produces sound when connected to optional powered stereo speakers, headphones, ear buds, a headset, or television audio. WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the <i>Regulatory, Safety, and Environmental Notices</i> . NOTE: When a device is connected to the jack, the computer speakers are disabled.
(8)	Drive light	<ul style="list-style-type: none"> Blinking white: The hard drive is being accessed. Off: The hard drive is idle.
(9)	Power light	<ul style="list-style-type: none"> White: The computer is on. Blinking white: The computer is in the Sleep state. Off: The computer is off or in Hibernation.
(10)	Digital Media Slot	Supports the following digital card formats: <ul style="list-style-type: none"> MultiMediaCard Secure Digital (SD) Card

Front



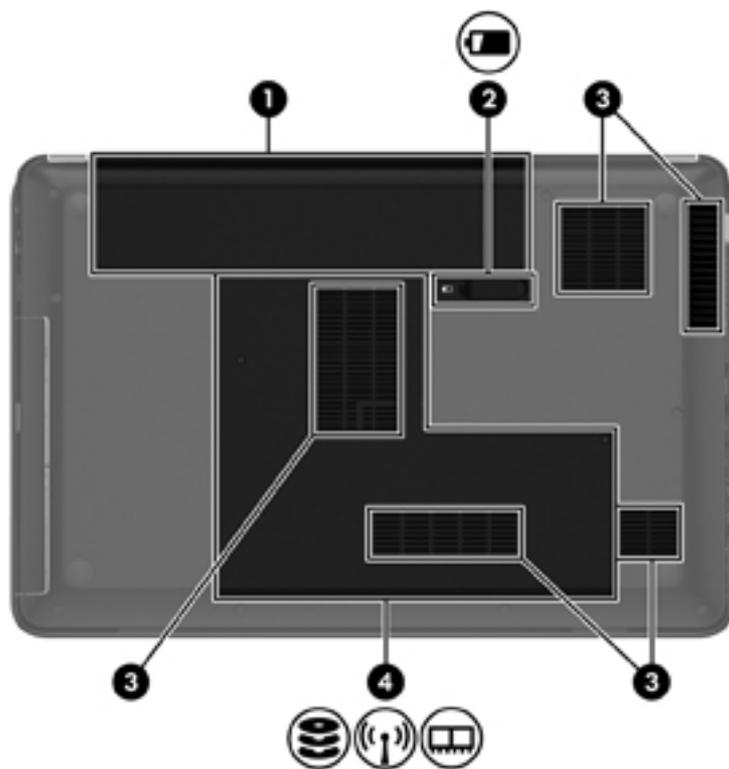
Component	Description
Speakers (2)	Produce sound.

Right side



Item	Component	Description
(1)	Optical drive	Reads and writes to an optical disc.
(2)	Optical drive light	<ul style="list-style-type: none">Green: The optical drive is being accessed.Off: The optical drive is off.
(3)	USB port	Connects an optional USB device.
(4)	AC adapter light	<ul style="list-style-type: none">White: The computer is connected to external power and the battery is fully charged.Amber: A battery is charging.Off: The computer is not connected to external power.
(5)	Power connector	Connects an AC adapter.
(6)	Security cable slot	Attaches an optional security cable to the computer. NOTE: The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Bottom components



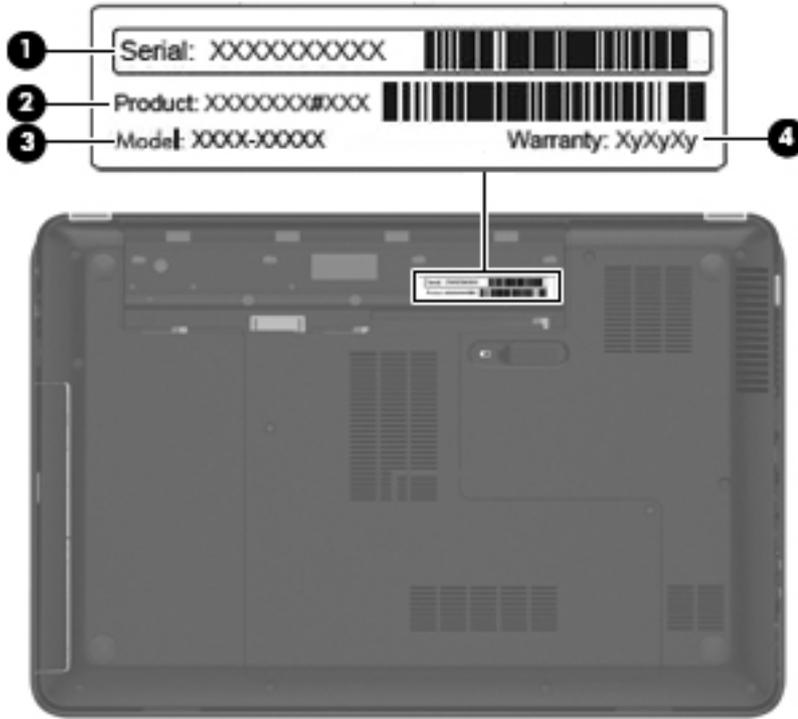
Item	Component	Description
(1)	Battery bay	Holds the battery.
(2)	Battery release latch	Releases the battery from the battery bay.
(3)	Vents (5)	Enable airflow to cool internal components. NOTE: The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation.
(4)	Hard drive bay	Holds the hard drive and WLAN device, and contains the memory module slots. 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.

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

3 Illustrated parts catalog

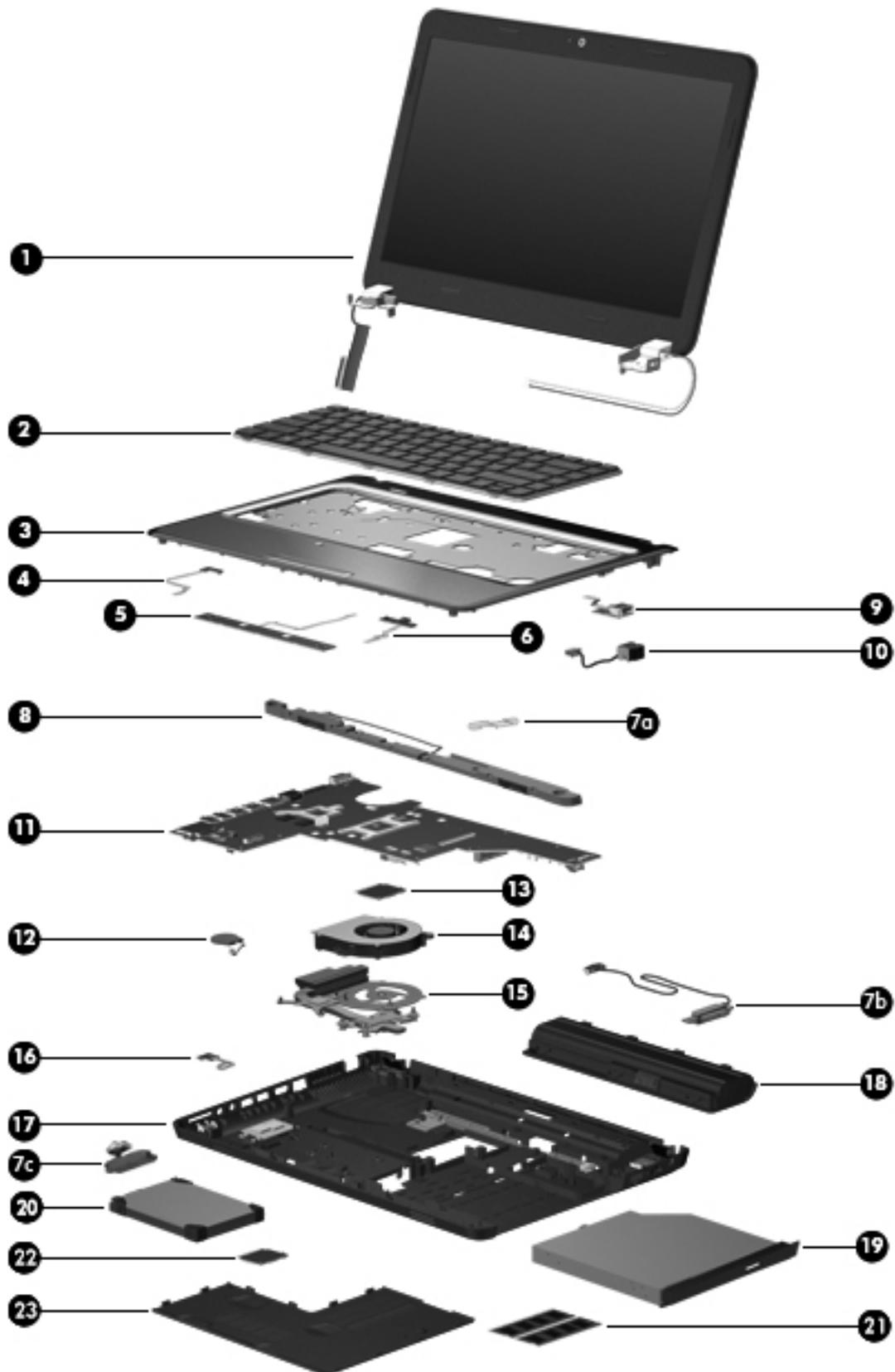
Service tag

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



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

Computer major components



Item	Component	Spare part number
(1)	14.0-in, high definition (HD), light-emitting diode (LED), BrightView display assembly (includes webcam, two microphones, and wireless antenna transceivers and cables)	
	In butter gold finish	641343-001
	In charcoal gray finish	641338-001
	In luminous rose finish	641337-001
	In ocean drive finish	639447-001
	In Pacific blue finish	641340-001
	In pearl pink finish	641341-001
	In pewter finish	641339-001
	In Sonoma red finish	641336-001
	In sweet purple finish	641342-001
	NOTE: For more display assembly spare part information, see Display assembly subcomponents on page 23 .	
(2)	Keyboard (includes keyboard cable):	
	Keyboard with black finish	
	For use in Brazil	636376-201
	For use in Canada	636376-121
	For use in Latin America	636376-161
	For use in Taiwan	636376-AB1
	For use in Thailand	636376-281
	For use in the United States	636376-001
	Keyboard with pearl pink finish	
	For use in Brazil	645893-201
	For use in Canada	645893-121
	For use in Latin America	645893-161
	For use in Taiwan	645893-AB1
	For use in Thailand	645893-281
	For use in the United States	645893-001
(3)	Top cover (includes TouchPad):	
	In butter gold finish	641351-001
	In charcoal gray finish	641346-001
	In luminous rose finish	641345-001
	In ocean drive finish	639459-001
	In Pacific blue finish	641348-001
	In pearl pink finish	641349-001

Item	Component	Spare part number
	In pewter finish	641347-001
	In Sonoma red finish	641344-001
	In sweet purple finish	641350-001
(4)	Power button board (includes cable)	639451-001
(5)	TouchPad button board (includes cable)	639450-001
(6)	TouchPad LED board (includes cable)	640292-001
	Cable Kit , includes:	639442-001
(7a)	TouchPad cable	
(7b)	Optical drive cable (includes optical drive connector)	
(7c)	Hard drive cable	
	NOTE: See Cable Kit on page 22 for more Cable Kit spare part information.	
(8)	Speaker Kit (includes left and right speakers and cable)	639458-001
(9)	USB board (includes cable)	639452-001
(10)	Power connector cable	639443-001
(11)	System board (includes replacement thermal material):	
	Equipped with an E2-1800 1.7-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	686615-001
	Equipped with a Fusion E-450 1.65-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	659871-001
	Equipped with a Fusion E-350 1.60-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	645529-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 1024-MB of discrete video memory	649950-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 512-MB of discrete video memory	649949-001
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649948-001
	For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with 1024-MB of discrete video memory and supports bus alive/chip off (BACO)	647627-001
	For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with 512-MB of discrete video memory and supports bus alive/chip off (BACO)	647626-001
	For use only with computer models equipped with a graphics subsystem with 1024-MB of discrete video memory	638855-001
	For use only with computer models equipped with a graphics subsystem with 512-MB of discrete video memory	638854-001
	For use only with computer models equipped with a graphics subsystem with UMA video memory	638856-001
(12)	RTC battery (includes cable and double-sided tape)	637193-001

Item	Component	Spare part number
(13)	Processor (includes replacement thermal material)	
	AMD A8-3520M 2.50-GHz processor (1.6-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	669690-001
	AMD A8-3500M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653350-001
	AMD A6-3420M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	669688-001
	AMD A6-3400M 2.30-GHz processor (1.4-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653349-001
	AMD A4-3320M 2.60-GHz processor (2.0-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)	669686-001
	AMD A4-3305M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 45 W)	672093-001
	AMD A4-3300M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)	653348-001
	AMD E2-3000M 2.40-GHz processor (1.8-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653351-001 or 677628-001
	AMD Athlon II P360 2.30-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)	636635-001
	AMD Athlon II P340 2.20-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)	616343-001
	AMD Phenom II N970 2.20-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, quad core, 35 W)	635496-001
	AMD Phenom II N870 2.30-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	635495-001
	AMD Phenom II N850 2.20-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	616345-001
	AMD Phenom II N660 3.00-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, dual core, 35 W)	635494-001
	AMD Phenom II P960 1.80-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, quad core, 25 W)	634689-001
	AMD Phenom II P860 2.00-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	634688-001
	AMD Phenom II P650 2.60-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, triple core, 25 W)	634687-001
	AMD Turion II P560 2.50-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, dual core, 25 W)	634691-001
	AMD V160 2.40-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)	636634-001
	AMD V140 2.30-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)	616333-001
(14)	Fan (includes replacement thermal material)	639460-001
(15)	Heat sink (includes replacement thermal material)	
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with discrete video memory	649953-001

Item	Component	Spare part number
	For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649954-001
	For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with discrete video memory	649952-001
	For use only with computer models equipped with an AMD Athlon, Phenom, Turion, or V-series processor and a graphics subsystem with discrete video memory	639462-001
	For use only with computer models equipped with an AMD Athlon, Phenom, Turion, or V-series processor and a graphics subsystem with UMA video memory	639463-001
(16)	LED board (includes cable)	640293-001
(17)	Base enclosure (includes battery release latch, replacement thermal material, and 4 rubber feet)	639439-001
	Rubber Feet Kit (not illustrated, includes 4 rubber feet)	639455-001
(18)	Battery:	
	6-cell, 55-Whr, 2.55-Ah Li-ion battery	593554-001
	6-cell, 47-Whr, 2.20-Ah Li-ion battery	593553-001
(19)	Optical drive (includes bezel and bracket):	
	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	639449-001 and 659848-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	639448-001 and 659847-001
	Optical drive bay space saver (not illustrated)	659618-001
(20)	Hard drive (2.5-in, SATA, does not include hard drive cable, isolators, or shield):	
	750-GB, 7200-rpm	633252-001
	750-GB, 5400-rpm	644351-001
	640-GB, 5400-rpm	637312-001
	500-GB, 7200-rpm	644685-001
	320-GB, 7200-rpm	645089-001
	Hard Drive Hardware Kit (not illustrated, includes isolators and shield)	639444-001
(21)	Memory modules (2, DDR3, 10600, 1333-MHz)	
	4 GB	621569-001
	2 GB	621565-001
(22)	WLAN module:	
	Qualcomm Atheros AR9485 802.11b/g/n 1x1 WiFi and AR3012 Bluetooth 4.0 Combo Adaptor	655795-005
	Atheros 9285G 802.11b/g/n 1×1 WiFi Adapter	605560-005
	Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter	600370-001
	Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter (Brazil only)	600370-201

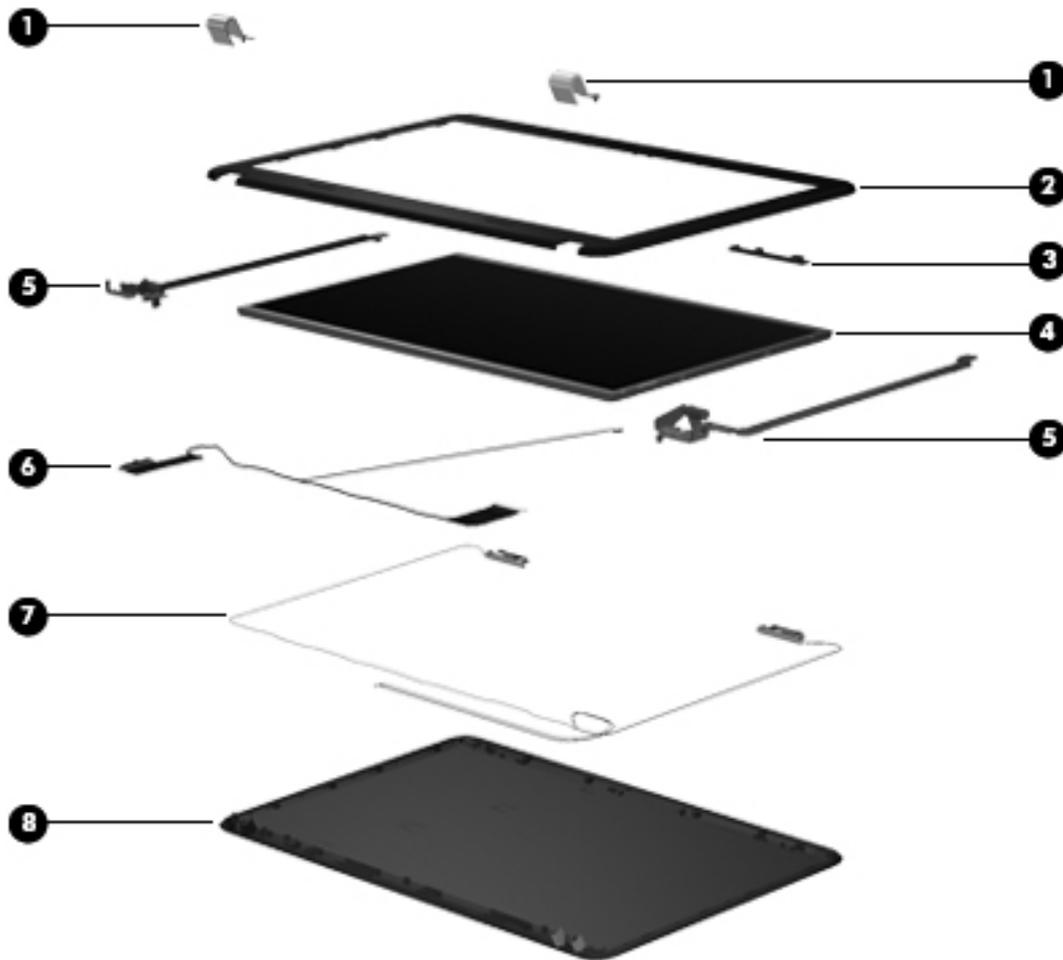
Item	Component	Spare part number
	Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
	Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-501
	Ralink RT5390 802.11 b/g/n 1x1 WiFi Adapter	630703-001
	Realtek RTL8188CE 802.11 b/g/n 1x1 WiFi Adapter	640926-001
	Atheros AR8002WB-1NGB 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready)	593127-001
	Broadcom 4313 802.11b/g/n 1x1 WiFi Adapter	593836-001
	Ralink RT3090BC4 802.11b/g/n 1x1 WiFi and Bluetooth 2.1+EDR Combo Adapter (Bluetooth 3.0+HS ready)	630705-001
	Realtek 8188BC8 802.11a/b/g/n 2x2 WiFi and Bluetooth 3.0+HS Combo Adapter	602993-001
(23)	Service cover (includes 2 captive screws, secured by C-clips) — available in the Plastics Kit, spare part number 639453-001)	

Cable Kit



Item	Component	Spare part number
	Cable Kit , includes:	639442-001
(1)	TouchPad cable	
(2)	Optical drive cable	
(3)	Hard drive cable	

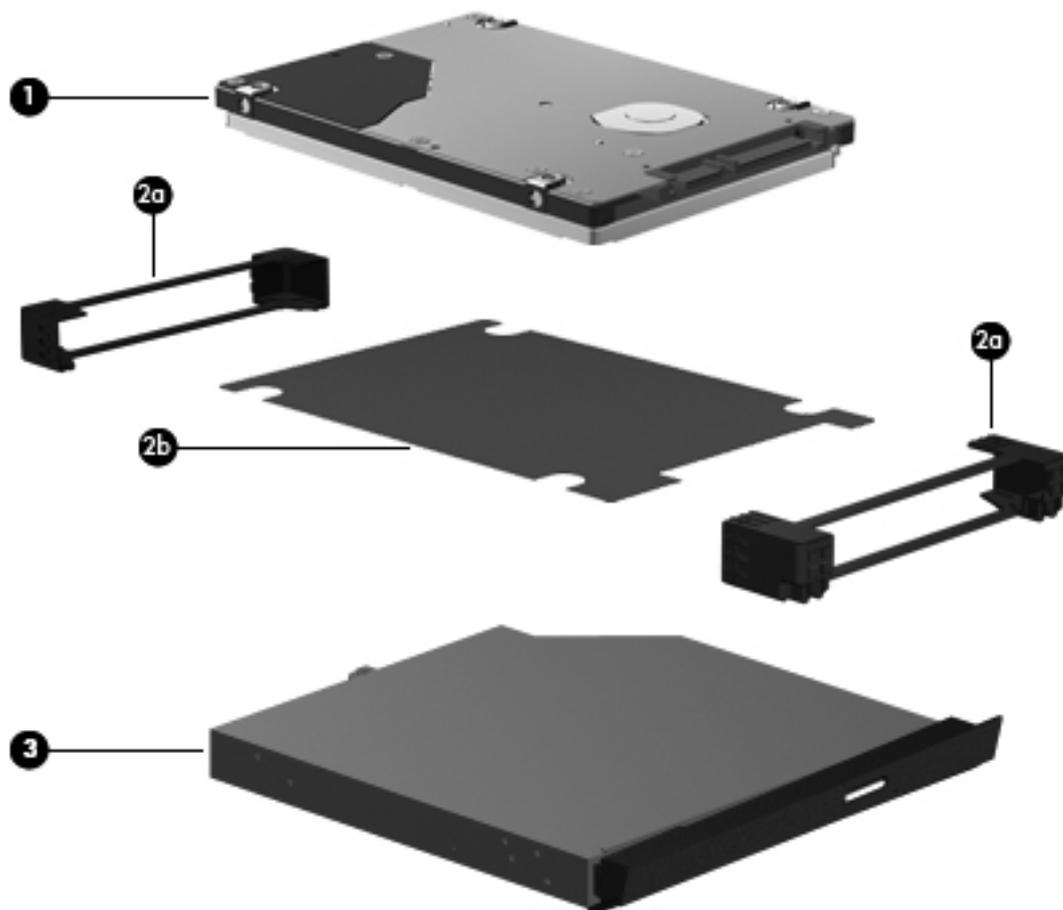
Display assembly subcomponents



Item	Component	Spare part number
(1)	Display hinge covers (2)	639446-001
(2)	Display bezel	639440-001
(3)	Webcam/microphone module	637197-001
(4)	14.0-in, HD, LED, BrightView display panel	639454-001
(5)	Display Hinge Kit (includes left and right display hinges and brackets)	639445-001
(6)	Display Cable Kit (includes display panel cable and webcam/microphone module cable)	639441-001
(7)	Antenna Kit (includes left and right wireless antenna cables and transceivers)	640294-001
(8)	Display enclosure:	
	In butter gold finish	641335-001
	In charcoal gray finish	641330-001
	In luminous rose finish	641329-001
	In ocean drive finish	639438-001

Item	Component	Spare part number
	In Pacific blue finish	641332-001
	In pearl pink finish	641333-001
	In pewter finish	641331-001
	In Sonoma red finish	641328-001
	In sweet purple finish	641334-001
	Display Screw Kit (not illustrated)	639457-001

Mass storage devices



Item	Component	Spare part number
(1)	Hard drive (2.5-in, SATA, does not include hard drive cable, isolators, or shield):	
	750-GB, 7200-rpm	633252-001
	750-GB, 5400-rpm	644351-001
	640-GB, 5400-rpm	637312-001
	500-GB, 7200-rpm	644685-001

Item	Component	Spare part number
	320-GB, 7200-rpm	645089-001
	Hard Drive Hardware Kit , includes:	639444-001
(2)	Hard drive isolators (2)	
(3)	Hard drive shield	
(4)	Optical drive (includes bezel and bracket):	
	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	639449-001 and 659848-001
	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	639448-001 and 659847-001
	Optical drive bay space saver (not illustrated)	659618-001

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter	
90-W PFC RC V HP Smart AC adapter for use with all computer models	609940-001
65-W RC V HP Smart AC adapter for use only with computer models equipped with an AMD processor	609939-001
Power cord (3-pin, black, 1.83-m):	
For use with all computer models:	
For use in Argentina	490371-D01
For use in Brazil	490371-202
For use in Italy	490371-061
For use in North America	490371-001
For use only with computer models equipped with an Intel processor:	
For use in the People's Republic of China	490371-AA1
For use in Taiwan	490371-AB1
For use in Thailand	490371-201
For use in the United Kingdom and Singapore	490371-031
Screw Kit	639456-001

Sequential part number listing

Spare part number	Description
490371-001	Power cord for use with all computer models in North America (black, 3-in, 1.83-m)

Spare part number	Description
490371-031	Power cord for use only with computer models equipped with an Intel processor in the United Kingdom and Singapore (black, 3-in, 1.83-m)
490371-061	Power cord for use with all computer models in Italy (black, 3-in, 1.83-m)
490371-201	Power cord for use with all computer models in Thailand (black, 3-in, 1.83-m)
490371-202	Power cord for use with all computer models in Brazil (black, 3-in, 1.83-m)
490371-AA1	Power cord for use only with computer models equipped with an Intel processor in the People's Republic of China (black, 3-in, 1.83-m)
490371-AB1	Power cord for use only with computer models equipped with an Intel processor in Taiwan (black, 3-in, 1.83-m)
490371-D01	Power cord for use with all computer models in Argentina (black, 3-in, 1.83-m)
593127-001	Atheros AR8002WB-1NGB 802.11b/g/n 1×1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready) for use only with computer models equipped with an AMD processor
593553-001	6-cell, 47-Whr, 2.20-Ah Li-ion battery
593554-001	6-cell, 55-Whr, 2.55-Ah Li-ion battery
593836-001	Broadcom 4313 802.11b/g/n 1×1 WiFi Adapter for use only on computer models equipped with an AMD processor
600370-001	Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter
600370-201	Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter (Brazil only)
602993-001	Realtek 8188BC8 802.11a/b/g/n 2×2 WiFi and Bluetooth 3.0+HS Combo Adapter for use only with computer models equipped with an AMD processor
605560-005	Atheros 9285G 802.11b/g/n 1×1 WiFi Adapter for use with for use only with computer models computer models
609939-001	65-W RC V HP Smart AC adapter for use only with computer models equipped with an AMD processor
609940-001	90-W PFC RC V HP Smart AC adapter for use with all computer models
616333-001	AMD V140 2.30-GHz processor (512-KB L2 cache, 1066-MHz, 3.2-GT/sec, single core, 25 W; includes replacement thermal material)
616343-001	AMD Athlon II P340 2.20-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25W; includes replacement thermal material)
616345-001	AMD Phenom II N850 2.20-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35W; includes replacement thermal material)
621565-001	2-GB memory module (DDR3, 10600, 1333-MHz)
621569-001	4-GB memory module (DDR3, 10600, 1333-MHz)
630703-001	Ralink RT5390 802.11 b/g/n 1x1 WiFi Adapter
630705-001	Ralink RT3090BC4 802.11b/g/n 1×1 WiFi and Bluetooth 2.1+EDR Combo Adapter (Bluetooth 3.0+HS ready) for use only with computer models equipped with an AMD processor
633252-001	750-GB, 7200-rpm hard drive (2.5-in, SATA, does not include isolators or shield)
634687-001	AMD Phenom II P650 2.60-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, triple core, 25W; includes replacement thermal material)
634688-001	AMD Phenom II P860 2.00-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35W; includes replacement thermal material)

Spare part number	Description
634689-001	AMD Phenom II P960 1.80-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, quad core, 25W; includes replacement thermal material)
634691-001	AMD Turion II P560 2.50-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, dual core, 25W; includes replacement thermal material)
635494-001	AMD Phenom II N660 3.00-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, dual core, 35W; includes replacement thermal material)
635495-001	AMD Phenom II N870 2.30-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35W; includes replacement thermal material)
635496-001	AMD Phenom II N970 2.20-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, quad core, 35W; includes replacement thermal material)
636376-001	Keyboard with black finish for use in the United States (includes cable)
636376-121	Keyboard with black finish for use in Canada (includes cable)
636376-161	Keyboard with black finish for use in Latin America (includes cable)
636376-201	Keyboard with black finish for use in Brazil (includes cable)
636376-281	Keyboard with black finish for use in Thailand (includes cable)
636376-AB1	Keyboard with black finish for use in Taiwan (includes cable)
636634-001	AMD V160 2.40-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25W; includes replacement thermal material)
636635-001	AMD Athlon II P360 2.30-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25W; includes replacement thermal material)
637193-001	RTC battery (includes cable and double-sided tape)
637197-001	Webcam/microphone module
637312-001	640-GB, 5400-rpm hard drive (2.5-in, SATA, does not include isolators or shield)
638854-001	System board for use only with computer models equipped with an AMD processor and a graphics subsystem with 512-MB of discrete video memory (includes replacement thermal material)
638855-001	System board for use only with computer models equipped with an AMD processor and a graphics subsystem with 1024-MB of discrete video memory (includes replacement thermal material)
638856-001	System board for use only with computer models equipped with an AMD processor and a graphics subsystem with UMA video memory (includes replacement thermal material)
639438-001	Display enclosure in ocean drive finish
639439-001	Base enclosure (includes battery release latch, replacement thermal material, and 4 rubber feet)
639440-001	Display bezel
639441-001	Display Cable Kit (includes display panel cable and webcam/microphone module cable)
639442-001	Cable Kit (includes TouchPad cable, optical drive cable, and hard drive cable) See Cable Kit on page 22 for more Cable Kit spare part information.
639443-001	Power connector cable
639444-001	Hard Drive Hardware Kit (includes hard drive isolators and shield)
639445-001	Display Hinge Kit (includes left and right display hinges and brackets)

Spare part number	Description
639446-001	Display hinge covers
639447-001	14.0-in, HD, LED, BrightView display assembly in ocean drive finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
639448-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive (includes bezel and bracket)
639449-001	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive (includes bezel and bracket)
639450-001	TouchPad button board (includes cable)
639451-001	Power button board (includes cable)
639452-001	USB board (includes cable)
639453-001	Plastics Kit
639454-001	14.0-in, HD, LED, BrightView display panel
639455-001	Rubber Feet Kit (includes 4 rubber feet)
639456-001	Screw Kit
639457-001	Display Screw Kit
639458-001	Speaker Kit (includes left and right speakers and cable)
639459-001	Top cover in ocean drive finish (includes TouchPad)
639460-001	Fan (includes replacement thermal material)
639462-001	Heat sink for use only with computer models equipped with an AMD processor and a graphics subsystem with discrete video memory (includes replacement thermal material)
639463-001	Heat sink for use only with computer models equipped with an AMD processor and a graphics subsystem with UMA video memory (includes replacement thermal material)
640292-001	TouchPad LED board (includes cable)
640293-001	LED board (includes cable)
640294-001	Antenna Kit (includes left and right wireless antenna cables and transceivers)
640926-001	Realtek RTL8188CE 802.11 b/g/n 1x1 WiFi Adapter
641328-001	Display enclosure in Sonoma red finish
641329-001	Display enclosure in luminous rose finish
641330-001	Display enclosure in charcoal grey finish
641331-001	Display enclosure in pewter finish
641332-001	Display enclosure in Pacific blue finish
641333-001	Display enclosure in pearl pink finish
641334-001	Display enclosure in sweet purple finish
641335-001	Display enclosure in butter gold finish
641336-001	14.0-in, HD, LED, BrightView display assembly in Sonoma red finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641337-001	14.0-in, HD, LED, BrightView display assembly in luminous rose finish (includes webcam, two microphones, and wireless antenna transceivers and cables)

Spare part number	Description
641338-001	14.0-in, HD, LED, BrightView display assembly in charcoal gray finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641339-001	14.0-in, HD, LED, BrightView display assembly in pewter finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641340-001	14.0-in, HD, LED, BrightView display assembly in Pacific blue finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641341-001	14.0-in, HD, LED, BrightView display assembly in pearl pink finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641342-001	14.0-in, HD, LED, BrightView display assembly in sweet purple finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641343-001	14.0-in, HD, LED, BrightView display assembly in butter gold finish (includes webcam, two microphones, and wireless antenna transceivers and cables)
641344-001	Top cover in Sonoma red finish (includes TouchPad)
641345-001	Top cover in luminous rose finish (includes TouchPad)
641346-001	Top cover in charcoal gray finish (includes TouchPad)
641347-001	Top cover in pewter finish (includes TouchPad)
641348-001	Top cover in Pacific blue finish (includes TouchPad)
641349-001	Top cover in pearl pink finish (includes TouchPad)
641350-001	Top cover in sweet purple finish (includes TouchPad)
641351-001	Top cover in butter gold finish (includes TouchPad)
644351-001	750-GB, 5400-rpm hard drive (2.5-in, SATA, does not include isolators or shield)
644685-001	500-GB, 7200-rpm hard drive (2.5-in, SATA, does not include isolators or shield)
645089-001	320-GB, 7200-rpm hard drive (2.5-in, SATA, does not include isolators or shield)
645529-001	System board for use only with computer models equipped with an AMD Fusion E-350 1.60-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory (includes replacement thermal material)
645893-001	Keyboard with silver finish for use in the United States (includes keyboard cable)
645893-121	Keyboard with silver finish for use in Canada (includes keyboard cable)
645893-161	Keyboard with silver finish for use in Latin America (includes keyboard cable)
645893-201	Keyboard with silver finish for use in Brazil (includes keyboard cable)
645893-281	Keyboard with silver finish for use in Thailand (includes keyboard cable)
645893-AB1	Keyboard with silver finish for use in Taiwan (includes keyboard cable)
647626-001	System board for use only with computer models equipped with the AMD RS880MD chipset, an AMD processor, and a graphics subsystem with 512-MB of discrete video memory, and supports bus alive/chip off (BACO; includes replacement thermal material)
647627-001	System board for use only with computer models equipped with the AMD RS880MD chipset, an AMD processor, and a graphics subsystem with 1024-MB of discrete video memory, and supports bus alive/chip off (BACO; includes replacement thermal material)
649948-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with UMA video memory (includes replacement thermal material)

Spare part number	Description
649949-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with 512-MB of discrete video memory (includes replacement thermal material)
649950-001	System board for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with 1024-MB of discrete video memory (includes replacement thermal material)
649952-001	Heat sink for use only with computer models equipped with the AMD RS880MD chipset, an AMD processor, and a graphics subsystem with discrete video memory (includes replacement thermal material)
649953-001	Heat sink for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with discrete video memory (includes replacement thermal material)
649954-001	Heat sink for use only with computer models equipped with the AMD A60M chipset, an AMD processor, and a graphics subsystem with UMA video memory (includes replacement thermal material)
653348-001	AMD A4-3300M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 35 W; includes replacement thermal material)
653349-001	AMD A6-3400M 2.30-GHz processor (1.4-GHz FSB, 4.0-MB L2 cache, quad core, 35 W; includes replacement thermal material)
653350-001	AMD A8-3500M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W; includes replacement thermal material)
653351-001 or 677628-001	AMD E2-3000M 2.40-GHz processor (1.8-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)
655795-001	Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter for use with all computer models
657325-001	Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
657325-501	Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter
659618-001	Optical drive bay space saver
659847-001	DVD±RW and CD-RW Super Multi Double-Layer Combo Drive
659848-001	Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive
659871-001	System board for use only with computer models equipped with an AMD Fusion E-450 1.65-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory (includes replacement thermal material)
669686-001	AMD A4-3320M 2.60-GHz processor (2.0-GHz FSB, 4.0-MB L2 cache, dual core, 35 W; includes replacement thermal material)
669688-001	AMD A6-3420M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W; includes replacement thermal material)
669690-001	AMD A8-3520M 2.50-GHz processor (1.6-GHz FSB, 4.0-MB L2 cache, quad core, 35 W; includes replacement thermal material)
672093-001	AMD A4-3305M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 45 W; includes replacement thermal material)
686615-001	System board for use only with computer models equipped with an E2-1800 1.7-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory (includes replacement thermal material)

4 Removal and replacement procedures

Preliminary replacement requirements

Tools required

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

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

Service considerations

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

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

Plastic parts

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

Cables and connectors

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

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

Drive handling

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

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

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

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

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

Avoid dropping drives from any height onto any surface.

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

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

Avoid exposing a drive to temperature extremes or liquids.

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

Grounding guidelines

Electrostatic discharge damage

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

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

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

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

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

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

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

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

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

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

Typical electrostatic voltage levels

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

Workstation guidelines

Follow these grounding workstation guidelines:

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

Equipment guidelines

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

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

The following grounding equipment is recommended to prevent electrostatic damage:

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

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

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

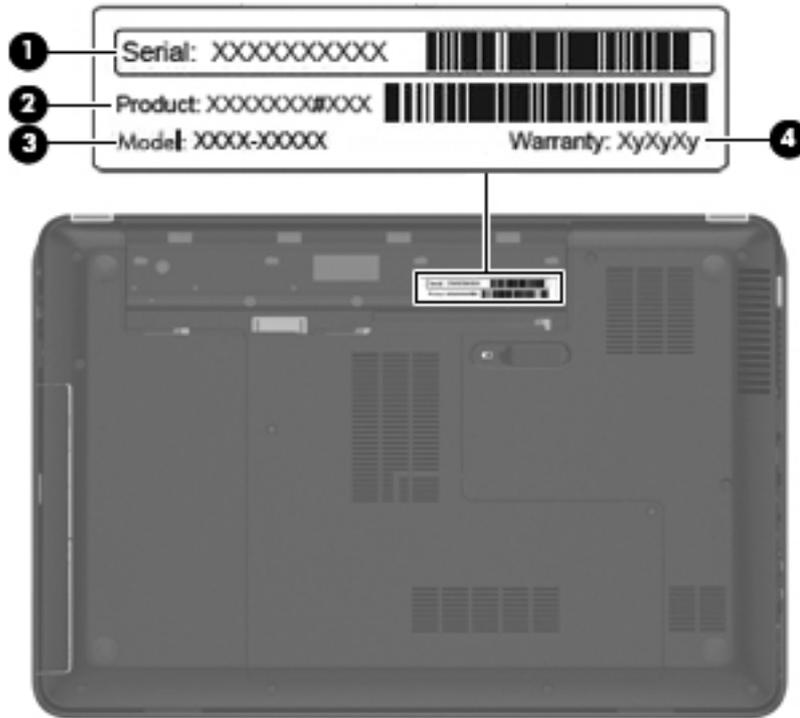
Component replacement procedures

This chapter provides removal and replacement procedures.

There are as many as 51 screws that must be removed, replaced, or loosened when servicing the computer. Make special note of each screw and screw lock size and location during removal and replacement.

Service tag

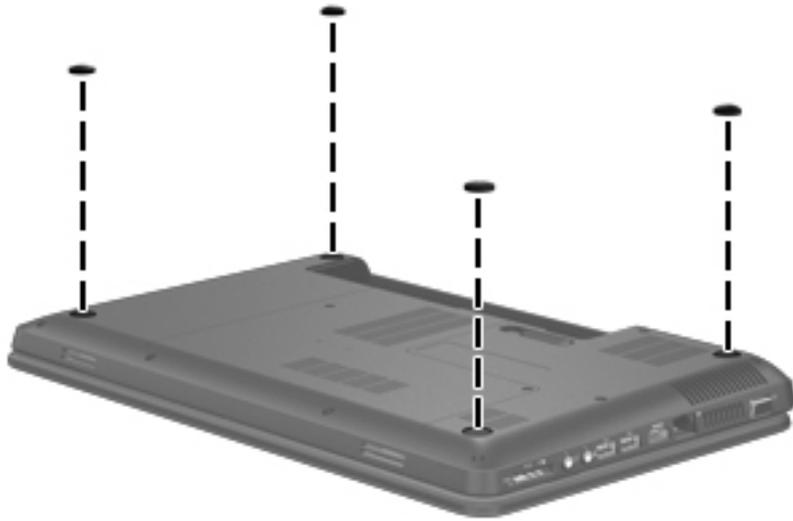
When ordering parts or requesting information, provide the computer serial number and model number provided on the service tag.



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

Computer feet

The computer feet are adhesive-backed rubber pads. The feet are included in the Rubber Feet Kit, spare part number 639455-001. There are 4 rubber feet that attach to the base enclosure in the locations illustrated below.



Battery

Description	Spare part number
6-cell, 55-Whr, 2.55-Ah Li-ion battery	593554-001
6-cell, 47-Whr, 2.20-Ah Li-ion battery	593553-001

Before disassembling the computer, follow these steps:

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

Remove the battery:

1. Slide the battery release latch **(1)** to release the battery.
2. Pivot the front edge of the battery **(2)** up and back.
3. Remove the battery **(3)** from the computer.



To insert the battery:

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

Optical drive

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

Description	Spare part number
Blu-ray ROM DVD±R/RW Super Multi Double-Layer Drive	639449-001 and 659848-001
DVD±RW and CD-RW Super Multi Double-Layer Combo Drive	639448-001 and 659847-001
Optical drive bay space saver	659618-001

Before removing the optical drive, follow these steps:

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

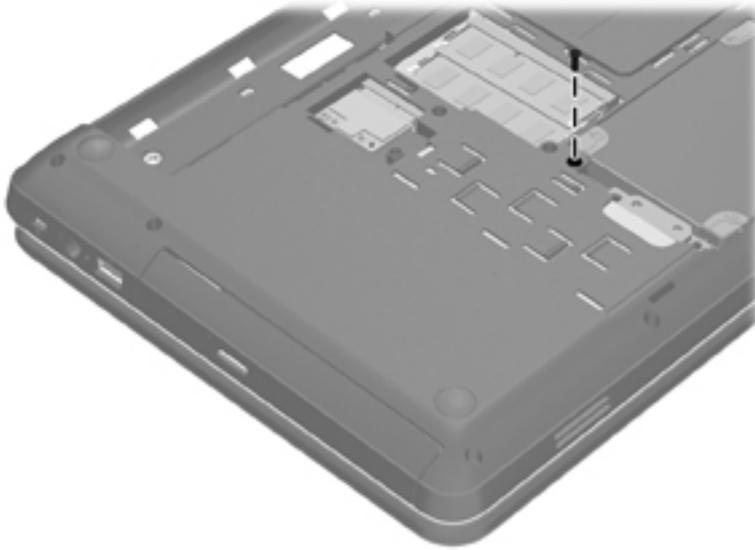
Remove the optical drive:

1. Loosen the two captive screws (1) that secure the service cover to the computer.
2. Lift the rear edge of the service cover (2) up and forward until it rests at an angle.

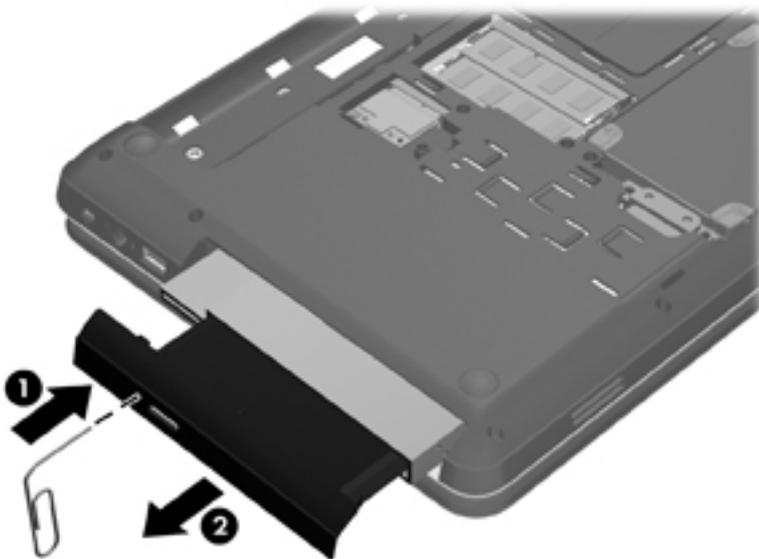


3. Remove the service cover. The service cover is available in the Plastics Kit, spare part number 639453-001.

4. Remove the Phillips PM2.5×6.0 screw that secures the optical drive to the computer.



5. Insert a thin tool, such as an unbent paper clip (1), into the optical drive release hole. (The optical drive tray releases.)
6. Use the optical drive tray to remove the optical drive (2) from the computer.



7. If it is necessary to replace the optical drive bracket, position the optical drive with the rear panel toward you.
8. Remove the two Phillips PM2.0×4.0 screws (1) that secure the bracket to the optical drive.

9. Remove the optical drive bracket (2).



Reverse this procedure to reassemble and install the optical drive.

Hard drive

 **NOTE:** The hard drive spare part kit does not include the hard drive cable, hard drive isolators, or Mylar shield. The hard drive isolators and Mylar shield are included in the Hard Drive Hardware Kit, spare part number 639444-001. The hard drive cable is included in the Cable Kit, spare part number 639442-001.

Description	Spare part number
750-GB, 7200-rpm	633252-001
750-GB, 5400-rpm	644351-001
640-GB, 5400-rpm	637312-001
500-GB, 7200-rpm	644685-001
320-GB, 7200-rpm	645089-001

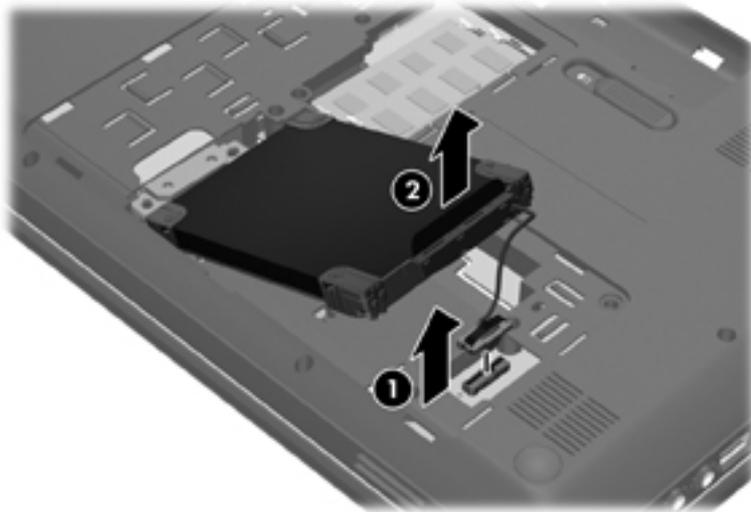
Before removing the mass storage device, follow these steps:

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

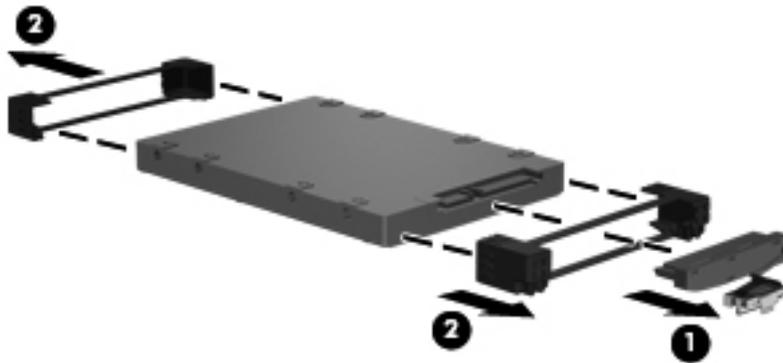
Remove the hard drive:

1. Disconnect the hard drive cable (1) from the system board.

2. Lift the front edge of the hard drive **(2)** until it rests at an angle.



3. Remove the hard drive.
4. If it is necessary to replace the hard drive cable **(1)** or the hard drive isolators **(2)** from the hard drive, remove and replace the components. The hard drive cable is included in the Cable Kit, spare part 639442-001. The hard drive isolators are available in the Hard Drive Hardware Kit, spare part number 639444-001.



Reverse this procedure to reassemble and install the mass storage device.

Memory module

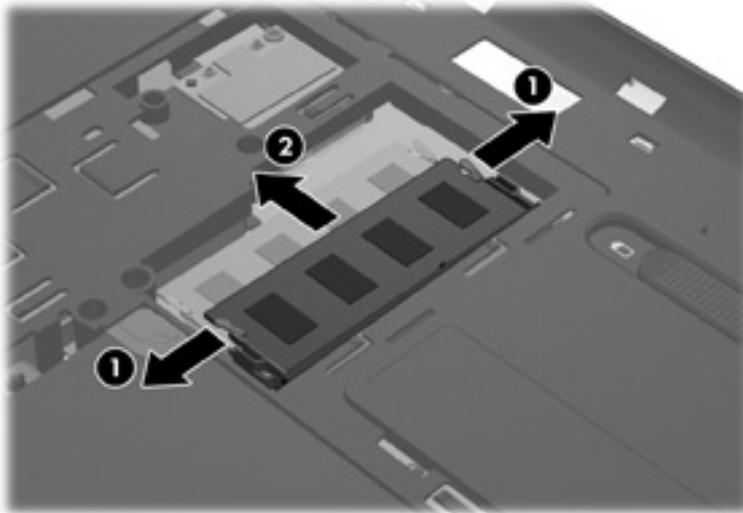
Description	Spare part number
4-GB (PC3, 10600, 1333-MHz)	621569-001
2-GB (PC3, 10600, 1333-MHz)	621565-001

Before removing a memory module, follow these steps:

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

Remove the memory module:

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



Reverse this procedure to install a memory module.

WLAN module

Description	Spare part number
Atheros 9485GN 802.11b/g/n 1×1 WiFi and 3012 Bluetooth 4.0 Combo Adapter	655795-001
Atheros 9285G 802.11b/g/n 1×1 WiFi Adapter	605560-005
Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter	600370-001
Broadcom 4313 802.11 b/g/n 1x1 WiFi and 2070 Bluetooth 3.0 Combo Adapter (Brazil only)	600370-201
Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-001
Broadcom 4313 802.11b/g/n 1x1 WiFi and 20702 Bluetooth 4.0 Combo Adapter	657325-501
Ralink RT5390 802.11 b/g/n 1x1 WiFi Adapter	630703-001
Realtek RTL8188CE 802.11 b/g/n 1x1 WiFi Adapter	640926-001
Atheros AR8002WB-1NGB 802.11b/g/n 1×1 WiFi and Bluetooth 2.1+EDR Combo Adapter (BT3.0+HS ready)	593127-001
Broadcom 4313 802.11b/g/n 1×1 WiFi Adapter	593836-001
Ralink RT3090BC4 802.11b/g/n 1×1 WiFi and Bluetooth 2.1+EDR Combo Adapter (Bluetooth 3.0+HS ready)	630705-001
Realtek 8188BC8 802.11a/b/g/n 2×2 WiFi and Bluetooth 3.0+HS Combo Adapter	602993-001

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

Before removing the WLAN module, follow these steps:

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

Remove the WLAN module:

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

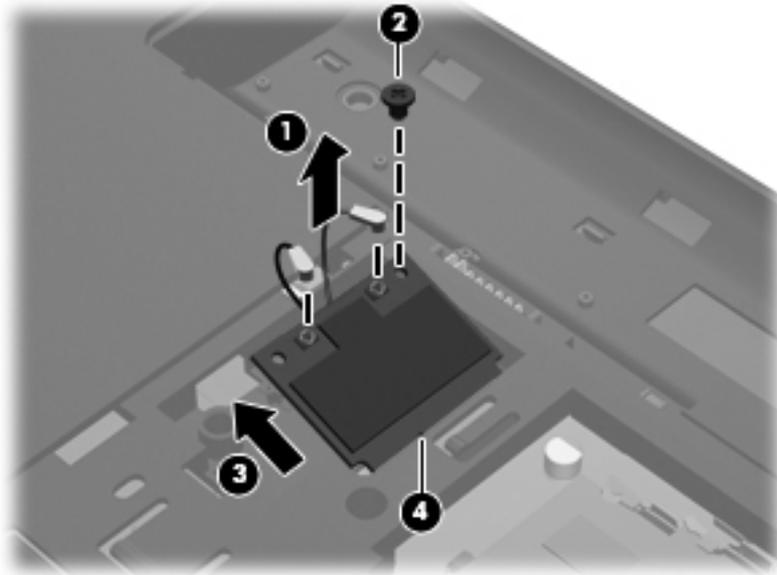


NOTE: The 1/black WLAN antenna cable is connected to the WLAN module 1/Main terminal. The 2/gray WLAN antenna cable is connected to the WLAN module 2/Aux terminal.

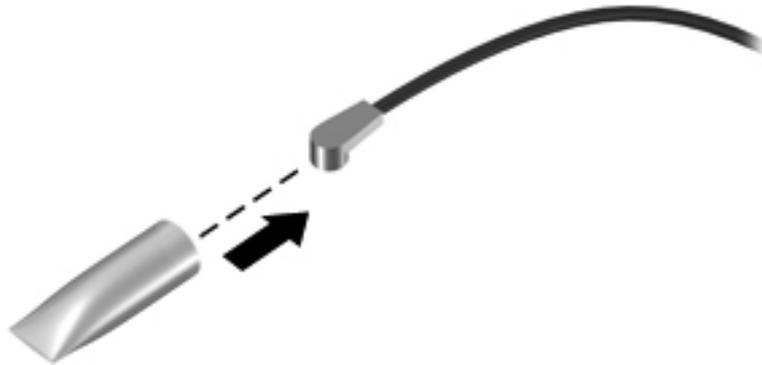
2. Remove the Phillips PM2.0×4.0 screw **(2)** that secures the WLAN module to the system board. (The WLAN module tilts up.)

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

 **NOTE:** The WLAN module is designed with a notch (4) to prevent incorrect installation into the WLAN module socket.



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



Reverse this procedure to install the WLAN module.

Keyboard



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

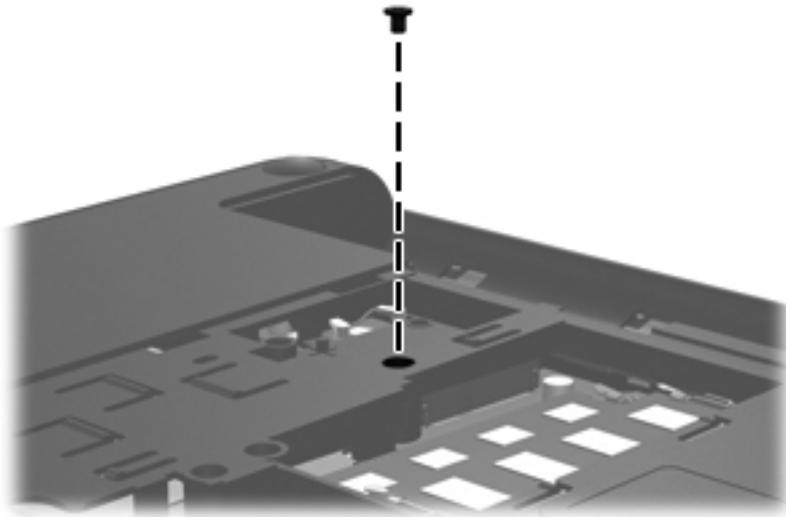
Description	Spare part number
Keyboard with black finish for use in Brazil	636376-201
Keyboard with black finish for use in Canada	636376-121
Keyboard with black finish for use in Latin America	636376-161
Keyboard with black finish for use in Taiwan	636376-AB1
Keyboard with black finish for use in Thailand	636376-281
Keyboard with black finish for use in the United States	636376-001
Keyboard with silver finish for use in Brazil	645893-201
Keyboard with silver finish for use in Canada	645893-121
Keyboard with silver finish for use in Latin America	645893-161
Keyboard with silver finish for use in Taiwan	645893-AB1
Keyboard with silver finish for use in Thailand	645893-281
Keyboard with silver finish for use in the United States	645893-001

Before removing the keyboard, follow these steps:

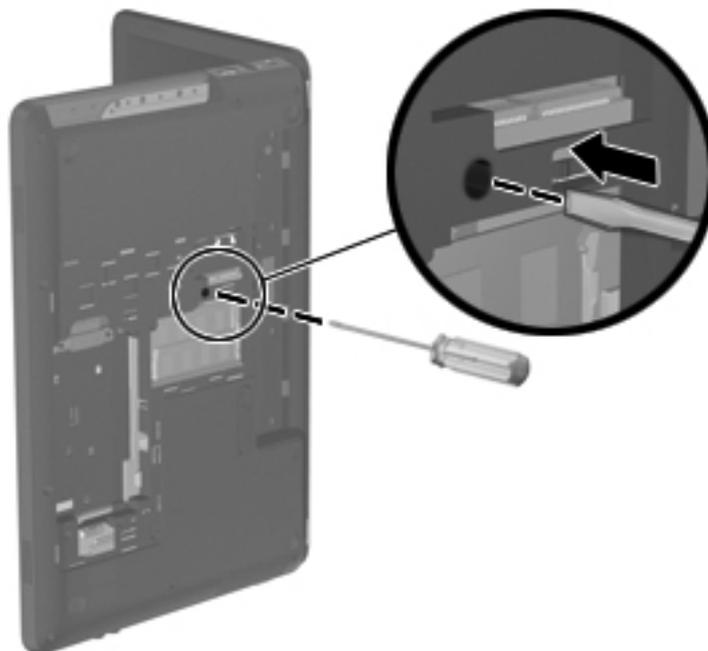
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord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

Remove the keyboard:

1. Remove the Phillips PM2.5×6.0 screw that secures the keyboard to the computer.



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

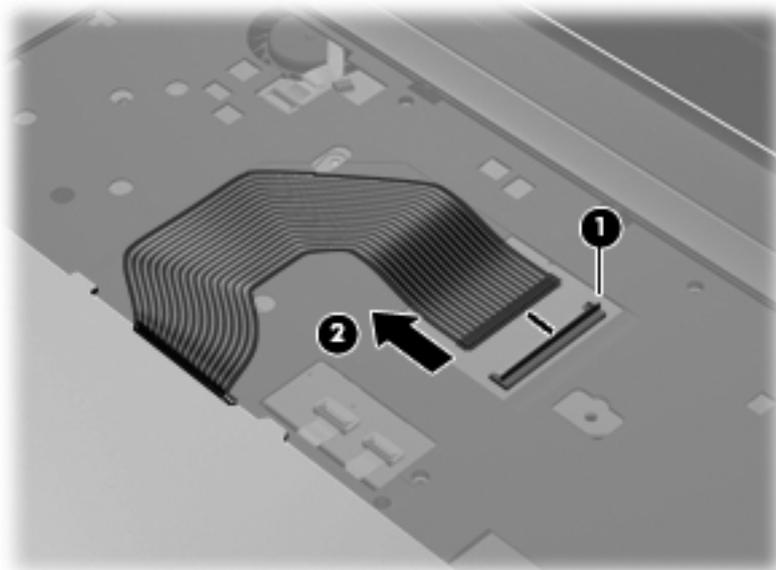


5. Turn the computer right-side up with the front toward you.

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



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



8. Remove the keyboard.

Reverse this procedure to install the keyboard.

Top cover



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

Description	Spare part number
In butter gold finish	641351-001
In charcoal gray finish	641346-001
In luminous rose finish	641345-001
In ocean drive finish	639459-001
In Pacific blue finish	641348-001
In pearl pink finish	641349-001
In pewter finish	641347-001
In Sonoma red finish	641344-001
In sweet purple finish	641350-001

Before removing the top cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))

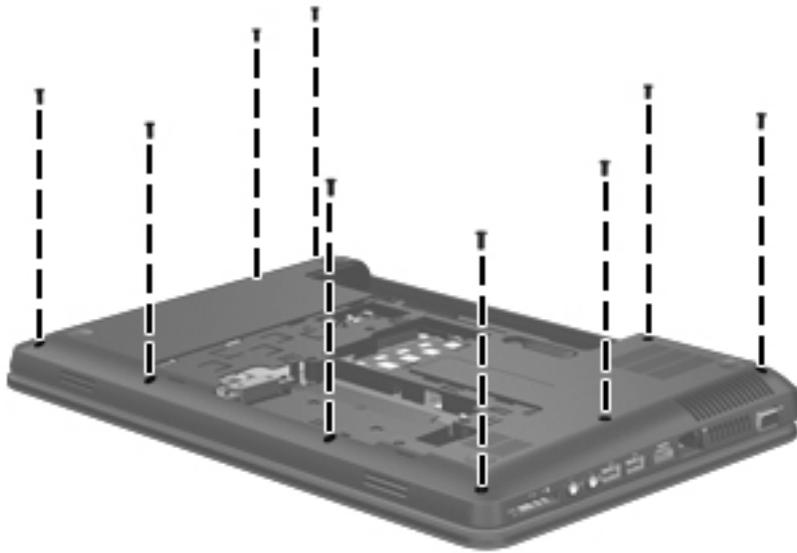
When replacing the top cover, be sure that the following components are removed from the defective top cover and installed on the replacement top cover:

- Power button board and cable (see [Power button board on page 53](#))
- TouchPad button board and cable (see [TouchPad button board on page 54](#))
- TouchPad LED board and cable (see [TouchPad LED board on page 55](#))

Remove the top cover:

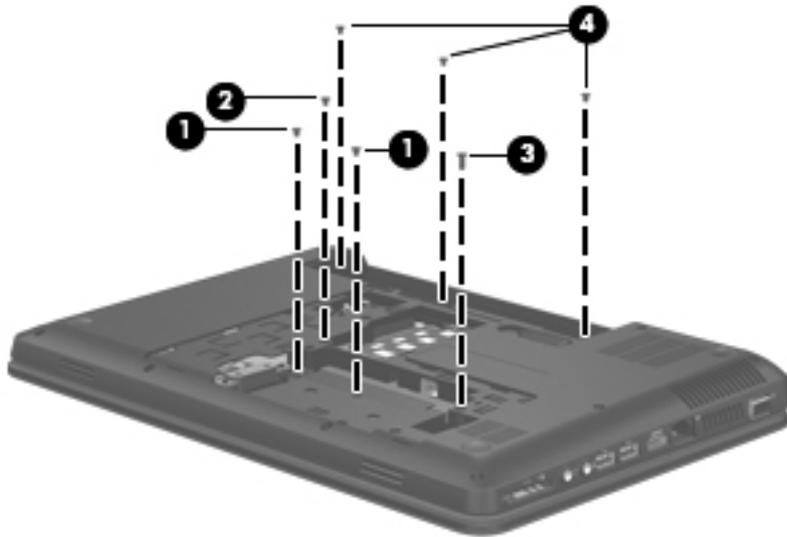
1. Close the computer.
2. Turn the computer upside down, with the front toward you.

3. Remove the nine Phillips PM2.5×7.0 screws that secure the top cover to the computer.



4. Remove the following screws:

- (1) Two Phillips PM 2.5×4.0 screws in the hard drive bay
- (2) One Phillips PM2.5×6.0 screw near the memory module bay
- (3) One Phillips PM2.5×6.0 screw on the right side of the hard drive bay
- (4) Three Phillips PM2.5×6.0 screws in the battery bay



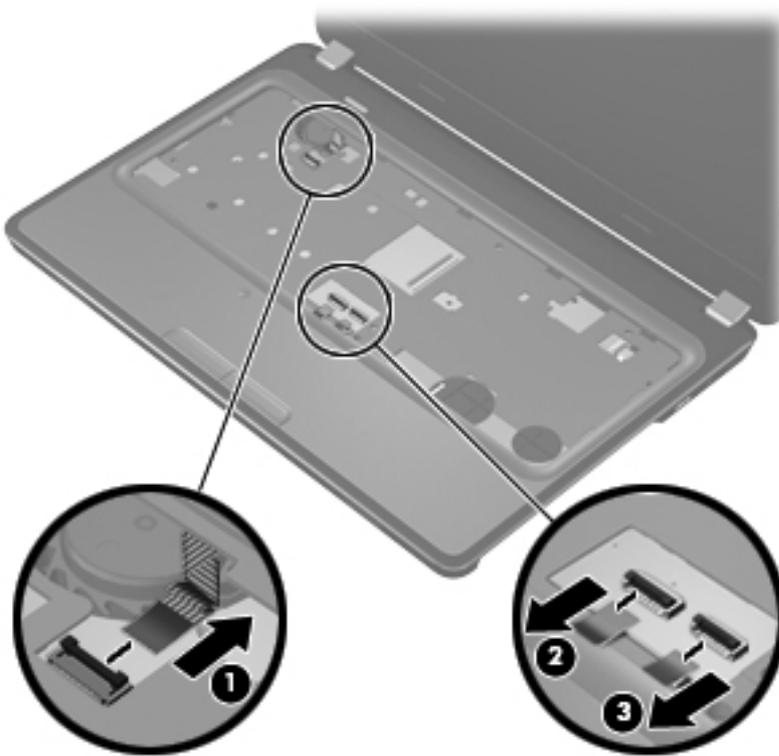
5. Turn the computer right-side up, with the front toward you.
6. Open the computer.

7. Release the ZIF connectors to which the following cables are attached, and then disconnect the cables from the system board:

- (1) Power button board cable (included with the power button board spare part kit)

- (2) TouchPad cable (included in the Cable Kit, spare part number 639442-001)

- (3) TouchPad button board cable (included with the TouchPad button board spare part kit)



8. Lift the front edge of the top cover (1) until the left and right sides disengage from the base enclosure.

9. Remove the top cover (2).



Reverse this procedure to install the top cover.

Power button board

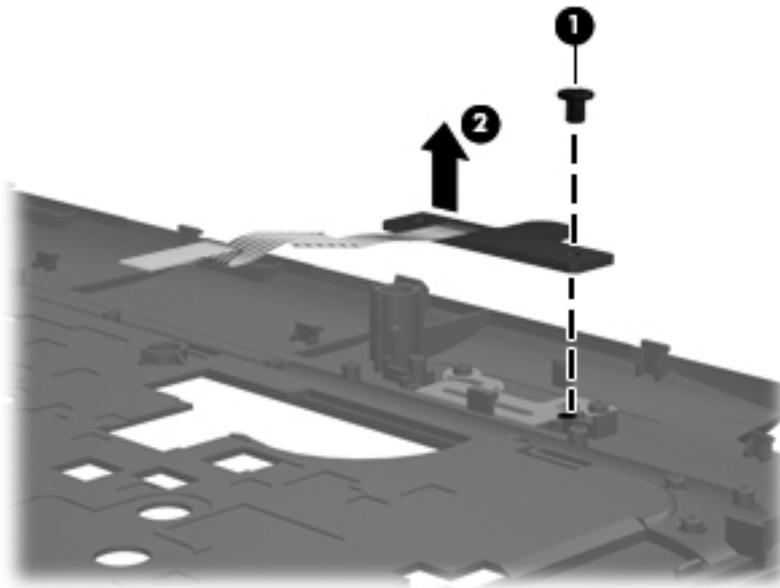
Description	Spare part number
Power button board (includes cable)	639451-001

Before removing the power button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.
2. Remove the Phillips PM2.0×3.0 screw (1) that secures the power button board to the top cover.
3. Remove the power button board and cable (2).



Reverse this procedure to install the power button board.

TouchPad button board

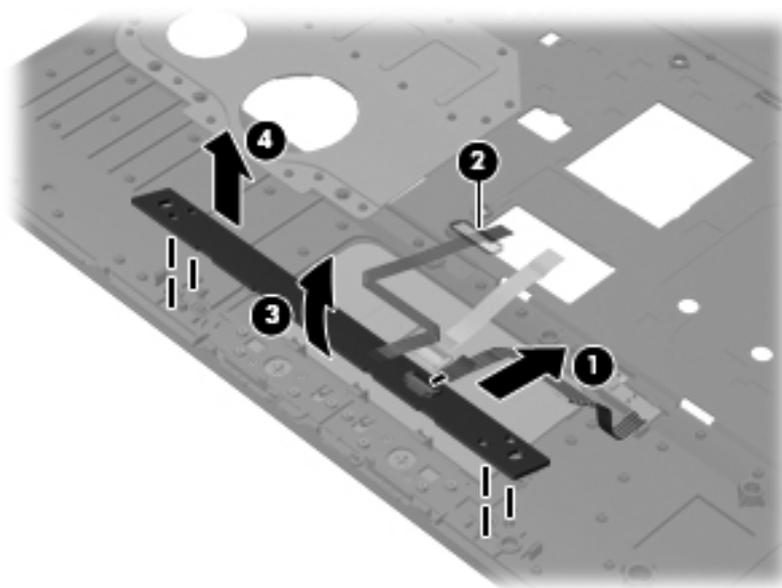
Description	Spare part number
TouchPad button board (includes cable)	639450-001

Before removing the TouchPad button board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the TouchPad button board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Release the ZIF connector to which the TouchPad LED board cable is connected, and then disconnect the TouchPad LED board cable (1) from the TouchPad button board.
3. Release the tape (2) that secures the TouchPad button board cable to the top cover.
4. Lift the front edge of the TouchPad button board (3) until it is released from the clips built into the top cover.
5. Remove the TouchPad button board (4) and cable.



Reverse this procedure to install the TouchPad button board and cable.

TouchPad LED board

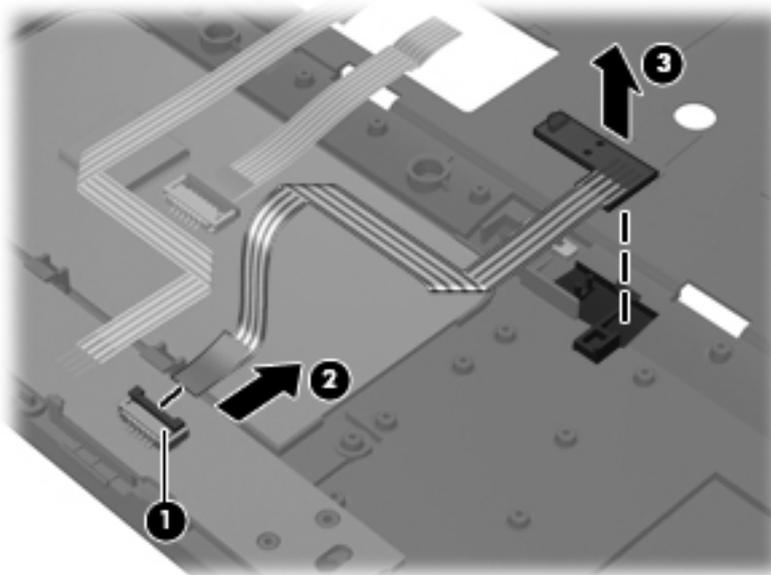
Description	Spare part number
TouchPad LED board (includes cable)	640292-001

Before removing the TouchPad LED board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the TouchPad LED board and cable:

1. Turn the top cover upside down, with the front toward you.
2. Release the ZIF connector (1) to which the TouchPad LED board cable is connected, and then disconnect the TouchPad LED board cable (2) from the TouchPad button board.
3. Detach the TouchPad LED board (2) from the top cover. (The TouchPad LED board is attached to the top cover with double-sided tape.)



4. Remove the TouchPad LED board and cable.

Reverse this procedure to install the TouchPad LED board and cable.

Speakers

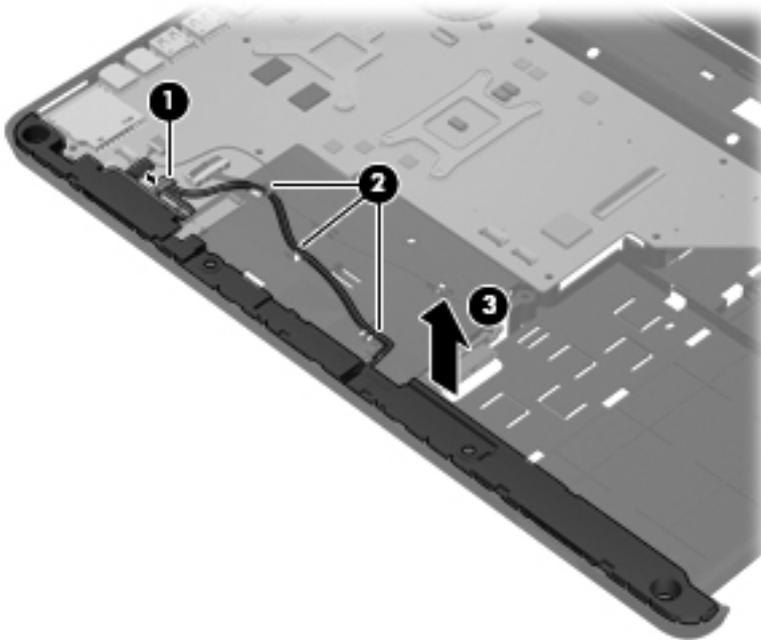
Description	Spare part number
Speaker Kit (includes left and right speakers and cable)	639458-001

Before removing the speakers, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the TouchPad LED board and cable:

1. Disconnect the speaker cable (1) from the system board.
2. Release the speaker cable from the clips built into the base enclosure (2).
3. Remove the speakers (3).



Reverse this procedure to install the speakers.

Optical drive cable

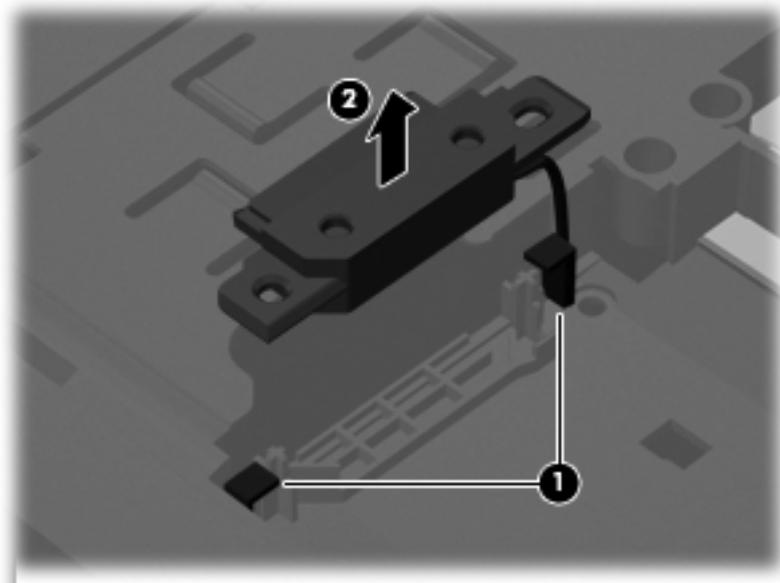
 **NOTE:** The optical drive cable is included in the Cable Kit, spare part number 639442-001. The optical drive cable includes the optical drive connector.

Before removing the optical drive cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))
 - Speakers (see [Speakers on page 57](#))

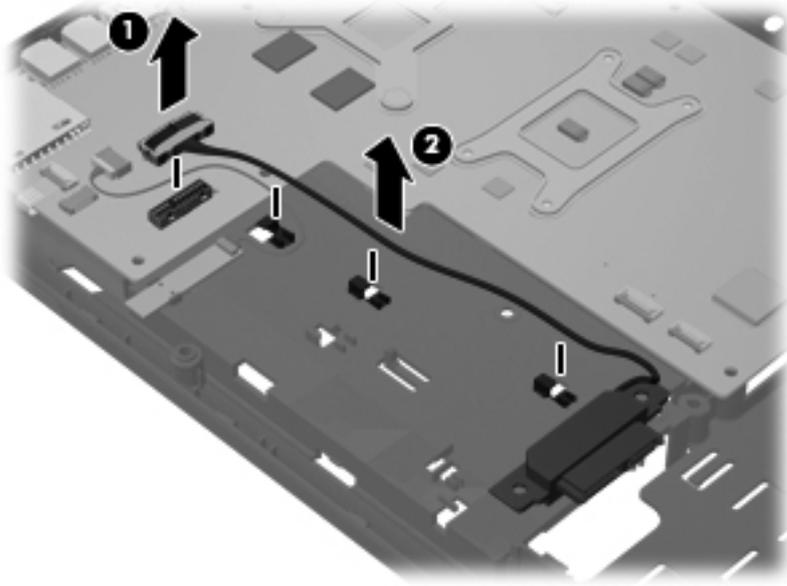
Remove the optical drive cable:

1. Close the computer.
2. Turn the computer upside down, with the front toward you.
3. Release the clips **(1)** that secure the optical drive connector to the base enclosure.
4. Release the optical drive connector **(2)** from the base enclosure.



5. Turn the computer right-side up, with the front toward you.
6. Open the computer.
7. Disconnect the optical drive cable **(1)** from the system board.

8. Release the optical drive cable (2) from the clips built into the base enclosure.



9. Remove the optical drive cable.
Reverse this procedure to install the optical drive cable.

USB board

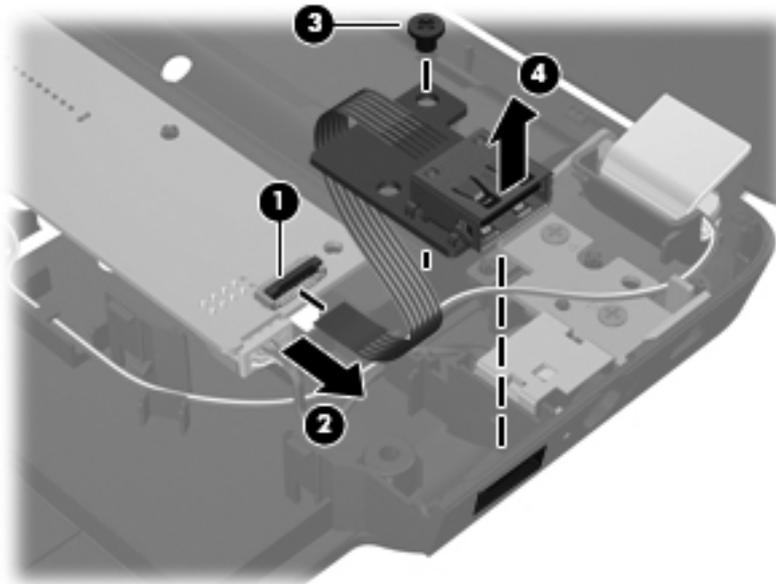
Description	Spare part number
USB board (includes cable)	639452-001

Before removing the USB board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the USB board:

1. Release the ZIF connector (1) to which the USB board cable is connected, and then disconnect the USB board cable (2) from the system board.
2. Remove the Phillips PM2.5×6.0 screw (3) that secures the USB board to the base enclosure.
3. Remove the USB board (4) and cable.



Reverse this procedure to install the USB board.

Power connector cable

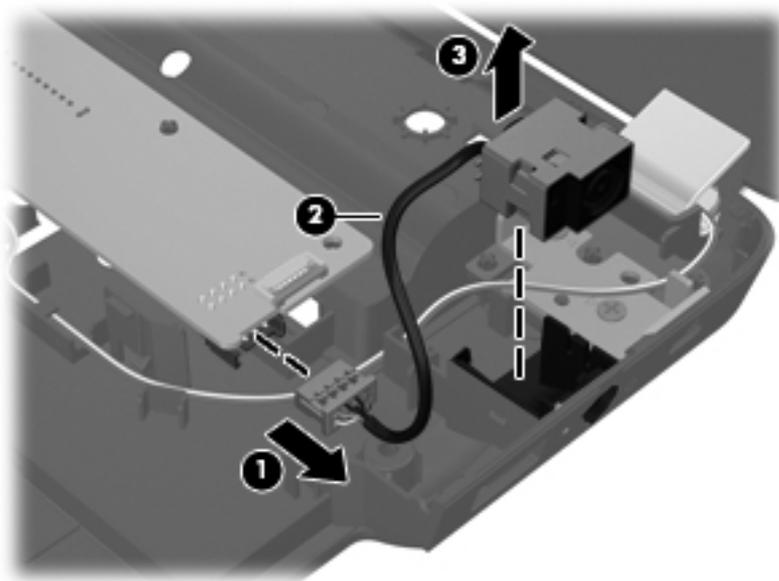
Description	Spare part number
Power connector cable	639443-001

Before removing the power connector cable, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

Remove the power connector cable:

1. Disconnect the power connector cable (1) from the system board.
2. Release the power connector cable (2) from the clip built into the base enclosure.
3. Remove the power connector (3) from the clip built into the base enclosure.



Reverse this procedure to install the power connector cable.

System board



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

Description	Spare part number
Equipped with an E2-1800 1.7-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	686615-001
Equipped with a Fusion E-450 1.65-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	659871-001
Equipped with a Fusion E-350 1.60-GHz processor (dual core, 18 W) and a graphics subsystem with UMA video memory	645529-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 1024-MB of discrete video memory	649950-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with 512-MB of discrete video memory	649949-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649948-001
For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with 1024-MB of discrete video memory and supports bus alive/chip off (BACO)	647627-001
For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with 512-MB of discrete video memory and supports bus alive/chip off (BACO)	647626-001
For use only with computer models equipped with a graphics subsystem with 1024-MB of discrete video memory	638855-001
For use only with computer models equipped with a graphics subsystem with 512-MB of discrete video memory	638854-001
For use only with computer models equipped with a graphics subsystem with UMA video memory	638856-001

Before removing the system board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

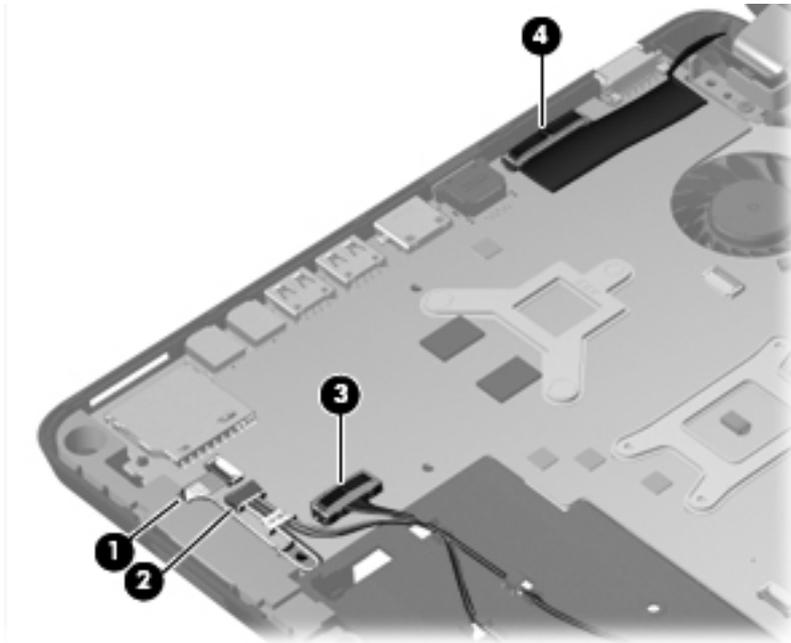
When replacing the system board, be sure that the following components are removed from the defective system board and installed on the replacement system board:

- Memory module (see [Memory module on page 43](#))
- RTC battery (see [RTC battery on page 66](#))
- Fan and heat sink (see [Fan and heat sink on page 67](#))
- Processor (see [Processor on page 70](#))

Remove the system board:

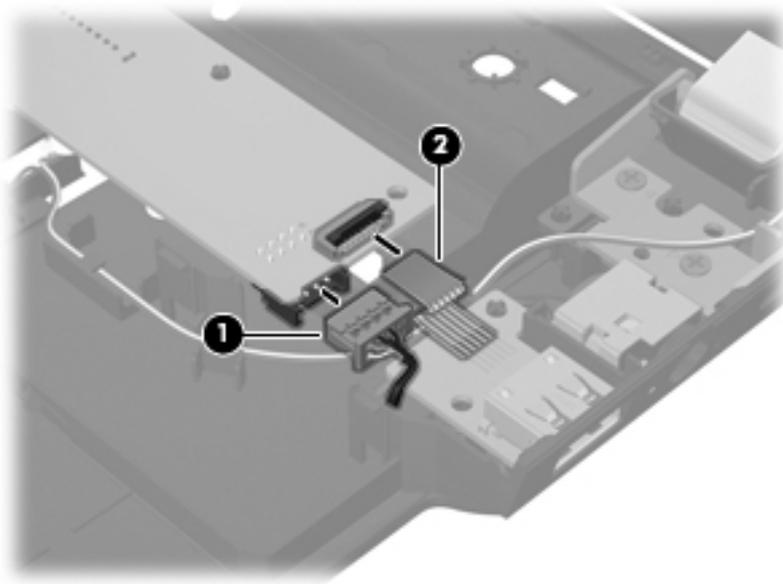
1. Disconnect the following cables from the system board:

- (1) LED board cable
- (2) Speaker cable
- (3) Optical drive cable
- (4) Display panel cable



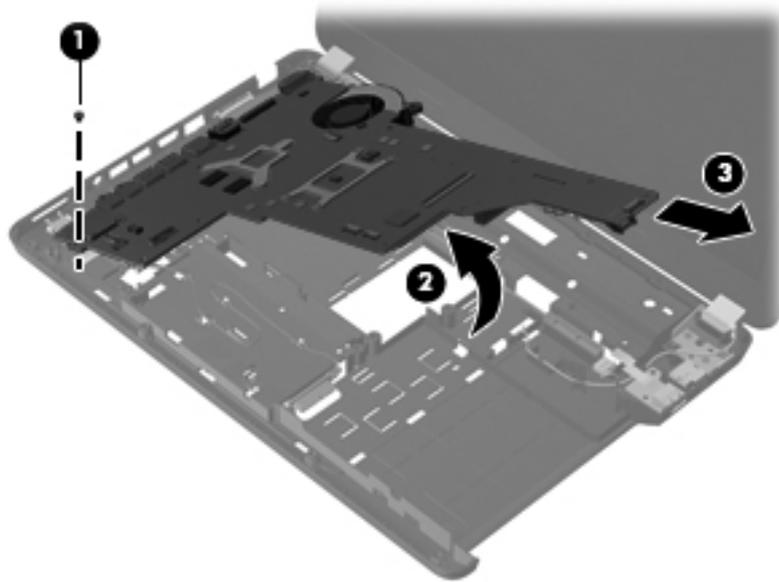
2. Disconnect the power connector cable (1) from the system board.

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

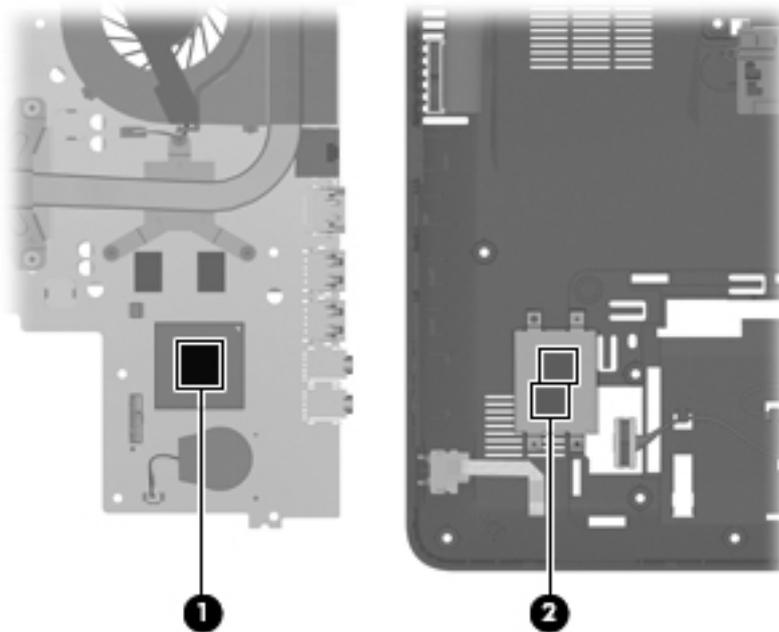


4. Remove the Phillips PM2.5×6.0 screw **(1)** that secures the system board to the base enclosure.
5. Lift the right side of the system board **(2)** until it rests at an angle.

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



 **NOTE:** System boards for use with computer models equipped with an AMD processor have the Southbridge chip located on the bottom of the board. A thermal pad is used on the Southbridge chip (1) and the base enclosure heat sink (2) that services it. The thermal material must be thoroughly cleaned from the surfaces of the system board and the heat sink attached to the base enclosure each time the system board is removed. Replacement thermal material is included with all base enclosure and system board spare part kits.



Reverse this procedure to install the system board.

RTC battery

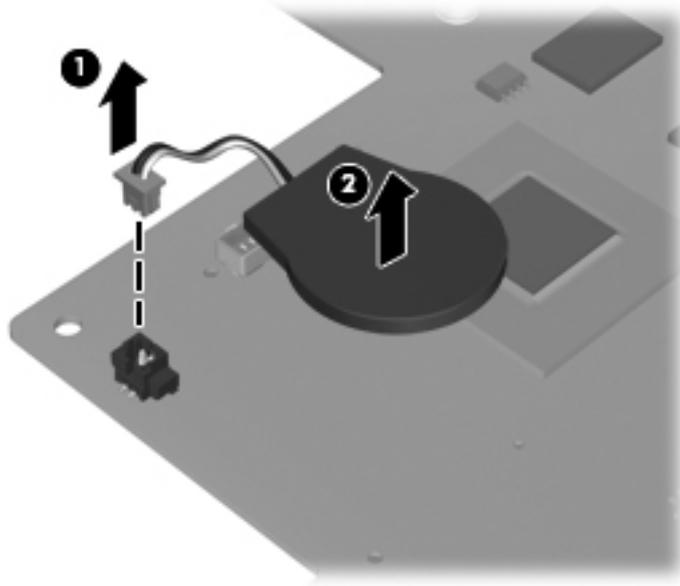
Description	Spare part number
RTC battery (includes cable and double-sided tape)	637193-001

Before removing the RTC battery, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))
 - System board (see [System board on page 62](#))

Remove the RTC battery:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the RTC battery cable (1) from the system board.
3. Remove the RTC battery (2) from the system board. (The RTC battery is attached to the system board with double-sided tape.)



Reverse this procedure to install the RTC battery.

Fan and heat sink



NOTE: The fan and heat sink spare part kits include replacement thermal material.

Description	Spare part number
Fan	639460-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with discrete video memory	649953-001
For use only with computer models equipped with the AMD A60M chipset and a graphics subsystem with UMA video memory	649954-001
For use only with computer models equipped with the AMD RS880MD chipset and a graphics subsystem with discrete video memory 649952-001	649952-001
For use only with computer models equipped with an AMD Athlon, Phenom, Turion, or V-series processor and a graphics subsystem with discrete video memory	639462-001
For use only with computer models equipped with an AMD Athlon, Phenom, Turion, or V-series processor and a graphics subsystem with UMA video memory	639463-001



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

Before removing the fan and 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 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))
 - System board (see [System board on page 62](#))

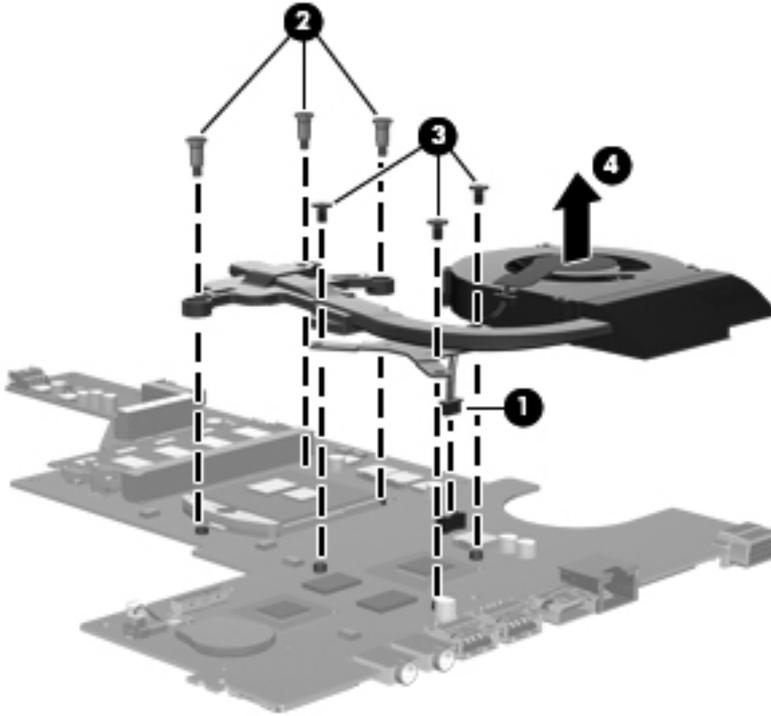
Remove the fan and heat sink:

1. Turn the system board upside down, with the front toward you.
2. Disconnect the fan cable **(1)** from the system board.

3. Remove the three Phillips PM2.5×5.0 screws **(2)** and the three Phillips PM2.5×10.0 spring-loaded screws **(3)** that secure the heat sink to the system board.

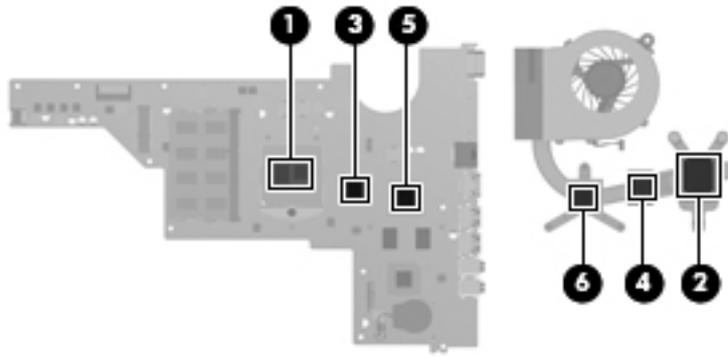
 **NOTE:** Due to the adhesive quality of the thermal material located between the heat sink and system board components, it may be necessary to move the heat sink from side to side to detach it.

4. Remove the fan and heat sink **(4)**.

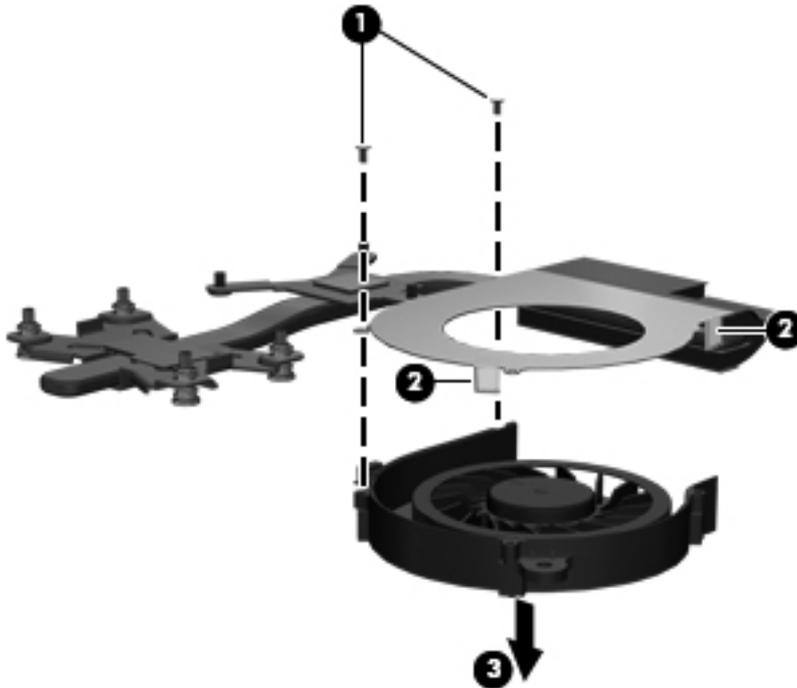


 **NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the heat sink and the system board components each time the heat sink is removed. Replacement thermal material is included with the base enclosure, heat sink, processor, and system board spare part kits.

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it
- A thermal pad is used on the Northbridge chip **(3)** and the heat sink section **(4)** that services it
- A thermal pad is used on the graphics subsystem chip **(5)** and the heat sink section **(6)** that services it (only on computer models equipped with a graphics subsystem with discrete memory)



1. If it is necessary to replace the fan, turn the fan and heat sink upside down with the fan toward you.
2. Remove the two Phillips PM2.0×3.0 screws (1) that secure the fan to the heat sink.
3. Disengage the two clips (2) that secure the fan to the heat sink.
4. Remove the heat sink (3) from the fan.



Reverse this procedure to reassemble and install the fan and heat sink.

Processor

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

Description	Spare part number
AMD A8-3520M 2.50-GHz processor (1.6-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	669690-001
AMD A8-3500M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653350-001
AMD A6-3420M 2.40-GHz processor (1.5-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	669688-001
AMD A6-3400M 2.30-GHz processor (1.4-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653349-001
AMD A4-3320M 2.60-GHz processor (2.0-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)	669686-001
AMD A4-3305M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 45 W)	672093-001
AMD A4-3300M 2.50-GHz processor (1.9-GHz FSB, 4.0-MB L2 cache, dual core, 35 W)	653348-001
AMD E2-3000M 2.40-GHz processor (1.8-GHz FSB, 4.0-MB L2 cache, quad core, 35 W)	653351-001 or 677628-001
AMD Athlon II P360 2.30-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)	636635-001
AMD Athlon II P340 2.20-GHz processor (1.0-MB L2 cache, 1066-MHz, 3.2GT/sec, dual core, 25 W)	616343-001
AMD Phenom II N970 2.20-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, quad core, 35 W)	635496-001
AMD Phenom II N870 2.30-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	635495-001
AMD Phenom II N850 2.20-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	616345-001
AMD Phenom II N660 3.00-GHz processor (2.0-MB L2 cache, 1333-MHz, 3.6GT/sec, dual core, 35 W)	635494-001
AMD Phenom II P960 1.80-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, quad core, 25 W)	634689-001
AMD Phenom II P860 2.00-GHz processor (1.5-MB L2 cache, 1333-MHz, 3.6GT/sec, triple core, 35 W)	634688-001
AMD Phenom II P650 2.60-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, triple core, 25 W)	634687-001
AMD Turion II P560 2.50-GHz processor (2.0-MB L2 cache, 1066-MHz, 3.6GT/sec, dual core, 25 W)	634691-001
AMD V160 2.40-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)	636634-001
AMD V140 2.30-GHz processor (512-KB L2 cache, 1066-MHz 3.2-GT/sec, single core, 25 W)	616333-001

Before removing the processor, follow these steps:

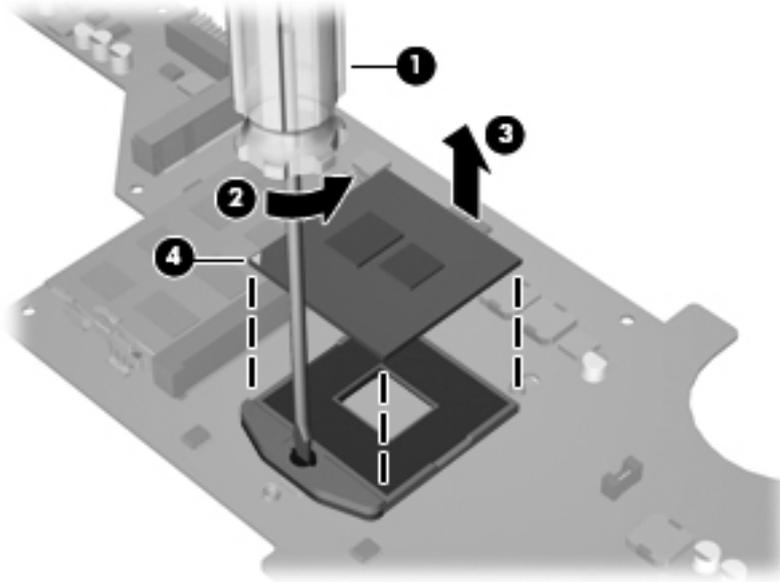
1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))
 - System board (see [System board on page 62](#))
 - Heat sink (see [Fan and heat sink on page 67](#))

Remove the processor:

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

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



Reverse this procedure to install the processor.

LED board

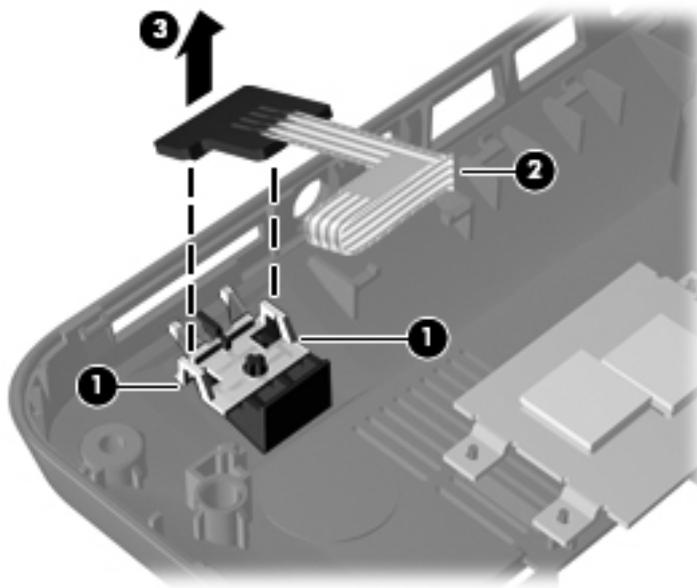
Description	Spare part number
LED board	640293-001

Before removing the LED board, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))
 - System board (see [System board on page 62](#))

Remove the LED board:

1. Release the clips **(1)** built into the base enclosure that secure the LED board.
2. Release the LED board cable **(2)** from the base enclosure. (The LED board cable is attached to the base enclosure with double-sided tape.)
3. Remove the LED board and cable **(3)**.



Reverse this procedure to install the LED board and cable.

Display assembly

 **NOTE:** The display assembly spare part kit includes webcam, two microphones, and wireless antenna transceivers and cables).

Description	Spare part number
14.0-in, HD, LED, BrightView display assembly	
In butter gold finish	641343-001
In charcoal gray finish	641338-001
In luminous rose finish	641337-001
In ocean drive finish	639447-001
In Pacific blue finish	641340-001
In pearl pink finish	641341-001
In pewter finish	641339-001
In Sonoma red finish	641336-001
In sweet purple finish	641342-001
In Nero black finish	677167-001

Before removing the display assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.
2. Disconnect all external devices connected to the computer.
3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
4. Remove the battery (see [Battery on page 38](#)), and then remove the following components:
 - Optical drive (see [Optical drive on page 39](#))
 - Hard drive (see [Hard drive on page 41](#))
 - WLAN module (see [WLAN module on page 44](#))
 - Keyboard (see [Keyboard on page 46](#))
 - Top cover (see [Top cover on page 49](#))

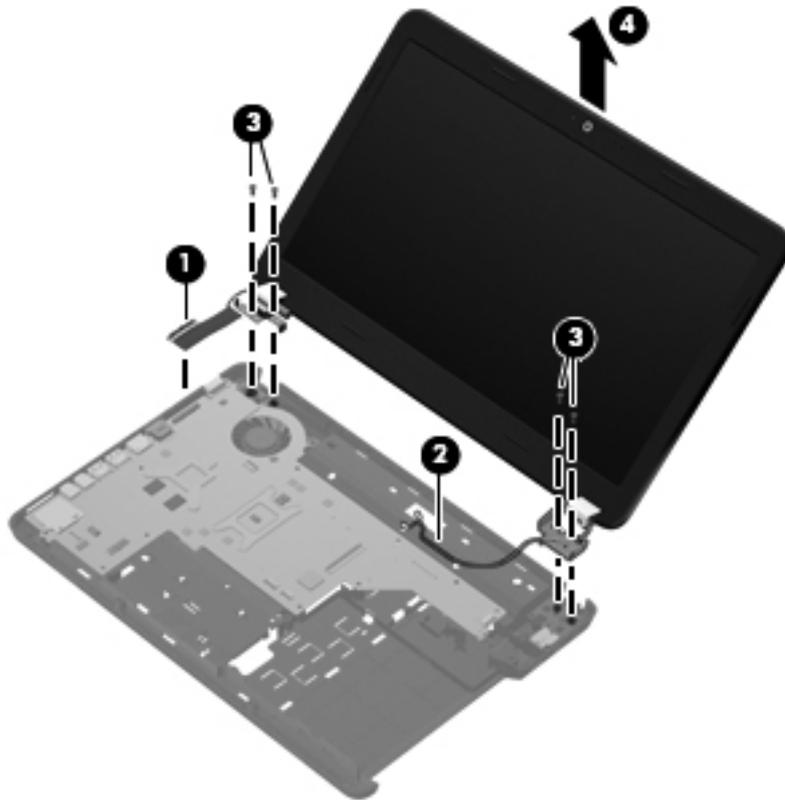
Remove the display assembly:

1. Disconnect the display panel cable **(1)** from the system board.
2. Release the wireless antenna cables **(2)** from the clips and the opening in the base enclosure.

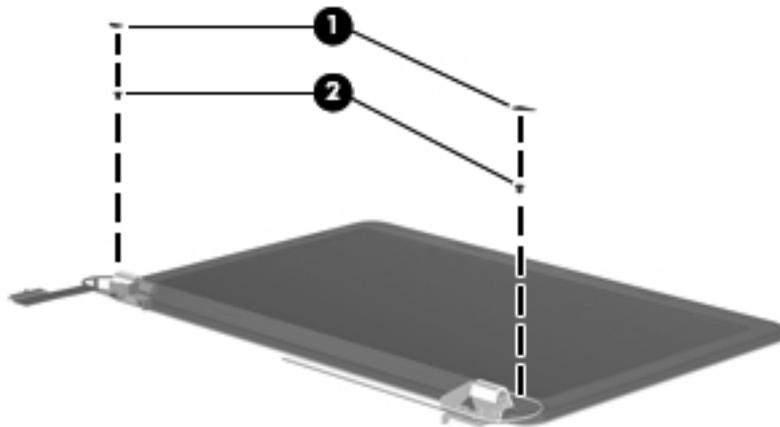
 **CAUTION:** Support the display assembly when removing the following screws. Failure to support the display assembly can result in damage to the display assembly and other computer components.

3. Remove the four Phillips PM2.5×6.0 screws **(3)** that secure the display assembly to the computer.

4. Remove the display assembly (4).

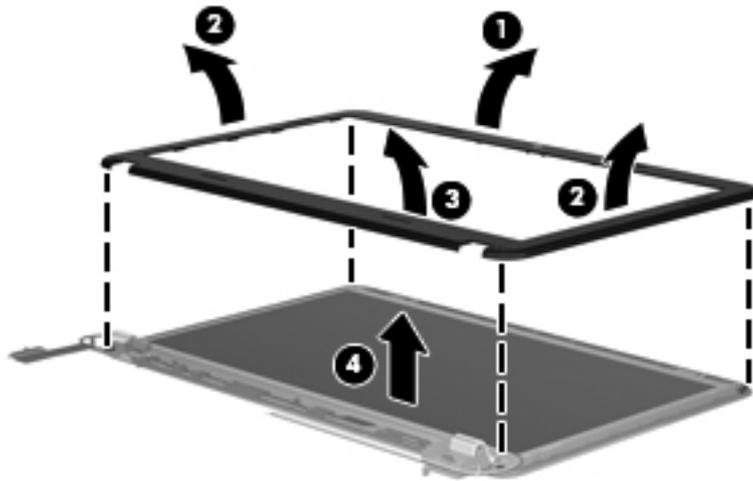


5. If it is necessary to replace the display bezel or any of the display assembly subcomponents:
 - a. Remove the Mylar screw covers (1) and the two Phillips PM2.5×6.0 screws (2) that secure the display bezel to the display assembly.

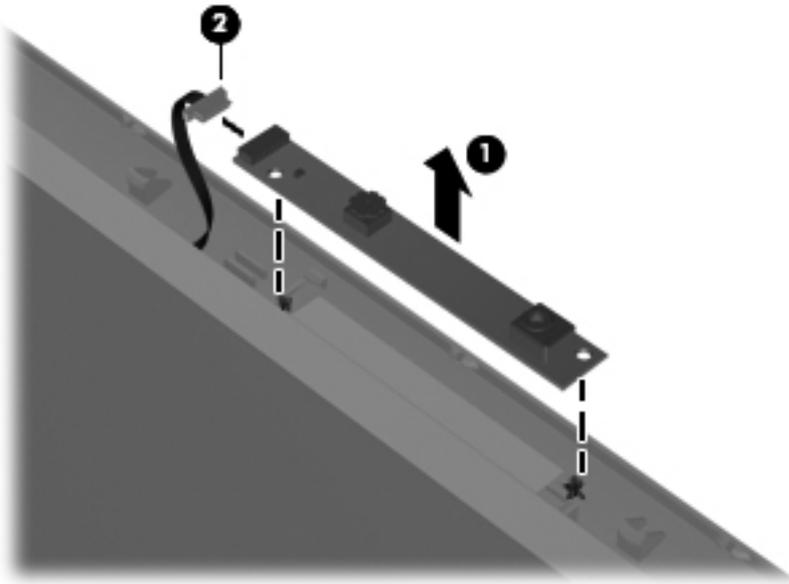


- b. Flex the inside edges of the top edge (1), the left and right sides (2), and the bottom edge (3) of the display bezel until the bezel disengages from the display enclosure.

- c. Remove the display bezel (4). The display bezel is available using spare part number 639440-001.

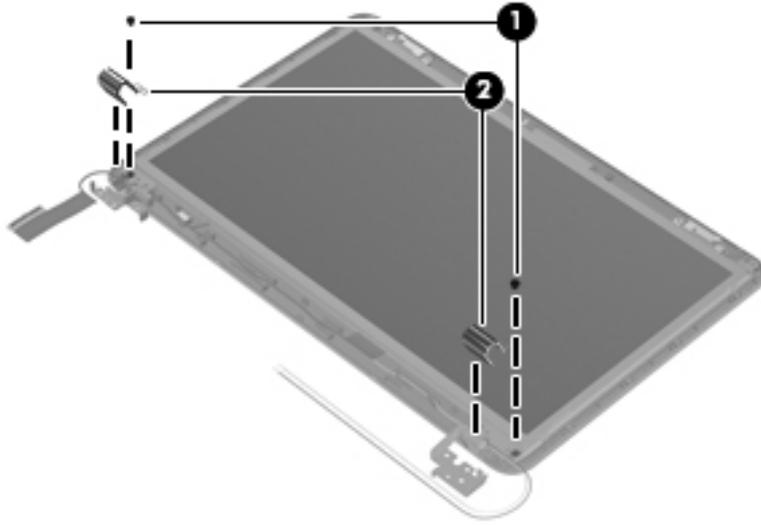


- 6. If it is necessary to replace the webcam/microphone module:
 - a. Detach and release the webcam/microphone module (1) as far as the webcam/microphone module cable allows. (The webcam/microphone module is attached to the display enclosure with double-sided tape.)
 - b. Disconnect the webcam/microphone module (2) from the webcam/microphone module.

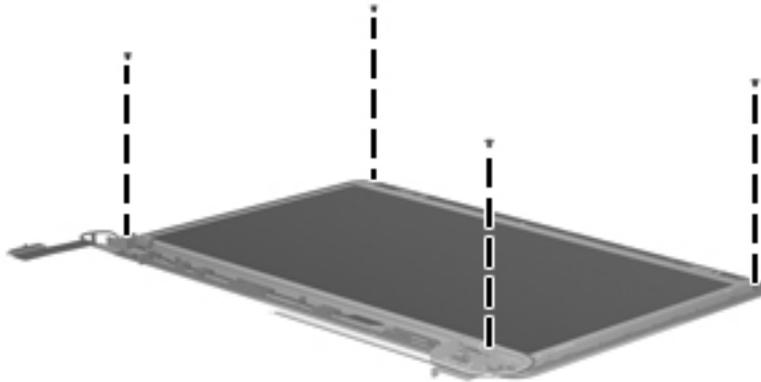


- c. Remove the webcam/microphone module. The webcam/microphone module is available using spare part number 637197-001.
- 7. If it is necessary to replace the hinge covers:
 - a. Remove the Phillips PM2.5×6.0 (1) screws that secure the hinge covers to the display enclosure.

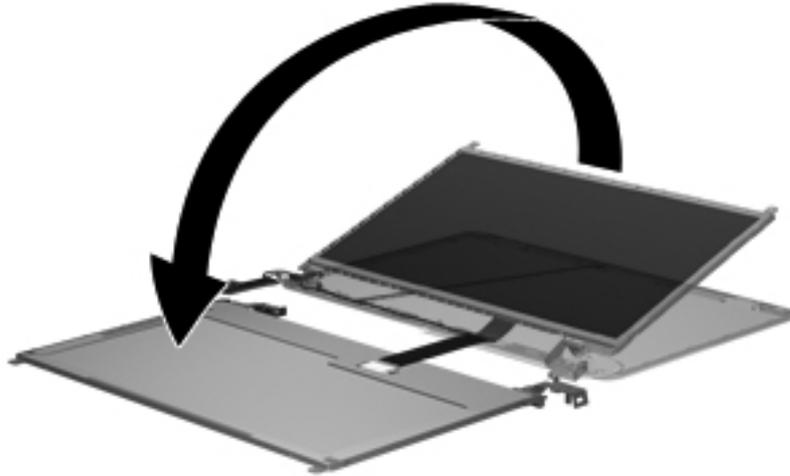
- b. Remove the hinge covers (2). The hinge covers are available using spare part number 639446-001.



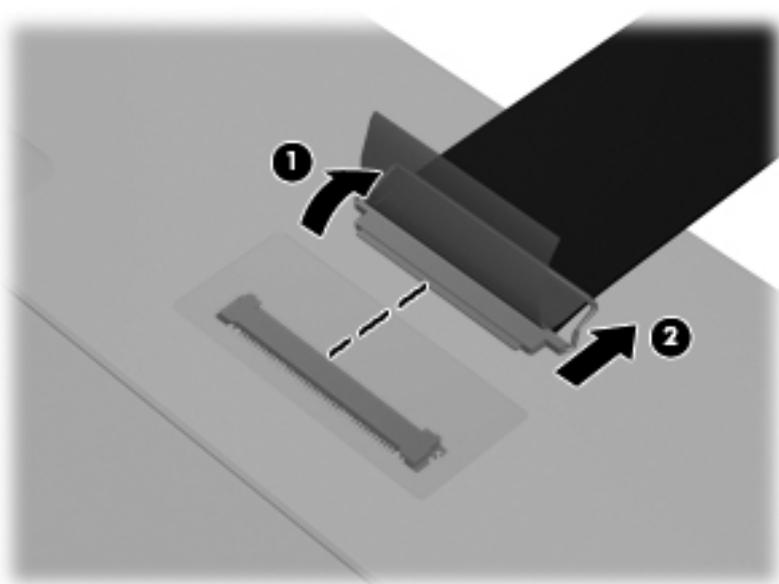
8. If it is necessary to replace the display panel:
- a. Remove the four Phillips PM2.5×6.0 screws that secure the display panel to the display enclosure.



- b. Lift the top edge of the display panel, and then swing it up and forward until it rests upside down in front of the display enclosure.

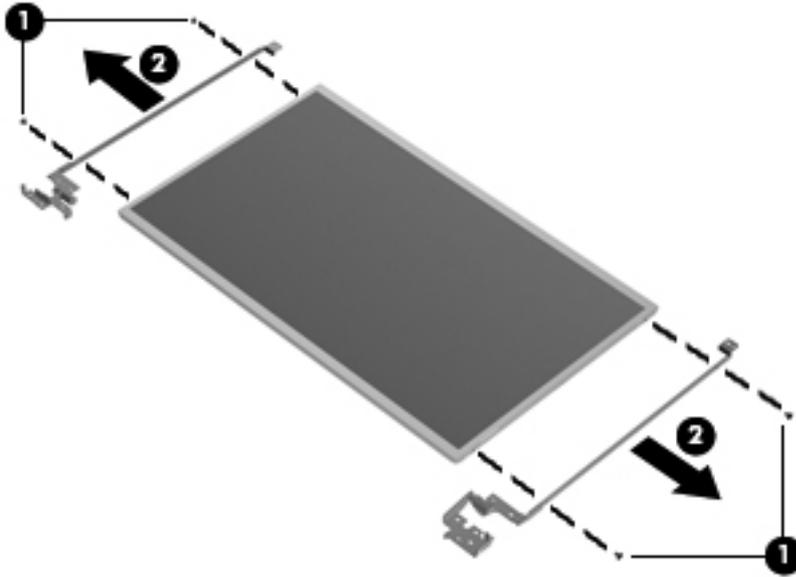


- c. Release the adhesive strip (1) that secures the display panel cable to the display panel, and then disconnect the display panel cable (2) from the display panel.



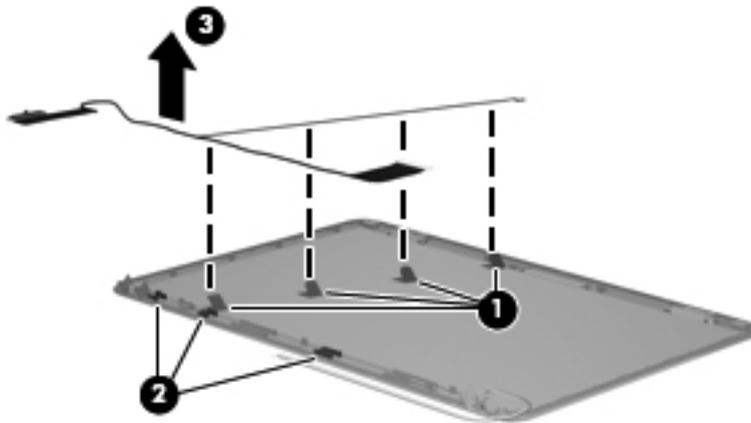
- d. Remove the display panel. The display panel cable is available using spare part number 639454-001.
9. If it is necessary to replace the display hinges:
- a. Remove the four Phillips PM2.0×3.0 screws (1) that secure the display hinges to the display panel.

- b. Remove the display hinges (2). The display hinges include the display hinges and brackets and are available using spare part number 639445-001.



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

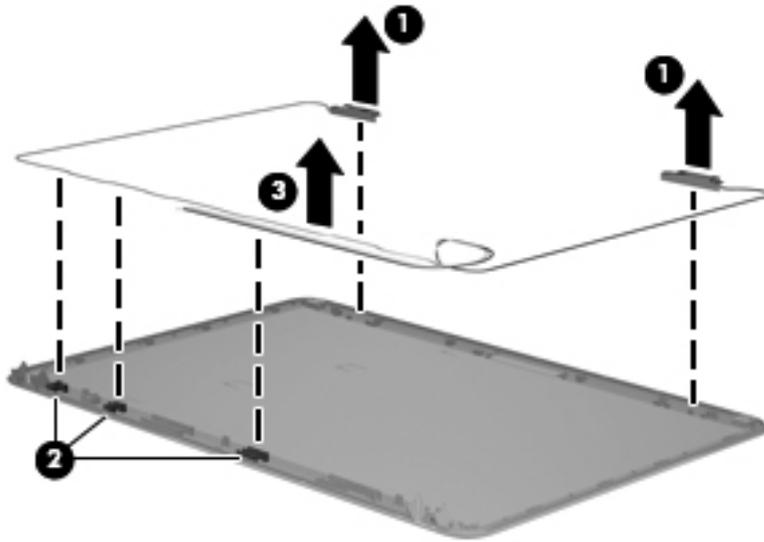
- Release the tabs (1) built into the display enclosure shielding that secure the display panel cable to the display enclosure.
- Release the display panel cable from the clips (2) built into the display enclosure.
- Remove the display panel cable (3). The display panel cable includes the webcam/microphone module cable and is available in the Display Cable Kit, spare part number 639441-001.



11. If it is necessary to replace the wireless antenna cables and transceivers:

- Release the wireless antenna transceivers (1) from the display enclosure. (The wireless antenna transceivers are attached to the display enclosure with double-sided tape.)
- Release the wireless antenna cables from the clips (2) built into the display enclosure.

- c. Remove the wireless antenna cables and transceivers (3). The wireless antenna cables and transceivers are available in the Antenna Kit, spare part number 640294-001.



Reverse this procedure to reassemble and install the display assembly.

5 Setup Utility (BIOS) and System Diagnostics

Using Setup Utility

Setup Utility, or Basic Input/Output System (BIOS), controls communication between all the input and output devices on the system (such as disk drives, display, keyboard, mouse, and printer). Setup Utility includes settings for the types of peripherals installed, the startup sequence of the computer, and the amount of system and extended memory.

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

Starting Setup Utility

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

To start Setup Utility, follow these steps:

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

Changing the language of Setup Utility

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

Your change takes effect immediately.

Navigating and selecting in Setup Utility

To navigate and select in Setup Utility, 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 Setup Utility 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 Setup Utility.

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

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

- To exit Setup Utility menus without saving your changes, click the **Exit** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

– or –

Use the tab key and the arrow keys to select **File > Ignore Changes and Exit**, and then press **enter**.
- To save your changes and exit Setup Utility 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.

Displaying system information

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

Restoring factory settings in Setup Utility

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

To return all settings in Setup Utility 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 Setup Utility.
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.

Exiting Setup Utility

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

Updating the BIOS

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

Most BIOS updates on the HP Web site are packaged in compressed files called *SoftPaqs*.

Some download packages contain a file named *Readme.txt*, which contains information regarding installing and troubleshooting the file.

Determining the BIOS version

To determine whether available BIOS updates contain later BIOS versions than those currently installed on the computer, you need to know the version of the system BIOS currently installed.

BIOS version information (also known as ROM date and System BIOS) can be displayed by pressing **fn+esc** (if you are already in Windows) or by using Setup Utility.

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

– or –

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

Downloading a BIOS update

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

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

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

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

1. **Windows 7**—Select **Start > Help and Support > Maintain**.
Windows XP—Select **Start > Help and Support**, and then select the software and drivers update.
2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.
3. At the download area, follow these steps:
 - a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.
 - b. Follow the on-screen instructions to download your selection to the hard drive. Make a note of the path to the location on your hard drive where the BIOS update is downloaded. You will need to access this path when you are ready to install the update.



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

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

1. **Windows 7**—Open Windows Explorer by selecting **Start > Computer**.
Windows XP—Open Windows Explorer by selecting **Start > My Computer**.
2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.
4. Double-click the file that has an .exe extension (for example, *filename.exe*).
The BIOS installation begins.
5. Complete the installation by following the on-screen instructions.



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

Using System Diagnostics

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

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

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

To start System Diagnostics:

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



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

6 Specifications

Computer specifications

	Metric	U.S.
Dimensions:		
Width	34.1 cm	13.43 in
Depth	23.1 cm	9.10 in
Height (front to back)	3.0 cm to 3.6 cm	1.9 in to 1.4 in
Weight:		
	2.20 kg	4.9 lbs
Input power		
Operating voltage and current	18.5 V dc @ 3.5 A - 65 W or 19 V dc @ 4.74 A - 90 W	
Temperature		
Operating (writing to optical disc)	5°C to 35°C	41°F to 95°F
Nonoperating	-20°C to 60°C	-4°F to 140°F
Relative humidity		
Operating	10% to 90%	
Nonoperating	5% to 90%	
Maximum altitude (unpressurized)		
Operating (14.7 to 10.1 psia)	-15 m to 3,048 m	-50 ft to 10,000 ft
Nonoperating (14.7 to 4.4 psia)	-15 m to 12,192 m	-50 ft to 40,000 ft
Shock		
Operating	125 g, 2 ms, half-sine	
Nonoperating	200 g, 2 ms, half-sine	
Random vibration		
Operating	0.75 g zero-to-peak, 10 Hz to 500 Hz, 0.25 oct/min sweep rate	
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.		

14.0-inch, display specifications

	Metric	U.S.
Dimensions		

	Metric	U.S.
Width	31.2 cm	12.28 in
Height	17.6 cm	6.93 in
Diagonal	35.7 cm	14.05 in
Number of colors	Up to 16.8 million	
Contrast ratio	200:1 (typical)	
Brightness	200 nits (typical)	
Backlight	LED	
Character display	80 × 25	
Total power consumption	6.0 W	
Viewing angle	+/-65 horizontal, +/-50° vertical (typical)	

Hard drive specifications

	750-GB*	640-GB*	500-GB*	320-GB*	250-GB*
Dimensions					
Height	9.5 mm	9.5 and 7.0 mm	9.5 mm	9.5 and 7.0 mm	7.0 mm
Width	70 mm	70 mm	70 mm	70 mm	70 mm
Weight	101 g	101 g	101 g	101 g	101 g
Interface type	SATA	SATA	SATA	SATA	SATA
Transfer rate	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec	100 MB/sec
Security	ATA security	ATA security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)					
Single track	3 ms	3 ms	3 ms	3 ms	3 ms
Average	13 ms	13 ms	13 ms	13 ms	13 ms
Maximum	24 ms	24 ms	24 ms	24 ms	24 ms
Logical blocks	1,465,128,359	1,250,242,867	976,752,240	625,121,433	488,376,120
Disk rotational speed	7200 and 5400 rpm	5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm	7200 and 5400 rpm
Operating temperature	5°C to 55°C (41°F to 131°F)				
*1 GB = 1 billion bytes when referring to hard drive storage capacity. Actual accessible capacity is less. Actual drive specifications may differ slightly.					
NOTE: Certain restrictions and exclusions apply. Contact technical support for details.					

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

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

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

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

Applicable disc	Read:	Write:
8X DVD+R	10,800 KB/sec	
4X DVD+RW	5,400 KB/sec	
8X DVD-R	10,800 KB/sec	
4X DVD-RW	5,400 KB/sec	
2.4X DVD+R(9)	2,700 KB/sec	
5X DVD-RAM	6,750 KB/sec	
Transfer mode	Multiword DMA Mode	

7 Backup and recovery

Your computer includes tools provided by the operating system and HP to help you safeguard your information and restore it if ever needed. This chapter provides information on the following topics:

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

Restore

In the event of hard drive failure, to restore your system to its factory image you will need a set of recovery discs or a recovery flash drive that you can create using HP Recovery Manager. HP recommends that you use this software to create either a set of recovery discs or a recovery flash drive immediately after software setup.

If for some other reason you need to restore your system, this can be achieved using the HP Recovery partition (select models only), without the need for recovery discs or a recovery flash drive. To check for the presence of a recovery partition, click **Start**, right-click **Computer**, click **Manage**, and then click **Disk Management**. If the recovery partition is present, a Recovery drive is listed in the window.

 **CAUTION:** HP Recovery Manager (partition, or discs/flash drive) restores only software that was preinstalled at the factory. Software not provided with this computer must be reinstalled manually.

 **NOTE:** Recovery discs have been included if your computer does not have a recovery partition.

Creating restore media

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

 **NOTE:** HP Recovery Manager allows the creation of only one set of recovery discs or one recovery flash drive. Handle these discs or flash drive carefully and keep them in a safe place.

 **NOTE:** If your computer does not include an integrated optical drive, you can use an optional external optical drive (purchased separately) to create recovery discs, or you can purchase recovery discs for your computer from the HP Web site. If you use an external optical drive, it must be connected directly to a USB port on the computer, not to a USB port on an external device, such as a USB hub.

Guidelines:

- Purchase high-quality DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs.

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

- The computer must be connected to AC power during this process.
- Only one set of recovery discs or one recovery flash drive can be created per computer.

 **NOTE:** If you are creating recovery discs, number each disc before inserting into the optical drive.

- If necessary, you can exit the program before you have finished creating the recovery discs or recovery flash drive. The next time you open Recovery Manager, you will be prompted to continue the backup creation process.

To create a set of recovery discs or a recovery flash drive:

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

Performing a system restore

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



NOTE: A system restore needs to be performed if the computer hard drive has failed or if all attempts to correct any functional computer issues fail.

A system restore should be used as a final attempt to correct computer issues. Note the following when performing a system restore:

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

Restoring using the dedicated recovery partition (select models only)

When using the dedicated recovery partition, there is an option to back up pictures, music and other audio, videos and movies, recorded TV shows, documents, spreadsheets and presentations, e-mails, Internet favorites and settings during this process.

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

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

Restoring using the restore media

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

– or –

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



NOTE: If the computer does not automatically restart in the Recovery Manager, the computer boot order needs to be changed.

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

Changing the computer boot order

To change the boot order for recovery discs:

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

To change the boot order for recovery flash drive:

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

Backing up and recovering your information

It is very important to back up your files and keep any new software in a safe place. As you add new software and data files, continue to create backups on a regular basis.

How completely you are able to recover your system depends on how recent your backup is.

 **NOTE:** A recovery from your most recent backup needs to be performed if the computer has a virus attack or if any major system components fail. In order to correct computer issues, a recovery should first be attempted before a system restore is attempted. You can back up your information to an optional external hard drive, a network drive, or discs.

Back up your system at the following times:

- At regularly scheduled times

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

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

Guidelines:

- Create system restore points using the Windows System Restore feature, and periodically copy them to an optical disc or an external hard drive. For more information on using system restore points, refer to **Using Windows system restore points**.
- Store personal files in the Documents library and back up this folder periodically.
- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.
2. Copy the screen image:
To copy only the active window, press **alt+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 and print the document.

Using Windows Backup and Restore

Guidelines:

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

To create a backup:

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



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

Using Windows system restore points

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



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

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

When to create restore points

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



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

Create a system restore point

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

Restore to a previous date and time

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

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

8 Power cord set requirements

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

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

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

Requirements for all countries

The following requirements are applicable to all countries and regions:

- The length of the power cord set must be at least **1.5 m** (5.0 ft) and no more than **2.0 m** (6.5 ft).
- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.
- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.
- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer.

Requirements for specific countries and regions

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

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

9 Recycling

Battery

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

Display

⚠ WARNING! The backlight contains mercury. Caution must be exercised when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

⚠ CAUTION: The procedures in this chapter can result in damage to display components. The only components intended for recycling purposes are the liquid crystal display (LCD) panel and the backlight. When you remove these components, handle them carefully.

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

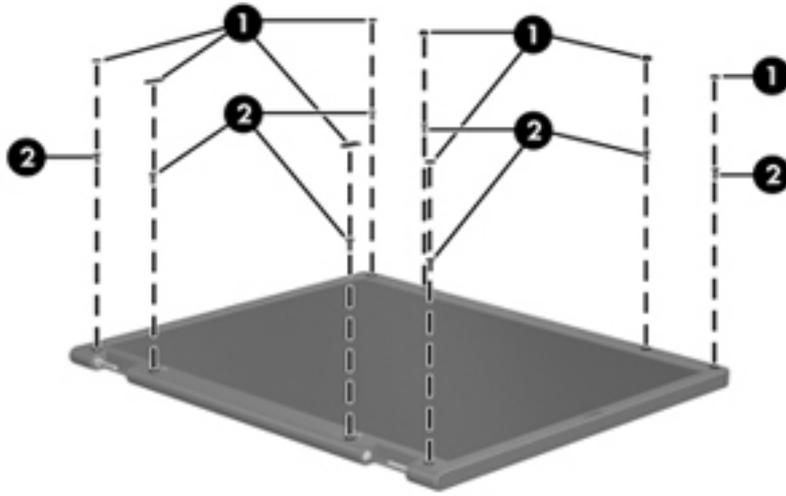
This section provides disassembly instructions for the display assembly. The display assembly must be disassembled to gain access to the backlight **(1)** and the liquid crystal display (LCD) panel **(2)**.



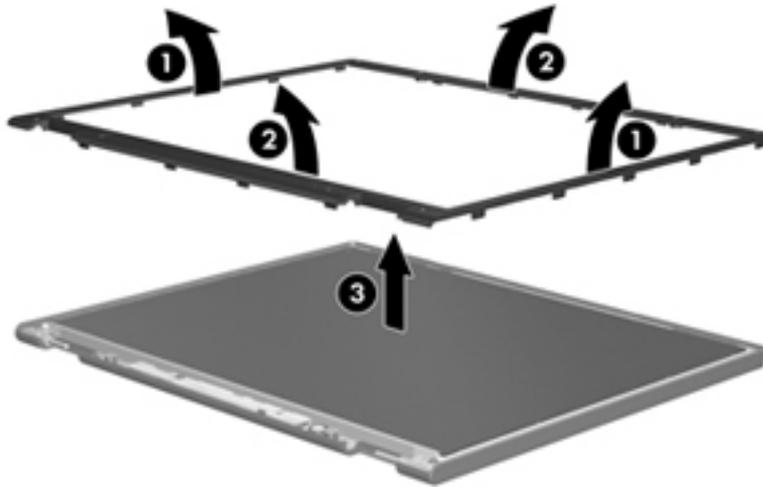
📄 NOTE: The procedures provided in this chapter are general disassembly instructions. Specific details, such as screw sizes, quantities, and locations, and component shapes and sizes, can vary from one computer model to another.

Perform the following steps:

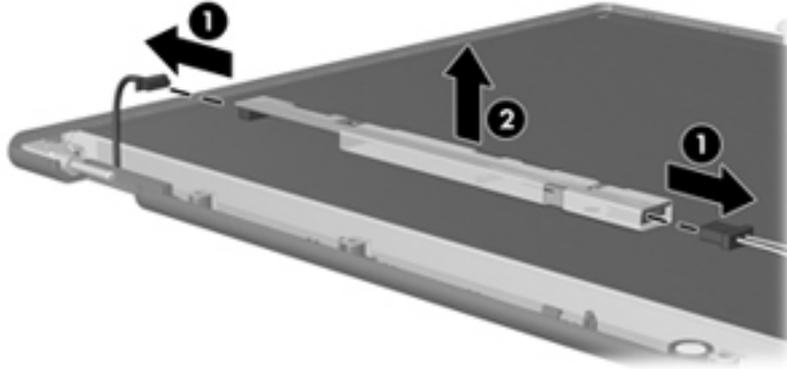
1. Remove all screw covers (1) and screws (2) that secure the display bezel to the display assembly.



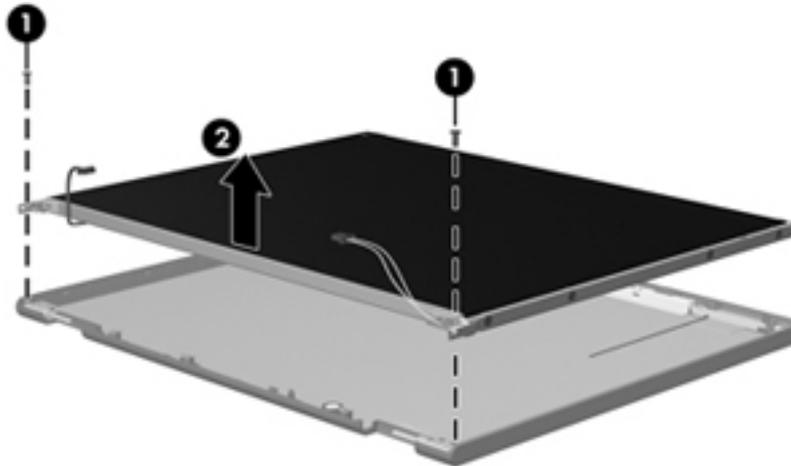
2. Lift up and out on the left and right inside edges (1) and the top and bottom inside edges (2) of the display bezel until the bezel disengages from the display assembly.
3. Remove the display bezel 3.



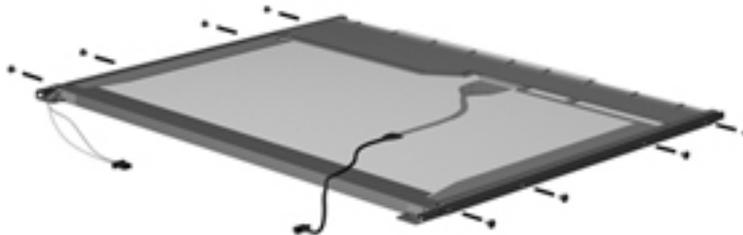
4. Disconnect all display panel cables (1) from the display inverter and remove the inverter 2.



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

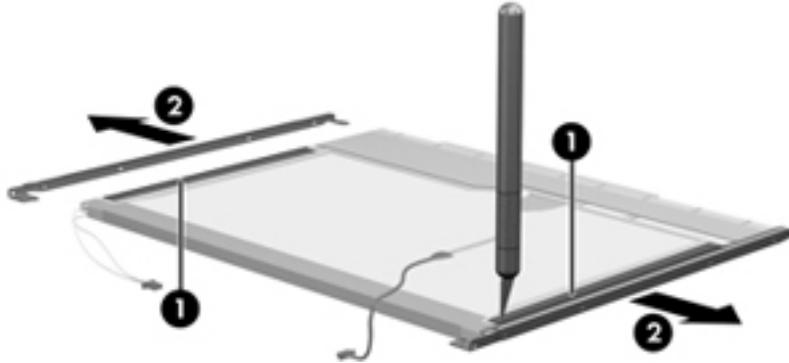


7. Turn the display panel assembly upside down.
8. Remove all screws that secure the display panel frame to the display panel.



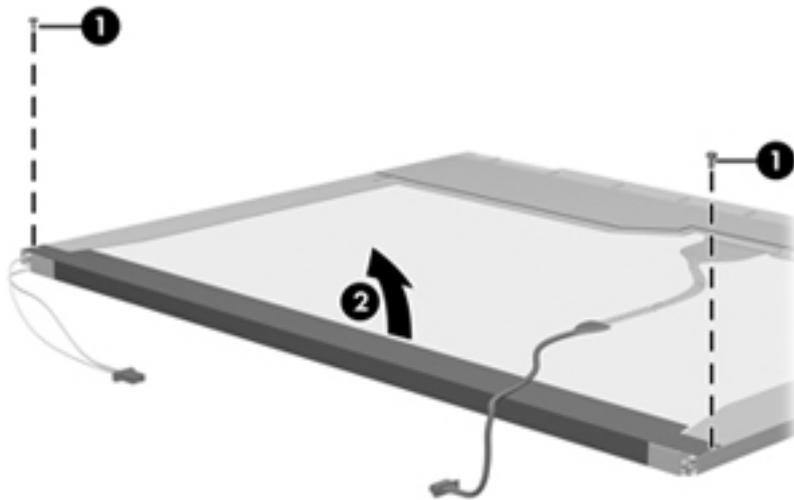
9. Use a sharp-edged tool to cut the tape (1) that secures the sides of the display panel to the display panel frame.

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



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

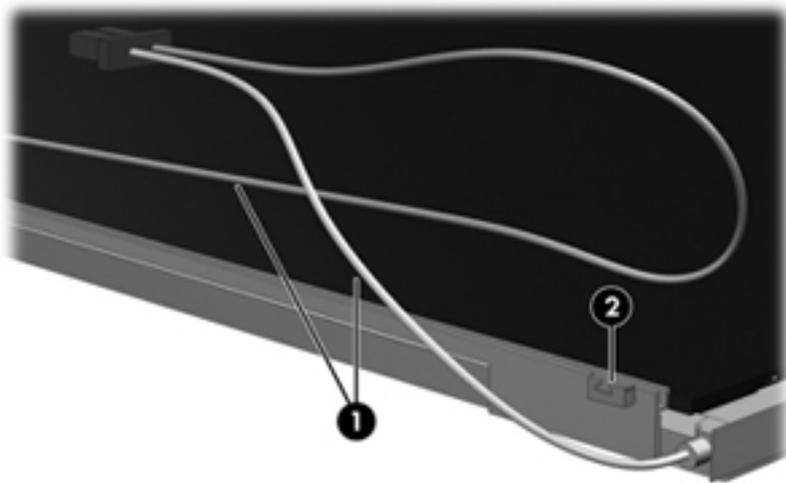
12. Lift the top edge of the backlight cover (2) and swing it outward.



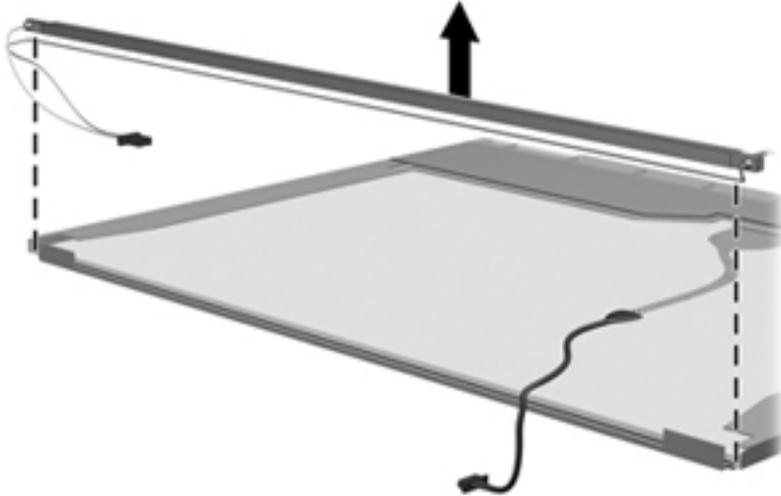
13. Remove the backlight cover.

14. Turn the display panel right-side up.

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

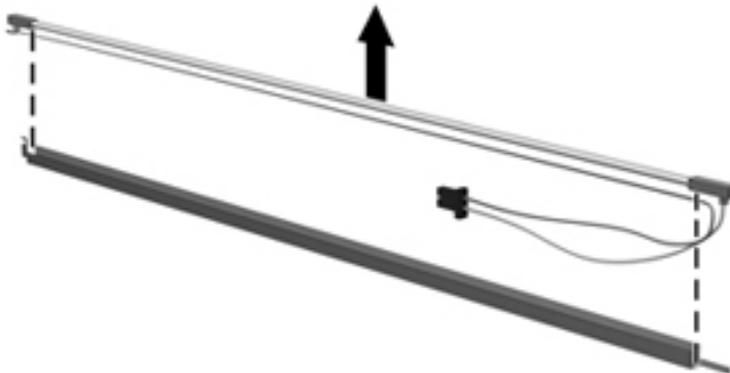


16. Turn the display panel upside down.
17. Remove the backlight frame from the display panel.



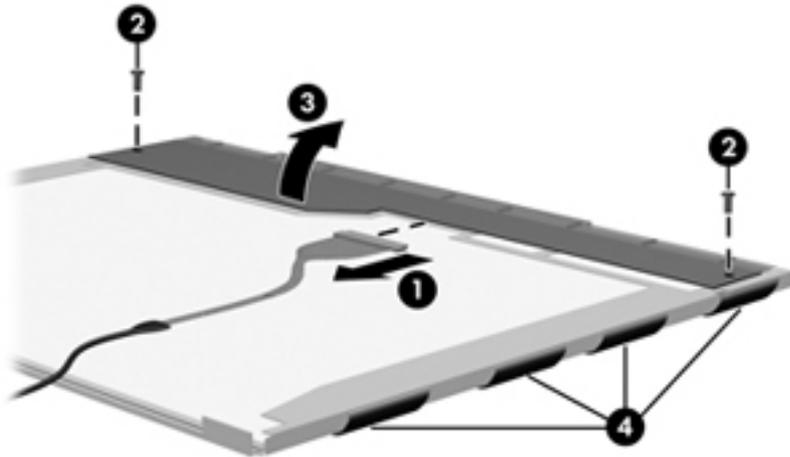
⚠ WARNING! The backlight contains mercury. Exercise caution when removing and handling the backlight to avoid damaging this component and causing exposure to the mercury.

18. Remove the backlight from the backlight frame.

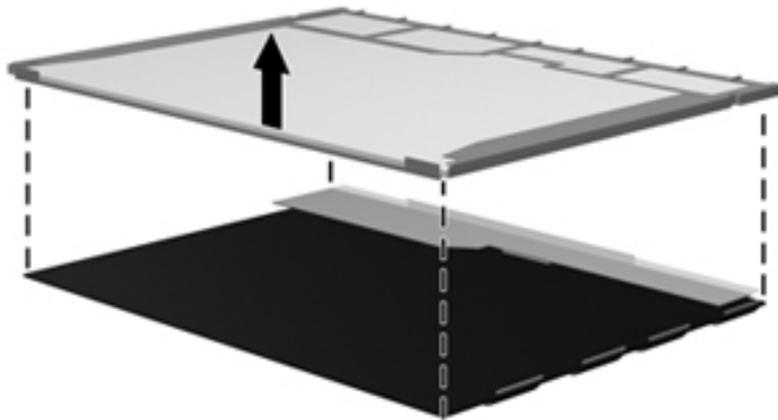


19. Disconnect the display cable (1) from the LCD panel.
20. Remove the screws (2) that secure the LCD panel to the display rear panel.
21. Release the LCD panel (3) from the display rear panel.

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



23. Remove the LCD panel.



24. Recycle the LCD panel and backlight.

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