HP Notebook PC (AMD)
HP 255 G4 Notebook PC

Maintenance and Service Guide

Product notice

This guide describes features that are common to most models. Some features may not be available on your computer.

Not all features are available on all editions of Windows 8.1. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com for details.

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 60950-1).

Table of contents

1 Product description

Category	Description
Product name	HP Notebook PC
	HP 255 G4 Notebook PC
Processors	**AMD Dual-Core E-Series Processor**
	E1-6015 (1.4-GHz, 1-MB L2 cache, 1333-MHz, dual, 15W)
	AMD Quad-Core A-Series Accelerated Processor
	A6-6310 (1.8-GHz, SC turbo up to 2.4 GHz, 2-MB L2 cache, 1600-MHz, quad, 15W)
	AMD Quad-Core A-Series Accelerated Processor
	A8-7410 (2.2-GHz, SC turbo 2.5 GHz, 2-MB L2 cache, 1600-MHz, quad, 15W)
Chipset	AMD Integrated SOC FCH
Graphics	**Internal graphics:**
	AMD Radeon™ R2 Graphics (E1-6015 processor)
	AMD Radeon R4 Graphics (A6-6310 processor)
	AMD Radeon R5 Graphics (A8-7410 processor)
	Switchable discrete graphics:
	AMD Radeon R5 M330(Exo PRO) with up to 2048 MB of dedicated video memory, 18W
	AMD Radeon R5 M330 (Exo PRO) with up to 1024 MB of dedicated video memory, 18W
	Support HD Decode, DX11, HDMI, and PX7
Panel	**39.6-cm** (15.6-in), high-definition (HD), white light-emitting diode (WLED), SVA BrightView (1366×768) display, flat 3.8 mm, eDP; typical brightness: 220 nits
	39.6-cm (15.6-in), high-definition (HD), white light-emitting diode (WLED), SVA BrightView (1366×768) display, slim 3.2 mm; typical brightness: 200 nits (for eDP TOP (touch on panel))
	Supports LVDS (co-layout with eDP1.3 + PSR)
Memory	Two non-customer-accessible/upgradable memory module slots
	DDR3L-1600 single channel support (DDR3L-1600 downgrade to DDR3L-1333)
	DDR3L-1600 single channel support
	Supports up to 8 GB of system RAM in the following configurations:
	● 8192-MB total system memory (8192×1) or (4096×2)
	● 6144-MB total system memory (4096×1) + (2048×1)
	● 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) SATA hard drives in **9.5-mm** (.37-in) and **7.0-mm** (.28-in) thicknesses
	Supports the following hard drives:
	● 1-TB, 5400-rpm, 9.5-mm

Category	Description
	● 1-TB, 5400-rpm + 8 GB NAND hybrid, 9.5-mm
	● 750-GB, 5400-rpm, 9.5-mm
	● 500-GB, 5400-rpm, 9.5-mm or 7.0-mm
	● 320-GB, 7200-rpm, 9.5-mm or 7.0-mm
Optical drive	Fixed, serial ATA, 9.5-mm tray load
	DVD+/-RW Double-Layer SuperMulti
	Supports zero power optical drive
	Supports M-disc
	Supports configuration without optical drive
Webcam/microphone	HP TrueVision HD: HD camera - Fixed (no tilt) + activity LED, USB 2.0, M-JPEG, 1280 x 720 by 30 frames per second
	HP Webcam– 640 x 480 by 24 frames per second
	Single digital microphone
	HP Noise Cancellation enabled
Audio	Dual speakers
	DTS Sound
Ethernet	Integrated 10/100 network interface card (NIC)
Sensor	TPM (Trusted Platform Module) 2.0
Wireless Networking	**Integrated wireless options with single antenna (M.2):**
	Compatible with Miracast-certified devices
	Support for the following WLAN formats:
	● Realtek RTL8188EE 802.11bgn 1x1 Wi-Fi Adapter
	● Realtek RT8723BE 802.11bgn 1x1 Wi-Fi + BT4.0 Combo Adapter
	● Broadcom BCM43142 802.11 bgn 1x1 Wi-Fi + BT4.0 HMC Combo Adapter
External media card	**HP Multi-Format Digital Media Reader**
	Support SD/SDHC/SDXC
	Push-Pull Insertion/Removal
Internal Card	One M.2 slot for WLAN
Ports	HDMI version 1.4 supporting 1920 ×1080 @ 60Hz
	Hot Plug/unplug and auto detect for correct output to wide-aspect vs. standard aspect video
	RJ-45 (Ethernet, includes link and activity lights)
	USB 3.0 (1 port; left side)
	USB 2.0 (2 ports; 1 left side, 1 right side)
	AC Smart Pin adapter plug
	Headphone/line in jack
	Microphone input jack

Category	Description
Keyboard/pointing devices	Full-size "island style" keyboard with numeric keypad
	TouchPad with multi-touch gestures, 2-finger scrolling, and pinch-zoom enabled
	Taps enabled by default
	Support Windows 8 Modern Trackpad Gestures
Power requirements	**AC adapters:**
	65-W Smart nPFC, 3 pin, RC 4.5mm connector - non slim for use in discrete models
	45-W Smart nPFC, 3 pin, RC 4.5mm connector - non slim for use in UMA models
	65-W EM Smart nPFC, 3 pin, RC 4.5mm connector, 90 degree plug design for use in India/China
	1 meter power cord
	Batteries:
	4-cell, 41-Whr Li-ion battery
	3-cell, 31-Whr Li-ion battery
Security	TPM 2.0
	Kensington Security Lock
Operating system	**Preinstalled:**
	● Windows 8.1
	● Windows 8.1 CPPP - China only
	● Windows 7 Professional
	● FreeDOS 2.0
Serviceability	**End-user replaceable parts:**
	● AC adapter
	● Battery
	● Optical drive

2 External component identification

Display

Component		Description
(1)	Internal display switch	Turns off the display and initiates Sleep if the display is closed while the power is on.
		NOTE: The internal display switch is not visible from the outside of the computer.
(2)	WLAN antenna*	Send and receive wireless signals to communicate with wireless local area networks (WLANs).
(3)	Webcam light	On: The webcam is in use.
(4)	Webcam	Records video and captures photographs. Some models allow you to video conference and chat online using streaming video.
		To use the webcam:
		▲ Windows 8.1: From the Start screen, type `camera`, and then select **Camera** from the list of applications.
		▲ Windows 7: To use the webcam, select **Start > All Programs > Communication and Chat > CyberLink YouCam**.
(5)	Internal microphone	Record 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. For wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region.

To access this document in Windows 8.1:

From the Start screen, type `support`, and then select the **HP Support Assistant** app.

– or –

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

To access this document in Windows 7: Select **Start > HP Support Assistant > Next > My computer > User Guides**.

Right side

Component		Description
(1) ⏻	Power light	• On: The computer is on. • Blinking: The computer is in the Sleep state, a power-saving state. The computer shuts off power to the display and other components. • Off: The computer is off or in Hibernation. Hibernation is a power-saving state that uses the least amount of power.
(2)	Hard drive light	• Blinking white: The hard drive is being accessed.
(3) SD	Memory card reader	Reads optional memory cards that enable you to store, manage, share or access information. To insert a card: 1. Hold the card label-side up, with connectors facing the computer. 2. Insert the card into the memory card reader, and then press in on the card until it is firmly seated. To remove a card: ▲ Press in on the card, and then remove it from the slot.
(4)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(5)	Optical drive	Depending on your computer model, reads an optical disc or reads and writes to an optical disc. **NOTE:** For disc compatibility information, go to the Help and Support web page. Follow the web page instructions to select your computer model. Select **Drivers & Downloads**, and then follow the on-screen instructions.
(6)	Optical drive eject button	Releases the disc tray.
(7)	Security cable slot	Attaches an optional security cable to the computer. **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen.

Left side

Component		Description
(1)	Power connector	Connects an AC adapter.
(2)	AC adapter/battery light	• White: The AC adapter is connected and the battery is fully charged. • Blinking white: The AC adapter is disconnected and the battery has reached a low battery level. • Amber: The AC adapter is connected and the battery is charging. • Off: The battery is not charging.
(3)	Vent	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)	External monitor port (select models only)	Connects an external VGA monitor or projector.
(5)	RJ-45 (network) jack/status lights	Connects a network cable. • White: The network is connected. • Amber: Activity is occurring on the network.
(6)	HDMI port	Connects an optional video or audio device, such as a high-definition television, any compatible digital or audio component, or a high-speed High-Definition Multimedia Interface (HDMI) device.
(7)	USB 3.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(8)	USB 2.0 port	Connects an optional USB device, such as a keyboard, mouse, external drive, printer, scanner or USB hub.
(9)	Audio-out (headphone)/Audio-in (microphone) jack	Connects optional powered stereo speakers, headphones, earbuds, a headset, or a television audio cable. Also connects an optional headset microphone. This jack does not support optional microphone-only devices.

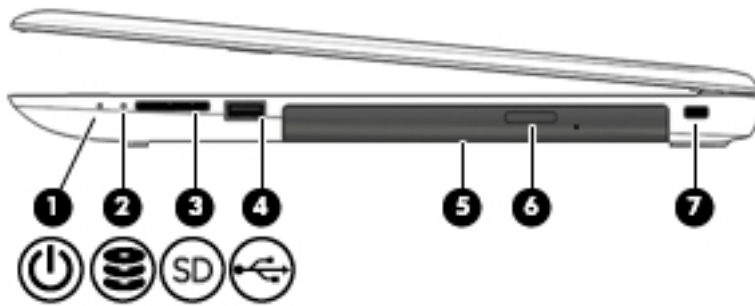| Component	Description
	WARNING! To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, refer to the *Regulatory, Safety, and Environmental Notices*. To access this document: ▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app. – or – From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar. **NOTE:** When a device is connected to the jack, the computer speakers are disabled. **NOTE:** Be sure that the device cable has a 4-conductor connector that supports both audio-out (headphone) and audio-in (microphone).

Top

TouchPad
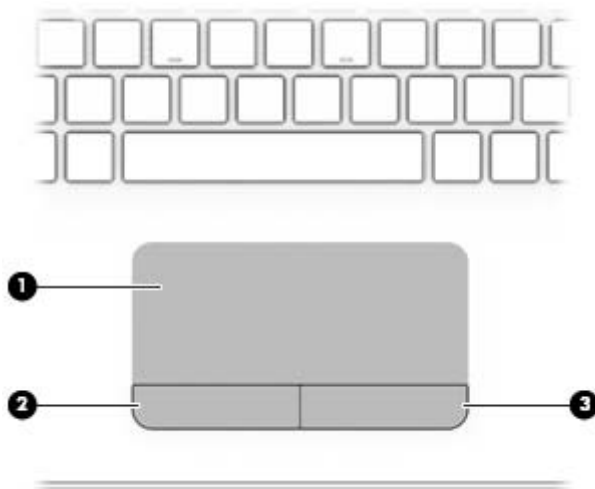
	Component	Description
(1)	TouchPad zone	Reads your finger gestures to move the pointer or activate items on the screen.
(2)	Left TouchPad button	Functions like the left button on an external mouse.
(3)	Right TouchPad button	Functions like the right button on an external mouse.

Lights
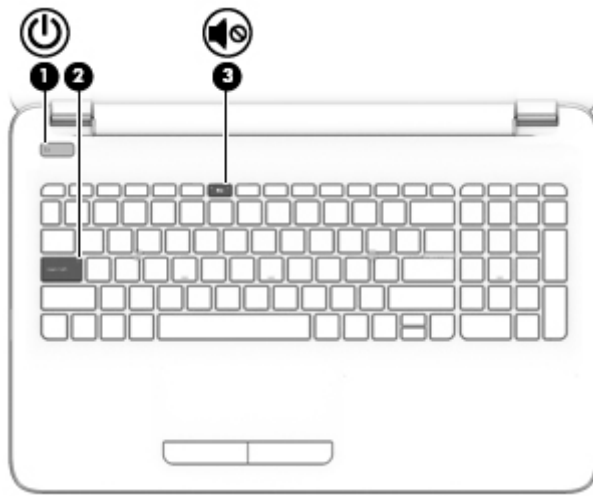
Component		Description
(1)	Caps lock light	On: Caps lock is on, which switches the keys to all capital letters.
(2)	Mute light	● Amber: Computer sound is off.
		● Off: Computer sound is on.

Buttons

Component		Description
(1) ⏻	Power button	● When the computer is off, press the button to turn on the computer.
		● When the computer is on, press the button 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.
		CAUTION: Pressing and holding down the power button will result in the loss of unsaved information.
		If the computer has stopped responding and Windows shutdown procedures are ineffective, press and hold the power button down for at least 5 seconds to turn off the computer.
		To learn more about your power settings in Windows 8.1, see your power options.
		▲ From the Start screen, type `power`, select **Power and sleep settings**, and then select **Power and sleep** from the list of applications.
		– or –
		From the Windows desktop, right-click the **Start** button, and then select **Power Options**.
		To learn more about your power settings in Windows 7, select **Start > Control Panel > System and Security > Power Options**.

Keys

Component		Description
(1)	esc key	Displays system information when pressed in combination with the fn key.
(2)	fn key	Executes frequently used system functions when pressed in combination with the esc key, or the spacebar.
(3) ⊞	Windows key	Windows 8.1:
		Returns you to the Start screen from an open app or the Windows desktop.
		NOTE: Pressing the Windows key again will return you to the previous screen.
		Windows 7:
		Displays the Windows Start menu.
(4)	Action keys	Execute frequently used system functions.
(5)	num lock key	Alternates between the navigational and numeric functions on the integrated numeric keypad.
(6)	Integrated numeric keypad	When num lock is on, it can be used like an external numeric keypad.

Bottom
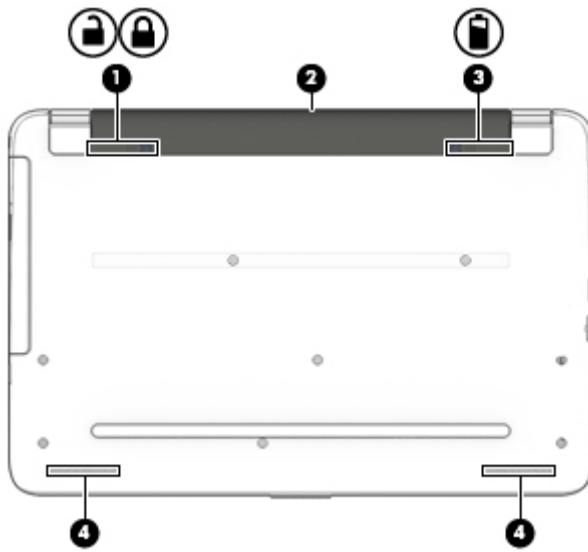
Component		Description
(1)	Battery lock	Locks the battery in the battery bay.
(2)	Battery bay	Holds the battery.
(3)	Battery release latch	Releases the battery.
(4)	Speakers (2)	Produce sound.

Labels

The labels affixed to the computer provide information you may need when you troubleshoot system problems or travel internationally with the computer.

- Service label—Provides important information to identify your computer. When contacting support, you will probably be asked for the serial number, and possibly for the product number or the model number. Locate these numbers before you contact support.

  Your service label will resemble one of the examples shown below. Refer to the illustration that most closely matches the service label on your computer.
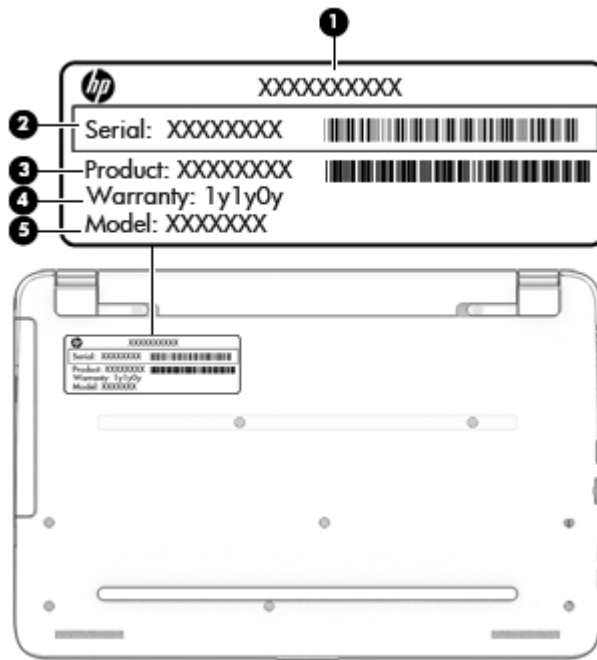
Component	
(1)	Product name
(2)	Serial number
(3)	Product number
(4)	Warranty period
(5)	Model number (select models only)

- Microsoft® Certificate of Authenticity label (select models only prior to Windows 8)—Contains the Windows Product Key. You may need the Product Key to update or troubleshoot the operating system. HP platforms with Windows 8 or Windows 8.x preinstalled do not have the physical label. Instead a Digital Product Key is electronically installed.

  NOTE: The Digital Product Key is automatically recognized and activated by Microsoft operating systems when a Windows 8 or Windows 8.x operating system is reinstalled using HP-approved recovery methods.

- Regulatory label(s)—Provide(s) regulatory information about the computer.

- Wireless certification label(s)—Provide(s) information about optional wireless devices and the approval markings for the countries or regions in which the devices have been approved for use.

3 Illustrated parts catalog

Computer major components
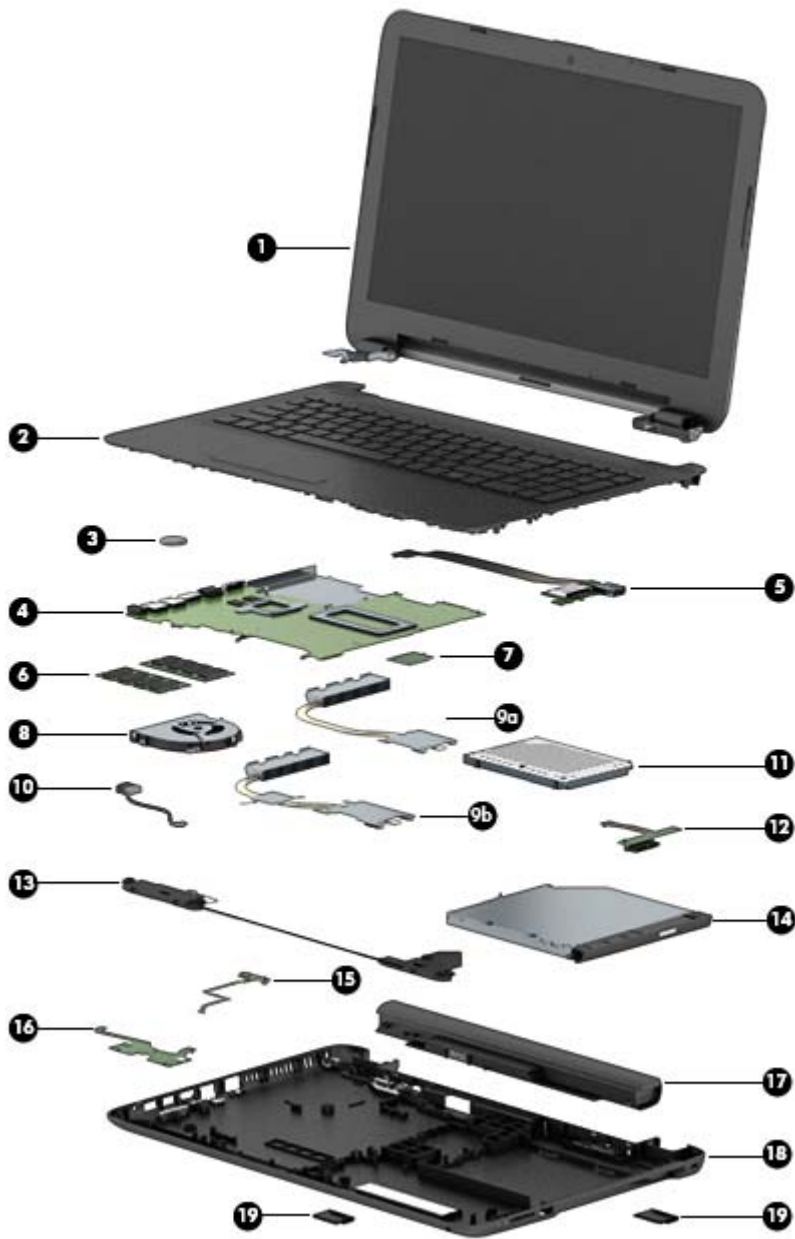
Item	Component	Spare part number
(1)	**Display assembly** (39.6-cm [15.6-in])	
	NOTE: For display assembly spare part information, see Display assembly subcomponents on page 20.	
(2)	**Top cover/keyboard**	
	NOTE: For a list of country code suffixes for the top cover/keyboard spare part numbers listed below, see Bottom cover on page 35.	
	For use in all black models (HP Notebook and HP 255 G4 Notebook)	813974-xxx
	For use in turbo silver HP Notebook models	813975-xxx
	For use in white silver HP Notebook models	813976-xxx
	For use in purple HP Notebook models	813977-xxx
	For use in blue HP Notebook models	813978-xxx
	For use in red HP Notebook models	813979-xxx
(3)	**RTC battery**	759981-001
(4)	**System board** (includes replacement thermal materials):	
	All system boards use the following part numbers:	
	xxxxxx-001: Without the Windows 8.1 operating system	
	xxxxxx-501: Windows 8.1 Standard	
	xxxxxx-601: Windows 8.1 Professional	
	For use in HP Notebook PC models:	
	Discrete graphics memory; Non-touch screen models:	
	● AMD A8-7410 processor and 2 GB of discrete graphics memory	813971-xxx
	● AMD A6-6310 processor and 1 GB of discrete graphics memory	818487-xxx
	UMA graphics memory; non-touch screen models:	
	● AMD A8-7410 processor	813969-xxx
	● AMD A6-6310 processor	813967-xxx
	● AMD E1-6015 processor	813966-xxx
	UMA graphics memory, touch screen models:	
	● AMD A8-7410 processor	813970-xxx
	● AMD A6-6310 processor	813968-xxx
	For use in HP 255 G4 models:	
	UMA graphics memory	
	● AMD A8-7410 processor	814612-xxx
	● AMD A6-6310 processor	814611-xxx
	● AMD E1-6015 processor	814610-xxx
(5)	**USB board** (includes cable)	813953-001

Item	Component	Spare part number
(6)	**Memory module** (PC3L, 12800, 1600-MHz):	
	8-GB	693374-005
	4 GB	691740-005
	2 GB	691739-005
(7)	**WLAN module:**	
	Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter	792610-005
	Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter	792609-005
(8)	**Fan**	813946-001
	Heat sink assembly (includes replacement thermal materials):	
(9a)	For use in models with UMA graphics	813947-001
(9b)	For use in models with discrete graphics memory	813948-001
(10)	**Power connector cable**	813945-001
(11)	**Hard drive** (SATA; does not include bracket):	
	NOTE: The hard drive brackets and connector are available using spare part number 813949-001.	
	For use only in HP Notebook models:	
	● 1-TB, 5400-rpm, hybrid 8 GB SSD	731999-005
	For use in all models:	
	● 1-TB, 5400-rpm, 2.5-inch	778192-005
	● 750 GB, 5400 rpm hard drive, 2.5 inch	778190-005
	● 500-GB, 5400-rpm, 7-mm	778186-005
	For use only in HP 255 G4 Notebook models:	
	● 500-GB, 7200-rpm, 7-mm	764211-005
(12)	**Optical drive board**	813956-001
(13)	**Speakers** (includes left and right speakers and cable)	813965-001
(14)	**Optical drive** (DVD+/-RW Double-Layer SuperMulti; includes bracket and bezel)	
	For use only in HP Notebook models	813952-001
	For use only in HP 255 G4 Notebook models	814617-001
(15)	**Power button board** (includes cable)	813955-001
(16)	**Touchpad button board** (includes bracket and cables)	813954-001
(17)	**Battery:**	
	4-cell, 41-Whr, 2.8-Ah Li-ion battery	807957-001
	3-cell, 31-Whr, 2.8-Ah Li-ion battery	807956-001
(18)	**Base enclosure**	
	For use in HP Notebook models:	

Item	Component	Spare part number
	● With an optical drive	813937-001
	● Without an optical drive	813939-001
	For use in HP 255 G4 Notebook models:	
	● With an optical drive	814614-001
	● Without an optical drive	816606-001
(19)	**Rubber Kit** (includes rear left and right feet)	813963-001

Mass storage devices

Component	Spare part number
Optical drive (DVD+/-RW Double-Layer SuperMulti; includes bracket and bezel)	
For use in HP Notebook models	813952-001
For use in HP 255 G4 Notebook models	814617-001
Hard drive, SATA; does not include bracket):	
For use only in HP Notebook models:	
● 1-TB, 5400-rpm, hybrid 8 GB SSD	731999-005
For use in all models:	
● 1-TB, 5400-rpm, 2.5-in	778192-005
● 750-GB, 5400-rpm, 2.5-in	778190-005
● 500-GB, 5400-rpm, 7-mm	778186-005
For use only in HP 255 G4 Notebook models:	
● 500-GB, 7200-rpm, 7-mm	764211-005
Hard Drive Hardware Kit (includes brackets and connector)	813949-001

Miscellaneous parts

Component	Spare part number
HP Smart AC adapter:	
65-W non-PFC EM (for use in the People's Republic of China and India only)	714657-001
65-W, non-PFC, 4.5 mm	710412-001
45-W non-PFC, non-slim (for use in all countries and regions except for the People's Republic of China and India)	741727-001
Power cord (3-pin, black, 1.0 m):	
For use in Argentina	755530-D01
For use in Australia	755530-011
For use in Denmark	755530-081
For use in Europe, the Middle East, and Africa	755530-021
For use in India	755530-D61
For use in Italy	755530-061
For use in Japan	755530-291
For use in North America	755530-001
For use in the People's Republic of China	755530-AA1
For use in South Africa	755530-AR1
For use in South Korea	755530-AD1
For use in Switzerland	755530-111
For use in Taiwan	755530-AB1
For use in Thailand	755530-201
For use in the United Kingdom and Singapore	755530-031
Rubber Kit (includes front and rear feet)	813963-001
Screw Kit	813964-001
HP HDMI to VGA Adapter	701943-001

Display assembly subcomponents
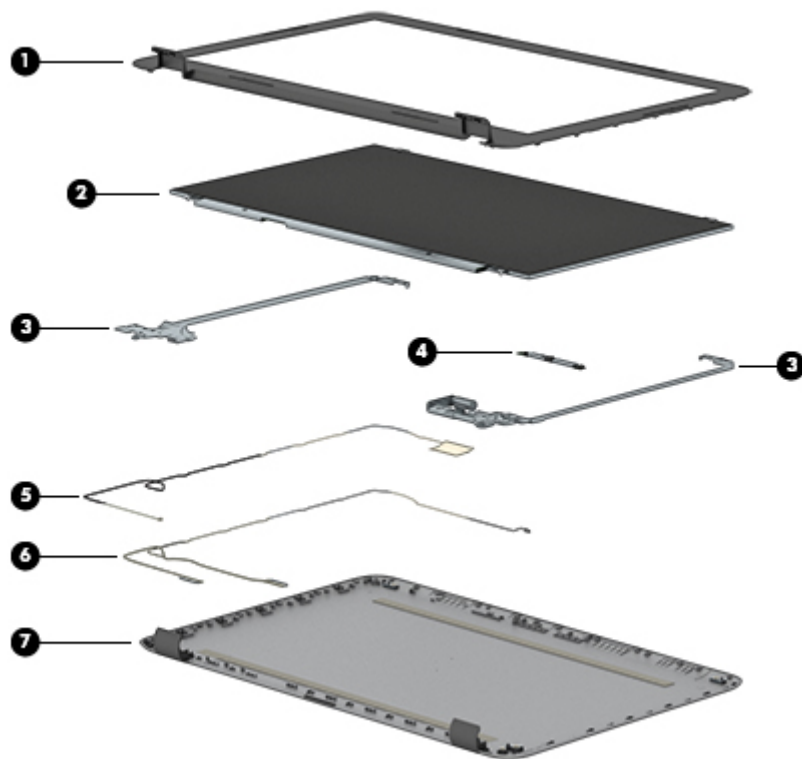
Item	Component	Spare part number
(1)	**Display bezel** (includes Mylar screw covers)	
	For use in HP Notebook models	813941-001
	For use in HP 255 G4 Notebook models	814615-001
(2)	**Raw display panel** (39.6-cm [15.6-in], HD, WLED, BrightView)	
	For use in models without a touch screen	813959-001
	For use in models with a touch screen	813961-001
(3)	**Hinges** (left and right)	813950-001
(4)	**Webcam/microphone module**	
	For use in HP Notebook models	813972-001
	For use in HP 255 G4 Notebook models	814613-001
(5)	**Antenna** (includes wireless antenna cable and transceiver)	813923-001
(6)	**Display cable** (includes display panel cable and webcam/microphone cable)	
	Non-touch screen	813943-001
	Touch screen	813944-001
(7)	**Display enclosure**:	
	For use in HP Notebook models without a touch screen:	
	● Black models	813925-001

Item	Component	Spare part number
	• Turbo silver models	813930-001
	• Red models	813929-001
	• White silver models	813926-001
	• Blue models	813927-001
	• Purple models	813928-001
	For use in HP Notebook models with a touch screen:	
	• Black models	813936-001
	• Turbo silver models	813935-001
	• Red models	813934-001
	• White silver models	813931-001
	• Blue models	813932-001
	• Purple models	813933-001
	For use in HP 255 G4 Notebook models	814616-001

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

Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

● To avoid hand contact, transport products in static-safe tubes, bags, or boxes.

● Protect ESD-sensitive parts and assemblies with conductive or approved containers or packaging.

● Keep ESD-sensitive parts in their containers until the parts arrive at static-free workstations.

● Place items on a grounded surface before removing items from their containers.

● Always be properly grounded when touching a component or assembly.

● Store reusable ESD-sensitive parts from assemblies in protective packaging or non-conductive foam.

● Use transporters and conveyors made of antistatic belts and roller bushings. Be sure that mechanized equipment used for moving materials is wired to ground and that proper materials are selected to avoid static charging. When grounding is not possible, use an ionizer to dissipate electric charges.

Workstation guidelines

Follow these grounding workstation guidelines:

● Cover the workstation with approved static-shielding material.

● Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.

● Use conductive field service tools, such as cutters, screwdrivers, and vacuums.

● When fixtures must directly contact dissipative surfaces, use fixtures made only of static-safe materials.

● Keep the work area free of nonconductive materials, such as ordinary plastic assembly aids and Styrofoam.

● Handle ESD-sensitive components, parts, and assemblies by the case or PCM laminate. Handle these items only at static-free workstations.

- Avoid contact with pins, leads, or circuitry.
- Turn off power and input signals before inserting or removing connectors or test equipment.

Equipment guidelines

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

- When seated, wear a wrist strap connected to a grounded system. Wrist straps are flexible straps with a minimum of one megohm ±10% resistance in the ground cords. To provide proper ground, wear a strap snugly against the skin at all times. On grounded mats with banana-plug connectors, use alligator clips to connect a wrist strap.

- When standing, use foot straps and a grounded floor mat. Foot straps (heel, toe, or boot straps) can be used at standing workstations and are compatible with most types of shoes or boots. On conductive floors or dissipative floor mats, use foot straps on both feet with a minimum of one megohm resistance between the operator and ground. To be effective, the conductive 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

5 Removal and replacement procedures for Customer Self-Repair parts

⚠ **CAUTION:** The Customer Self-Repair program is not available in all locations. Installing a part not supported by the Customer Self-Repair program may void your warranty. Check your warranty to determine if Customer Self-Repair is supported in your location.

📝 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

📝 **NOTE:** Please read and follow the procedures described here to access and replace Customer Self-Repair parts successfully.

📝 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 13 for details.

This chapter provides removal and replacement procedures for Customer Self-Repair parts.

There are as many as 3 screws that must be removed, replaced, or loosened when servicing Customer Self-Repair parts. Make special note of each screw size and location during removal and replacement.

Battery

Description	Spare part number
4-cell, 41-Whr, 2.8-Ah Li-ion battery	807957-001
3-cell, 31-Whr, 2.8-Ah Li-ion battery	807956-001

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.

To remove the battery:

1. Position the computer upside down on a flat surface.

2. Slide the battery lock latch **(1)**, and then slide the battery release latch **(2)** to release the battery.

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

Optical drive

NOTE: Optical drive spare part kits include bracket and bezel.

Description	Spare part number
DVD+/-RW Double-Layer SuperMulti Drive for use in HP Notebook models (includes bracket and bezel)	813952-001
DVD+/-RW Double-Layer SuperMulti Drive for use in HP 255 G4 Notebook models (includes bracket and bezel)	814617-001

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 28).

To remove the optical drive:

1. Remove the Phillips PM2.5×8.0 screw **(1)** that secures the optical drive to the computer.

2. Remove the optical drive **(2)** by sliding it out of the optical drive bay.
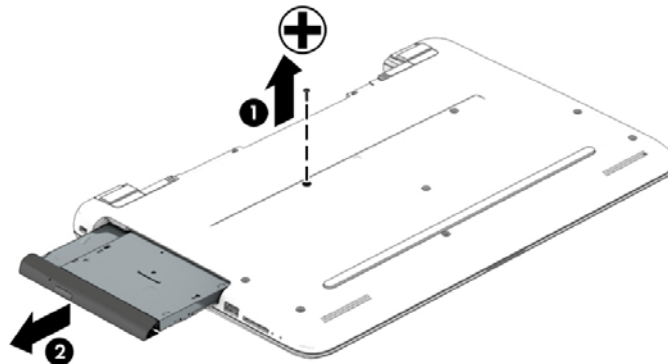
Reverse this procedure to reassemble and install the optical drive.

6 Removal and replacement procedures for Authorized Service Provider parts

⚠ **CAUTION:** Components described in this chapter should only be accessed by an authorized service provider. Accessing these parts can damage the computer or void the warranty.

📝 **NOTE:** HP continually improves and changes product parts. For complete and current information on supported parts for your computer, go to http://partsurfer.hp.com, select your country or region, and then follow the on-screen instructions.

Component replacement procedures

📝 **NOTE:** Details about your computer, including model, serial number, product key, and length of warranty, are on the service tag at the bottom of your computer. See Labels on page 13 for details.

This chapter provides removal and replacement procedures for Authorized Service Provider only parts.

There are as many as 56 screws that must be removed, replaced, or loosened when servicing Authorized Service Provider only parts. Make special note of each screw size and location during removal and replacement.

Display subcomponents (bezel, webcam, panel)

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

To remove the remaining display subcomponents, you must remove the entire display assembly from the computer. See Display assembly on page 54 for more information about removing the display assembly in its entirety.

Description	Spare part number
Raw display panel	
For use in models without a touch screen	813959-001
For use in models with a touch screen	813961-001
Display bezel (includes Mylar screw covers)	
For use in Notebook models	813941-001
For use in HP 255 G4 Notebook models	814615-001
Webcam/microphone module	
For use in HP Notebook models	813972-001
For use in HP 255 G4 Notebook models	814613-001

Before removing display subcomponents while the display assembly is still attached to the computer, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 28).

To remove the display bezel, webcam/microphone module, and raw display panel:

1. Position the computer upright with the front toward you, and then open it.

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

3. Remove the display bezel **(4)**.
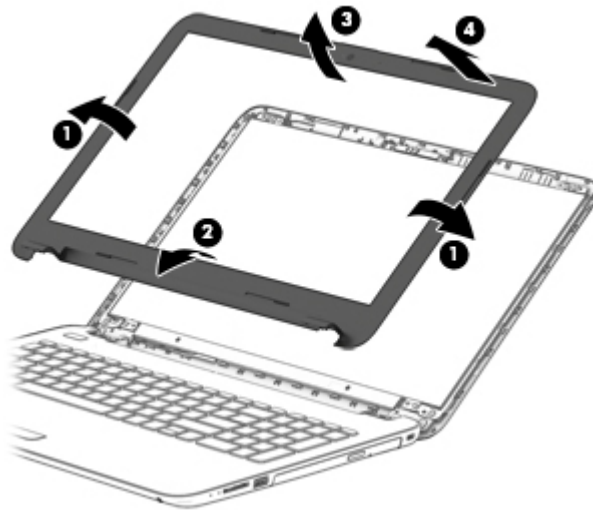
4. To remove the webcam/microphone module:

   a. Position the display assembly with the top edge toward you.

   b. Disconnect the cable **(1)** from the module.

c. Lift to disengage the adhesive that secures the webcam/microphone module to the display, and then remove the module **(2)**.

5. To remove the display panel:

   a. Remove the four Phillips PM2.0×2.4 screws **(1)** that secure the display panel to the enclosure.

   b. Rotate the display panel onto the keyboard **(2)** to gain access to the display cable connection on the back of the panel.
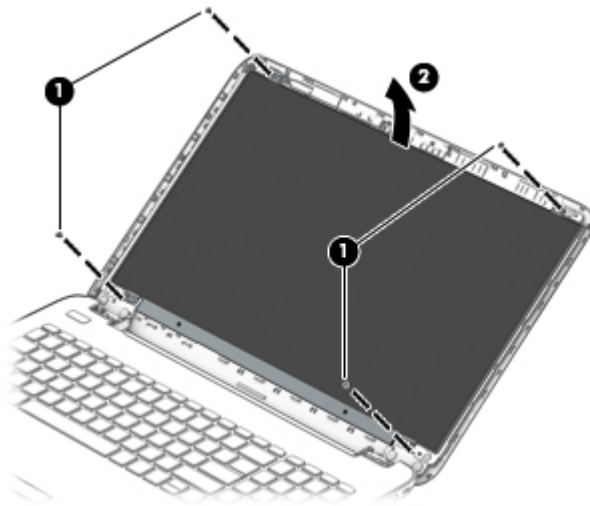
   c. On the back of the display panel, release the adhesive strip **(1)** that secures the display panel cable to the display panel, and then disconnect the cable **(2)**.

d. Remove the display panel from the computer **(3)**.

Reverse this procedure to reassemble and install the display bezel, webcam/microphone module, and display panel.

Bottom cover

In this section, the first table provides the main spare part number for the top covers/keyboards. The second table provides the country code suffixes for the spare part number.

Description	Spare part number
Top cover with keyboard for use in all black models (HP Notebook and HP 255 G4 Notebook)	813974-xxx
Top cover with keyboard for use in turbo silver HP Notebook models	813975-xxx
Top cover with keyboard for use in white silver HP Notebook models	813976-xxx
Top cover with keyboard for use in purple HP Notebook models	813977-xxx
Top cover with keyboard for use in blue HP Notebook models	813978-xxx
Top cover with keyboard for use in red HP Notebook models	813979-xxx

For use in country or region	Spare part number	For use in country or region	Spare part number	For use in country or region	Spare part number
Belgium	-A41	Italy	-061	South Korea	-AD1
Bulgaria	-261	Japan	-291	Spain	-071
Canada	-DB1	Latin America	-161	Switzerland	-BG1
Czech Republic and Slovakia	-FL1	The Netherlands	-B31	Taiwan	-AB1
Denmark, Finland, and Norway	-DH1	Portugal	-131	Thailand	-281
France	-051	Romania	-271	Turkey	-141
Germany	-041	Russia	-251	United Kingdom	-031
Greece	-151	Saudi Arabia	-171	United States	-001
Hungary	-211	Slovenia	-BA1		

Before removing the bottom cover, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.
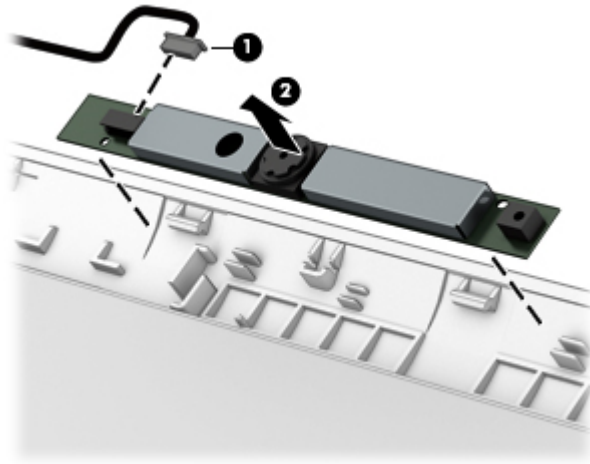
4. Remove the battery (see Battery on page 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

To remove the bottom cover:

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

2. Remove the two rubber bumpers from rear of the bottom of the computer **(1)**

3. Remove the 11 Phillips PM2.5×8.0 screws **(2)** that secure the bottom cover to the computer.

4. Start prying at the front of the computer and work around to the back to separate the bottom cover from computer **(1)**.

5. Remove the bottom cover **(2)**.
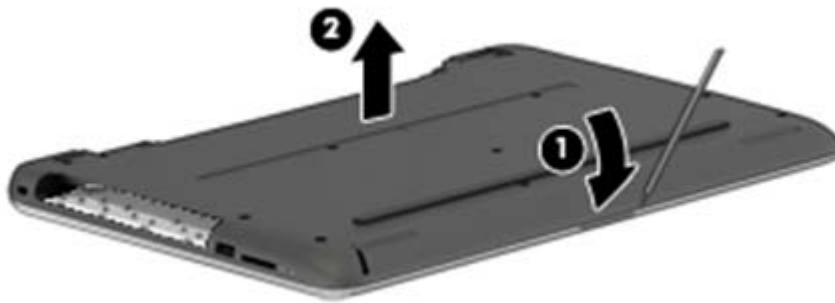
Reverse this procedure to install the bottom cover.

Optical drive board

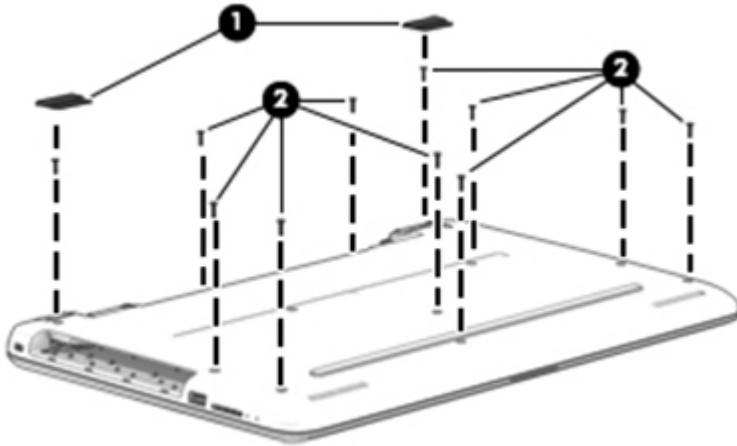| Description	Spare part number
Optical drive board (includes cable)	813956-001

Before removing the optical drive 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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the optical drive board:

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

2. Remove the Phillips PM2.0×2.4 screw **(2)** that secures the optical drive board to the computer.

3. Remove the board and cable from the computer **(3)**.
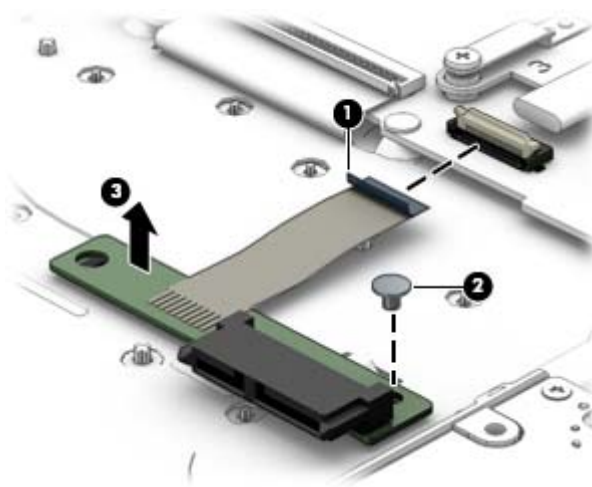
Reverse this procedure to install the optical drive board and cable.

Hard drive

NOTE: The hard drive spare part kit does not include the hard drive bracket.

Description	Spare part number
For use only in HP Notebook models:	
1-TB, 5400-rpm, hybrid 8 GB SSD	731999-005
For use in all models:	
1-TB, 5400-rpm, 2.5-in	778192-005
750 GB, 5400 rpm, 2.5 in	778190-005
500-GB, 5400-rpm, 7-mm	778186-005
For use only in HP 255 G4 Notebook models:	
500-GB, 7200-rpm, 7-mm	764211-005
Hard Drive Hardware Kit (includes brackets and connector)	813949-001

Before removing the hard drive, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see).

5. Remove the optical drive (see), if installed.

6. Remove the bottom cover (see).

To remove the hard drive:

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

2. Remove the three Phillips PM2.0×2.4 screws **(2)** that secure the hard drive assembly to the computer.

3. Lift the hard drive assembly from the computer **(3)**.
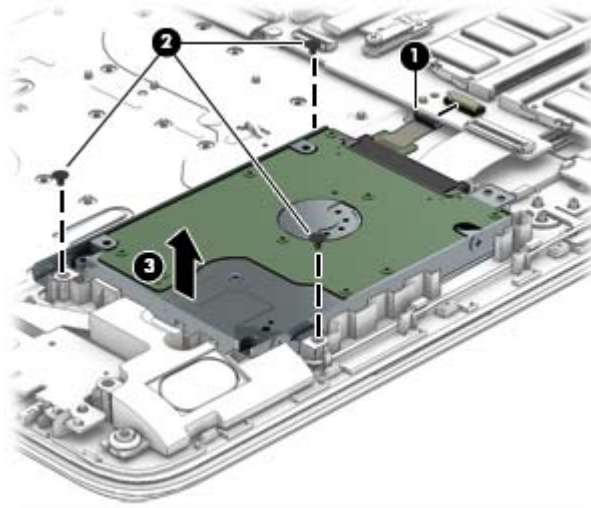
4. To disassemble the hard drive, pull the connector away from the drive to remove it **(1)**.

5. To remove the hard drive brackets, remove the two Phillips PM3.0×3.0 screws **(2)** that secure each bracket to the hard drive.

6. Remove the hard drive brackets from the hard drive **(3)**.
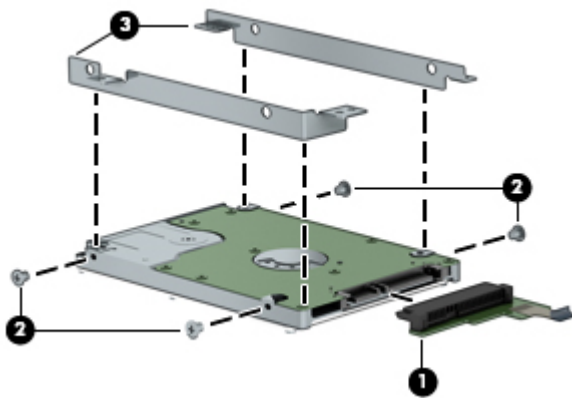
Reverse this procedure to reassemble and install the hard drive.

WLAN module

Description	Spare part number
Realtek RTL8723BE 802.11b/g/n 1x1 Wi-Fi + BT4.0 Combo Adapter	792610-005
Realtek RTL8188EE 802.11b/g/n 1x1 Wi-Fi Adapter	792609-005

⚠ **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 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).

5. Remove the optical drive (see), if installed.

6. Remove the bottom cover (see).

To remove the WLAN module:

1. Disconnect the WLAN antenna cable **(1)** from the terminal on the WLAN module.

   📝 **NOTE:** The #1 WLAN antenna cable is connected to the WLAN module Main terminal.

2. Remove the Phillips PM2.0×3.0 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)**.
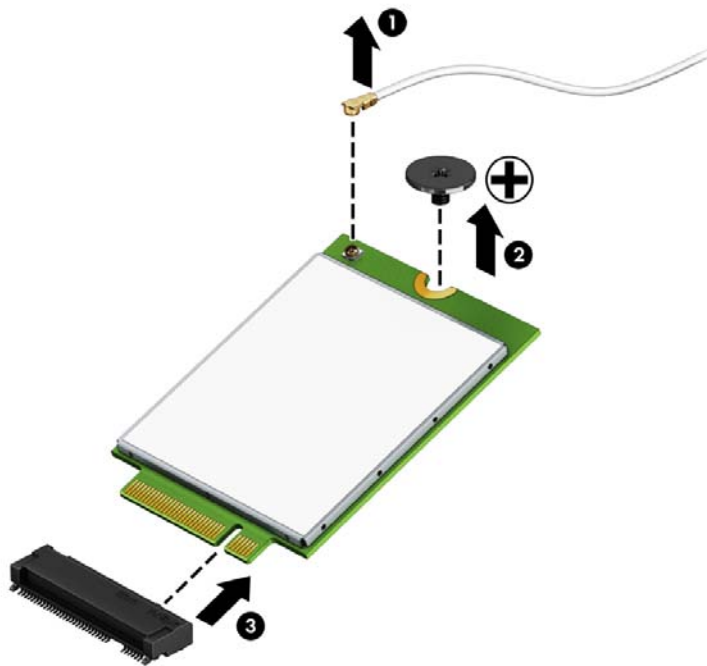
NOTE: If the WLAN antennas are not connected to the terminals on the WLAN module, the protective sleeves must be installed on the antenna connectors, as shown in the following illustration.

Reverse this procedure to install the WLAN module.

Memory module

Description	Spare part number
8-GB (PC3L, 12800, 1600-MHz)	693374-005
4-GB (PC3L, 12800, 1600-MHz)	691740-005
2-GB (PC3L, 12800, 1600-MHz)	691739-005

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove a 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.
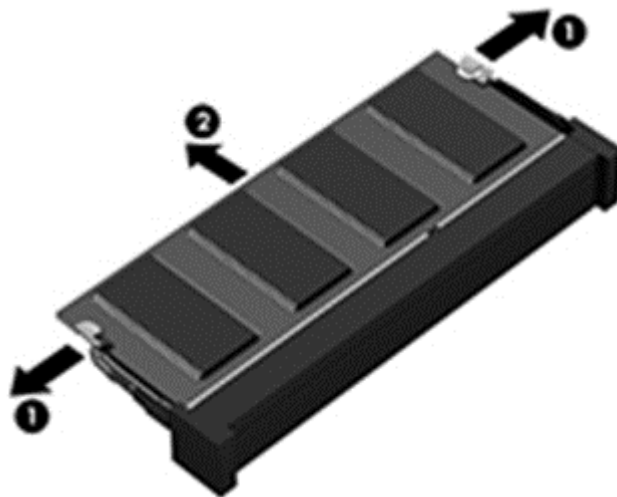
Reverse this procedure to install a memory module.

RTC battery

Description	Spare part number
RTC battery	759981–001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the RTC battery:

▲ Using a thin tool or screwdriver, disengage the battery from the socket **(1)**, and then remove the battery **(2)**.
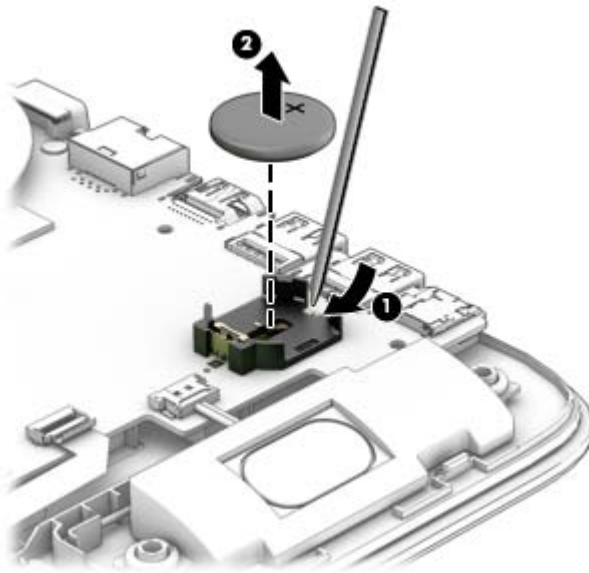
Reverse this procedure to install the RTC battery.

USB board

Description	Spare part number
USB board (includes cable)	813953-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the USB board:

1. Disconnect the USB board cable from the system board **(1)**.

2. Lift the cable to disengage the adhesive that secures it to the computer **(2)**.

3. Remove the Phillips PM2.0×2.5 screw **(3)** that secures the USB board to the computer.

4. Remove the USB board and cable **(4)**.
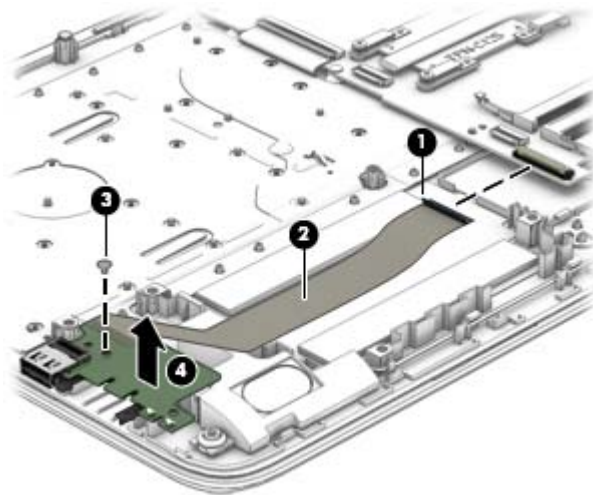
Reverse this procedure to install the USB board.

Speakers

Description	Spare part number
Speakers (includes left and right speakers and cable)	813965-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the speakers:

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

2. Remove the cable from the routing path **(2)**, and then lift up and remove the speakers from the computer **(3)**.

📝 **NOTE:** The speakers are not secured with screws. Note the rubber gaskets **(4)** that help secure the speakers to the computer. When installing the speakers, make sure the gaskets are installed correctly.
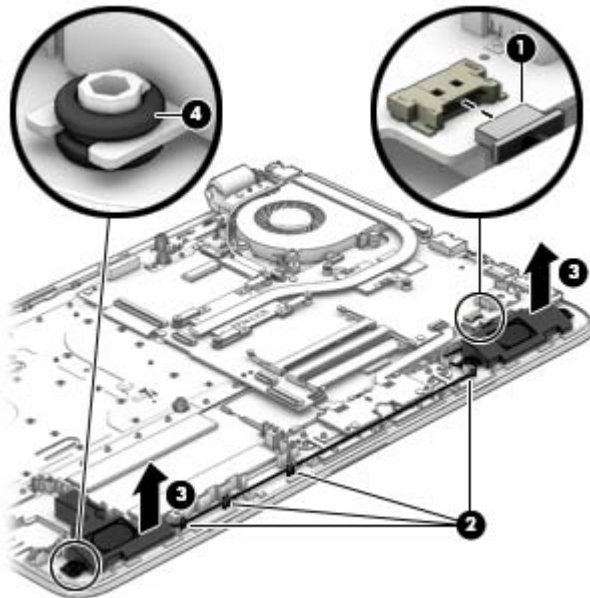
Reverse this procedure to install the speakers.

Heat sink assembly

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

Description	Spare part number
Heat sink for use in models with discrete graphics memory	813948-001
Heat sink for use in models with UMA	813947-001

NOTE: To properly ventilate the computer, allow at least **7.6 cm** (3.0 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 heat sink assembly, follow these steps:

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see).

5. Remove the optical drive (see), if installed.

6. Remove the bottom cover (see).

To remove the heat sink assembly:

1. Refer to the following heat sink removal image that matches your computer.

2. Loosen the screws on the heat sink that secure the heat sink assembly to the system board.

3. Remove the heat sink assembly from the system board.

NOTE: Heat sink appearance may vary.

Discrete graphics:
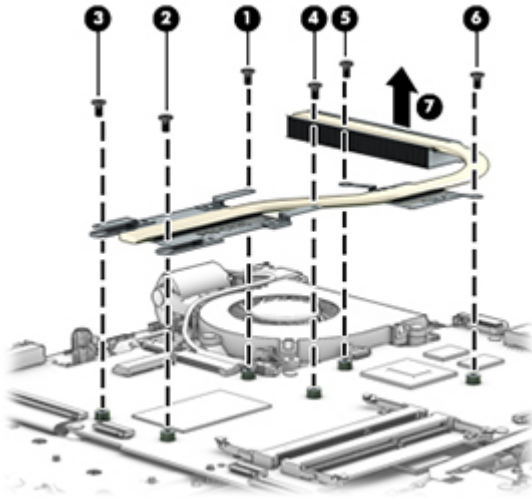
UMA graphics:
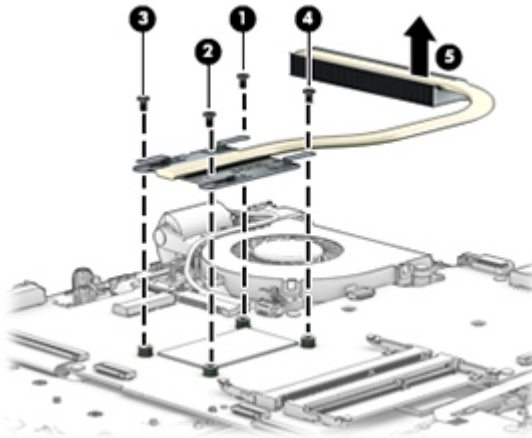
● **Discrete graphics:** Thermal paste is used on the processor and associated heat sink area **(1)(2)**, as well as the graphics chip and associated heat sink area **(3)(4)**.
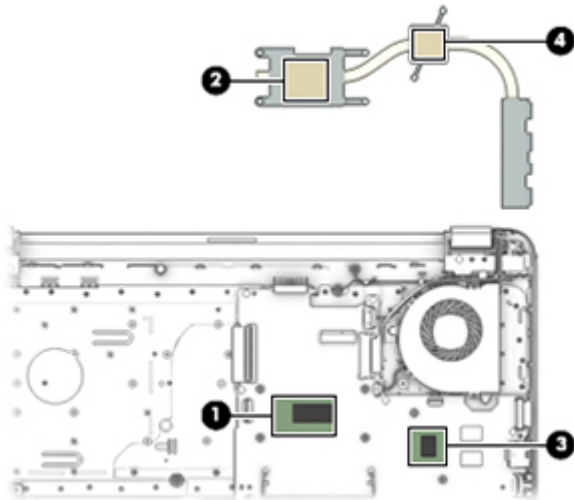
● **UMA graphics:** Thermal paste is used on the heat sink **(1)** and the processor **(2)**.
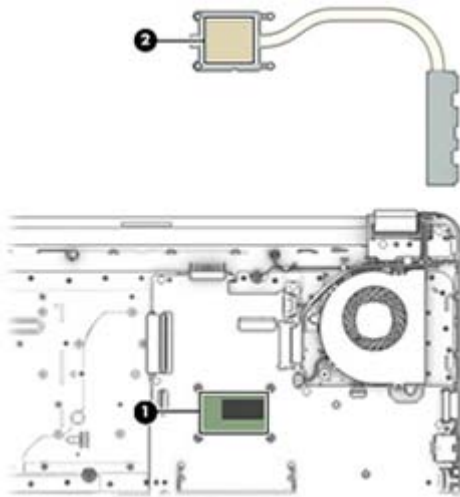
Reverse this procedure to reassemble and install the heat sink assembly.

Fan

Description	Spare part number
Fan	813946-001

📝 **NOTE:** To properly ventilate the computer, allow at least **7.6 cm** (3.0 in) of clearance on the left side of the computer. The computer uses an electric fan for ventilation. The fan is controlled by a temperature sensor and is designed to turn on automatically when high temperature conditions exist. These conditions are affected by high external temperatures, system power consumption, power management/battery conservation configurations, battery fast charging, and software requirements. Exhaust air is displaced through the ventilation grill located on the left side of the computer.

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

1. Shut down the computer. If you are unsure whether the computer is off or in Hibernation, turn the computer on, and then shut it down through the operating system.

2. Disconnect all external devices connected to the computer.

3. Disconnect the power from the computer by first unplugging the power cord from the AC outlet and then unplugging the AC adapter from the computer.

4. Remove the battery (see Battery on page 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the fan:

1. Disconnect the fan cable **(1)** from the system board.

2. Remove the two Phillips PM2.5×6.0 screws **(2)** that secure the fan to the computer.

3. Remove the fan from the computer **(3)**.
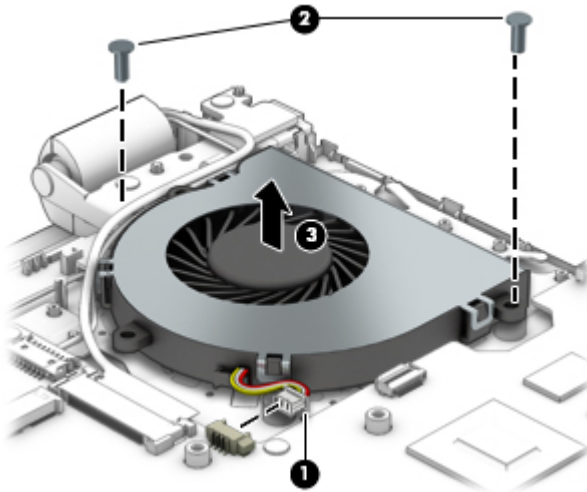
Reverse this procedure to install the fan.

TouchPad button board

Description	Spare part number
TouchPad button board (includes bracket and cables)	813954-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the TouchPad button board:

1. Disconnect the longer cable from the system board **(1)** and the shorter cable from the TouchPad **(2)**.

2. Remove the two Phillips PM2.0×2.5 screws **(3)** that secure the TouchPad button board to the computer.

3. Pull the TouchPad button board toward the bottom of the computer **(4)**, and then remove the TouchPad and cables **(5)**.
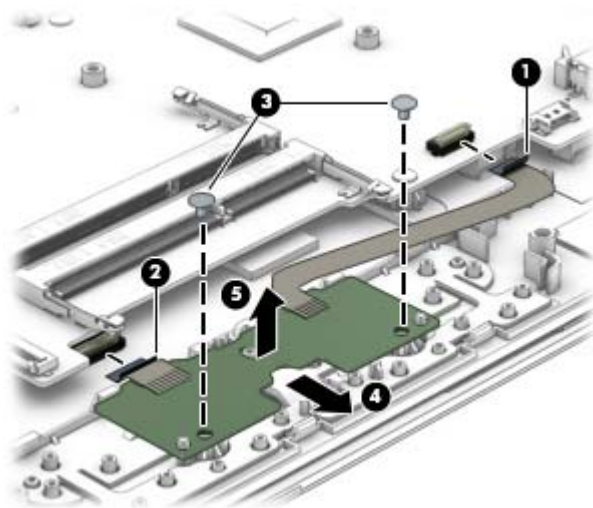
Reverse this procedure to install the TouchPad button board and cables.

System board

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

Description	Spare part number
System board (includes replacement thermal materials): All system boards use the following part numbers: xxxxxx-001: Without the Windows 8.1 operating system xxxxxx-501: Windows 8.1 Standard xxxxxx-601: Windows 8.1 Professional	
For use in HP Notebook PC models:	
Discrete graphics memory; Non-touch screen models:	
● AMD A8-7410 processor and 2 GB of discrete graphics memory	813971-xxx
● AMD A6-6310 processor and 1 GB of discrete graphics memory	818487-xxx
UMA graphics memory; non-touch screen models:	
● AMD A8-7410 processor	813969-xxx
● AMD A6-6310 processor	813967-xxx
● AMD E1-6015 processor	813966-xxx
UMA graphics memory, touch screen models:	
● AMD A8-7410 processor	813970-xxx
● AMD A6-6310 processor	813968-xxx
For use in HP 255 G4 models:	
UMA graphics memory	
● AMD A8-7410 processor	814612-xxx
● AMD A6-6310 processor	814611-xxx
● AMD E1-6015 processor	814610-xxx

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see).

7. Remove the hard drive (see).

📝 **NOTE:** 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:

- WLAN module (see)
- Memory module (see)

To remove the system board:

1. Position the computer upright, and then disconnect the following cables from the system board:

(1): USB board cable

(2): Optical drive connector cable

(3): Keyboard cable

(4): Power connector cable

(5): Display cable

(6): Power button board cable

(7): TouchPad button board cable

(8): Speaker cable
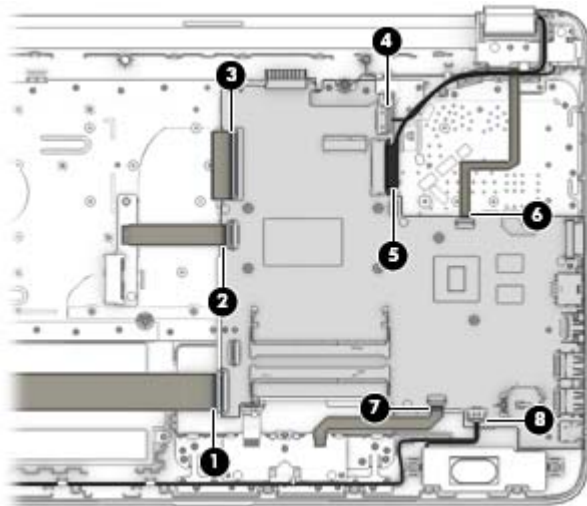
2. Remove the six Phillips PM2.5×2.5 screws **(1)** that secure the system board to the computer.

3. Lift the side of the system board **(2)**, and then pull the board away from the computer **(3)**.
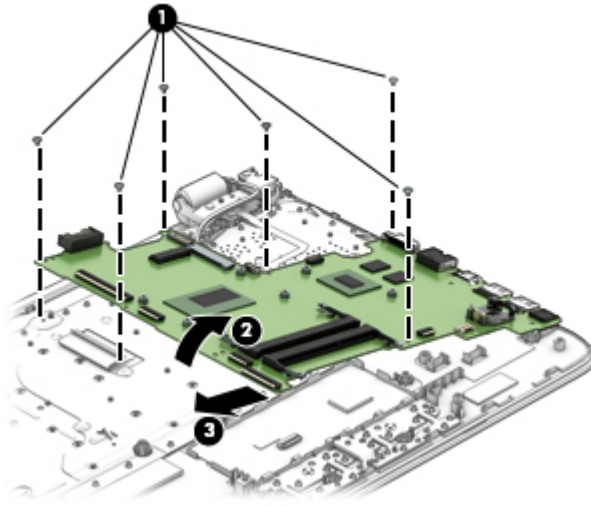
Reverse this procedure to install the system board.

Display assembly

This section describes removing the display assembly and disassembling display subcomponents.

If you only need to remove the display bezel, webcam/microphone module, or display panel, you do not need to remove the entire display assembly from the computer. See Display subcomponents (bezel, webcam, panel) on page 31 for more information about removing the display subcomponents that do not require that you remove the entire display assembly from the computer.

Description	Spare part number
Raw display panel (39.6-cm [15.6-in], HD, WLED, BrightView)	
For use in models without a touch screen	813959-001
For use in models with a touch screen	813961-001
Antenna (includes wireless antenna cable and transceiver)	813923-001
Display bezel (includes Mylar screw covers)	
For use in HP Notebook models	813941-001
For use in HP 255 G4 Notebook models	814615-001
Display cable	
For use in non-touch screen models (includes display panel cable and webcam/microphone cable)	813943-001
For use in touch screen models (includes display panel cable and webcam/microphone cable)	813944-001
Display enclosure for use in HP Notebook models without a touch screen	
Black models	813925-001
Red models	813929-001
White silver models	813926-001
Turbo silver models	813930-001
Blue models	813927-001
Purple models	813928-001
Display enclosure for use in HP Notebook models with a touch screen	
Black models	813936-001
Red models	813934-001
White silver models	813931-001
Turbo silver models	813935-001
Blue models	813932-001
Purple models	813933-001
Display enclosure for use in HP 255 G4 Notebook models	814616-001
Hinges (left and right)	813950-001
Webcam/microphone module	
For use in HP Notebook models	813972-001
For use in HP 255 G4 Notebook models	814613-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

To remove the display assembly:

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

2. Remove the four Phillips PM2.5×5.0 screws **(2)** (two from each hinge), and one Phillips PM2.5×4.0 screw **(3)** (on the right hinge), and one broadhead Phillips PM2.0×2.0 screw **(4)** (on the left hinge) that secures the display assembly to the computer.

3. Lift the display to bend the hinges upward **(5)**, and then separate the display from the computer **(6)**.
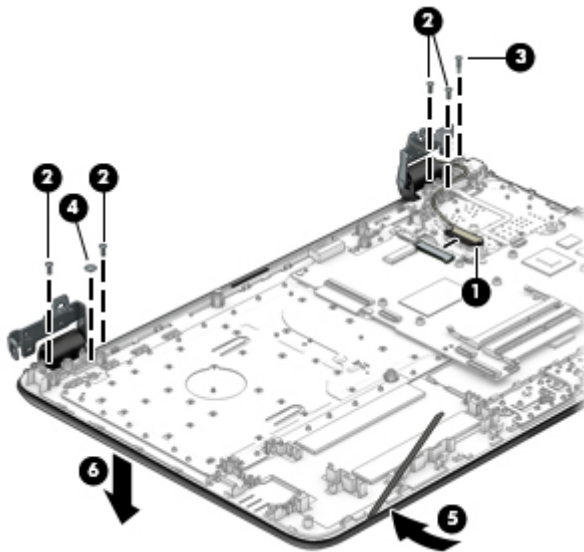
4. Use the following image to determine proper cable routing around the hinge.

(1): Display cable routing path

(2): Webcam cable routing path

(3): Antenna cable routing path
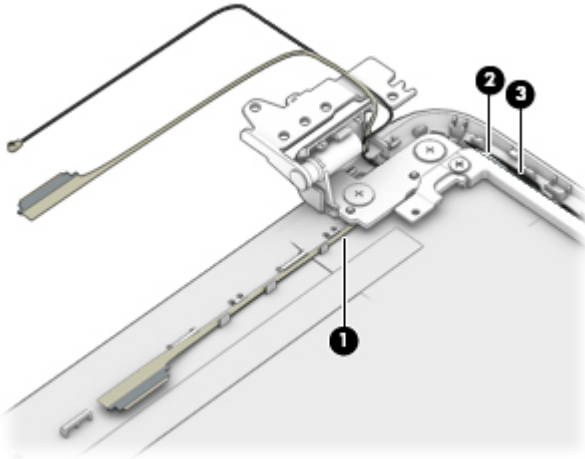
If it is necessary to replace any of the display assembly subcomponents:

1. To remove the display bezel:

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

   b. Remove the display bezel **(4)**.

   > **NOTE:** In this procedure, the display will NOT be connected to the computer, as shown in the following image.
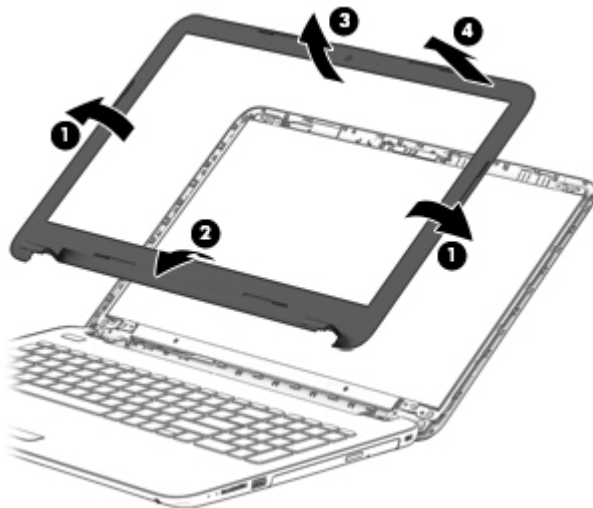
2. To remove the webcam/microphone module:

   a. Position the display assembly with the top edge toward you.

   b. Disconnect the cable **(1)** from the module.

c. Remove the webcam/microphone module **(2)**. (The module is attached to the display enclosure with double-sided tape.)

3. To remove the display panel:

a. Remove the four Phillips PM2.0×2.4 screws **(1)** that secure the display panel to the enclosure.

b. Rotate the display panel out of the enclosure **(2)** to gain access to the display cable connection on the back of the panel.

> **NOTE:** In this procedure, the display will NOT be connected to the computer, as shown in the following image.
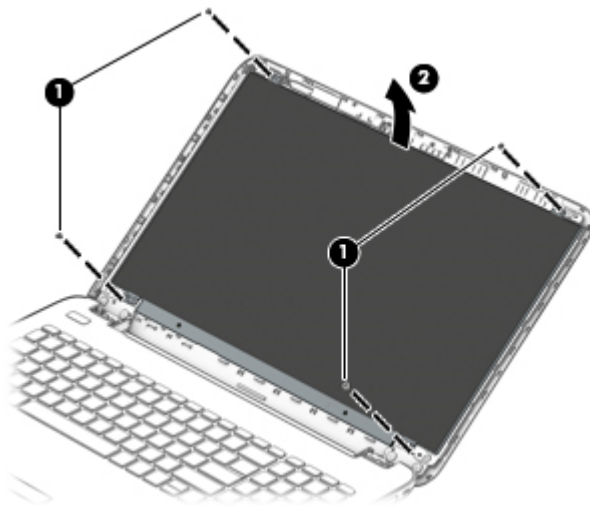
c. On the back of the display panel, release the adhesive strip **(1)** that secures the display panel cable to the display panel, and then disconnect the cable **(2)**.

d. Remove the display panel from the computer **(3)**.

> **NOTE:** In this procedure, the display will NOT be connected to the computer, as shown in the following image.

4. To remove the display hinges:

a. Remove the eight Phillips PM2.5×3.5 screws **(1)** (four per hinge) that secure the hinges to the display enclosure.

b. Remove the display hinges **(2)**.
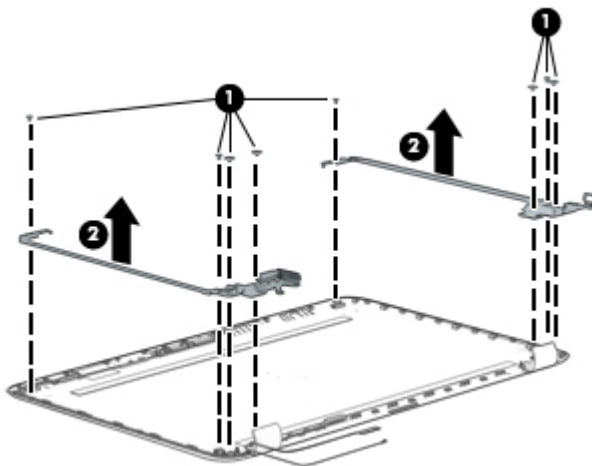
5. To remove the wireless antenna cables and transceivers, release the wireless antenna cables from the clips built into the display enclosure **(1)**, and then remove the cables **(2)**.
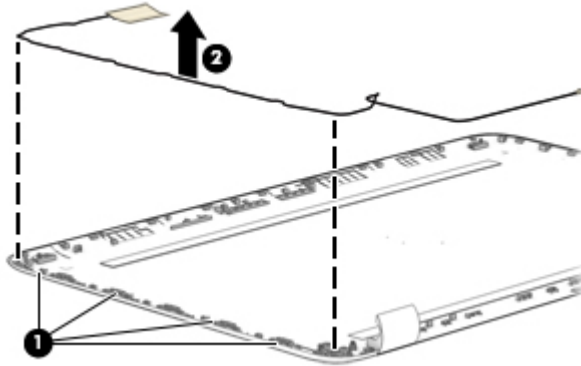
6. To remove the display/webcam cable, remove the cable from the clips built into the display enclosure **(1)**, and then remove the cable from the display enclosure **(2)**.
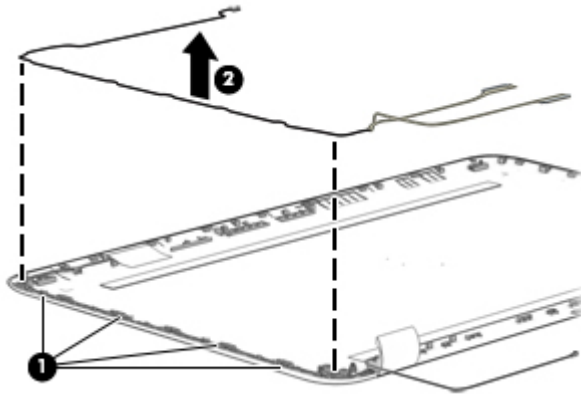
7. If replacing the display enclosure, be sure that the subcomponents (including the webcam/microphone module, the antenna receivers, and all associated cables and hardware) are transferred to the new enclosure.

Reverse this procedure to reassemble and install the display assembly.

Power connector cable

Description	Spare part number
Power connector cable	813945-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

7. Remove the display (see Display assembly on page 54).

To remove the power connector cable:

1. Pull on the tab that secures the connector to the computer **(1)**.

2. Remove the power connector cable **(2)**.
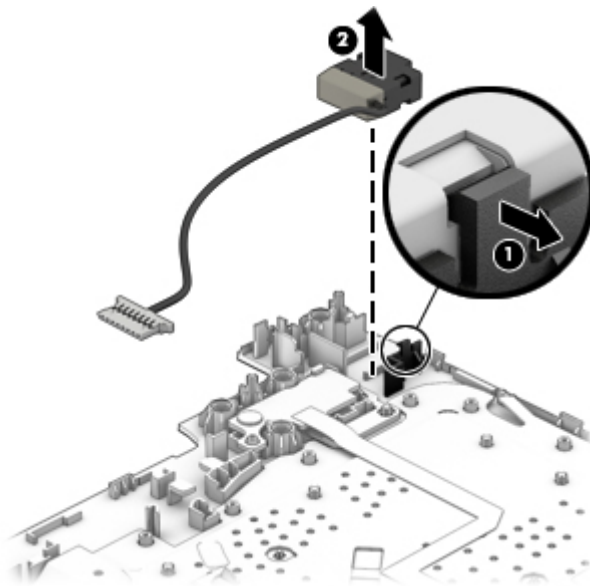
Reverse this procedure to install the power connector cable.

Power button board

Description	Spare part number
Power button board (includes cable)	813955-001

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 28).

5. Remove the optical drive (see Optical drive on page 29), if installed.

6. Remove the bottom cover (see Bottom cover on page 35).

7. Remove the display (see Display assembly on page 54).

To remove the power button board:

1. Remove the Phillips PM2.0×2.5 screw **(1)** that secures the power button board to the top cover.

2. Remove the power button board and cable from the computer **(2)**.
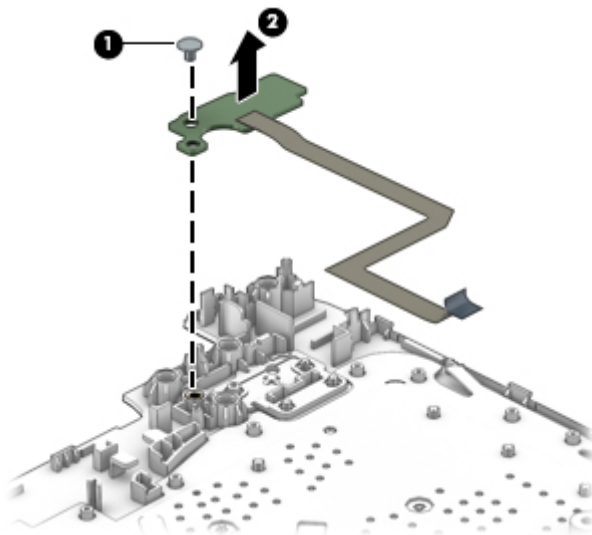
Reverse this procedure to install the power button board and cable.

7   Using Setup Utility (BIOS) in Windows 8.1

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

Starting Setup Utility (BIOS)

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

▲   Turn on or restart the computer, quickly press esc, and then press f10.

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

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

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

Determining the BIOS version

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

BIOS version information (also known as *ROM date* and *System BIOS*) can be revealed from the Start screen by typing `support`, selecting the **HP Support Assistant** app, selecting **My computer**, and then selecting **System Information**, or by using Setup Utility (BIOS).

1. Start Setup Utility (BIOS) (see Starting Setup Utility (BIOS) on page 63).

2. Select **Main**, and then make note of your BIOS version.

3. Select **Exit**, select **Exit Discarding Changes**, and then follow the on-screen instructions.

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.

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

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

1. From the Start screen, type `support`, and then select the **HP Support Assistant** app.

   – or –

   From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

2. Click **Updates and tune-ups**, and then click **Check for HP updates now**.

3. Follow the on-screen instructions.

4. At the download area, follow these steps:

   a. Identify the most recent BIOS update and compare it to the BIOS version currently installed on your computer. If the update is more recent than your BIOS, 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.

      If the update is more recent than your BIOS, 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.

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

1. From the Start screen, type `file`, and then select **File Explorer**.

   – or –

   From the Windows desktop, right-click the **Start** button, and then select **File Explorer**.

2. 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.

8   Using Setup Utility (BIOS) in Windows 7

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

Starting Setup Utility (BIOS)

▲   To start Setup Utility (BIOS), turn on or restart the computer, quickly press esc, and then press f10.

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

Updating the BIOS

Updated versions of the BIOS may be available on the HP website.

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

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

Determining the BIOS version

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

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

1.   Start Setup Utility (BIOS).

2.   Use the arrow keys to select **Main**, and then make note of your current BIOS version.

3.   To exit Setup Utility (BIOS) without saving your changes, use the tab key and the arrow keys to select **Exit > Exit Discarding Changes**, and then press enter.

Downloading a BIOS update

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

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

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

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

1. Select **Start**, type `hp support assistant`, and then select the **HP Support Assistant** program.

2. Follow the on-screen instructions to identify your computer and access the BIOS update you want to download.

3. At the download area, follow these steps:

   a. Identify the BIOS update that is later than the BIOS version currently installed on your computer. Make a note of the date, name, or other identifier. You may need this information to locate the update later, after it has been downloaded to your hard drive.

   b. Follow the on-screen instructions to download your selection to the hard drive.

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

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

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

1. Open Windows Explorer by selecting **Start > Computer**.

2. Double-click your hard drive designation. The hard drive designation is typically Local Disk (C:).

3. Using the hard drive path you recorded earlier, open the folder on your hard drive that contains the update.

4. Double-click the file that has an .exe extension (for example, *filename*.exe).

   The BIOS installation begins.

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

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

9 Backing up, restoring, and recovering in Windows 8.1

This chapter provides information about the following processes. The information in the chapter is standard procedure for most models.

- Creating recovery media and backups
- Restoring and recovering your system

For additional information, refer to the HP Support Assistant.

▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.

   - or -

   From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

Creating recovery media and backups

The following methods of creating recovery media and backups are available on select models only. Choose the available method according to your computer model.

- Use HP Recovery Manager after you successfully set up the computer to create HP Recovery media. This step creates a backup of the HP Recovery partition on the computer. The backup can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. For information on creating recovery media, see Creating HP Recovery media (select models only) on page 67. For information on the recovery options that are available using the recovery media, see Recovering using HP Recovery Manager on page 69.

- Use Windows tools to create system restore points and create backups of personal information.

   For more information, see Using Windows tools on page 68.

   NOTE: If storage is 32 GB or less, Microsoft System Restore is disabled by default.

Creating HP Recovery media (select models only)

IMPORTANT: If your computer does not list a Recovery Media Creation option, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

HP Recovery Manager is a software program that allows you to create recovery media after you successfully set up the computer. HP Recovery media can be used to perform system recovery if the hard drive becomes corrupted. System recovery reinstalls the original operating system and the software programs installed at the factory and then configures the settings for the programs. HP Recovery media can also be used to customize the system or restore the factory image if you replace the hard drive.

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

- HP Recovery Manager examines the computer and determines the required storage capacity for the media that will be required.

- To create recovery discs, your computer must have an optical drive with DVD writer capability, and you must use only high-quality blank DVD-R, DVD+R, DVD-R DL, or DVD+R DL discs. Do not use rewritable discs such as CD±RW, DVD±RW, double-layer DVD±RW, or BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software. Or, instead, you can use a high-quality blank USB flash drive.

- If your computer does not include an integrated optical drive with DVD writer capability, but you would like to create DVD recovery media, you can use an external optical drive (purchased separately) to create recovery discs, or you can obtain recovery discs for your computer from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions. If you use an external optical drive, it must be connected directly to a USB port on the computer; the drive cannot be connected to a USB port on an external device, such as a USB hub.

- Be sure that the computer is connected to AC power before you begin creating the recovery media.

- The creation process can take an hour or more. Do not interrupt the creation process.

- If necessary, you can exit the program before you have finished creating all of the recovery DVDs. HP Recovery Manager will finish burning the current DVD. The next time you start HP Recovery Manager, you will be prompted to continue, and the remaining discs will be burned.

To create HP Recovery media:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Recovery Media Creation**, and then follow the on-screen instructions.

If you ever need to recover the system, see Recovering using HP Recovery Manager on page 69.

Using Windows tools

You can create system restore points and create backups of personal information using Windows tools.

📝 **NOTE:** If storage is 32 GB or less, Microsoft System Restore is disabled by default.

▲ From the Start screen, type `help`, and then select **Help and Support**.

– or –

From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

For more information and steps, see Help and Support.

Restore and recovery

There are several options for recovering your system. Choose the method that best matches your situation and level of expertise:

📝 **IMPORTANT:** Not all methods are available on all models.

- Windows offers several options for restoring from backup, refreshing the computer, and resetting the computer to its original state. For more information see Help and Support.

  ▲ From the Start screen, type `support`, and then select the **HP Support Assistant** app.

    - or -

    From the Windows desktop, click the question mark icon in the notification area, at the far right of the taskbar.

- If you need to correct a problem with a preinstalled application or driver, use the Drivers and Applications Reinstall option of HP Recovery Manager to reinstall the individual application or driver.

  ▲ From the Start screen, type `recovery`, select **HP Recovery Manager**, select **Drivers and Applications Reinstall**, and then follow the on-screen instructions.

- On select models, if you want to reset your computer using a minimized image, you can choose the HP Minimized Image Recovery option from the HP Recovery partition or HP Recovery media. Minimized Image Recovery installs only drivers and hardware-enabling applications. Other applications included in the image continue to be available for installation through the Drivers and Applications Reinstall option in HP Recovery Manager.

  For more information, see Recovering using HP Recovery Manager on page 69.

- If you want to recover the Windows partition to original factory content, you can choose the System Recovery option from the HP Recovery partition (select models only) or use the HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 69. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 67.

- On select models, if you want to recover the computer's original factory partition and content , or if you have replaced the hard drive, you can use the Factory Reset option of HP Recovery media. For more information, see Recovering using HP Recovery Manager on page 69.

- On select models, if you want to remove the recovery partition to reclaim hard drive space, HP Recovery Manager offers the Remove Recovery Partition option.

  For more information, see Removing the HP Recovery partition (select models only) on page 71.

Recovering using HP Recovery Manager

HP Recovery Manager software allows you to recover the computer to its original factory state by using the HP Recovery media that you either created or that you obtained from support, or by using the HP Recovery partition (select models only). If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 67.

What you need to know before you get started

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the media provided by the manufacturer.

  IMPORTANT: Recovery through HP Recovery Manager should be used as a final attempt to correct computer issues.

- HP Recovery media must be used if the computer hard drive fails. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 67.

- To use the Factory Reset option (select models only), you must use HP Recovery media. If you have not already created recovery media, see Creating HP Recovery media (select models only) on page 67.

- If your computer does not allow the creation of HP Recovery media or if the HP Recovery media does not work, you can obtain recovery media for your system from support. See the *Worldwide Telephone Numbers* booklet included with the computer. You can also find contact information from the HP website. Go to http://www.hp.com/support, select your country or region, and follow the on-screen instructions.

📝 **IMPORTANT:** HP Recovery Manager does not automatically provide backups of your personal data. Before beginning recovery, back up any personal data you want to retain.

Using HP Recovery media, you can choose from one of the following recovery options:

📝 **NOTE:** Only the options available for your computer display when you start the recovery process.

- System Recovery—Reinstalls the original operating system, and then configures the settings for the programs that were installed at the factory.

- Minimized Image Recovery (select models only)—Reinstalls the operating system and all hardware-related drivers and software, but not other software applications.

- Factory Reset—Restores the computer to its original factory state by deleting all information from the hard drive and re-creating the partitions. Then it reinstalls the operating system and the software that was installed at the factory.

The HP Recovery partition (select models only) allows System Recovery and Minimized Image Recovery (select models only).

Using the HP Recovery partition (select models only)

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

To start HP Recovery Manager from the HP Recovery partition:

1. From the Start screen, type `recovery`, select **HP Recovery Manager**, and then select **HP Recovery Environment**.

   - or-

   Press f11 while the computer boots, or press and hold f11 as you press the power button.

2. Select **Troubleshoot** from the boot options menu.

3. Select **Recovery Manager**, and then follow the on-screen instructions.

Using HP Recovery media to recover

You can use HP Recovery media to recover the original system. This method can be used if your system does not have an HP Recovery partition or if the hard drive is not working properly.

1. If possible, back up all personal files.

2. Insert the HP Recovery media, and then restart the computer.

   📝 **NOTE:** If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See Changing the computer boot order on page 71.

3. Follow the on-screen instructions.

Changing the computer boot order

If your computer does not restart in HP Recovery Manager, you can change the computer boot order, which is the order of devices listed in BIOS where the computer looks for startup information. You can change the selection for an optical drive or a USB flash drive.

To change the boot order:

1. Insert the HP Recovery media.

2. Start Computer Setup:

   ▲ Turn on or restart the computer, quickly press esc, and then press f9 for boot options.

3. Select the optical drive or USB flash drive from which you want to boot.

4. Follow the on-screen instructions.

Removing the HP Recovery partition (select models only)

HP Recovery Manager software allows you to remove the HP Recovery partition to free up hard drive space.

IMPORTANT: After you remove the HP Recovery partition, you can no longer use the Windows Refresh option or the Windows option to remove everything and reinstall Windows. In addition, you will not be able to perform System Recovery or Minimized Image Recovery from the HP Recovery partition. So before you remove the Recovery partition, create HP Recovery media; see Creating HP Recovery media (select models only) on page 67.

Follow these steps to remove the HP Recovery partition:

1. From the Start screen, type `recovery`, and then select **HP Recovery Manager**.

2. Select **Remove Recovery Partition**, and then follow the on-screen instructions.

10 Backing up, restoring, and recovering in Windows 7

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

Creating backups

1. Use HP Recovery Manager to create recovery media immediately after you set up the working computer.

2. As you add hardware and software programs, create system restore points.

3. As you add photos, video, music, and other personal files, create a backup of your system and personal information.

Creating recovery media to recover the original system

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

What you need to know

- Only one set of recovery media can be created. Handle these recovery tools carefully, and keep them in a safe place.

- HP Recovery Manager examines the computer and determines the required storage capacity for the flash drive or the number of blank DVD discs that will be required.

  Use DVD-R, DVD+R, DVD-R DL, DVD+R DL discs or a flash drive. Do not use rewriteable discs such as CD±RW, DVD±RW, double-layer DVD±RW, and BD-RE (rewritable Blu-ray) discs; they are not compatible with HP Recovery Manager software.

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

- Be sure that the computer is connected to AC power before you begin creating the recovery media.

- The creation process can take up to an hour or more. Do not interrupt the creation process.

- Store the recovery media in a safe location, separate from the computer.

- If necessary, you can exit the program before you have finished creating the recovery media. The next time you open HP Recovery Manager, you will be prompted to continue the process.

1. Select **Start** and type `recovery` in the search field. Select **HP Recovery Manager** from the list. Allow the action to continue, if prompted.

2. Click **Recovery Media Creation**.

3. Follow the on-screen instructions to continue.

To recover, see Recovering the original system using HP Recovery Manager on page 76.

Creating system restore points

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

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

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

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

What you need to know

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

Creating a system restore point

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **Create**, and follow the on-screen instructions.

To restore, see Restoring to a previous system restore point on page 76.

Backing up system and personal information

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

Tips for a successful backup

- Number backup discs before inserting them into the optical drive.

- Store personal files in the Documents, Music, Pictures, and Videos libraries, and back up these folders periodically.

- Save customized settings in a window, toolbar, or menu bar by taking a screen shot of your settings. The screen shot can be a time-saver if you have to re-enter your preferences.

To create a screen shot:

1. Display the screen you want to save.

2. Copy the screen image:

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

   To copy the entire screen, press prt sc.

3. Open a word-processing document or graphics editing program, and then select **Edit > Paste**. The screen image is added to the document.

4. Save and print the document.

What you need to know

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

- Connect the computer to AC power during backups.

- Allow enough time for the backup. Depending on files sizes, it may take more than an hour.

- Verify the amount of free space on your backup storage device before you back up.

- You should back up:

  ◦ Before adding or changing software or hardware.

  ◦ Before the computer is repaired or restored.

  ◦ On a regular schedule to be sure you have recent copies of personal information.

  ◦ After you add many files—for example, if you saved videos from a birthday party.

  ◦ Before using antivirus software to remove a malicious program.

  ◦ After adding information that is hard to replace, such as pictures, videos, music, project files, or data records.

Creating a backup using Windows Backup and Restore

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

1. Select **Start > Control Panel > System and Security > Backup and Restore**.

2. Follow the on-screen instructions to schedule and create a backup.

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

To restore, see .

Restore and recovery

Restoring to a previous system restore point

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

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

1. Select **Start > Control Panel > System and Security > System**.

2. In the left pane, click **System Protection**.

3. Click the **System Protection** tab.

4. Click **System Restore**, and follow the on-screen instructions.

Restoring specific files

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

Restoring specific files using Windows Backup and Restore

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

1. Select **Start > Control Panel > System and Security > Backup and Restore**.

2. Follow the on-screen instructions to restore your backup.

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

Recovering the original system using HP Recovery Manager

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

What you need to know

- HP Recovery Manager recovers only software that was installed at the factory. For software not provided with this computer, you must either download the software from the manufacturer's website or reinstall the software from the disc provided by the manufacturer.

- A system recovery should be used as a final attempt to correct computer issues. If you have not already tried restore points (see Restoring to a previous system restore point on page 76) and partial restores (see Restoring specific files on page 76), try them before using HP Recovery Manager to recover your system.

- A system recovery must be performed if the computer hard drive fails or if all attempts to correct any functional computer issues fail.

- If the recovery media do not work, you can obtain recovery discs for your system from the HP website.

- The Minimized Image Recovery option is recommended for advanced users only. All hardware-related drivers and software are re-installed, but other software applications are not. Do not interrupt the process until it is complete, otherwise the recovery will fail.

Recovering using HP Recovery partition (select models only)

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

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

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

1. Access HP Recovery Manager in either of the following ways:

   - Select **Start** and type `recovery` in the search field. Select **HP Recovery Manager** from the list.

     – or –

   - Turn on or restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen. Then press f11 while the "F11 (System Recovery)" message is displayed on the screen.

2. Click **System Recovery** in the **HP Recovery Manager** window.

3. Follow the on-screen instructions.

Recovering using the recovery media

1. If possible, back up all personal files.

2. Insert the first recovery disc into the optical drive on your computer or an optional external optical drive, and then restart the computer.

   – or –

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

   NOTE: If the computer does not automatically restart in HP Recovery Manager, change the computer boot order. See .

3. Press f9 at system bootup.

4. Select the optical drive or the flash drive.

5. Follow the on-screen instructions.

Changing the computer boot order

To change the boot order for recovery discs:

1. Restart the computer.

2. Press esc while the computer is restarting, and then press f9 for boot options.

3. Select **Internal CD/DVD ROM Drive** from the boot options window.

To change the boot order for a recovery flash drive:

1. Insert the flash drive into a USB port.

2. Restart the computer.

3. Press esc while the computer is restarting, and then press f9 for boot options.

4. Select the flash drive from the boot options window.

11 Using HP PC Hardware Diagnostics (UEFI)

HP PC Hardware Diagnostics is a Unified Extensible Firmware Interface (UEFI) that allows you to run diagnostic tests to determine whether the computer hardware is functioning properly. The tool runs outside the operating system so that it can isolate hardware failures from issues that are caused by the operating system or other software components.

To start HP PC Hardware Diagnostics (UEFI):

1. Start Setup Utility:

   ▲ Turn on or restart the computer, quickly press esc.

2. Press or tap **f2**.

   The BIOS searches 3 places for the diagnostic tools, in the following order:

   a. Connected USB drive

   ⬙ **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see Downloading HP PC Hardware Diagnostics (UEFI) to a USB device on page 79.

   b. Hard drive

   c. BIOS

3. When the diagnostic tool opens, use the keyboard arrow keys to select the type of diagnostic test you want to run, and then follow the on-screen instructions.

⬙ **NOTE:** If you need to stop a diagnostic test, press or tap esc.

Downloading HP PC Hardware Diagnostics (UEFI) to a USB device

⬙ **NOTE:** Instructions for downloading HP PC Hardware Diagnostics (UEFI) are provided in English only.

There are two options to download HP PC Hardware Diagnostics to a USB device.

Download the latest UEFI version:

1. Go to http://hp.com/go/techcenter/pcdiags. The HP PC Diagnostics home page is displayed.

2. Click the **Download** link in the HP PC Hardware Diagnostics section, and then select **Run**.

Download any version of UEFI for a specific product:

1. Go to http://www.hp.com/support, and then select your country. The HP Support page is displayed.

2. Click **Drivers & Downloads**.

3. In the text box, enter the product name, and then click **Go**.

   – or –

   Click **Find Now** to let HP automatically detect your product.

4. Select your computer model, and then select your operating system.

5. In the **Diagnostic** section, follow the on-screen instructions to select and download the UEFI version you want.

12 Specifications

Computer specifications

	Metric	U.S.
Dimensions (touch models)		
Depth	**254.6 mm**	10.02 in
Width	**384.3 mm**	15.13 in
Height	**24.3 mm**	0.96 in
Weight		
3 cell battery	**1994 g**	4.40 lb
4 cell battery	**2040 g**	4.50 lb
Input power		
Operating voltage and current	19.5 V dc @ 3.33 A – 65 W	
	19.5 V dc @ 2.31 A – 45 W	
Temperature		
Operating	**5°C to 35°C**	41°F to 95°F
Nonoperating	**-20°C to 60°C**	-4°F to 140°F
Relative humidity (noncondensing)		
Operating	10% to 90%	
Nonoperating	5% to 95%	
Maximum altitude (unpressurized)		
Operating	**-15 m to 3,048 m**	-50 ft to 10,000 ft
Nonoperating	**-15 m to 12,192 m**	-50 ft to 40,000 ft

NOTE: Applicable product safety standards specify thermal limits for plastic surfaces. The device operates well within this range of temperatures.

39.6-cm (15.6-in) display specifications

	Metric	U.S.
Active diagonal size	39.6-cm	15.6-in
Resolution	1366x768 (HD)	
Surface treatment	BrightView	
Brightness	200 nits (touch)	
	220 nits (non-touch)	
Viewing angle	SVA	
Backlight	WLED	
Graphics adapter	eDP	
Thickness	3.2 mm (touch)	
	3.8 mm (non-touch)	

Hard drive specifications, hybrid drives

	1000-GB*, 8 GB NAND hybrid SSD
Dimensions	
Height	5 mm
Length	100.2 mm
Width	69.9 mm
Weight	70.0 g
Form Factor	2.5 inch
NAND flash memory	8 GB
Average seek time	12 ms
Formatted capacity	1,000,204,886 MB
User sectors per drive	1.953,525,168
Disk rotational speed	5400 rpm
Operating temperature	**0℃** to **60℃** (32°F to 140°F)

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

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

Hard drive specifications

	1–TB*	750-GB*	500-GB*
Dimensions			
Height	9.5 mm	9.5 mm	7.0 mm or 9.5 mm
Length	100.4 mm	100.4 mm	100.6 mm
Width	69.9 mm	69.9 mm	70.1 mm
Weight	107.0 g	115.0 g	92.0 g
Interface type	SATA	SATA	SATA
Transfer rate			
Synchronous (maximum)	300 MB/sec	300 MB/sec	300 MB/sec
Security	ATA security	ATA security	ATA security
Seek times (typical read, including setting)			
Single track	2.0 ms	1.5 ms	3 ms
Average (read/write)	12 ms	11 ms	13 ms
Maximum	22 ms	14 ms	24 ms
Logical blocks	1,953,525,168	1,465,149,168	1,048,576,000
Disk rotational speed	5400 rpm	5400 rpm	5400 rpm
Operating temperature			

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

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

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

13 Statement of Volatility

The purpose of this document is to provide general information regarding non-volatile memory in industry-standards based HP Business Notebook PC systems and provide general instructions for restoring nonvolatile memory that can contain personal data after the system has been powered off and the hard drive has been removed.

HP Business Notebook PC products that use Intel®-based or AMD®-based system boards contain volatile DDR memory. The amount of nonvolatile memory present in the system depends upon the system configuration. Intel-based and AMD-based system boards contain nonvolatile memory subcomponents as originally shipped from HP assuming that no subsequent modifications have been made to the system and assuming that no applications, features, or functionality have been added to or installed on the system.

Following system shutdown and removal of all power sources from an HP Business Notebook PC system, personal data can remain on volatile system memory (DIMMs) for a finite period of time and will also remain in nonvolatile memory. The steps below will remove personal data from the notebook PC, including the nonvolatile memory found in Intel-based and AMD-based system boards. Some of these steps are disclosed in the Maintenance & Service Guides available for HP PC products available on the product support pages at www.hp.com.

1. Follow steps (a) through (I) below to restore the nonvolatile memory that can contain personal data. Restoring or reprogramming nonvolatile memory that does not store personal data is neither necessary nor recommended.

   a. Enter BIOS (F10) Setup by powering on the system and pressing F10 when prompted near the bottom of the display, or press the ESC key to display the start up menu, then press F10 . If the system has a BIOS administrator password, enter the password at the prompt.

   b. Select the **File** menu, then **Restore Defaults**.

   c. Select the **System Configuration** menu, then **Restore Security Defaults**.

   d. If an asset or ownership tag is set, select the **Security** menu and scroll down to the **Utilities** menu. Select **System IDs**, and then select the tag that has been set. Press the spacebar once to clear the tag, then press Enter to return to the prior menu.

   e. If a DriveLock password is set, select the **Security** menu, scroll down to **DriveLock**, then select **DriveLock password**. Select the desired hard drive. Click **Disable protection**, enter the existing master DriveLock password, then press Enter to confirm and return to the prior menu. Repeat this procedure if more than one hard drive has a DriveLock password.

   f. If an Automatic DriveLock password is set, select the **Security** menu, scroll down to **Automatic DriveLock**, then select the desired hard drive and disable protection. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.

   g. Select the **File** menu, then **Reset BIOS Security to factory default**. Click **yes** at the warning message.

   h. Select the **File** menu, then **Save Changes and Exit**.

   i. Reboot the system. If the system has a Trusted Platform Module (TPM) and/or fingerprint sensor, one or two prompts will appear. One to clear the TPM and the other to Reset Fingerprint Sensor; press F1 to accept or F2 to reject.

      If the HP notebook model number ends in a 'p' or 'w' and includes Intel® Centrino with VProTM, reboot the PC and enter BIOS Setup by pressing F10 when prompted. Select **System**

Configuration, then **AMT Options**. Then select **Unconfigure AMT** on next boot. Select **Save** then **Yes**. Select the **File** menu, and then select **Save Changes and Exit**. Reboot the system and confirm that you want to unconfigure AMT.

j. If the optional Intel® Anti-Theft Technology (AT) was activated, contact the provider to deactivate it.

k. If the optional Absolute® Software Computrace® management and tracking service was activated on the notebook PC, contact the provider to deactivate it.

l. Remove all power and system batteries for at least 24 hours.

2. Remove and retain the storage drive or clear the contents of the drive.

a. Hard Disk Drive (HDD)

Clear the HDD contents by using the HP Disk Sanitizer® utility or a third party application that, ideally, is U.S. Department of Defense (DOD) 5220.22-M approved.

To run HP Disk Sanitizer, enter BIOS Setup by powering on the system and pressing F10 when prompted near the bottom of the display, or press ESC to display the start up menu, then press F10. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Disk Sanitizer** and select the desired drive. For a higher level of protection, select **Optimum**.

NOTE: This process will take a long time, and the amount of time varies based on the hard drive capacity.

b. Solid State Drive (SSD)

Clear the SSD contents by using the BIOS Setup Secure Erase command option, or by using a third party utility designed to erase data from an SSD. To run Secure Erase, enter BIOS Setup by powering on the system and pressing F10 when prompted near the bottom of the display. Select the **Security** menu and scroll down to the **Utilities** menu. Select **Secure Erase** and select the desired hard drive.

Non-volatile memory usage

Non Volatile Memory Type	Amount (Size)	Does this memory store customer data?	Does this memory retain data when power is removed?	What is the purpose of this memory?	How is data input into this memory?	How is this memory write protected?
Real Time Clock (RTC) battery backed-up CMOS configuration memory (CMOS)	256 Bytes	No	Yes	Stores system date and time and limited keyboard controller data.	Using the F10 Setup utility or changing the Microsoft® Windows® date & time.	This memory is not write-protected. HP recommends password protecting the F10 Setup utility.
Controller (NIC) EEPROM	64 Kbytes (not customer accessible)	No	Yes	Store NIC configuration and NIC firmware.	Using a utility from the NIC vendor that can be run from DOS.	A utility is required to write data to this memory and is available from NIC vendor. Writing data to this ROM in an inappropriate manner will render the NIC nonfunctional.
Keyboard ROM	64 Kbytes (not customer accessible)	No	Yes	Stores firmware code (keyboard, mouse, & battery management).	Programmed at the factory. Code is updated when the system BIOS is updated.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
DIMM Serial Presence Detect (SPD) configuration data	256 Bytes per memory module, 128 Bytes programmabl e (not customer accessible)	No	Yes	Stores memory module information.	Programmed by the memory vendor.	Data cannot be written to this memory when the module is installed in a PC. The specific write protection method varies by memory vendor.
System BIOS	4 to 5 MBytes	Yes	Yes	Store system BIOS code and PC configuration data.	System BIOS code is programmed at the factory. Code is updated when the system BIOS is updated. Configuration data and settings are input using the F10 setup utility or a custom utility.	A utility is required for writing data to this memory and is available on the HP website. Writing data to this ROM in an inappropriate manner can render the PC nonfunctional.
Intel Management Engine Firmware (present only in models ending in a 'p' or 'w' or with Intel Centrino Pro technology)	1.5 or 5MByte	Yes	Yes	Stores Management Engine Code, Settings, Provisioning Data and iAMT third party data store.	Management Engine Code is programmed at the factory. Code is updated via Intel secure firmware update utility. Unique Provisioning Data can be entered at the factory or by an administrator using the Management Engine (MEBx) setup utility. The	The Intel chipset is configured to enforce HW protection to block all direct read/write access to this area. An Intel utility is required for updating the firmware. Only firmware updates digitally signed by

					third party data store contents can populated by a remote management console or local applications registered by an administrator to have access to the space.	Intel can be applied using this utility.
Bluetooth flash	2Mbit	No	Yes	Stores Bluetooth configuration and firmware.	Programmed at the factory. Tools for writing data to this memory are not publicly available but can be obtained from the silicon vendor.	A utility is required for writing data to this memory and is made available through newer versions of the driver if the flash requires an upgrade.
802.11 WLAN EEPROM	4kb to 8kb	No	Yes	Stores configuration and calibration data.	Programmed at the factory. Tools for writing data to this memory are not made public.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Web camera	64K bit	No	Yes	Store Web Cam configuration and firmware.	Using a utility from the device manufacturer that can be run from Windows.	A utility is required for writing data to this memory and is typically not made available to the public unless a firmware upgrade is necessary to address a unique issue.
Fingerprint reader	512kByte Flash	Yes	Yes	Stores fingerprint templates.	By enrolling in HP ProtectTools Security Manager.	Only a digitally signed application can make the call to write to the flash.

Questions and answers

1. **How can the BIOS settings be restored (returned to factory settings)?**

   a. Turn on or restart the computer and press F10 when prompted near the bottom of the display.

   b. Select **File**, then select **Restore defaults**.

   c. Follow the on-screen instructions.

   d. Select **File**, save changes and exit, then press Enter.

2. **What kind of configuration data is stored on the DIMM Serial Presence Detect (SPD) memory module? How would this data be written?**

   The DIMM SPD memory contains information about the memory module such as size, serial number, data width, speed/timing, voltage and thermal information. This information is written by the module manufacturer and stored on an EEPROM. This EEPROM cannot be written to when the memory module is installed in a PC. Third party tools do exist that can write to the EEPROM when the memory module is not installed in a PC. There are various third party tools available to read SPD memory.

3. **Does the "Firmware Hub for System BIOS" contain the BIOS program? Is this chip writable, and if so how?**

   The Firmware Hub does contain the BIOS program and is writable. A utility is required to perform the write function.

4. **In some PC systems, the Firmware Hub for System BIOS is a flash memory chip so that updates can be written by the customer. Is this true for these BIOS chips?**

   Yes, they are flash memory chips.

5. **What is meant by "Restore the nonvolatile memory found in Intel-based system boards"?**

   This relates to clearing the Real Time Clock (RTC) CMOS memory that contains PC configuration data.

6. **Does resetting the CMOS configuration memory return the PC back to factory defaults?**

   The process of resetting the CMOS will return certain system settings to factory default but will not reset many of the system data and configuration defaults to their factory settings. To return these system data and configuration defaults to factory settings, refer to question and answer 1 and follow the instructions for returning the BIOS settings to factory defaults.

14 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 A 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
Argentina	IRAM	1
Australia	SAA	1
Austria	OVE	1
Belgium	CEBEC	1
Brazil	ABNT	1
Canada	CSA	2
Chile	IMQ	1
Denmark	DEMKO	1
Finland	FIMKO	1
France	UTE	1
Germany	VDE	1
India	ISI	1
Israel	SII	1
Italy	IMQ	1
Japan	JIS	3
The Netherlands	KEMA	1
New Zealand	SANZ	1
Norway	NEMKO	1
The People's Republic of China	CCC	4
Saudi Arabia	SASO	7
Singapore	PSB	1
South Africa	SABS	1
South Korea	KTL	5
Sweden	SEMKO	1
Switzerland	SEV	1
Taiwan	BSMI	6
Thailand	TISI	1
The United Kingdom	ASTA	1
The United States	UL	2

1. The flexible cord must be Type HO5VV-F, 3-conductor, 0.75mm^2 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.

Country/region	Accredited agency	Applicable note number

2. The flexible cord must be Type SVT/SJT 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 ac) or NEMA 6–15P (15 A, 250 V ac) configuration. CSA or C-UL mark. UL file number must be on each element.

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 VCTF, 3-conductor, 0.75mm^2 or 1.25mm^2 conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V ac) configuration.

4. The flexible cord must be Type RVV, 3-conductor, 0.75mm^2 conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the CCC certification mark.

5. The flexible cord must be Type H05VV-F 3X0.75mm^2 conductor size. KTL logo and individual approval number must be on each element. Corset approval number and logo must be printed on a flag label.

6. The flexible cord must be Type HVCTF 3X1.25mm^2 conductor size. Power cord set fittings (appliance coupler, cable, and wall plug) must bear the BSMI certification mark.

7. For 127 V ac, the flexible cord must be Type SVT or SJT 3 x 18 AWG, with plug NEMA 5-15P (15 A, 125 V ac), with UL and CSA or C-UL marks. For 240 V ac, the flexible cord must be Type H05VV-F 3X0.75/1.00mm^2 conductor size, with plug BS 1363/A with BSI or ASTA marks.

15 Recycling

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

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

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