# HP ProBook 640 G1 Notebook PC
# HP ProBook 645 G1 Notebook PC
# HP ProBook 650 G1 Notebook PC
# HP ProBook 655 G1 Notebook PC

Maintenance and Service Guide
IMPORTANT! This document is intended for HP authorized service providers only.

**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 in all editions of Windows 8. This computer may require upgraded and/or separately purchased hardware, drivers, and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com for details.

**Software terms**

By installing, copying, downloading, or otherwise using any software product preinstalled on this computer, you agree to be bound by the terms of the HP End User License Agreement (EULA). If you do not accept these license terms, your sole remedy is to return the entire unused product (hardware and software) within 14 days for a refund subject to the refund policy of your place of purchase.

For any further information or to request a full refund of the computer, please contact your local point of sale (the seller).

# Safety warning notice

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

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# 1 Product description

| Category | Description |
|---|---|
| **Product Name** | HP ProBook 640 G1 Notebook PC |
| | HP ProBook 645 G1 Notebook PC |
| | HP ProBook 650 G1 Notebook PC |
| | HP ProBook 655 G1 Notebook PC |
| **Processors** | • Intel® Dual Core i7-4600M 2.90-GHz processor (up to 3.6-GHz), 4.0-MB, (1600-MHz FSB, 4.0-MB L3 cache, 37W) |
| | • Intel Dual Core i5-4330M 2.80-GHz processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) |
| | • Intel Dual Core i5-4300M 2.60-GHz processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) |
| | • Intel Dual Core i5-4200M 2.50-GHz processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) |
| | • Intel Dual Core i3-4100M 2.50-GHz processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) |
| | • Intel Dual Core i3-4000M 2.40-GHz processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) |
| | • AMD® Quad Core A10-5750M with Radeon HD 8650G Graphics (3.5 GHz/2.5 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A10-4600M with Radeon HD 7660G Graphics (3.2 GHz/2.3 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A8-5550M with Radeon HD 8550G Graphics (3.1 GHz/2.1 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A8-4500M with Radeon HD 7640G Graphics (2.8 GHz/1.9 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A6-5350M with Radeon HD 8450G Graphics (3.5 GHz/2.9 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A6-4400M with Radeon HD 7520G Graphics (3.2 GHz/2.7 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A4-5150M with Radeon HD 8350G Graphics (3.3 GHz/2.7 GHz; 4.0-MB L2 cache, 35W) |
| | • AMD Quad Core A4-4300M with Radeon HD 7420G Graphics (3.0 GHz/2.5 GHz; 4.0-MB L2 cache, 35W) |
| **Chipset** | Mobile IntelQM87 |
| | Mobile Intel HM87 |
| **Fusion Controller Hub** | AMD A76M Fusion Controller Hub (FCH) |
| **Graphics** | **Switchable graphics:** |
| | • Intel HD Graphics 4600 with shared video memory |
| | • AMD Radeon HD 8750M |
| | Support for hybrid (switchable) graphics |
| | Frame buffer width 128-bit |
| | Support dual-display ports through the dock |

| Category | Description |
|---|---|
| | Support for up to 4 total displays with discrete configurations (through Advanced Docking Station) |
| | Support AMD Eyefinity Technology (with AMD Discrete graphics) |
| **Panel** | <ul><li>14.0-in full high-definition (FHD) AG UWA, SVA (1920x1080 resolution, 300 nits, 72% CG, 1.3-mm + PSR slim design eDP panel) with camera and WWAN</li><li>14.0-in full high-definition (FHD) AG UWA, SVA (1920x1080 resolution, 300 nits, 72% CG, 1.3-mm + PSR slim design eDP panel) with WWAN</li><li>14.0-in full high-definition (FHD) AG UWA, SVA (1920x1080 resolution, 300 nits, 72% CG, 1.3-mm + PSR slim design eDP panel) with WWAN</li><li>14.0-in full high-definition (FHD) AG UWA, SVA (1920x1080 resolution, 300 nits, 72% CG, 1.3-mm + PSR slim design eDP panel)</li><li>14.0-in HD AG SVA (1600x1900 resolution, 250 nits, 45% CG, 1.2-mm flat design eDP panel) with camera and WWAN</li><li>14.0-in HD AG SVA (1600x1900 resolution, 250 nits, 45% CG, 1.2-mm flat design eDP panel) with WWAN</li><li>14.0-in HD AG SVA (1600x1900 resolution, 250 nits, 45% CG, 1.2-mm flat design eDP panel) with camera</li><li>14.0-in HD AG SVA (1600x1900 resolution, 250 nits, 45% CG, 1.2-mm flat design eDP panel)</li><li>14.0-in HD AG SVA (1366x768 resolution, 200 nits, 45% CG, 1.2-mm flat design eDP panel) with camera and WWAN</li><li>14.0-in HD AG SVA (1366x768 resolution, 200 nits, 45% CG, 1.2-mm flat design eDP panel) with WWAN</li><li>14.0-in HD AG SVA (1366x768 resolution, 200 nits, 45% CG, 1.2-mm flat design eDP panel) with camera</li><li>14.0-in HD AG SVA (1366x768 resolution, 200 nits, 45% CG, 1.2-mm flat design eDP panel)</li><li>15.6-in, full high-definition (FHD), AntiGlare (AG) SVA (1920x1080 resolution, 300 nits, 60% CG, 1.2-mm slim design eDP panel) with camera and WWAN</li><li>15.6-in FHD AG SVA (1920x1080 resolution, 300 nits, 60% CG, 1.2-mm slim design eDP panel) with WWAN</li><li>15.6-in FHD AG SVA (1920x1080 resolution, 300 nits, 60% CG, 1.2-mm slim design eDP panel) with camera</li><li>15.6-in FHD AG SVA (1920x1080 resolution, 300 nits, 60% CG, 1.2-mm slim design eDP panel)</li><li>15.6-in (1366x768 resolution) 200 nits, 45% CG, 1.2-mm flat design eDP panel) with camera and WWAN</li><li>15.6-in (1366x768 resolution) 200 nits, 45% CG, 1.2-mm flat design eDP panel) with WWAN</li><li>15.6-in (1366x768 resolution) 200 nits, 45% CG, 1.2-mm flat design eDP panel) with camera</li><li>15.6-in HD AG SVA (1366x768 resolution) 200 nits, 45% CG, 1.2-mm flat design eDP panel)</li></ul>All panels are 16:9 aspect ratio |
| **Memory** | Two customer-accessible/upgradable memory module slots |
| | Support for DDR3L 1600-MHz PC3-12800 dual channel memory |

| Category | Description |
|---|---|
| | Support for 16384-MB of system RAM in the following configurations: |
| | ● 16384-MB total system memory (8192-MB×2 or 4096-MB×4) |
| | ● 12288-MB Total system semory (8192-MB + 4096-MB) |
| | ● 8192-MB total system memory (8192-MB or 4096-MB×2) |
| | ● 8192-MB total system memory (8192-MB×1) |
| | ● 6144-MB Total system memory (4096-MB + 2048-MB) |
| | ● 4096-MB total system memory (4096-MB×1) |
| | ● 2048-MB total system memory (2048-MB×1) |
| **Flash cache** | 32-GB MLC SATA-3 module (Intel Smart Response Technology (SRT) |
| | Dedicated MiniCard slot |
| | Support for no flash cache option |
| | Fast Flash Standby not supported |
| | Not available on computer models equipped with WWAN capability, a solid-state drive (SSD), or a self-encrypted drive (SED) |
| | Not available on computer models equipped with the Linux operating system |
| **MiniCard solid-state drive** | 256-GB SATA-3 SSD |
| | 180-GB SATA-3 SSD |
| | 128-GB mSATA SSD |
| | SSD is set as primary storage if selected; hard drive becomes secondary storage |
| **Hard drive** | Support for 6.35-cm (2.5-in) hard drives in 7.0-mm (.28-in) and 9.5-mm (.37-in) thickness |
| | Support for Serial ATA |
| | Support for 3D DriveGuard hard drive protection |
| | Support toolless removal |
| | Support for the following hard drives: |
| | ● 1-TB, 5400-rpm, 9.5-mm |
| | ● 750-GB, 7200-rpm, 7.0-mm |
| | ● 500-GB, 7200-rpm, 7.0-mm |
| | ● 500-GB, 5400-rpm, 7.0-mm, FIPS (not available on computer models equipped with the Windows 8, Windows 7, or Windows 8 downgrade operating systems) |
| | ● 500-GB, 7200-rpm, 7.0-mm, self-encrypting drive (not available on computer models equipped with the Windows 8, Windows 7, or Windows 8 downgrade operating systems) |
| | ● 320-GB, 7200-rpm, 7.0-mm |
| | Support for the following 6.35-cm (2.5-in) solid-state drives: |
| | ● 256-GB SATA-3 self-encrypting SSD (not available on computer models equipped with the Windows 8, Windows 7, or Windows 8 downgrade operating systems) |
| | ● 180-GB SATA-3 SSD |
| | ● 128-GB SATA-3 SSD |
| **Upgrade drive** | Support for the following 9.5-mm (.37-in) , SATA optical drives: |

| Category | Description |
|---|---|
| | • Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive |
| | • DVD±RW SuperMulti Double-Layer Drive |
| | • DVD-ROM Drive |
| | Support for 6.35-cm (2.5-in) 750-GB, 7200-rpm SATA hard drive in 7.0-mm (.28-in) and 9.5-mm (.37-in) thicknesses |
| | Support for the following 6.35-cm (2.5-in) SATA III solid-state drives: |
| | • 512-GB SSD |
| | • 256-GB SED SSD (not available on computer models equipped with the Windows 8, Windows 7, or Windows 8 downgrade operating systems) |
| | Supports for no Upgrade drive option (bezel) |
| **Audio and video** | Stereo speakers |
| | Dual array microphone (select models only) |
| | HD Audio with DTS Studio sound |
| | DTS sound+ |
| | Integrated HD 720p webcam (fixed [no tilt], activity LED, 1280×720 by 30 frames per second) |
| | Support for no webcam option |
| **Ethernet** | Intel I218-LM 10/100/1000 Ethernet, with Intel I218-LM Gigabit Network Connection (select models only) |
| | Realtek RTL8151GH-CG 10/100/1000 Ethernet (select models only) |
| | Support for Power Optimizer |
| | Intel Stable Image Platform Program (SIPP) |
| **Wireless** | Integrated wireless local area network (WLAN) options by way of wireless module |
| | Two WLAN antennas built into display assembly |
| | Support for the following WLAN formats: |
| | • Intel 802.11 a/b/g/n 2x2 + BT 4.0 Combo Adapter |
| | • Intel 802.11 2x2 AC + BT 4.0 Combo Adapter |
| | • Intel 802.11 2x2 a/b/g/n + BT 4.0 Combo Adapter |
| | • Intel 802.11 2x2 a/b/g/n |
| | • Broadcom 802.11 a/b/g/n 2x2 + BT 4.0 LE PCIe+USB HMC WW Combo Adapter |
| | • Atheros 802.11 b/g/n 1x1 + BT 4.0 Combo  Adapter |
| | • Atheros 802.11 b/g/n 1x1 |
| | Integrated wireless wide area network (WWAN) options by way of wireless module (select models only) |
| | Two WWAN antennas built into display assembly |
| | Security provided by subscriber identify module (SIM), slot located in battery bay |
| | Support for the following WWAN formats: |
| | • HP lt4111 LTE/EV-DO/HSPA+ Mobile Broadband Module |
| | • HP lt4112 LTE/HSPA+ Mobile Broadband Module |

| Category | Description |
|---|---|
| | ● HP hs3110 HSPA+ Mobile Broadband Module |
| **External media cards** | Digital Media Reader Slot with push-push technology. Reads data from and writes data to digital memory cards such as Secure Digital (SD). |
| **Ports** | ● AC adapter, HP Smart |
| | ● Audio-in (mono microphone)/audio-out (stereo headphone) combo jack |
| | ● Battery (secondary) |
| | ● DisplayPort 1.2 |
| | ● Docking |
| | ● RJ-45 (Ethernet) |
| | ● USB 3.0 (3 or 4) |
| | ● USB 3.0 charging (1) |
| | ● VGA (Dsub 15 pin) supporting: 1920×1200 external resolution @ 75 Hz, hot plug and unplug and autodetection for correct output to wide-aspect vs. standard aspect video |
| **Keyboard/pointing devices** | Full-size, spill-resistant keyboard with drain and numeric keypad |
| | Gesture support: MultiTouch gestures enabled, two-finger scrolling, and pinch-zoom as default |
| | Support for Windows 8 dual-point (pointing stick with 3 pointing stick buttons plus TouchPad with 3 TouchPad buttons) |
| | DuraKeys |
| | Spill Resistant with drain |
| | TouchPad requirements: |
| | ● On/off button |
| | ● Support for 2-way scroll |
| | ● Taps enabled by default |
| | ● Gestures enabled by default: |
| | ◦ 2-finger scrolling |
| | ◦ 2-finger zoom (pinch) |
| **Power requirements** | Support for the following AC adapters: |
| | ● 90-W, HP Smart Adapter |
| | ● 65-W, HP Smart Adapter |
| **Power requirements** *(continued)* | Support for the following batteries |
| | ● 9-cell cylindrical 100-WHr, 3.0-Ah, Li-ion battery |
| | ● 6-cell cylindrical 55-WHr, 2.8-Ah, Li-ion battery |
| | ● 6-cell cylindrical 55-WHr, 2.55-Ah, Li-ion battery |
| | ● 3-cell cylindrical 33-WHr, 2.0-Ah, Li-ion battery |
| **Security** | Support security lock |
| | Trusted platform module (TPM) 1.2 (Infineon; soldered down) and TPM Enhanced Drive Lock (For the People's Republic of China and Asia Pacific countries and regions, disabled but available) |

| Category | Description |
| --- | --- |
| | Fingerprint reader (select models only) |
| | Integrated smart card reader |
| **Operating system** | **Preinstalled:** |
| | ● Windows 8.1 Professional 64-bit |
| | ● Windows 8.1 Professional 64-bit (MSNA) |
| | ● Win 8.1 Professional 64-bit DPK with Windows 7 Professional 64-bit Image |
| | ● Win 8.1 Professional 64-bit DPK with Windows 7 Professional 32-bit Image |
| | ● Windows 8.1 Chinese Market 64-bit |
| | ● Windows 8.1 Emerging Market 64-bit |
| | ● Windows 8.1 Multi-Language 64-bit |
| | ● Windows 8 Professional 64-bit |
| | ● Windows 8 Multi-Language 64-bit |
| | ● Windows 8 Emerging Market 64-bit |
| | ● Windows 8 CH 64-bit (available only in the People's Republic of China with Hardware Kit) |
| | ● Windows 8 Professional 64-bit DPK with Windows 7 Professional 64-bit Image (not supported in the People's Republic of China) |
| | ● Windows 7 Professional 64-bit |
| | ● Windows 7 Professional 64-bit MSNA |
| | ● Windows 7 Professional 32-bit |
| | ● Windows 7 Professional 32-bit MSNA |
| | ● Windows 7 Home Premium 64-bit |
| | ● Windows 7 Home Premium 32-bit |
| | ● Windows 7 Basic 32-bit |
| | ● FreeDOS 2.0 |
| | ● SuSE Linux Enterprise (SLED 11) Service Pack 2, 64-bit (not available on computer models equipped with WWAN capability or Blu-ray ROM DVD±RW SuperMulti Double-Layer Drive |
| | **Restore media-DRDVD:** |
| | ● DRDVD Windows 8.1 (available with any Windows 8 localization, required for any Windows 8.1 Professional downgrade operating system) |
| | ● DRDVD Windows 8 (available with any Windows 8 localization, required for any Windows 8 Professional downgrade operating system) |
| | ● DRDVD Windows 7 (available with any Windows 8 or Windows 7 Professional downgrade loc) |
| | ● SRDVD SuSE Linux Enterprise (SLED) Service Pack 2, 64-bit (available with FreeDOS and SuSE Linux) |
| **Operating system** *(continued)* | **Restore media-OSDVD:** |
| | ● Windows 8.1 64-bit (available only and required with Windows 8 Downgrade OS except ASIA and the People's Republic of China) |
| | ● Windows 8 64-bit (for service only) |

| Category | Description |
|---|---|
| | • Windows 8 Country-Specific 64-bit (for service only) |
| | • Windows 8 Emerging Market 64-bit (for service only) |
| | • Windows 8 Professional 64-bit (available only and required with Windows 8 downgrade operating systems) |
| | • Windows 7 Professional 64 -bit (available with any Windows 8 Professional or Windows 7 Professional downgrade loc, not available in the People's Republic of China) |
| | **Certified:** |
| | • Microsoft WHQL |
| | • SuSE Linux Enterprise (SLED) Service Pack 2, 64-bit |
| | **Web-only support:** |
| | • Windows 8.1 Professional 64-bit |
| | • Windows 8.1 Enterprise 64-bit |
| | • Windows 8.1 Multi-Language 64-bit |
| | • Windows 8.1 Emerging Market 64-bit |
| | • Windows 8.1 Chinese Market 64-bit |
| | • Windows 8 Enterprise 64-bit |
| | • Windows 7 Ultimate 64-bit |
| | • Windows 7 Ultimate 32-bit |
| | • Windows 7 Enterprise 64-bit |
| | • Windows 7 Enterprise 32-bit |
| | • Windows 7 Professional 32-bit |
| | • Windows 7 Basic 64-bit |
| | • Windows 7 Basic 32-bit |
| **Serviceability** | **End user replaceable parts:** |
| | • AC adapter |
| | • Battery (system) |
| | • Hard drive |
| | • Keyboard |
| | • Memory modules (2, one primary and one expansion) |
| | • Optical drive |
| | • SSD |
| | • WLAN module |
| | • WWAN module |

# 2   External component identification

## Display

📝 **NOTE:**   Your computer may look slightly different from the illustration in this section.
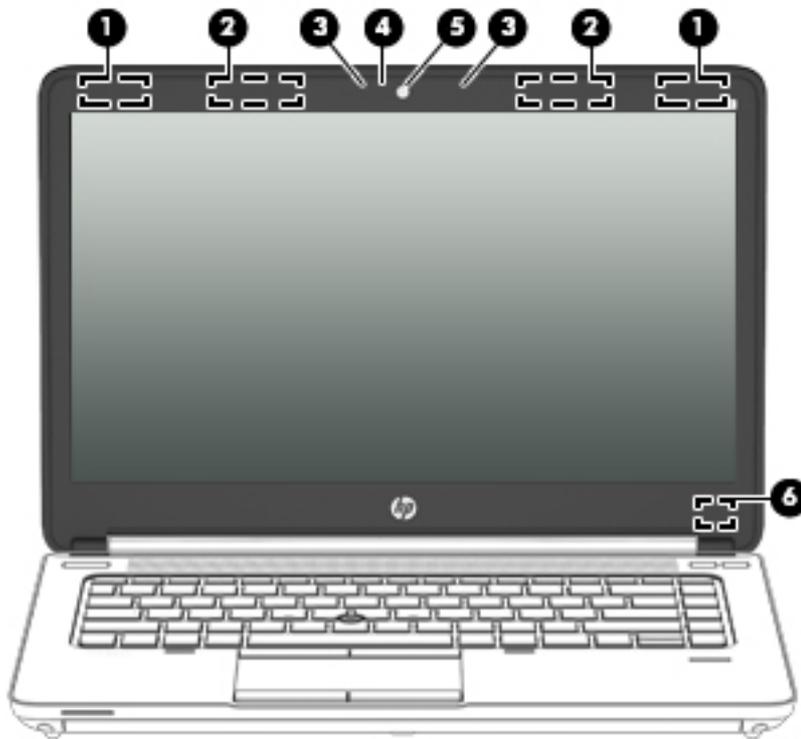


| Component | | Description |
|---|---|---|
| **(1)** | WLAN antennas (2)* | Send and receive wireless signals to communicate with wireless local area networks (WLAN). |
| **(2)** | WWAN antennas (2)* (select models only) | Send and receive wireless signals to communicate with wireless wide area networks (WWAN). |
| **(3)** | Internal microphones (2) | Record sound. |
| **(4)** | Webcam light | On: The webcam is in use. |
| **(5)** | Webcam | Records video and captures still photographs. |
| | | For information on using the webcam, access HP Support Assistant. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app. |
| **(6)** | Internal display switch | Turns off the display or initiates Sleep if the display is closed while the power is on. |

| Component | Description |
|---|---|
| | **NOTE:** The display switch is not visible on the outside of the computer. |

*The antennas are not visible on the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions. To see wireless regulatory notices, see the section of the *Regulatory, Safety, and Environmental Notices* that applies to your country or region. To access the user guides, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select **User guides**.

# Buttons and fingerprint reader (select models only)

📝 **NOTE:** Your computer may look slightly different from the illustration in this section.

| 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. |
| | | To learn more about your power settings, see your power options. From the Start screen, type `power`, select **Settings**, and then select **Power Options**. |
| **(2)** | Speakers (2) | Produce sound. |
| **(3)** | (((⋅))) Wireless button | Turns the wireless feature on or off but does not establish a wireless connection. |
| **(4)** | ◀⊘ Volume mute button | Mutes and restores speaker sound. |
| **(5)** | Fingerprint reader (select models only) | Allows a fingerprint logon to Windows, instead of a password logon. |

# Keys

| Component | | Description |
|---|---|---|
| **(1)** | esc key | Displays system information when pressed in combination with the fn key. |
| **(2)** | fn key | Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or the b key. |
| **(3)** | Windows button | Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows button again will return you to the previous screen. |
| **(4)** | Function keys | Execute frequently used system functions when pressed in combination with the fn key. |
| **(5)** | Windows applications key | Displays options for a selected object. |
| **(6)** | Embedded numeric keypad | When the keypad is turned on, it can be used like an external numeric keypad. Each key on the keypad performs the function indicated by the icon in the upper-right corner of the key. |
| **(7)** | num lk key | Turns the embedded numeric keypad on and off when pressed in combination with the fn key. |

| Component | | Description |
|---|---|---|
| **(1)** | esc key | Displays system information when pressed in combination with the fn key. |
| **(2)** | fn key | Executes frequently used system functions when pressed in combination with a function key, the num lk key, the esc key, or the b key. |
| **(3)** | Windows button | Returns you to the Start screen from an open app or the Windows desktop. **NOTE:** Pressing the Windows button again will return you to the previous screen. |
| **(4)** | Function keys | Execute frequently used system functions when pressed in combination with the fn key. |
| **(5)** | num lk key | Alternates between the navigational and numeric functions on the integrated numeric keypad. |
| **(6)** | Integrated numeric keypad | When num lk has been enabled, it can be used like an external numeric keypad. |

# Lights

| Component | | Description |
|---|---|---|
| **(1)** | Power light | • On: The computer is on. |
| | | • Blinking: The computer is in the Sleep state. |
| | | • Off: The computer is off. |
| **(2)** | Caps lock light | On: Caps lock is on. |
| **(3)** | TouchPad light | • Amber: The TouchPad is off. |
| | | • Off: The TouchPad is on. |
| **(4)** | Microphone mute light | • Amber: Microphone sound is off. |
| | | • Off: Microphone sound is on. |
| **(5)** | Num lock light | On: Num lock is on. |
| **(6)** | Wireless light | • White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. |
| | | • Amber: All wireless devices are off. |
| **(7)** | Mute light | • Amber: Computer sound is off. |
| | | • White: Computer sound is on. |

| Component | | Description |
|---|---|---|
| **(1)** | Power light | • On: The computer is on. |
| | | • Blinking: The computer is in the Sleep state. |
| | | • Off: The computer is off. |
| **(2)** | Microphone mute light | • Amber: Microphone sound is off. |
| | | • Off: Microphone sound is on. |
| **(3)** | Num lock light | On: Num lock is on. |
| **(4)** | Wireless light | • White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on. |
| | | • Amber: All wireless devices are off. |
| **(5)** | Mute light | • Amber: Computer sound is off. |
| | | • White: Computer sound is on. |
| **(6)** | Caps lock light | On: Caps lock is on. |
| **(7)** | TouchPad light | • Amber: The TouchPad is off. |
| | | • Off: The TouchPad is on. |

# TouchPad

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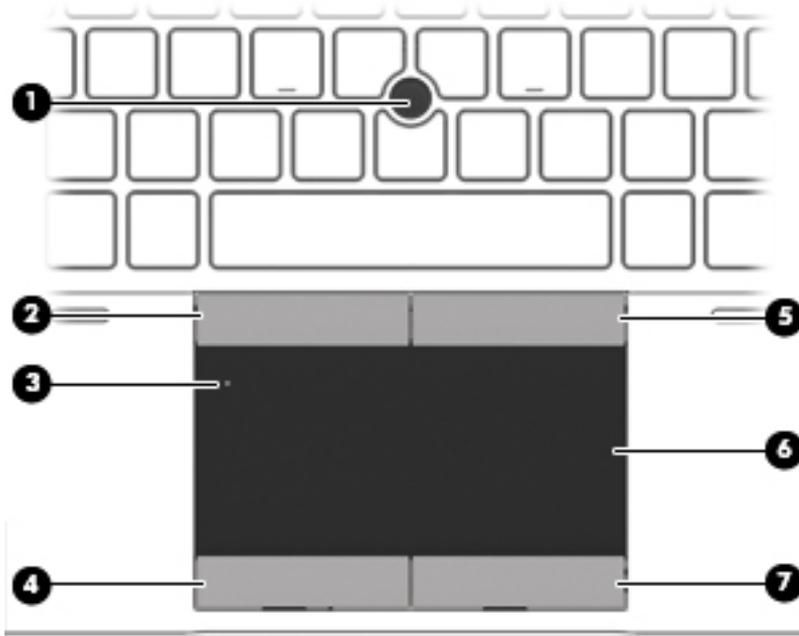


| Component | | Description |
|---|---|---|
| **(1)** | Pointing stick (select models only) | Moves the pointer and selects or activates items on the screen. |
| **(2)** | Left pointing stick button (select models only) | Functions like the left button on an external mouse. |
| **(3)** | TouchPad on/off button | Turns the TouchPad on and off. |
| **(4)** | Left TouchPad button | Functions like the left button on an external mouse. |
| **(5)** | Right pointing stick button (select models only) | Functions like the right button on an external mouse. |
| **(6)** | TouchPad zone | Moves the pointer and selects or activates items on the screen. |
| **(7)** | Right TouchPad button | Functions like the right button on an external mouse. |

# Front

| Component | | | Description |
|---|---|---|---|
| **(1)** | ((ı)) | Wireless light | • White: An integrated wireless device, such as a wireless local area network (WLAN) device and/or a Bluetooth® device, is on.<br><br>• Amber: All wireless devices are off. |
| **(2)** | ⏻ | Power light | • On: The computer is on.<br><br>• Blinking: The computer is in the Sleep state.<br><br>• Off: The computer is off. |
| **(3)** | ⚡ | AC adapter/Battery light | • White: The computer is connected to external power and the battery is charged from 90 to 99 percent.<br><br>• Amber: The computer is connected to external power and the battery is charged from 0 to 90 percent.<br><br>• Blinking amber: A battery that is the only available power source has reached a low battery level. When the battery reaches a critical battery level, the battery light begins blinking rapidly.<br><br>• Off: The battery is fully charged. |
| **(4)** | 🖴 | Hard drive light | • Blinking white: The hard drive is being accessed.<br><br>• Amber: HP 3D DriveGuard has temporarily parked the hard drive. |

# Left side

**NOTE:** Refer to the illustration that most closely matches your computer.



| Component | | Description |
|---|---|---|
| **(1)** | Power connector | Connects an AC adapter. |
| **(2)** | RJ-45 (network) jack/lights (2) | Connects a network cable.<br><br>• Amber (left): The network is showing activity.<br><br>• Green (right): The network is connected. |
| **(3)** | USB 3.0 charging port | Connects optional USB 3.0 devices and provides enhanced USB power performance. The USB charging port can also charge |

| Component | | Description |
|---|---|---|
| | | select models of cell phones and MP3players, even when the computer is off |
| **(4)** | Memory card reader | Reads data from and writes data to memory cards such as Secure Digital (SD). |
| **(5)** | USB 3.0 port | Connects optional USB 3.0 devices and provide enhanced USB power performance. |
| **(6)** | Upgrade bay (optical drive shown) | The upgrade bay can hold either a hard drive or an optical drive that reads and writes (select models only) to an optical disc. It can also hold a weight saver option. |
| **(7)** | Optical drive eject button (select models only) | Releases the optical drive disc tray. |
| **(8)** | ExpressCard slot or smart card reader (depending on the configuration) | Supports optional ExpressCards or smart cards. |



| Component | | Description |
|---|---|---|
| **(1)** | Power connector | Connects an AC adapter. |
| **(2)** | RJ–45 (network) jack/lights (2) | Connects a network cable.<br>● Amber (left): The network is showing activity.<br>● Green (right): The network is connected. |
| **(3)** | USB 3.0 charging port | Connects optional USB 3.0 devices and provides enhanced USB power performance. The USB charging port can also charge select models of cell phones and MP3players, even when the computer is off. |
| **(4)** | Memory card reader | Reads data from and writes data to memory cards such as Secure Digital (SD). |
| **(5)** | USB 3.0 ports (2) | Connect optional USB 3.0 devices and provide enhanced USB power performance. |
| **(6)** | Upgrade bay (optical drive shown) | The upgrade bay can hold either a hard drive or an optical drive that reads and writes (select models only) to an optical disc. It can also hold a weight saver option. |
| **(7)** | Optical drive eject button (select models only) | Releases the optical drive disc tray. |
| **(8)** | ExpressCard slot or smart card reader (depending on the configuration) | Supports optional ExpressCards or smart cards. |

# Right side

| Component | | | Description |
|---|---|---|---|
| **(1)** | | Audio-out (headphone) jack/Audio-in (microphone) jack | Produces sound when connected to optional powered stereo speakers, headphones, earbuds, a headset, or television audio. Also connects an optional headset microphone. |
| | | | **WARNING!** To reduce the risk of personal injury, adjust the volume before putting on headphones, earbuds, or a headset. For additional safety information, see the *Regulatory, Safety, and Environmental Notices*. To access the user guides, select the **HP Support Assistant** app on the Start screen, select **My computer**, and then select **User guides**. |
| | | | **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). |
| **(2)** | | USB 3.0 ports (2) | Connect optional USB 3.0 devices and provide enhanced USB power performance. |
| **(3)** | | Dual-Mode DisplayPort | Connects an optional digital display device, such as a high-performance monitor or projector. |
| **(4)** | | External monitor port | Connects an external VGA monitor or projector. |
| **(5)** | | Vents (2) | Enable airflow to cool internal components. |
| | | | **NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |
| **(6)** | | Security cable slot | Attaches an optional security cable to the computer. |
| | | | **NOTE:** The security cable is designed to act as a deterrent, but it may not prevent the computer from being mishandled or stolen. |

# Rear (select models only)



| Component | | Description |
|---|---|---|
| **(1)** | RJ-11 (modem) jack (select models only) | Connects a modem cable. |
| **(2)** | Serial port | Connects an optional device such as a serial modem, mouse, or printer. |

# Bottom



| Component | | Description |
|---|---|---|
| **(1)** ((•)) ▭▭ ▤ | Service cover | Provides access to the hard drive bay, the wireless LAN (WLAN) module slot, the WWAN module slot, and the memory module slots. |
| | | **CAUTION:** To prevent an unresponsive system, replace the wireless module only with a wireless module authorized for use in the computer by the governmental agency that regulates wireless devices in your country or region. If you replace the module and then receive a warning message, remove the module to restore computer functionality, and then contact support through HP Support Assistant. To access HP Support Assistant on the Start screen, select the **HP Support Assistant** app. |
| **(2)** 🔋 | Battery release latch | Releases the battery. |
| **(3)** SIM | SIM slot | Supports a wireless subscriber identity module (SIM) (select models only). The SIM slot is located inside the battery bay. |
| **(4)** 💻 | Docking connector | Connects an optional docking device. |
| **(5)** ▼🔒 | Service cover release lock | Locks the service cover. |

| Component | | Description |
|---|---|---|
| **(6)** | Service cover release latch | Releases the service cover on the computer. |
| **(7)** | Battery bay | Holds the battery. |
| **(8)** | Vents (4) | Enable airflow to cool internal components.<br><br>**NOTE:** The computer fan starts up automatically to cool internal components and prevent overheating. It is normal for the internal fan to cycle on and off during routine operation. |

# 3 Illustrated parts catalog

## Service tag

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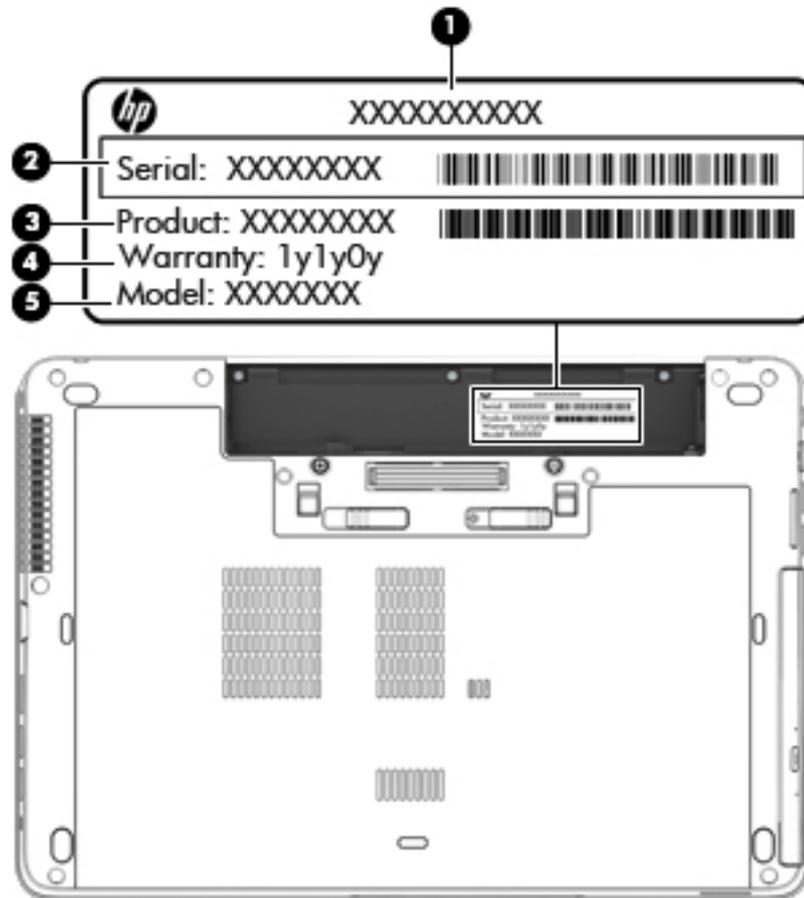


| Item | Description | Function |
|------|-------------|----------|
| **(1)** | Product name | This is the product name affixed to the front of the computer. |
| **(2)** | Serial number | This is an alphanumeric identifier that is unique to each product. |
| **(3)** | Part number/Product number | This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

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

# Computer major components
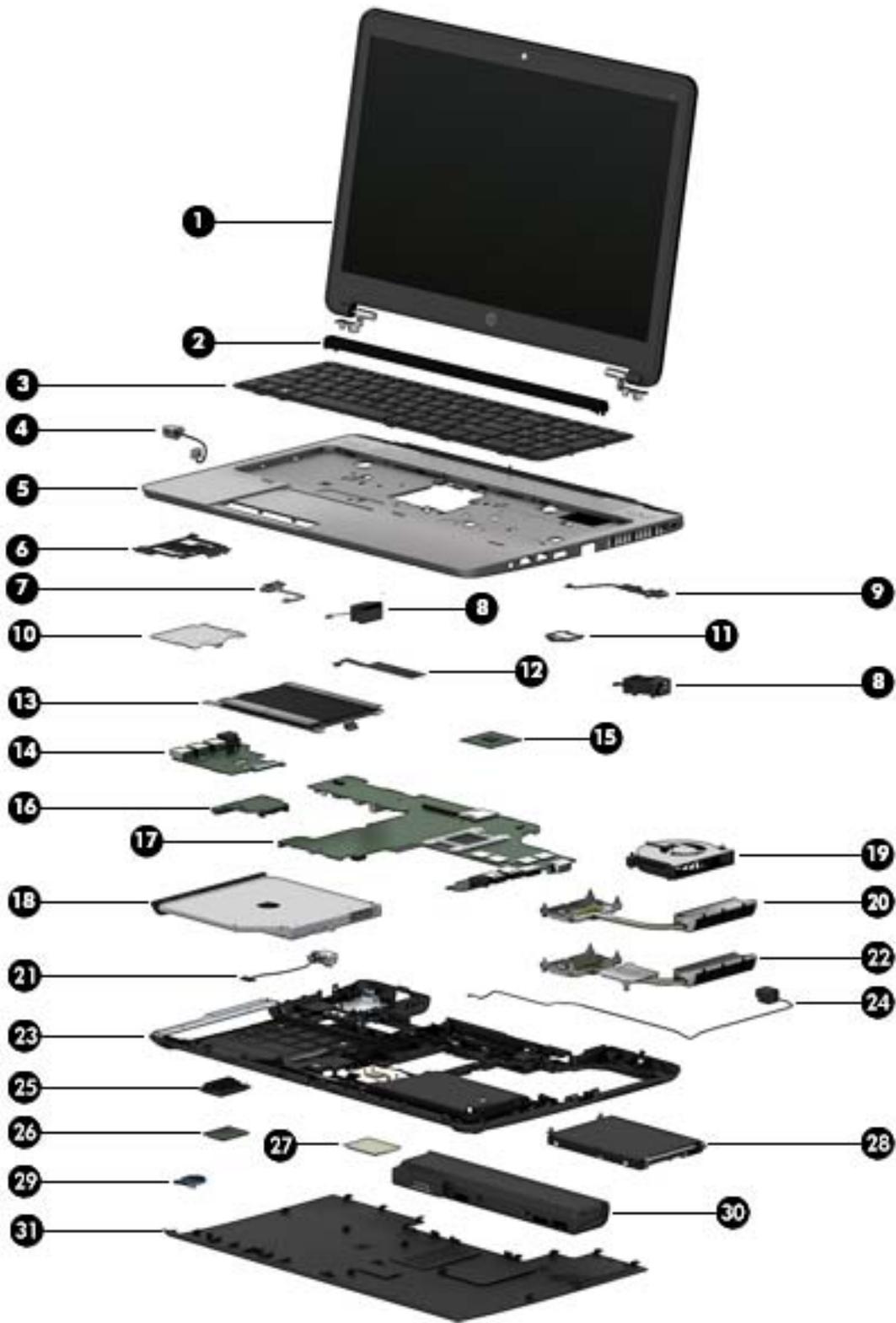
| Item | Component | Spare part number |
|------|-----------|-------------------|
| (1) | **Display panel**: | |
| | 15.6-in, FHD, WLED UWVA | 739998-001 |
| | 15.6-in, HD, WLED UWVA | 739997-001 |
| | 14-in, HD WLED | 747751-001 |
| | 14-in, HD+ WLED | 747752-001 |
| | 14-in, FHD, WLED UWVA | 747753-001 |
| | **Raw Panel Support Kit** (includes LCD back cover and wireless antennas and transceivers): | |
| | For use in models equipped with a 15.6–inch display assembly | 738691-001 |
| | For use in models equipped with a 14–inch display assembly | 738680–001 |
| (2) | **Top hinge cover** for 15.6-in models | |
| (3) | **Keyboard** (includes keyboard cable): | |
| | **Keyboard for 15.6-in models with pointing stick (includes keyboard cable and pointing stick cable):** | |
| | For use in Belgium | 738697-A41 |
| | For use in Brazil | 738697-201 |
| | For use in Bulgaria | 738697-261 |
| | For use in Canada | 738697-DB1 |
| | For use in the Czech Republic and Slovakia | 738697-FL1 |
| | For use in Denmark | 738697-081 |
| | For use in France | 738697-051 |
| | For use in Germany | 738697-041 |
| | For use in Greece | 738697-151 |
| | For use in Hungary | 738697-211 |
| | For use in Iceland | 738697-DD1 |
| | For use in India | 738697-D61 |
| | For use in Israel | 738697-BB1 |
| | For use in Italy | 738697-061 |
| | For use in Japan | 738697-291 |
| | For use in Latin America | 738697-161 |
| | For use in the Netherlands | 738697-B31 |
| | For use in Northwest Africa | 738697-FP1 |
| | For use in Norway | 738697-091 |
| | For use in Portugal | 738697-131 |
| | For use in Romania | 738697-271 |
| | For use in Russia | 738697-251 |

| Item | Component | Spare part number |
|---|---|---|
| | For use in Saudi Arabia | 738697-171 |
| | For use in Slovenia | 738697-BA1 |
| | For use in South Korea | 738697-AD1 |
| | For use in Spain | 738697-071 |
| | For use in Sweden and Finland | 738697-B71 |
| | For use in Switzerland | 738697-BG1 |
| | For use in Taiwan | 738697-AB1 |
| | For use in Thailand | 738697-281 |
| | For use in Turkey | 738697-141 |
| | For use in the United Kingdom and Singapore | 738697-031 |
| | For use in the United States | 738697-001 |
| | **Backlit keyboard for 15.6-in models (includes backlight and keyboard cables):** | |
| | For use in Belgium | 787801-A41 |
| | For use in Brazil | 787801-201 |
| | For use in Bulgaria | 787801-261 |
| | For use in Canada | 787801-DB1 |
| | For use in the Czech Republic and Slovakia | 787801-FL1 |
| | For use in Denmark | 787801-081 |
| | For use in France | 787801-051 |
| | For use in Germany | 787801-041 |
| | For use in Greece | 787801-151 |
| | For use in Hungary | 787801-211 |
| | For use in Iceland | 787801-DD1 |
| | For use in India | 787801-D61 |
| | For use in Israel | 787801-BB1 |
| | For use in Italy | 787801-061 |
| | For use in Japan | 787801-291 |
| | For use in Latin America | 787801-161 |
| | For use in the Netherlands | 787801-B31 |
| | For use in Northwest Africa | 787801-FP1 |
| | For use in Norway | 787801-091 |
| | For use in Portugal | 787801-131 |
| | For use in Romania | 787801-271 |
| | For use in Russia | 787801-251 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
| | For use in Saudi Arabia | 787801-171 |
| | For use in Slovenia | 787801-BA1 |
| | For use in South Korea | 787801-AD1 |
| | For use in Spain | 787801-071 |
| | For use in Sweden and Finland | 787801-B71 |
| | For use in Switzerland | 787801-BG1 |
| | For use in Taiwan | 787801-AB1 |
| | For use in Thailand | 787801-281 |
| | For use in Turkey | 787801-141 |
| | For use in the United Kingdom and Singapore | 787801-031 |
| | For use in the United States | 787801-001 |
| | **Keyboard for 15.6-in models (includes keyboard cable):** | |
| | For use in Belgium | 738696-A41 |
| | For use in Brazil | 738696-201 |
| | For use in Bulgaria | 738696-261 |
| | For use in Canada | 738696-DB1 |
| | For use in the Czech Republic and Slovakia | 738696-FL1 |
| | For use in Denmark | 738696-081 |
| | For use in France | 738696-051 |
| | For use in Germany | 738696-041 |
| | For use in Greece | 738696-151 |
| | For use in Hungary | 738696-211 |
| | For use in Iceland | 738696-DD1 |
| | For use in India | 738696-D61 |
| | For use in Israel | 738696-BB1 |
| | For use in Italy | 738696-061 |
| | For use in Japan | 738696-291 |
| | For use in Latin America | 738696-161 |
| | For use in the Netherlands | 738696-B31 |
| | For use in Northwest Africa | 738696-FP1 |
| | For use in Norway | 738696-091 |
| | For use in Portugal | 738696-131 |
| | For use in Romania | 738696-271 |
| | For use in Russia | 738696-251 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
| | For use in Saudi Arabia | 738696-171 |
| | For use in Slovenia | 738696-BA1 |
| | For use in South Korea | 738696-AD1 |
| | For use in Spain | 738696-071 |
| | For use in Sweden and Finland | 738696-B71 |
| | For use in Switzerland | 738696-BG1 |
| | For use in Taiwan | 738696-AB1 |
| | For use in Thailand | 738696-281 |
| | For use in Turkey | 738696-141 |
| | For use in the United Kingdom and Singapore | 738696-031 |
| | For use in the United States | 738696-001 |
| | **Keyboard for 14" models with pointing stick (includes keyboard cable and pointing stick cable):** | |
| | For use in Belgium | 738688-A41 |
| | For use in Brazil | 738688-201 |
| | For use in Bulgaria | 738688-261 |
| | For use in Canada | 738688-DB1 |
| | For use in the Czech Republic and Slovakia | 738688-FL1 |
| | For use in Denmark | 738688-081 |
| | For use in France | 738688-051 |
| | For use in Germany | 738688-041 |
| | For use in Greece | 738688-151 |
| | For use in Hungary | 738688-211 |
| | For use in Iceland | 738688-DD1 |
| | For use in India | 738688-D61 |
| | For use in Israel | 738688-BB1 |
| | For use in Italy | 738688-061 |
| | For use in Japan | 738688-291 |
| | For use in Latin America | 738688-161 |
| | For use in the Netherlands | 738688-B31 |
| | For use in Northwest Africa | 738688-FP1 |
| | For use in Norway | 738688-091 |
| | For use in Portugal | 738688-131 |
| | For use in Romania | 738688-271 |
| | For use in Russia | 738688-251 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
|  | For use in Saudi Arabia | 738688-171 |
|  | For use in Slovenia | 738688-BA1 |
|  | For use in South Korea | 738688-AD1 |
|  | For use in Spain | 738688-071 |
|  | For use in Sweden and Finland | 738688-B71 |
|  | For use in Switzerland | 738688-BG1 |
|  | For use in Taiwan | 738688-AB1 |
|  | For use in Thailand | 738688-281 |
|  | For use in Turkey | 738688-141 |
|  | For use in the United Kingdom and Singapore | 738688-031 |
|  | For use in the United States | 738688-001 |
|  | **Backlit keyboard for 14-in models (includes backlight and keyboard cables):** | |
|  | For use in Belgium | 787294-A41 |
|  | For use in Brazil | 787294-201 |
|  | For use in Bulgaria | 787294-261 |
|  | For use in Canada | 787294-DB1 |
|  | For use in the Czech Republic and Slovakia | 787294-FL1 |
|  | For use in Denmark | 787294-081 |
|  | For use in France | 787294-051 |
|  | For use in Germany | 787294-041 |
|  | For use in Greece | 787294-151 |
|  | For use in Hungary | 787294-211 |
|  | For use in Iceland | 787294-DD1 |
|  | For use in India | 787294-D61 |
|  | For use in Israel | 787294-BB1 |
|  | For use in Italy | 787294-061 |
|  | For use in Japan | 787294-291 |
|  | For use in Latin America | 787294-161 |
|  | For use in the Netherlands | 787294-B31 |
|  | For use in Northwest Africa | 787294-FP1 |
|  | For use in Norway | 787294-091 |
|  | For use in Portugal | 787294-131 |
|  | For use in Romania | 787294-271 |
|  | For use in Russia | 787294-251 |

| Item | Component | Spare part number |
|---|---|---|
| | For use in Saudi Arabia | 787294-171 |
| | For use in Slovenia | 787294-BA1 |
| | For use in South Korea | 787294-AD1 |
| | For use in Spain | 787294-071 |
| | For use in Sweden and Finland | 787294-B71 |
| | For use in Switzerland | 787294-BG1 |
| | For use in Taiwan | 787294-AB1 |
| | For use in Thailand | 787294-281 |
| | For use in Turkey | 787294-141 |
| | For use in the United Kingdom and Singapore | 787294-031 |
| | For use in the United States | 787294-001 |
| | **Keyboard for 14" models (includes keyboard cable):** | |
| | For use in Belgium | 738687-A41 |
| | For use in Bulgaria | 738687-261 |
| | For use in Canada | 738687-DB1 |
| | For use in the Czech Republic and Slovakia | 738687-FL1 |
| | For use in Denmark | 738687-081 |
| | For use in France | 738687-051 |
| | For use in Germany | 738687-041 |
| | For use in Greece | 738687-151 |
| | For use in Hungary | 738687-211 |
| | For use in Iceland | 738687-DD1 |
| | For use in India | 738687-D61 |
| | For use in Israel | 738687-BB1 |
| | For use in Italy | 738687-061 |
| | For use in Japan | 738687-291 |
| | For use in Latin America | 738687-161 |
| | For use in the Netherlands | 738687-B31 |
| | For use in Northwest Africa | 738687-FP1 |
| | For use in Norway | 738687-091 |
| | For use in Portugal | 738687-131 |
| | For use in Romania | 738687-271 |
| | For use in Russia | 738687-251 |
| | For use in Saudi Arabia | 738687-171 |

| Item | Component | Spare part number |
|---|---|---|
| | For use in Slovenia | 738687-BA1 |
| | For use in South Korea | 738687-AD1 |
| | For use in Spain | 738687-071 |
| | For use in Sweden and Finland | 738687-B71 |
| | For use in Switzerland | 738687-BG1 |
| | For use in Taiwan | 738687-AB1 |
| | For use in Thailand | 738687-281 |
| | For use in Turkey | 738687-141 |
| | For use in the United Kingdom and Singapore | 738687-031 |
| | For use in the United States | 738687-001 |
| **(4)** | **Power connector board** | |
| **(5)** | **Top cover** | |
| | Top cover and 2-button TouchPad for HP ProBook 655 G1 models | 745889–001 |
| | Top cover and 4-button TouchPad for HP ProBook 655 G1 models | 745890–001 |
| | Top cover and 2-button TouchPad for HP ProBook 655 G1 models equipped with a backlit keyboard | 805782–001 |
| | Top cover and 2-button TouchPad for HP ProBook 650 G1 models | 738708-001 |
| | Top cover and 4-button TouchPad for HP ProBook 650 G1 models | 738709-001 |
| | Top cover and 2-button TouchPad for HP ProBook 650 G1 models equipped with a backlit keyboard | 805787–001 |
| | Top cover and 2-button TouchPad for models equipped with a 14–inch display assembly | 738405-001 |
| | Top cover and 4-button TouchPad for models equipped with a 14–inch display assembly | 738406–001 |
| | Top cover and 2-button TouchPad for models equipped with a 14–inch display assembly and a backlit keyboard | 805783–001 |
| **(6)** | **Smart card reader** (includes cable) | |
| | For use in models equipped with a 15.6–inch display assembly | 748958–001 |
| | Smart Card reader for models equipped with a 2-button TouchPad and a 14–inch display assembly | 738398-001 |
| | Smart Card reader for models equipped with a 4-button TouchPad and a 14–inch display assembly | 744005-001 |
| **(7)** | **Power button board** (includes cable) | |
| | For 15.6-in models | 738701-001 |
| | For 14-in models | 738399-001 |
| **(8)** | **Speakers** (include cable) | 738404-001 |
| **(9)** | **Wireless card** | |
| **(10)** | **Smart card reader shield** (select models only) (included with smart card reader) | |

| Item | Component | Spare part number |
|---|---|---|
| **(11)** | **Fingerprint reader bracket** (included with fingerprint reader) | |
| **(12)** | **Fingerprint reader board** (includes cable and double-sided adhesive) | 738394-001 |
| **(13)** | **TouchPad** (includes TouchPad,TouchPad cable, and TouchPad bracket) | |
| | For 15.6-in models with 2-button TouchPad | 738710-001 |
| | For 15.6-in models with 4-button TouchPad | 738711-001 |
| | Top cover and 2-button TouchPad for models equipped with a 14–inch display assembly | 738405-001 |
| | Top cover and 4-button TouchPad for models equipped with a 14–inch display assembly | 738406-001 |
| **(14)** | **Audio/USB board** | |
| | For use in ProBook 655 G1 models equipped with a 15.6–inch display assembly | 745891-001 |
| | For use in ProBook 650 G1 models equipped with a 15.6–inch display assembly | 738702-001 |
| | For use in computer models equipped with a 14–inch display assembly | 738400-001 |
| **(15)** | **Processor** (includes replacement thermal material): | |
| | Intel Dual Core i7-4600M 2.80-GHz processor (4.0-MB L3 cache, 37 W) | 737330-001 |
| | Intel Dual Core i5-4330M 2.80-GHz processor (3.0-MB L3 cache, 37 W) | 738201-001 |
| | Intel Dual Core i5-4300M 2.60-GHz processor (3.0-MB L3 cache, 37 W) | 738309-001 |
| | Intel Dual Core i5-4200M 2.50-GHz processor (3.0-MB L3 cache, 37 W) | 737328-001 |
| | Intel Dual Core i3-4100M 2.50-GHz processor (3.0-MB L3 cache, 37 W) | 737474-001 |
| | Intel Dual Core i3-4000M 2.40-GHz processor (3.0-MB L3 cache, 37 W) | 737327-001 |
| | AMD A10-5750M with Radeon HD 8650G Graphics (quad-core; 3.5 GHz/2.5 GHz; 35W, 4 MB L2 cache) | 713548-001 |
| | AMD A10-4600M with Radeon HD 7660G Graphics (quad-core; 3.2 GHz/2.3 GHz; 35W; 4 MB L2 cache) | 683046-001 |
| | AMD A8-4500M with Radeon HD 7640G Graphics (quad-core; 2.8 GHz/1.9 GHz; 35W; 4 MB L2 cache) | 683048-001 |
| | AMD A6-4400M with Radeon HD 7520G Graphics (dual-core; 3.2 GHz/2.7 GHz; 35W; 1 MB L2 cache) | 683047-001 |
| | AMD A6-5350M with Radeon HD 8450G Graphics (dual-core; 3.5 GHz/2.9 GHz; 35W; 1 MB L2 cache) | 713550-001 |
| | AMD A4-4300M with Radeon HD 7420G Graphics (dual-core; 3.0 GHz/2.5 GHz; 35W; 1 MB L2 cache) | 685990-001 |
| | AMD A4-5150M with Radeon HD 8350G Graphics (dual-core; 3.3 GHz/2.7 GHz; 35W; 1 MB L2 cache) | 713549-001 |
| | AMD A8-5550M Quad Core 3.1 GHz/2.1 GHz | 713551-001 |
| **(16)** | **Function button board** (includes cable and double-sided adhesive) | |
| | For use in computer models equipped with a 14–inch display assembly | 738401-001 |
| | For use in computer models equipped with a 15.6–inch display assembly | 738703-001 |
| **(17)** | **System board** (includes battery connector bracket and replacement thermal material): | |

| Item | Component | Spare part number |
|---|---|---|
| | System board for 14-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744007-001 |
| | System board for 14-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744007-501 |
| | System board for 14-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744007-601 |
| | System board for 14-in. computer models equipped with discrete memory and WWAN capability (includes replacement thermal material) | 744008-001 |
| | System board for 14-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744008-501 |
| | System board for 14-in. computer models equipped with discrete memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744008-601 |
| | System board for 14-in. computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) | 744009-001 |
| | System board for 14-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744009-501 |
| | System board for 14-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744009-601 |
| | System board for 14-in. computer models equipped with discrete memory and WWAN capability (includes replacement thermal material) | 744010-001 |
| | System board for 14-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744010-501 |
| | System board for 14-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744010-601 |
| | System board for 15.6-in. computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) | 744015-001 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744015-501 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744015-601 |
| | System board for 15.6-in. computer models equipped with shared memory with WWAN capability (includes replacement thermal material) | 744015-001 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744015-501 |

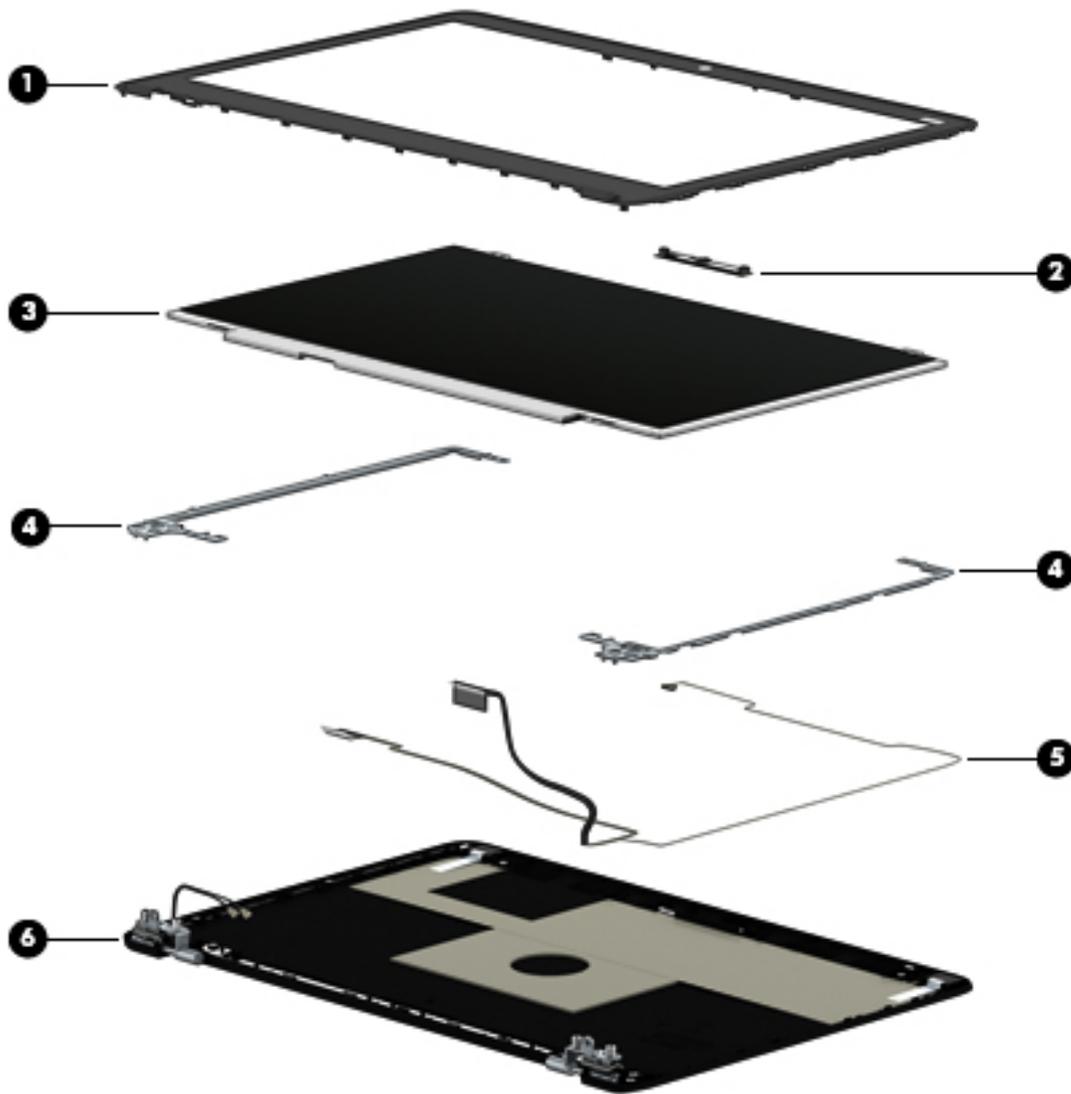| Item | Component | Spare part number |
|---|---|---|
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744015-601 |
| | System board for 15.6-in. computer models equipped with shared memory, WWAN capability, and a modem (includes replacement thermal material) | 744016-001 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability and a modem (includes replacement thermal material) | 744016-501 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability and a modem (includes replacement thermal material) | 744016-601 |
| | System board for 15.6-in. computer models equipped with discrete memory with WWAN capability (includes replacement thermal material) | 744017-001 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744017-501 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744017-601 |
| | System board for 15.6-in. computer models equipped with discrete memory with WWAN capability and a modem (includes replacement thermal material) | 744018-001 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability and a modem (includes replacement thermal material) | 744018-501 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Professional operating system with WWAN capability and a modem (includes replacement thermal material) | 744018-601 |
| | System board for 15.6-in. computer models equipped with shared memory, WWAN capability (includes replacement thermal material) | 744019-001 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744019-501 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744019-601 |
| | System board for 15.6-in. computer models equipped with shared memory, WWAN capability and a modem (includes replacement thermal material) | 744020-001 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability and a modem (includes replacement thermal material) | 744020-501 |
| | System board for 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability and a modem (includes replacement thermal material) | 744020-601 |
| | System board for 15.6-in. computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) | 744021-001 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744021-501 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744021-601 |
| | System board for 15.6-in. computer models equipped with discrete memory, WWAN capability and a modem (includes replacement thermal material) | 744022-001 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Standard operating system with WWAN capability and a modem (includes replacement thermal material) | 744022-501 |
| | System board for 15.6-in. computer models equipped with discrete memory and the Windows 8 Professional operating system with WWAN capability and a modem (includes replacement thermal material) | 744022-601 |
| | For use only 14-in. computer models equipped with an Intel Quad Core processor with WWAN capability | 745883-001 |
| | For use only on 14-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability | 745883-501 |
| | For use only on 14-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability | 745883-601 |
| | For use only 14-in. computer models equipped with shared memory without WWAN capability | 745884-001 |
| | For use only on 14-in. computer models equipped with shared memory and the Windows 8 Standard operating system without WWAN capability | 745884-501 |
| | For use only on 14-in. computer models equipped with shared memory, the Windows 8 Professional operating system without WWAN capability | 745884-601 |
| | For use only on 15.6-in. computer models equipped with shared memory and WWAN capability | 745887-001 |
| | For use only on 15.6-in. computer models equipped with shared memory and the Windows 8 Standard operating system and WWAN capability | 745887-501 |
| | For use only on 15.6-in. computer models equipped with shared memory and the Windows 8 Professional operating system with WWAN capability | 745887-601 |
| | For use only on 15.6-in computer models equipped with shared memory without WWAN capability | 745888-001 |
| | For use only on 15.6-in computer models equipped with shared memory and the Windows 8 Standard operating system without WWAN capability | 745888-501 |
| | For use only on 15.6-in computer models equipped with shared memory and the Windows 8 Professional operating system without WWAN capability | 745888-601 |
| **(18)** | **Optical drive** (includes bezel and bracket): | |
| | Blu-ray R/RE DVD±RW SuperMulti Double-Layer Combo Drive | 749959-001 |
| | | 739999-001 |
| | | 744820-001 |
| | DVD±RW SuperMulti Double-Layer Drive | 749958-001 |
| | | 744822-001 |
| | | 740001-001 |
| | DVD-ROM Drive | 749957-001 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
| | | 744821-001 |
| | | 740000-001 |
| | | 735601-001 |
| | **Fan and heat sink assembly** (includes replacement thermal material): | |
| **(19)** | Fan | 738685-001 |
| **(20)** | Heat sink for computer models with Intel UMA graphics memory | 738686-001 |
| **(22)** | Heat sink for computer models with discrete graphics | 738393-001 |
| **(21)** | Fingerprint reader bracket | 738394 |
| **(23)** | **Base enclosure** (includes 4 rubber feet, battery lock latch, battery release latch, and RJ-45 cover) | |
| | For 14-in models | 738681-001 |
| | For 15.6-in models | 738692-001 |
| **(24)** | **Power connector cable** | |
| | For use on models equipped with a 15.6–inch display assembly | 738694–001 |
| | For use on models equipped with a 14–inch display assembly | 738683–001 |
| **(25)** | **Modem** (select models only) | 628824-001 |
| **(26)** | **WLAN module:** | |
| | Intel 802.11 2x2 a/b/g/n | 695915-001 |
| | Intel 802.11 2x2 a/b/g/n Combo Adapter | 670292-001 |
| | Atheros 802.11 b/g/n 1x1 | 690019-001 |
| | Intel 802.11 2x2 AC + Bluetooth 4.0 | 710661-001 |
| | Intel 802.11 2x2 AC + Bluetooth 4.0 | 717381-001 |
| | Intel 802.11 a/b/g/n 2x2 + Bluetooth 4.0 WLAN | 710661-001 |
| | Broadcom 802.11 a/b/g/n 2x2 + BT 4.0 LE PCIe+USB HMC WW | 730668-001 |
| | Intel 802.11 a/b/g/n 2x2 + BT 4.0 WLAN | 747832-001 |
| **(27)** | **Solid-state drive** | |
| | 512-GB SATA-3 SSD | 738714-001 |
| | 256-GB SATA-3 self-encrypting SSD | 735598-001 |
| | 180-GB SATA-3 SSD | 735597-001 |
| | 128-GB SATA-3 SSD | 735596-001 |
| | 128-GB mSATA-3 SSD | 735595-001 |
| | 32-GB mSATA flash cache SSD | 735594-001 |
| **(28)** | **Hard drive** (does not include hard drive bracket or screws): | |
| | 1-TB, 5400-rpm, 9.5-mm | 676521-001 |
| | 750-GB, 7200-rpm, 7.0-mm | 633252-001 |

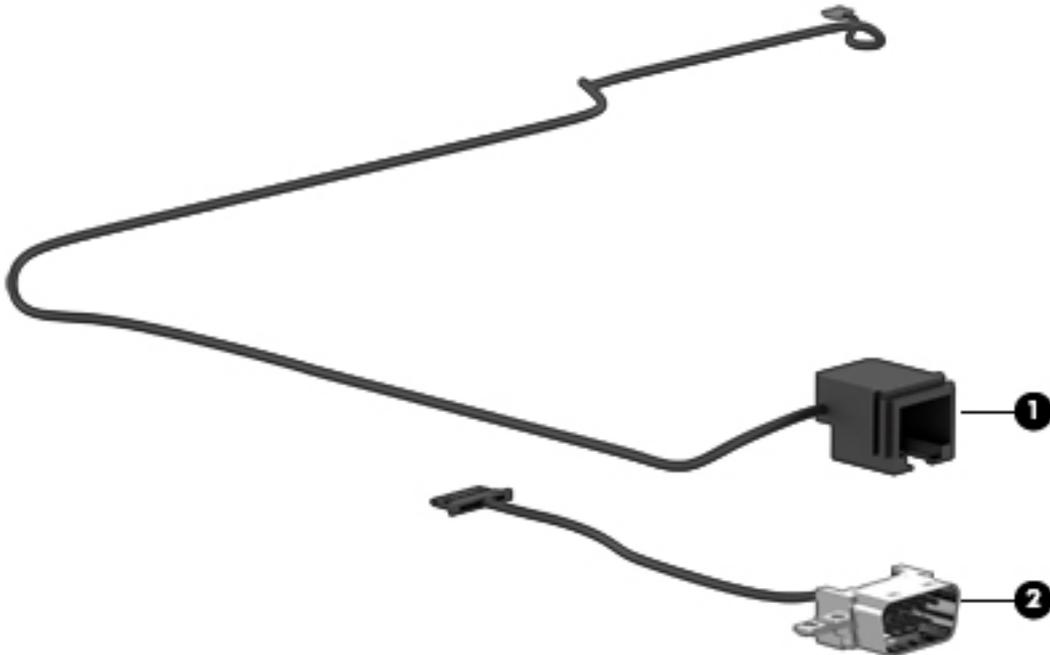| Item | Component | Spare part number |
|------|-----------|-------------------|
| | 500-GB, 7200-rpm, 7.0-mm | 703267-001 |
| | 500-GB, 5400-rpm, 7.0-mm, FIPS | 730946-001 |
| | 500-GB, 7200-rpm, 7.0-mm, self-encrypting | 703268-001 |
| | 320-GB, 7200-rpm, 7.0-mm | 634862-001 |
| | **Hard Drive Hardware Kit** (not illustrated, includes hard drive bracket and screws) | 738395-001 |
| **(29)** | **WWAN module** (select models only) | |
| | HP hs3110 HSPA+ Mobile Broadband Module | 723895-001 |
| | HP lt4111 LTE/EV-DO/HSPA+ Mobile Broadband Module | 704030-001 |
| | HP lt4112 LTE/HSPA+ Mobile Broadband Module | 704031-001 |
| **(30)** | **Battery:** | |
| | 9-cell, 100-WHr, 3.0-AHr, Li-ion battery | 718757-001 |
| | 6-cell, 55-WHr, 2.8-AHr, Li-ion battery | 718756-001 |
| | 6-cell, 55-WHr, 2.5-AHr, Li-ion battery | 718755-001 |
| | 3-cell, 33-WHr, 2.0-AHr, Li-ion battery | 718754-001 |
| **(31)** | **Service cover** | |
| | Service cover for use on computer models equipped with a 15.6-inch display assembly | 738693-001 |
| | Service cover for use on computer models equipped with a 15.6-inch display assembly and which meet regional configure to order (RCTO) specifications | 748358-001 |
| | Service cover for use on computer models equipped with a 14-inch display assembly | 738682-001 |
| | Service cover for use on computer models equipped with a 14-inch display assembly and which meet regional configure to order (RCTO) specifications | 748357-001 |

# Display assembly subcomponents



| Item | Component | Spare part number |
|------|-----------|-------------------|
| **(1)** | **Display bezel:** | |
| | For use only on 15.6-in computer models | 738690-001 |
| | For use only on 14-in computer models | 738679-001 |
| **(2)** | **Webcamera/microphone module** (includes double-sided adhesive) | 738409-001 |
| | **Microphone module** (includes double-sided adhesive) | 738397-001 |
| **(3)** | **Display panel:** | |
| | 15.6-in WLED FHD, UWVA | 739998-001 |
| | 15.6-in WLED HD, SVA | 739997-001 |
| | 14-in WLED FHD, UWVA | 747753-001 |

| Item | Component | Spare part number |
|---|---|---|
| | 14-in WLED HD, SVA | 747752-001 |
| | 14-in WLED HD, SVA | 747751-001 |
| | **Raw Panel Support Kit** (includes LCD back cover and wireless antennas and transceivers): | |
| | For use in models equipped with a 15.6–inch display assembly | 738691-001 |
| | For use in models equipped with a 14–inch display assembly | 738680–001 |
| **(4) and (6)** | **Display hinge kit** (includes left and right hinges and display panel cable bracket) | |
| | For 15.6-in computer models | 738699-001 |
| | For 14-in computer models | 738396-001 |
| **(5)** | **Display Cable Kit** (includes display panel cable) | |
| | For use on HP ProBook 655 G1 models equipped with a 15.6-inch display assembly | 745892-001 |
| | For use on HP ProBook 650 G1 models equipped with a 15.6-inch display assembly | 744013-001 |
| | For use on computer models equipped with a 14-inch display assembly | 738684-001 |

# Cables



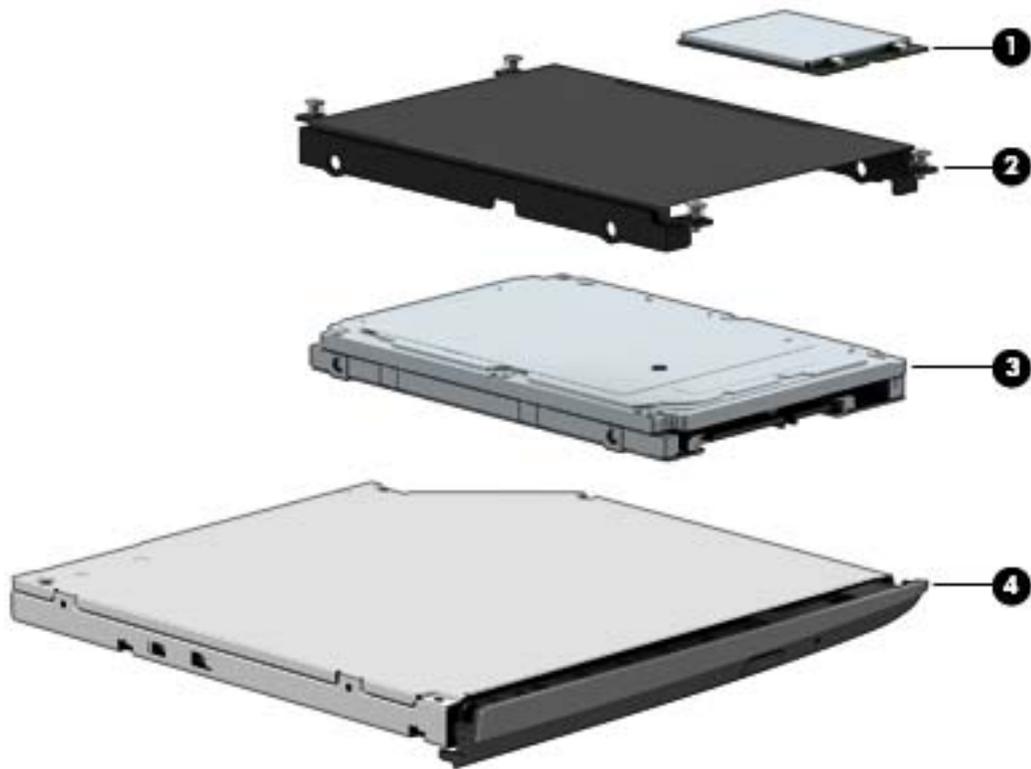| Item | Component | Spare part number |
|---|---|---|
| **(1)** | RJ-45 (network) cable | |
| **(2)** | Power connector cable | |
| | **Cable Kit** (includes the RJ-45 (network) cable, power connector cable, and replacement thermal material for the models listed below): | |

| Item | Component | Spare part number |
|---|---|---|
| | For use on HP ProBook 650 G1 computer models equipped with a 15.6-inch display assembly | 744013–001 |
| | For use on HP ProBook 655 G1 computer models equipped with a 15.6-inch display assembly | 745892-001 |
| | For use on computer models equipped with a 14-inch display assembly | 738684-001 |

# Plastics Kit



| Item | Component | Spare part number |
|---|---|---|
| | **Plastics Kit**, includes: | |
| | For 14-in models | 738402-001 |
| | For 15.6-in models | 738706-001 |
| (1) | Fingerprint bracket | |
| (2) | Smart card reader blank | |
| (3) | WLAN bracket | |
| (4) | Fingerprint reader bezel | |
| (5) | SD card reader bezel | |
| (6) | Optical drive blank tray | |

# Mass storage devices



| Item | Component | Spare part number |
|------|-----------|-------------------|
| **(1)** | **Solid-state drive** (SSD): | |
| | 256-GB SATA-3 self-encrypting SSD | 749263-001 |
| | 180-GB SATA-3 SSD | 749262-001 |
| | | 749278-001 |
| | 128-GB SATA-3 SSD | 749261-001 |
| | | 749277-001 |
| | 128-GB mSATA-3 SSD | 749280-0011 |
| | 32-GB mSATA flash cache SSD | 7749281-001 |
| | **Hard Drive Hardware Kit**, includes: | 738395-001 |
| **(2)** | Hard drive bracket | |
| | Screws (not illustrated) | |
| **(3)** | **Hard drive** (does not include hard drive bracket or screws): | |
| | 1-TB, 5400-rpm, 9.5-mm | 676521-001 |
| | 750-GB, 7200-rpm, 7.0-mm | 633252-001 |
| | 500-GB, 7200-rpm, 7.0-mm | 703267-001 |
| | 500-GB, 5400-rpm, 7.0-mm, FIPS | 730946-001 |

| Item | Component | Spare part number |
|------|-----------|-------------------|
| | 500-GB, 7200-rpm, 7.0-mm, self-encrypting | 703268-001 |
| | 320-GB, 7200-rpm, 7.0-mm | 634862-001 |
| **(4)** | **Optical drive** (includes bezel and bracket): | |
| | Blu-ray R/RE DVD±RW SuperMulti Double-Layer Combo Drive | 749959-001 |
| | | 739999-001 |
| | | 744820-001 |
| | DVD±RW SuperMulti Double-Layer Drive | 749958-001 |
| | | 744822-001 |
| | | 740000-001 |
| | DVD-ROM Drive | 749957-001 |
| | | 744821-001 |
| | | 740001-001 |
| | | 735601-001 |

# Miscellaneous parts

| Component | Spare part number |
|-----------|-------------------|
| **AC adapter:** | |
| 65-W HP Smart adapter (PFC, 3-wire, 4.5-mm) | 693710-001 |
| 65-W HP Smart adapter (PFC, 3-wire, 4.5-mm) | 693711-001 |
| 90-W HP Smart adapter (PFC, 3-wire, 4.5-mm) | 693712-001 |
| 90-W HP Smart adapter (PFC, 3-wire, 4.5-mm) | 693713-001 |
| **Power cord** (3-pin, black, 1.83-m): | |
| For use in Argentina | 490371-D01 |
| For use in Australia | 490371-011 |
| For use in Brazil | 490371-202 |
| For use in Europe | 490371-021 |
| For use in India | 490371-D61 |
| For use in Israel | 490371-BB1 |
| For use in Italy | 490371-061 |
| For use in Japan | 490371-291 |
| For use in North America | 490371-001 |
| For use in the People's Republic of China | 490371-AA1 |
| For use in South Africa | 490371-AR1 |
| For use in South Korea | 490371-AD1 |

| Component | Spare part number |
|---|---|
| For use in Switzerland | 490371-111 |
| For use in Taiwan | 490371-AB1 |
| For use in Thailand | 490371-201 |
| For use in the United Kingdom and Singapore | 490371-031 |
| **Screw Kit** | 738689-001 |

# Sequential part number listing

| Spare part number | Description |
|---|---|
| 490371-001 | Power cord for use in North America (3-pin, black, 1.83-m) |
| 490371-011 | Power cord for use in Australia (3-pin, black, 1.83-m) |
| 490371-021 | Power cord for use in Europe (3-pin, black, 1.83-m) |
| 490371-031 | Power cord for use in the United Kingdom and Singapore (3-pin, black, 1.83-m) |
| 490371-061 | Power cord for use in Italy (3-pin, black, 1.83-m) |
| 490371-111 | Power cord for use in Switzerland (3-pin, black, 1.83-m) |
| 490371-201 | Power cord for use in Thailand (3-pin, black, 1.83-m) |
| 490371-202 | Power cord for use in Brazil (3-pin, black, 1.83-m) |
| 490371-291 | Power cord for use in Japan (3-pin, black, 1.83-m) |
| 490371-AA1 | Power cord for use in the People's Republic of China (3-pin, black, 1.83-m) |
| 490371-AB1 | Power cord for use in Taiwan (3-pin, black, 1.83-m) |
| 490371-AD1 | Power cord for use in South Korea (3-pin, black, 1.83-m) |
| 490371-AR1 | Power cord for use in South Africa (3-pin, black, 1.83-m) |
| 490371-BB1 | Power cord for use in Israel (3-pin, black, 1.83-m) |
| 490371-D01 | Power cord for use in Argentina (3-pin, black, 1.83-m) |
| 490371-D61 | Power cord for use in India (3-pin, black, 1.83-m) |
| 603783-001 | 320-GB, 7200-rpm, SATA, 7.0-mm hard drive (does not include hard drive bracket or screws) <br> **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 628824-001 | Modem (select models only) |
| 633252-001 | 750-GB, 7200-rpm, SATA, 2.5-in hard drive (does not include hard drive bracket or screws) <br> **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 634862-001 | 320-GB, 7200-rpm, SATA, 7.0-mm hard drive (does not include hard drive bracket or screws) <br> **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 634921-001 | 500GB, 7200-rpm, SATA, 2.5-in hard drive (does not include hard drive bracket or screws) |

| Spare part number | Description |
|---|---|
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 634925-001 | 500GB, 7200-rpm, SATA, 2.5-in hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 651948-001 | RTC battery (includes cable and double-sided adhesive) |
| 670292-001 | Intel 802.11 a/b/g/n 2x2 Combo Adapter |
| 675794-001 | Intel 802.11 b/g/n HMC 1x1 |
| 676521-001 | 1-TB, 5400-rpm, SATA, 9.5-mm hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 683046-001 | AMD A10-4600M with Radeon HD 7660G Graphics (quad-core; 3.2 GHz/2.3 GHz; 35W; 4 MB L2 cache) |
| 683047-001 | AMD A6-4400M with Radeon HD 7520G Graphics (dual-core; 3.2 GHz/2.7 GHz; 35W; 1 MB L2 cache) |
| 683048-001 | AMD A8-4500M with Radeon HD 7640G Graphics (quad-core; 2.8 GHz/1.9 GHz; 35W; 4 MB L2 cache) |
| 683801-001 | 500-GBB, 7200-rpm, SATA, self–encrypting hard drive 9.5-mm hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 683802-001 | 500-GBB, 5400-rpm, SATA, hard drive 7-mm hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 685990-001 | Processor A4-4300M 3.0/2.5 GHz 35W 1M |
| 685990-001 | 750-GBB, 7200-rpm, SATA hard drive 2.5-in hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 686850-001 | 750-GBB, 7200-rpm, SATA hard drive 2.5-in hard drive (does not include hard drive bracket or screws) |
| | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 688169-001 | Dock/expansion base (select models only) |
| 690019-001 | Atheros 802.11 b/g/n 1x1 |
| 691739-001 | 2-GB memory module (PC3L, 12800, 1600-MHz) |
| 691740-001 | 4-GB memory module (PC3L, 12800, 1600-MHz) |
| 691922-001 | HP comfort grip wireless mouse |
| 693374-001 | 8-GB memory module (PC3L, 12800, 1600-MHz) |
| 693710-001 | 65-W HP Smart adapter (PFC, 3-wire, 4.5-mm) |
| 693711-001 | 65-W HP Smart adapter (PFC, 3-wire, 4.5-mm) |
| 693712-001 | 90-W HP Smart adapter (PFC, 3-wire, 4.5-mm) |
| 693713-001 | 90-W HP Smart adapter (PFC, 3-wire, 4.5-mm) |

| Spare part number | Description |
|---|---|
| 695915-001 | Intel 802.11 2x2 a/b/g/n |
| 703267-001 | 500-GB, 7200-rpm, SATA, 7.0-mm hard drive (does not include hard drive bracket or screws) |
|  | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 703268-001 | 500-GB, 7200-rpm, SATA, 7.0-mm self-encrypting drive (SED, does not include hard drive bracket or screws) |
|  | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 704030-001 | HP lt4111 LTE/EV-DO/HSPA+ Mobile Broadband Module |
| 704031-001 | HP lt4112 LTE/HSPA+ Mobile Broadband Module |
| 710661-001 | Intel 802.11 2x2 AC + Bluetooth 4.0 |
| 713548-001 | AMD A10-5750M with Radeon HD 8650G Graphics (quad-core; 3.5 GHz/2.5 GHz; 35W, 4 MB L2 cache) |
| 713549-001 | AMD A4-5150M with Radeon HD 8350G Graphics (dual-core; 3.3 GHz/2.7 GHz; 35W; 1 MB L2 cache) |
| 713550-001 | A6-5350M with Radeon HD 8450G Graphics (dual-core; 3.5 GHz/2.9 GHz; 35W; 1 MB L2 cache) |
| 713551-001 | AMD A8-5550M Quad Core 3.1 GHz/2.1 GHz HD8550G |
| 717381-001 | Intel 802.11 a/b/g/n 2x2 + Bluetooth 4.0 WLAN |
| 718754-001 | 3-cell, 33-WHr, 2.0-AHr, Li-ion battery |
| 718755-001 | 6-cell, 55-WHr, 2.55-AHr, Li-ion battery |
| 718756-001 | 6-cell, 55-WHr, 2.8-AHr, Li-ion battery |
| 718757-001 | 9-cell, 100-WHr, 3.0-AHr, Li-ion battery |
| 723895-001 | HP hs3110 HSPA+ Mobile Broadband Module |
| 730668-001 | Broadcom 802.11 a/b/g/n 2x2 + BT 4.0 LE PCIe+USB HMC WW |
| 730946-001 | 500-GB, 5400-rpm, SATA, 7.0-mm FIPS hard drive (does not include hard drive bracket or screws) |
|  | **NOTE:** The hard drive bracket and screws are included in the Hard Drive Hardware Kit, spare part number 738395-001. |
| 735400-001 | USB board (includes cable and double-sided adhesive) |
| 735401-001 | Function button board (includes cable and double-sided adhesive) |
| 735402-001 | Plastics kit |
| 735404-001 | Speaker kit |
| 735405-001 | Top cover and 2-button TouchPad for 14-in models |
| 735406-001 | Top cover and 4-button TouchPad for 14-in models |
| 735407-001 | TouchPad bracket with 2 buttons |
| 735408-001 | TouchPad bracket with 4 buttons |
| 735409-001 | Webcamera/microphone module (includes double-sided adhesive) |
| 737327-001 | Intel Dual Core i3-4000M 2.40-GHz processor (3.0- MB L3 cache, 37 W) |
| 737328-001 | Intel Dual Core i5-4200M 2.50-GHz processor ( 3.0- MB L3 cache, 37 W) |

| Spare part number | Description |
|---|---|
| 737330-001 | Intel Dual Core i7 4600M 2.8 GHz (3MB 37W) |
| 737474-001 | Intel Dual Core i3-4100M 2.50-GHz processor (3.0- MB L3 cache, 37 W) |
| 738201-001 | Intel Dual Core i5-4330M 2.80-GHz processor (3.0- MB L3 cache, 37 W) |
| 738309-001 | Intel Dual Core i5-4300M 2.60-GHz processor ( 3.0-MB L3 cache, 37 W) |
| 738393-001 | Heat sink assembly for models with discrete memory |
| 738394-001 | Fingerprint reader (includes cable) |
| 738395-001 | Hard drive hardware kit |
| 738396-001 | Display hinge kit |
| 738397-001 | Microphone module (includes double-sided adhesive) |
| 738398-001 | Smart card reader for 14-in models with 2-button TouchPad (includes cable) |
| 738399-001 | Power button board (includes cable) |
| 738400–001 | USB board for use in computer models equipped with a 14–inch display assembly (includes cable) |
| 738401–001 | Function button board for use in models equipped with a 14–inch display assembly (includes cable) |
| 738403-001 | Rubber kit |
| 738679-001 | Display bezel for 14-in models |
| 738680-001 | Raw Panel Support Kit for 14-in models (includes wireless antennas and transceivers) |
| 738681-001 | Base enclosure for 14-in models |
| 738682-001 | Service cover for use on computer models equipped with a 14–inch display assembly |
| 738683-001 | Power connector cable for use on models equipped with a 14–inch display assembly |
| 738684-001 | Display cable kit for 14-in models (includes display panel cable) |
| 738685-001 | Fan |
| 738686-001 | Heat sink for computer models with Intel UMA graphics memory |
| 738687-001 | Keyboard for 14-in models for use in the United States (includes keyboard cable) |
| 738687-031 | Keyboard for 14-in models for use in the United Kingdom and Singapore (includes keyboard cable) |
| 738687-041 | Keyboard for 14-in models for use in Germany (includes keyboard cable) |
| 738687-051 | Keyboard for 14-in models for use in France (includes keyboard cable) |
| 738687-061 | Keyboard for 14-in models for use in Italy (includes keyboard cable) |
| 738687-071 | Keyboard for 14-in models for use in Spain (includes keyboard cable) |
| 738687-081 | Keyboard for 14-in models for use in Denmark (includes keyboard cable) |
| 738687-091 | Keyboard for 14-in models for use in Norway (includes keyboard cable) |
| 738687-131 | Keyboard for 14-in models for use in Portugal (includes keyboard cable) |
| 738687-141 | Keyboard for 14-in models for use in Turkey (includes keyboard cable) |
| 738687-151 | Keyboard for 14-in models for use in Greece (includes keyboard cable) |
| 738687-161 | Keyboard for 14-in models for use in Latin America (includes keyboard cable) |

| Spare part number | Description |
| --- | --- |
| 738687-171 | Keyboard for 14-in models for use in Saudi Arabia (includes keyboard cable) |
| 738687-211 | Keyboard for 14-in models for use in Hungary (includes keyboard cable) |
| 738687-251 | Keyboard for 14-in models for use in Russia (includes keyboard cable) |
| 738687-261 | Keyboard for 14-in models for use in Bulgaria (includes keyboard cable) |
| 738687-271 | Keyboard for 14-in models for use in Romania (includes keyboard cable) |
| 738687-281 | Keyboard for 14-in models for use in Thailand (includes keyboard cable) |
| 738687-291 | Keyboard for 14-in models for use in Japan (includes keyboard cable) |
| 738687-A41 | Keyboard for 14-in models for use in Belgium (includes keyboard cable) |
| 738687-AB1 | Keyboard for 14-in models for use in Taiwan (includes keyboard cable) |
| 738687-AD1 | Keyboard for 14-in models for use in South Korea (includes keyboard cable) |
| 738687-B31 | Keyboard for 14-in models for use in the Netherlands (includes keyboard cable) |
| 738687-B71 | Keyboard for 14-in models for use in Sweden (includes keyboard cable) |
| 738687-BA1 | Keyboard for 14-in models for use in Slovenia (includes keyboard cable) |
| 738687-BB1 | Keyboard for 14-in models for use in Israel (includes keyboard cable) |
| 738687-BG1 | Keyboard for 14-in models for use in Switzerland (includes keyboard cable) |
| 738687-D61 | Keyboard for 14-in models for use in India (includes keyboard cable) |
| 738687-DB1 | Keyboard for 14-in models for use in Canada (includes keyboard cable) |
| 738687-DD1 | Keyboard for 14-in models for use in Iceland (includes keyboard cable) |
| 738687-FL1 | Keyboard for 14-in models for use in the Czech Republic and Slovakia (includes keyboard cable) |
| 738687-FP1 | Keyboard for 14-in models for use in Northwest Africa (includes keyboard cable) |
| 738688-001 | Keyboard with pointing stick for 14-in models for use in the United States (includes keyboard cable and pointing stick cable) |
| 738688-031 | Keyboard with pointing stick for 14-in models for use in the United Kingdom and Singapore (includes keyboard cable and pointing stick cable) |
| 738688-041 | Keyboard with pointing stick for 14-in models for use in Germany (includes keyboard cable and pointing stick cable) |
| 738688-051 | Keyboard with pointing stick for 14-in models for use in France (includes keyboard cable and pointing stick cable) |
| 738688-061 | Keyboard with pointing stick for 14-in models for use in Italy (includes keyboard cable and pointing stick cable) |
| 738688-071 | Keyboard with pointing stick for 14-in models for use in Spain (includes keyboard cable and pointing stick cable) |
| 738688-081 | Keyboard with pointing stick for 14-in models for use in Denmark (includes keyboard cable and pointing stick cable) |
| 738688-091 | Keyboard with pointing stick for 14-in models for use in Norway (includes keyboard cable and pointing stick cable) |
| 738688-131 | Keyboard with pointing stick for 14-in models for use in Portugal (includes keyboard cable and pointing stick cable) |

| Spare part number | Description |
|---|---|
| 738688-141 | Keyboard with pointing stick for 14-in models for use in Turkey (includes keyboard cable and pointing stick cable) |
| 738688-151 | Keyboard with pointing stick for 14-in models for use in Greece (includes keyboard cable and pointing stick cable) |
| 738688-161 | Keyboard with pointing stick for 14-in models for use in Latin America (includes keyboard cable and pointing stick cable) |
| 738688-171 | Keyboard with pointing stick for 14-in models for use in Saudi Arabia(includes keyboard cable and pointing stick cable) |
| 738688-201 | Keyboard with pointing stick for 14-in models for use in Brazil (includes keyboard cable and pointing stick cable) |
| 738688-211 | Keyboard with pointing stick for 14-in models for use in Hungary (includes keyboard cable and pointing stick cable) |
| 738688-251 | Keyboard with pointing stick for 14-in models for use in Russia (includes keyboard cable and pointing stick cable) |
| 738688-261 | Keyboard with pointing stick for 14-in models for use in Bulgaria (includes keyboard cable and pointing stick cable) |
| 738688-271 | Keyboard with pointing stick for 14-in models for use in Romania (includes keyboard cable and pointing stick cable) |
| 738688-281 | Keyboard with pointing stick for 14-in models for use in Thailand (includes keyboard cable and pointing stick cable) |
| 738688-291 | Keyboard with pointing stick for 14-in models for use in Japan (includes keyboard cable and pointing stick cable) |
| 738688-A41 | Keyboard with pointing stick for 14-in models for use in Belgium includes keyboard cable and pointing stick cable) |
| 738688-AB1 | Keyboard with pointing stick for 14-in models for use in Taiwan (includes keyboard cable and pointing stick cable) |
| 738688-AD1 | Keyboard with pointing stick for 14-in models for use in South Korea includes keyboard cable and pointing stick cable) |
| 738688-B31 | Keyboard with pointing stick for 14-in models for use in the Netherlands (includes keyboard cable and pointing stick cable) |
| 738688-B71 | Keyboard with pointing stick for 14-in models for use in Sweden and Finland (includes keyboard cable and pointing stick cable) |
| 738688-BA1 | Keyboard with pointing stick for 14-in models for use in Slovenia (includes keyboard cable and pointing stick cable) |
| 738688-BB1 | Keyboard with pointing stick for 14-in models for use in Israel includes keyboard cable and pointing stick cable) |
| 738688-BG1 | Keyboard with pointing stick for 14-in models for use in  Switzerland (includes keyboard cable and pointing stick cable) |
| 738688-D61 | Keyboard with pointing stick for 14-in models for use in India (includes keyboard cable and pointing stick cable) |
| 738688-DB1 | Keyboard with pointing stick for 14-in models for use in Canada (includes keyboard cable and pointing stick cable) |
| 738688-DD1 | Keyboard with pointing stick for 14-in models for use in Iceland includes keyboard cable and pointing stick cable) |

| Spare part number | Description |
| --- | --- |
| 738688-FL1 | Keyboard with pointing stick for 14-in models for use in the Czech Republic and Serbia (includes keyboard cable and pointing stick cable) |
| 738688-FP1 | Keyboard with pointing stick for 14-in models for use in Northwest Africa (includes keyboard cable and pointing stick cable) |
| 738689-001 | Screw Kit |
| 738690-001 | Display bezel for 15.6-in models |
| 738691-001 | Raw Panel Support Kit for 15.6-in models (includes wireless antennas and transceivers) |
| 738692-001 | Base enclosure for 15.6-in models |
| 738693-001 | Service cover for use on computer models equipped with a 15.6–inch display assembly |
| 738694-001 | Power connector cable for use on models equipped with a 15.6–inch display assembly |
| 738695-001 | Display cable kit for use on models equipped with a 15.6–inch display assembly (includes display panel cable) |
| 738696-001 | Keyboard for 15.6-in models for use in the United States (includes keyboard cable) |
| 738696-031 | Keyboard for 15.6-in models for use in the United Kingdom and Singapore (includes keyboard cable) |
| 738696-041 | Keyboard for 15.6-in models for use in Germany (includes keyboard cable) |
| 738696-051 | Keyboard for 15.6-in models for use in France (includes keyboard cable) |
| 738696-061 | Keyboard for 15.6-in models for use in Italy (includes keyboard cable) |
| 738696-071 | Keyboard for 15.6-in models for use in Spain (includes keyboard cable) |
| 738696-081 | Keyboard for 15.6-in models for use in Denmark (includes keyboard cable) |
| 738696-091 | Keyboard for 15.6-in models for use in Norway (includes keyboard cable and pointing stick cable) |
| 738696-131 | Keyboard for 15.6-in models for use in Portugal (includes keyboard cable) |
| 738696-141 | Keyboard for 15.6-in models for use in Turkey (includes keyboard cable) |
| 738696-151 | Keyboard for 15.6-in models for use in Greece (includes keyboard cable and pointing stick cable) |
| 738696-161 | Keyboard for 15.6-in models for use in Latin America (includes keyboard cable) |
| 738696-171 | Keyboard for 15.6-in models for use in Saudi Arabia (includes keyboard cable) |
| 738696-201 | Keyboard for 15.6-in models for use in Brazil (includes keyboard cable) |
| 738696-211 | Keyboard for 15.6-in models for use in Hungary (includes keyboard cable and pointing stick cable) |
| 738696-251 | Keyboard for 15.6-in models for use in Russia (includes keyboard cable) |
| 738696-261 | Keyboard for 15.6-in models for use in Bulgaria (includes keyboard cable) |
| 738696-271 | Keyboard for 15.6-in models for use in Romania (includes keyboard cable) |
| 738696-281 | Keyboard for 15.6-in models for use in Thailand (includes keyboard cable) |
| 738696-291 | Keyboard for 15.6-in models for use in Japan (includes keyboard cable and pointing stick cable) |
| 738696-A41 | Keyboard for 15.6-in models for use in Belgium (includes keyboard cable) |
| 738696-AB1 | Keyboard for 15.6-in models for use in Taiwan (includes keyboard cable) |
| 738696-AD1 | Keyboard for 15.6-in models for use in South Korea (includes keyboard cable) |

| Spare part number | Description |
|---|---|
| 738696-B31 | Keyboard for 15.6-in models for use in the Netherlands (includes keyboard cable) |
| 738696-B71 | Keyboard for 15.6-in models for use in Sweden and Finland (includes keyboard cable and pointing stick cable) |
| 738696-BA1 | Keyboard for 15.6-in models for use in Slovenia (includes keyboard cable) |
| 738696-BB1 | Keyboard for 15.6-in models for use in Israel (includes keyboard cable) |
| 738696-BG1 | Keyboard for 15.6-in models for use in Switzerland (includes keyboard cable) |
| 738696-D61 | Keyboard for 15.6-in models for use in India (includes keyboard cable) |
| 738696-DB1 | Keyboard for 15.6-in models for use in Canada (includes keyboard cable) |
| 738696-DD1 | Keyboard for 15.6-in models for use in Iceland (includes keyboard cable) |
| 738696-FL1 | Keyboard for 15.6-in models for use in the Czech Republic and Slovakia (includes keyboard cable) |
| 738696-FP1 | Keyboard for 15.6-in models for use in Northwest Africa (includes keyboard cable) |
| 738697-001 | Keyboard with pointing stick for 15.6-in models for use in the United States (includes keyboard cable and pointing stick cable) |
| 738697-031 | Keyboard with pointing stick for 15.6-in models for use in the United Kingdom and Singapore (includes keyboard cable and pointing stick cable) |
| 738697-041 | Keyboard with pointing stick for 15.6-in models for use in Germany (includes keyboard cable and pointing stick cable) |
| 738697-051 | Keyboard with pointing stick for 15.6-in models for use in France (includes keyboard cable and pointing stick cable) |
| 738697-061 | Keyboard with pointing stick for 15.6-in models for use in Italy (includes keyboard cable and pointing stick cable) |
| 738697-071 | Keyboard with pointing stick for 15.6-in models for use in Spain (includes keyboard cable and pointing stick cable) |
| 738697-081 | Keyboard with pointing stick for 15.6-in models for use in Denmark (includes keyboard cable and pointing stick cable) |
| 738697-091 | Keyboard with pointing stick for 15.6-in models for use in Norway (includes keyboard cable and pointing stick cable) |
| 738697-131 | Keyboard with pointing stick for 15.6-in models for use in Portugal (includes keyboard cable and pointing stick cable) |
| 738697-141 | Keyboard with pointing stick for 15.6-in models for use in Turkey (includes keyboard cable and pointing stick cable) |
| 738697-151 | Keyboard with pointing stick for 15.6-in models for use in Greece (includes keyboard cable and pointing stick cable) |
| 738697-161 | Keyboard with pointing stick for 15.6-in models for use in Latin America (includes keyboard cable and pointing stick cable) |
| 738697-171 | Keyboard with pointing stick for 15.6-in models for use in Saudi Arabia (includes keyboard cable and pointing stick cable) |
| 738697-211 | Keyboard with pointing stick for 15.6-in models for use in Hungary (includes keyboard cable and pointing stick cable) |
| 738697-251 | Keyboard with pointing stick for 15.6-in models for use in Russia (includes keyboard cable and pointing stick cable) |

| Spare part number | Description |
|---|---|
| 738697-261 | Keyboard with pointing stick for 15.6-in models for use in Bulgaria (includes keyboard cable and pointing stick cable) |
| 738697-271 | Keyboard with pointing stick for 15.6-in models for use in Romania (includes keyboard cable and pointing stick cable) |
| 738697-281 | Keyboard with pointing stick for 15.6-in models for use in Thailand (includes keyboard cable and pointing stick cable) |
| 738697-291 | Keyboard with pointing stick for 15.6-in models for use in Japan (includes keyboard cable and pointing stick cable) |
| 738697-A41 | Keyboard with pointing stick for 15.6-in models for use in Belgium (includes keyboard cable and pointing stick cable) |
| 738697-AB1 | Keyboard with pointing stick for 15.6-in models for use in Taiwan (includes keyboard cable and pointing stick cable) |
| 738697-AD1 | Keyboard with pointing stick for 15.6-in models for use in South Korea (includes keyboard cable and pointing stick cable) |
| 738697-B31 | Keyboard with pointing stick for 15.6-in models for use in the Netherlands (includes keyboard cable and pointing stick cable) |
| 738697-B71 | Keyboard with pointing stick for 15.6-in models for use in Sweden and Finland (includes keyboard cable and pointing stick cable) |
| 738697-BA1 | Keyboard with pointing stick for 15.6-in models for use in Slovenia (includes keyboard cable and pointing stick cable) |
| 738697-BB1 | Keyboard with pointing stick for 15.6-in models for use in Israel (includes keyboard cable and pointing stick cable) |
| 738697-BG1 | Keyboard with pointing stick for 15.6-in models for use in Switzerland (includes keyboard cable and pointing stick cable) |
| 738697-DB1 | Keyboard with pointing stick for 15.6-in models for use in Canada (includes keyboard cable and pointing stick cable) |
| 738697-DD1 | Keyboard with pointing stick for 15.6-in models for use in Iceland (includes keyboard cable and pointing stick cable) |
| 738697-FL1 | Keyboard with pointing stick for 15.6-in models for use in the Czech Republic and Slovakia (includes keyboard cable and pointing stick cable) |
| 738697-FP1 | Keyboard with pointing stick for 15.6-in models for use in Northwest Africa (includes keyboard cable and pointing stick cable) |
| 738699-001 | Display hinge Kit for 15.6-in models (includes left and right hinges and display panel cable bracket) |
| 738701-001 | Power button board for 15.6-in models (includes cable) |
| 738702-001 | USB board for use in 15.6-in ProBook 650 G1 models (includes cable) |
| 738703-001 | Function button board for 15.6-in models (includes cable) |
| 738704-001 | Optical drive transfer board for 15.6-in models (includes cable) |
| 738705-001 | Modem transfer board for select 15.6-in models (includes cable) |
| 738706-001 | Plastics Kit |
| 738708-001 | Top cover and 2-button TouchPad for HP ProBook 650 G1 models |
| 738709-001 | Top cover and 4-button TouchPad for HP ProBook 650 G1 models |

| Spare part number | Description |
|---|---|
| 738710-001 | TouchPad for 15.6-in models with 2 buttons (includes bracket) |
| 738711-001 | TouchPad for 15.6-in models with 4 buttons (includes bracket) |
| 738712-001 | Display bezel for 14-in models |
| 739997-001 | Display panel for 15.6-in models, HD SVA AG flat |
| 739998-001 | Display panel for 15.6-in models, FHD SVA AG slim |
| 739999-001 | DVD±RW Double-Layer Combo Drive |
| 740000-001 | DVD-ROM Drive |
| 740001-001 | DVD-ROM SuperMulti Drive |
| 744005-001 | Smart card reader for 14-in models with 4-button TouchPad (includes cable) |
| 744007-001 | System board for use only on computer models equipped with shared memory, WWAN capability (includes replacement thermal material) |
| 744007-501 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744007-601 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744008-001 | System board for use only on computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) |
| 744008-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744008-601 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744009-001 | System board for use only on computer models equipped with shared memory, WWAN capability (includes replacement thermal material) |
| 744009-501 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744009-601 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744010-001 | System board for use only on computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) |
| 744010-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744010-601 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744013-001 | Cable Kit for HP ProBook 650 G1 models with a 15.6–inch display assembly (includes power connector cable and RJ-45 (network) cable and replacement thermal material) |
| 744015-001 | System board for use only on computer models equipped with shared memory, WWAN capability (includes replacement thermal material) |
| 744015-501 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744015-601 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |

| Spare part number | Description |
| --- | --- |
| 744016-001 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem (includes replacement thermal material) |
| 744016-501 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744016-601 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744017-001 | System board for use only on computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) |
| 744017-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744017-601 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744018-001 | System board for use only on computer models equipped with discrete memory, a modem, WWAN capability (includes replacement thermal material) |
| 744018-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, a modem, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744018-601 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744019-001 | System board for use only on computer models equipped with shared memory, WWAN capability (includes replacement thermal material) |
| 744019-501 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744019-601 | System board for use only on computer models equipped with shared memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744020-001 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem (includes replacement thermal material) |
| 744020-501 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744020-601 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744021-001 | System board for use only on computer models equipped with discrete memory, WWAN capability (includes replacement thermal material) |
| 744021-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744021-601 | System board for use only on computer models equipped with discrete memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744022-001 | System board for use only on computer models equipped with discrete memory, a modem, WWAN capability (includes replacement thermal material) |
| 744022-501 | System board for use only on computer models equipped with discrete memory, WWAN capability, a modem, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744022-601 | System board for use only on computer models equipped with shared memory, WWAN capability, a modem, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744715-001 | System board for use only on computer models equipped with shared memory, without WWAN capability (includes replacement thermal material) |

| Spare part number | Description |
|---|---|
| 744715-501 | System board for use only on computer models equipped with shared memory, without WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 744715-601 | System board for use only on computer models equipped with shared memory, without WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 744820-001 | Blu-ray ROM DVD±RW Combo Drive |
| 744821-001 | DVD-ROM 9.5-mm Drive |
| 744822-001 | DVD-ROM SuperMulti 9.5-mm Drive |
| 745883-001 | For use only computer models with shared memory and WWAN capability |
| 745883-501 | For use only on computer models with shared memory, the Windows 8 Standard operating system, and WWAN capability |
| 745883-601 | For use only on computer models with shared memory, the Windows 8 Professional operating system, and WWAN capability |
| 745884-001 | For use only computer models equipped with shared memory without WWAN capability |
| 745884-501 | For use only on computer models equipped with shared memory and the Windows 8 Standard operating system without WWAN capability |
| 745884-601 | For use only on computer models equipped with shared memory, the Windows 8 Professional operating system without WWAN capability |
| 745887-001 | System board for use only on 15.6-in models with shared memory, WWAN capability (includes replacement thermal material) |
| 745887-501 | System board for use only on 15.6-in models with shared memory, WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 745887-601 | System board for use only on 15.6-in models with shared memory, WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 745888-001 | System board for use only on 15.6-in models with shared memory, without WWAN capability (includes replacement thermal material) |
| 745888-501 | System board for use only on 15.6-in models with shared memory, without WWAN capability, and the Windows 8 Standard operating system (includes replacement thermal material) |
| 745888-601 | System board for use only on 15.6-in models with shared memory, without WWAN capability, and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 745889-001 | Top cover and 2-button TouchPad for HP ProBook 655 G1 models |
| 745890-001 | Top cover and 4-button TouchPad for HP ProBook 655 G1 models |
| 745891-001 | USB board for use in ProBook 655 G1 models (includes cable) |
| 745892-001 | Cable Kit for HP ProBook 650 G1 models with a 15.6–inch display assembly (includes power connector cable and RJ-45 (network) cable and replacement thermal material) |
| 745893-001 | Display bezel |
| 747751-001 | Display panel for 14-in models, HD AG WLED SVA eDP FLT |
| 747752-001 | Display panel for 14-in models, HD+ AG WLED SVA eDP FLT |
| 747753-001 | Display panel for 14-in models, FHD AG WLED UWVA eDPslim PSR |
| 747832-001 | Intel 802.11 a/b/g/n 2x2 + BT 4.0 WLAN |
| 748357-001 | Service cover for use on computer models equipped with a 14-inch display assembly and which meet regional configure to order (RCTO) specifications |

| Spare part number | Description |
| --- | --- |
| 748358-001 | Service cover for use on computer models equipped with a 15.6-inch display assembly and which meet regional configure to order (RCTO) specifications |
| 748958-001 | Smart card reader board with TouchPad, for use on 15.6–inch models |
| 749254-001 | System board for use only on computer models equipped with shared memory and a modem (includes replacement thermal material) |
| 749261-001 | 128-GB SATA-3 solid-state drive |
| 749262-001 | 180-GB SATA-3 solid-state drive |
| 749263-001 | 256-GB SATA-3 self-encrypting solid-state drive |
| 749274-001 | System board for use only on computer models equipped with shared memory (includes replacement thermal material) |
| 749274-501 | System board for use only on computer models equipped with shared memory and the Windows 8 Standard operating system (includes replacement thermal material) |
| 749274-601 | System board for use only on computer models equipped with shared memory and the Windows 8 Professional operating system (includes and replacement thermal material) |
| 749277-001 | 128-GB mSATA-3 solid-state drive |
| 749278-001 | 128-GB SATA-3 solid-state drive |
| 749279-001 | 180-GB SATA-3 solid-state drive |
| 749280-001 | 128-GB mSATA-3 solid-state drive for use in Brazil |
| 749281-001 | 32-GB mSATA flash cache solid-state drive |
| 749263-001 | 256-GB SATA-3 self-encrypting solid-state drive |
| 749263-001 | 256-GB SATA-3 self-encrypting solid-state drive |
| 749284-001 | 128-GB mSATA-3 solid-state drive |
| 749285-001 | 128-GB mSATA-3 solid-state drive for use in Brazil |
| 749286-001 | 180-GB mSATA-3 solid-state drive |
| 749287-001 | 256-GB mSATA-3 solid-state self-encrypting drive |
| 749609-001 | Display panel HD SVA AG flat |
| 749610-001 | Display panel HD SVA AG flat |
| 749954-001 | 128-GB SATA-3 solid-state drive |
| 749955-001 | 180-GB SATA-3 solid-state drive |
| 749956-001 | 256-GB SATA-3 self-encrypting solid-state drive |
| 749957-001 | DVD-ROM 9.5-mm Drive |
| 749958-001 | DVD-ROM SuperMulti 9.5-mm Drive |
| 749959-001 | Blu-ray R/RE DVD±RW SuperMulti Double-Layer Combo Drive |
| 787294-001 | Keyboard for 14-inch models for use in the United States (includes keyboard and backlight cables) |
| 787294-031 | Keyboard for 14-inch models for use in the United Kingdom and Singapore (includes keyboard and backlight cables) |
| 787294-041 | Keyboard for 14-inch models for use in Germany (includes keyboard and backlight cables) |

| Spare part number | Description |
|---|---|
| 787294-051 | Keyboard for 14-inch models for use in France (includes keyboard and backlight cables) |
| 787294-061 | Keyboard for 14-inch models for use in Italy (includes keyboard and backlight cables) |
| 787294-071 | Keyboard for 14-inch models for use in Spain (includes keyboard and backlight cables) |
| 787294-081 | Keyboard for 14-inch models for use in Denmark (includes keyboard and backlight cables) |
| 787294-091 | Keyboard for 14-inch models for use in Norway (includes keyboard and backlight cables) |
| 787294-131 | Keyboard for 14-inch models for use in Portugal (includes keyboard and backlight cables) |
| 787294-141 | Keyboard for 14-inch models for use in Turkey (includes keyboard and backlight cables) |
| 787294-151 | Keyboard for 14-inch models for use in Greece (includes keyboard and backlight cables) |
| 787294-161 | Keyboard for 14-inch models for use in Latin America (includes keyboard and backlight cables) |
| 787294-171 | Keyboard for 14-inch models for use in Saudi Arabia (includes keyboard and backlight cables) |
| 787294-201 | Keyboard for 14-inch models for use in Brazil (includes keyboard and backlight cables) |
| 787294-211 | Keyboard for 14-inch models for use in Hungary (includes keyboard and backlight cables) |
| 787294-251 | Keyboard for 14-inch models for use in Russia (includes keyboard and backlight cables) |
| 787294-261 | Keyboard for 14-inch models for use in Bulgaria (includes keyboard and backlight cables) |
| 787294-271 | Keyboard for 14-inch models for use in Romania (includes keyboard and backlight cables) |
| 787294-281 | Keyboard for 14-inch models for use in Thailand (includes keyboard and backlight cables) |
| 787294-291 | Keyboard for 14-inch models for use in Japan (includes keyboard and backlight cables) |
| 787294-A41 | Keyboard for 14-inch models for use in Belgium (includes keyboard and backlight cables) |
| 787294-AB1 | Keyboard for 14-inch models for use in Taiwan (includes keyboard and backlight cables) |
| 787294-AD1 | Keyboard for 14-inch models for use in South Korea (includes keyboard and backlight cables) |
| 787294-B31 | Keyboard for 14-inch models for use in the Netherlands (includes keyboard and backlight cables) |
| 787294-B71 | Keyboard for 14-inch models for use in Sweden and Finland (includes keyboard and backlight cables) |
| 787294-BA1 | Keyboard for 14-inch models for use in Slovenia (includes keyboard and backlight cables) |
| 787294-BB1 | Keyboard for 14-inch models for use in Israel (includes keyboard and backlight cables) |
| 787294-BG1 | Keyboard for 14-inch models for use in Switzerland (includes keyboard and backlight cables) |
| 787294-D61 | Keyboard for 14-inch models for use in India (includes keyboard and backlight cables) |
| 787294-DB1 | Keyboard for 14-inch models for use in Canada (includes keyboard and backlight cables) |
| 787294-DD1 | Keyboard for 14-inch models for use in Iceland (includes keyboard and backlight cables) |
| 787294-FL1 | Keyboard for 14-inch models for use in Czech Republic and Slovakia (includes keyboard and backlight cables) |
| 787294-FP1 | Keyboard for 14-inch models for use in Northwest Africa (includes keyboard and backlight cables) |
| 787801-001 | Keyboard for 15.6-inch models for use in the United States (includes keyboard and backlight cables) |
| 787801-031 | Keyboard for 15.6-inch models for use in the United Kingdom and Singapore (includes keyboard and backlight cables) |
| 787801-041 | Keyboard for 15.6-inch models for use in Germany (includes keyboard and backlight cables) |

| Spare part number | Description |
| --- | --- |
| 787801-051 | Keyboard for 15.6-inch models for use in France (includes keyboard and backlight cables) |
| 787801-061 | Keyboard for 15.6-inch models for use in Italy (includes keyboard and backlight cables) |
| 787801-071 | Keyboard for 15.6-inch models for use in Spain (includes keyboard and backlight cables) |
| 787801-081 | Keyboard for 15.6-inch models for use in Denmark (includes keyboard and backlight cables) |
| 787801-091 | Keyboard for 15.6-inch models for use in Norway (includes keyboard and backlight cables) |
| 787801-131 | Keyboard for 15.6-inch models for use in Portugal (includes keyboard and backlight cables) |
| 787801-141 | Keyboard for 15.6-inch models for use in Turkey (includes keyboard and backlight cables) |
| 787801-151 | Keyboard for 15.6-inch models for use in Greece (includes keyboard and backlight cables) |
| 787801-161 | Keyboard for 15.6-inch models for use in Latin America (includes keyboard and backlight cables) |
| 787801-171 | Keyboard for 15.6-inch models for use in Saudi Arabia (includes keyboard and backlight cables) |
| 787801-201 | Keyboard for 15.6-inch models for use in Brazil (includes keyboard and backlight cables) |
| 787801-211 | Keyboard for 15.6-inch models for use in Hungary (includes keyboard and backlight cables) |
| 787801-251 | Keyboard for 15.6-inch models for use in Russia (includes keyboard and backlight cables) |
| 787801-261 | Keyboard for 15.6-inch models for use in Bulgaria (includes keyboard and backlight cables) |
| 787801-271 | Keyboard for 15.6-inch models for use in Romania (includes keyboard and backlight cables) |
| 787801-281 | Keyboard for 15.6-inch models for use in Thailand (includes keyboard and backlight cables) |
| 787801-291 | Keyboard for 15.6-inch models for use in Japan (includes keyboard and backlight cables) |
| 787801-A41 | Keyboard for 15.6-inch models for use in Belgium (includes keyboard and backlight cables) |
| 787801-AB1 | Keyboard for 15.6-inch models for use in Taiwan (includes keyboard and backlight cables) |
| 787801-AD1 | Keyboard for 15.6-inch models for use in South Korea (includes keyboard and backlight cables) |
| 787801-B31 | Keyboard for 15.6-inch models for use in the Netherlands (includes keyboard and backlight cables) |
| 787801-B71 | Keyboard for 15.6-inch models for use in Sweden and Finland (includes keyboard and backlight cables) |
| 787801-BA1 | Keyboard for 15.6-inch models for use in Slovenia (includes keyboard and backlight cables) |
| 787801-BB1 | Keyboard for 15.6-inch models for use in Israel (includes keyboard and backlight cables) |
| 787801-BG1 | Keyboard for 15.6-inch models for use in Switzerland (includes keyboard and backlight cables) |
| 787801-D61 | Keyboard for 15.6-inch models for use in India (includes keyboard and backlight cables) |
| 787801-DB1 | Keyboard for 15.6-inch models for use in Canada (includes keyboard and backlight cables) |
| 787801-DD1 | Keyboard for 15.6-inch models for use in Iceland (includes keyboard and backlight cables) |
| 787801-FL1 | Keyboard for 15.6-inch models for use in Czech Republic and Slovakia (includes keyboard and backlight cables) |
| 787801-FP1 | Keyboard for 15.6-inch models for use in Northwest Africa (includes keyboard and backlight cables) |
| 805782-001 | Top cover for ProBook 655 G1 models equipped with a backlit keyboard |
| 805783-001 | Top cover and 2-button TouchPad for models equipped with a 14–inch display assembly and a backlit keyboard |
| 805787-001 | Top cover for ProBook 650 G1 models equipped with a backlit keyboard |

# 4 Removal and replacement procedures preliminary requirements

## Tools required

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

- Flat-bladed screw driver
- Magnetic screw driver
- Phillips P0 and P1 screw drivers

## 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, and then degrade in the internal layers, reducing its life expectancy.

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

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

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

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

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

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

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

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

## Packaging and transporting guidelines

Follow these grounding guidelines when packaging and transporting equipment:

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

## Workstation guidelines

Follow these grounding workstation guidelines:

- Cover the workstation with approved static-shielding material.
- Use a wrist strap connected to a properly grounded work surface and use properly grounded tools and equipment.
- Use conductive field service tools, such as cutters, screw drivers, 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

**NOTE:** 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.

## 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 Service tag on page 16 for details.

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

There are as many as 16 screws that must be removed, replaced, and/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 |
|---|---|
| 9-cell, 100-WHr, 3.0-AHr, Li-ion battery | 718757-001 |
| 9-cell, 73-WHr, 2.2-AHr, Li-ion battery | 718756-001 |
| 8-cell, 83-WHr, 2.8-AHr, Li-ion battery | 718755-001 |
| 8-cell, 75-WHr, 2.8-AHr, Li-ion battery | 718754-001 |

Before removing the battery, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

Remove the battery:

⚠ **WARNING!** To reduce potential safety issues, use only the user-replaceable battery provided with the computer, a replacement battery provided by HP, or a compatible battery purchased from HP.

⚠ **CAUTION:** Removing a user-replaceable battery that is the sole power source for the computer can cause loss of information. To prevent loss of information, save your work or shut down the computer through Windows before removing the battery.

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

2. Slide the battery release latch **(1)** to release the battery.

📝 **NOTE:** The battery release latch automatically returns to its original position.

3. Remove the battery **(2)** from the computer.
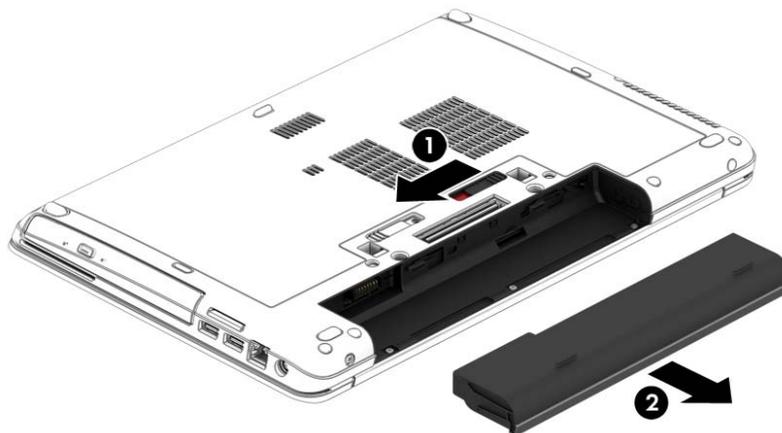


Reverse this procedure to install the battery.

# Service cover

| Description | Spare part number |
|---|---|
| Service cover for use on computer models equipped with a 15.6-inch display assembly | 738693-001 |
| Service cover for use on computer models equipped with a 15.6-inch display assembly and which meet regional configure to order (RCTO) specifications | 748358-001 |
| Service cover for use on computer models equipped with a 14-inch display assembly | 738682-001 |
| Service cover for use on computer models equipped with a 14-inch display assembly and which meet regional configure to order (RCTO) specifications | 748357-001 |

Remove the service cover to access the memory module slot, hard drive, and other components.

1.  Remove the battery (see Battery on page 64).

2.  With the battery bay toward you, slide the service cover release latch **(1)** to the left, remove the screw (if the optional screw is being used) **(2)**, and then slide the release latch again **(3)** to release the service cover.

    **NOTE:** If you not want to use the optional screw, you can store it inside the service cover.

3.  Slide the service cover toward the front of the computer **(4)** and lift **(5)** to remove the service cover.
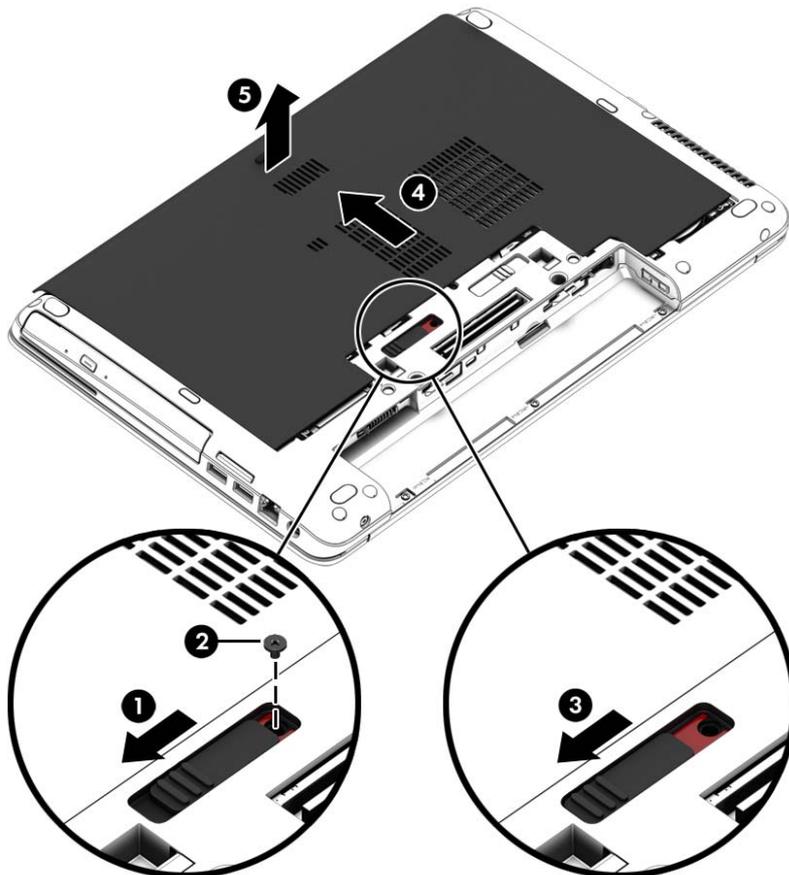


Reverse this procedure to install the service cover.

# Hard drive

**NOTE:** The hard drive spare part kit does not include the hard drive bracket or screws. These components are included in the Hard Drive Hardware Kit, spare part number 738395-001.

| Description | Spare part number |
|---|---|
| **Hard drive** (does not include hard drive bracket or screws): | |
| 1-TB, 5400-rpm, 9.5-mm | 676521-001 |
| 750-GB, 7200-rpm, 9.5-mm | 633252-001 |
| 500-GB, 7200-rpm, 7.0-mm | 703267-001 |
| 500-GB, 7200-rpm, 7.0-mm | 634925-001 |
| 500-GB, 7200-rpm, 7.0-mm, self-encrypting | 703268-001 |
| 500-GB, 5400-rpm, 7.0-mm, FIPS | 730946-001 |
| 500-GB, 5400-rpm, 9.5-mm, self-encrypting | 683801-001 |
| 500-GB, 5400-rpm, 7.0-mm | 683802-001 |
| 320-GB, 7200-rpm, 9.5-mm | 603783-001 |
| 320-GB, 7200-rpm, 7.0-mm | 634862-001 |
| 320-GB, 5400-rpm, 7.0-mm | 670035-001 |

Before removing the hard drive, follow these steps:

1. Save your work and shut down the computer.
2. Disconnect AC power and external devices connected to the computer.
3. Turn the computer upside down on a flat surface.
4. Remove the battery. (See ).

Remove the hard drive:

1. Disconnect the hard drive cable**(1)**.

**2.**   Loosen the 4 hard drive screws **(2)**. Pull the hard drive tab **(3)** to the right to disconnect the hard drive.
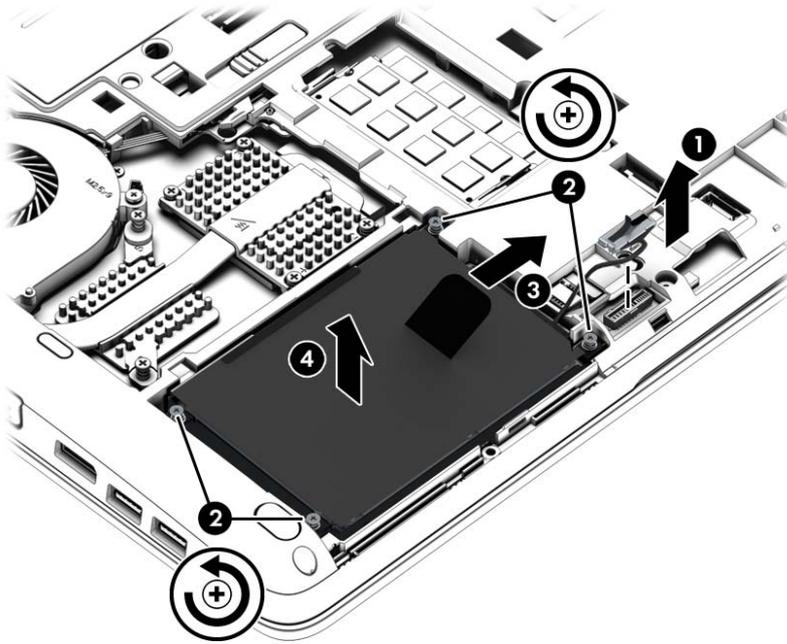


**3.**   Lift the hard drive **(4)**, and then pull the hard drive out of the hard drive bay.

**4.**   If it is necessary to disassemble the hard drive, perform the following steps:

    **a.**   Position the hard drive with the hard drive tab toward you.

    **b.**   Remove the four Phillips screws **(1)** that secure the hard drive bracket to the hard drive.

**c.** Remove the hard drive bracket **(2)** from the hard drive.

The hard drive bracket and screws are available in the Hard Drive Hardware Kit, spare part number 738395-001.
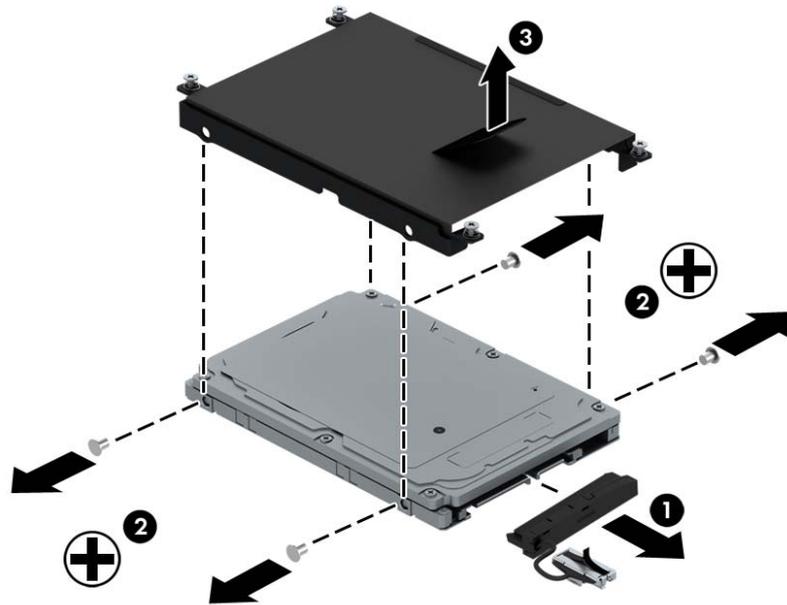
Reverse this procedure to install a hard drive.

## Modem module (select models only)

| Description | Spare part number |
|---|---|
| Modem module | 628824-001 |

Before removing the modem module, follow these steps:

**1.** Turn off 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 the power from the computer by unplugging the power cord from the computer.

**3.** Disconnect all external devices from the computer.

**4.** Remove the battery (see Battery on page 64).

**5.** Remove the service cover (see Service cover on page 65).

Remove the modem module:

**1.** Remove the two Phillips screws **(1)** that secure the modem module.

**2.** Lift the front of the modem module **(2)**, and then disconnect the modem cable **(3)**.
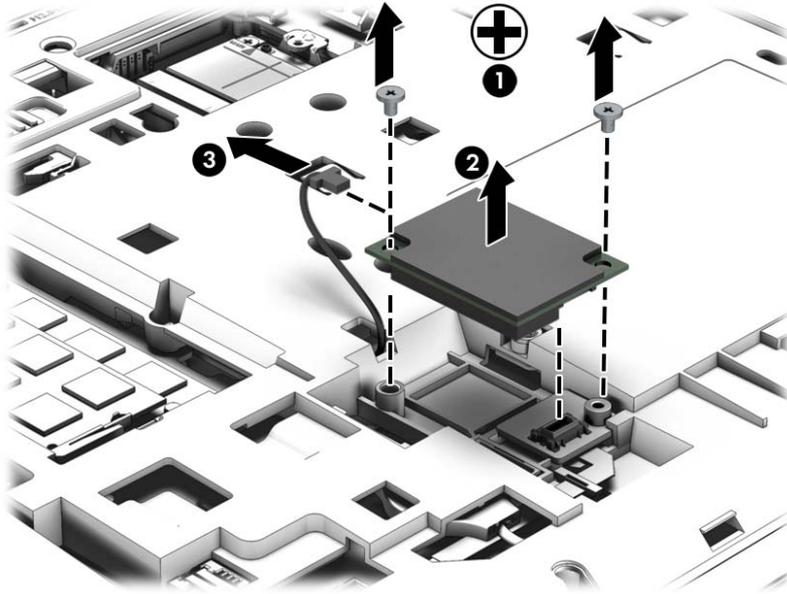


**3.** Release the modem module connector board from the clip, and then release the ZIF connector to remove modem module connector board.

Reverse this procedure to install a modem module.

# Primary memory module

The computer has one memory module compartment. The capacity of the computer can be upgraded by adding a memory module to the vacant expansion memory module slot or by upgrading the existing memory module in the primary memory module slot.

⚠ **WARNING!**    To reduce the risk of electric shock and damage to the equipment, unplug the power cord and remove all batteries before installing a memory module.

⚠ **CAUTION:**    Electrostatic discharge (ESD) can damage electronic components. Before beginning any procedure, ensure that you are discharged of static electricity by touching a grounded metal object.

**CAUTION:**    To prevent information loss or an unresponsive system:

Shut down the computer before adding or replacing memory modules. Do not remove a memory module while the computer is on, in the Sleep state, or in Hibernation.

If you are not sure whether the computer is off or in Hibernation, turn the computer on by pressing the power button. Then shut down the computer through the operating system.

📝 **NOTE:**    To use a dual-channel configuration when adding a second memory module, be sure that both memory modules are identical.

📝 **NOTE:**    The primary memory is located in the bottom memory slot and the expansion memory is located in the top memory slot.

| Description | Spare part number |
| --- | --- |
| 8-GB (PC3L, 12800, 1600-MHz) | 693374-001 |

| Description | Spare part number |
|---|---|
| 4-GB (PC3L, 12800, 1600-MHz) | 691740-001 |
| 2-GB (PC3L, 12800, 1600-MHz) | 691739-001 |

To add or replace a memory module:

1. Save your work and shut down the computer.

2. Disconnect AC power and external devices connected to the computer.

3. Remove the battery (see Battery on page 64).

4. Remove the service cover (see Service cover on page 65).

5. If you are replacing a memory module, remove the existing memory module:

   a. Pull away the retention clips **(1)** on each side of the memory module.

      The memory module tilts up.

   b. Grasp the edge of the memory module **(2)**, and then gently pull the memory module out of the memory module slot.

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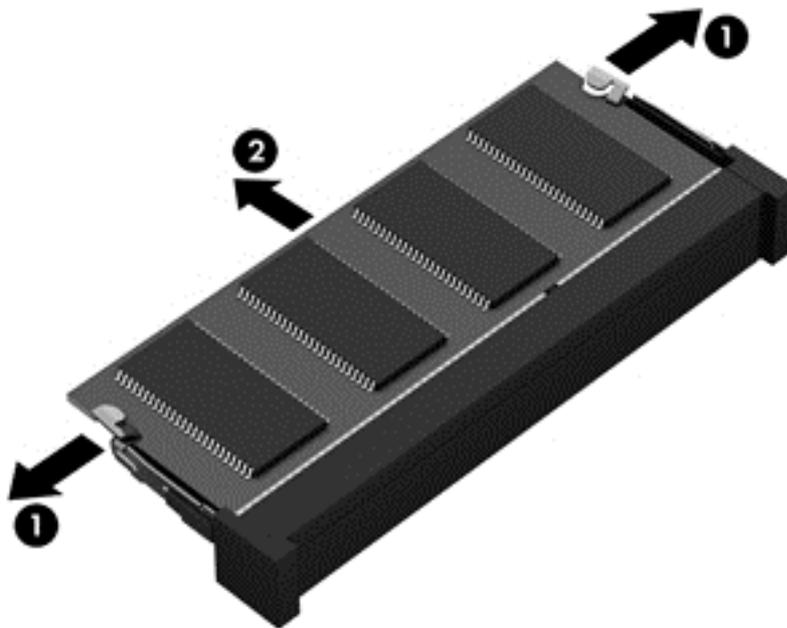


   To protect a memory module after removal, place it in an electrostatic-safe container.

6. Insert a new memory module:

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

**a.** Align the notched edge **(1)** of the memory module with the tab in the memory module slot.

**b.** With the memory module at a 45-degree angle from the surface of the memory module compartment, press the module **(2)** into the memory module slot until it is seated.

**c.** Gently press the memory module **(3)** down, applying pressure to both the left and right edges of the memory module, until the retention clips snap into place.

> ⚠ **CAUTION:** To prevent damage to the memory module, be sure that you do not bend the memory module.
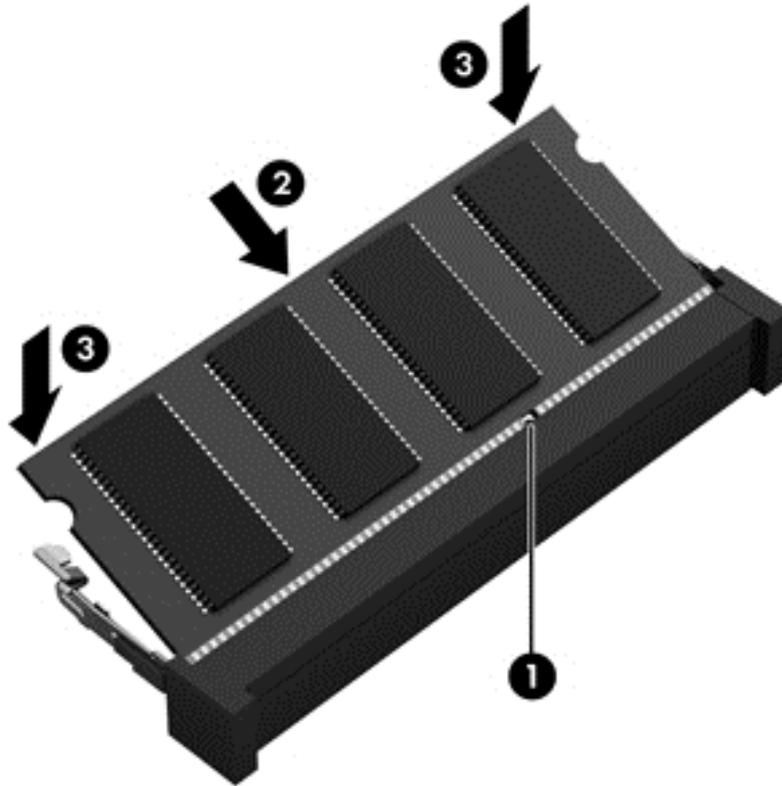


Reverse this procedure to install a memory module.

# Expansion memory module

**Update BIOS before adding memory modules**

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

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

To update BIOS:

1. Navigate to www.hp.com.

2. Click **Support & Drivers > click Drivers & Software**.

3. In the **Enter a product name/number box**, type the computer model information, and then click **Search**.

4. Click the link for the computer model.

5. Select the operating system, and then click **Next**.

6. Under **Step 2: Select a Download**, click the **BIOS** link.

7. Click the link for the most recent BIOS.

8. Click the **Download** button, and then follow the on-screen instructions.

Before removing a memory module, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

Remove the memory module:

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

**2.** Remove the memory module **(2)** by pulling the module away from the slot at an angle.
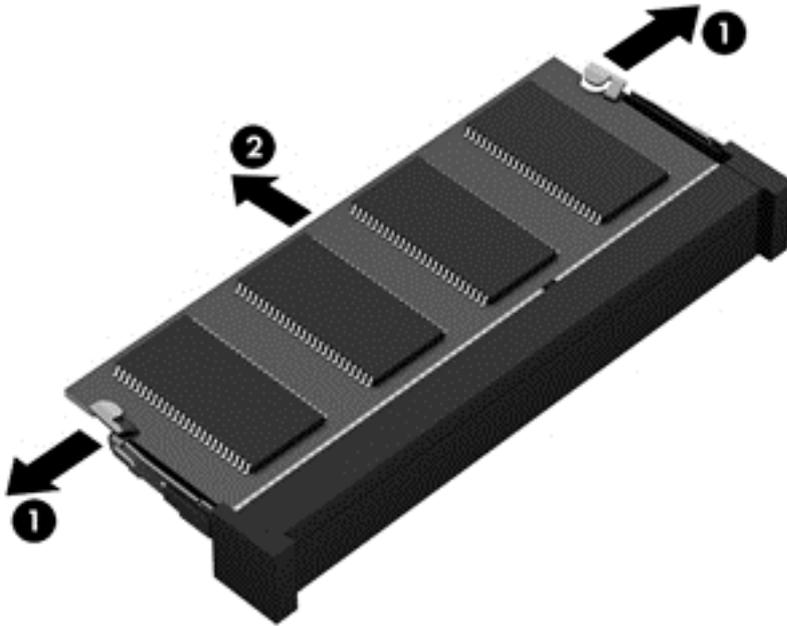
Reverse this procedure to install a memory module.

# WWAN module (select models only)

| Description | Spare part number |
|---|---|
| HP hs3110 HSPA+ Mobile Broadband Module | 723895-001 |
| HP lt4112 LTE/HSPA+ Mobile Broadband Module | 704031-001 |
| HP lt4111 LTE/EV-DO/HSPA+ Mobile Broadband Module | 704030-001 |

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

Before removing the WWAN module, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

Remove the WWAN module:

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

   📝 **NOTE:** The WWAN antenna cable labeled "5" connects to the WWAN module "Main" terminal labeled "5". The WWAN antenna cable labeled "6" connects to the WWAN module "Aux/GPS" terminal labeled "6".

2. Remove the Phillips screw **(2)** that secures the WWAN module to the system board.

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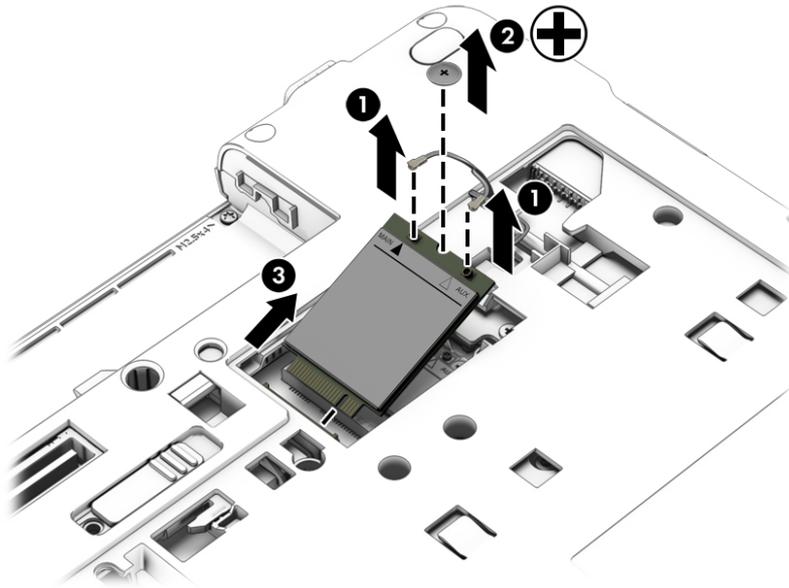


**NOTE:** If the WWAN antenna cables are not connected to the terminals on the WWAN module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WWAN module.

# WLAN module

| Description | Spare part number |
| --- | --- |
| Intel 802.11 a/b/g/n 2x2 Combo Adapter | 670292-001 |
| Intel 802.11 b/g/n HMC 1x1 | 675794-001 |
| Atheros 802.11 b/g/n 1x1 | 690019-001 |
| Intel 802.11 2x2 a/b/g/n | 695915-001 |
| Intel 802.11 2x2 a/b/g/n | 710661-001 |
| Intel 802.11 a/b/g/n 2x2 + Bluetooth 4.0 WLAN | 717381-001 |

| Description | Spare part number |
|---|---|
| Broadcom 802.11 a/b/g/n 2x2 + BT 4.0 LE PCIe+USB HMC WW | 730668-001 |
| Intel 802.11 a/b/g/n 2x2 + BT 4.0 WLAN | 747832-001 |

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

Before removing the WLAN module, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

Remove the WLAN module:

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

   📝 **NOTE:** The WLAN antenna cable labeled "1" connects to the WLAN module "Main" terminal labeled "1". The WLAN antenna cable labeled "2" connects to the WLAN module "Aux" terminal labeled "2".

2. Remove the two Phillips screws **(2)** that secure the WLAN module to the system board.)

3. Remove the WLAN module **(3)** by gently pulling the module away from the slot at an angle. (The WLAN module tilts up.)
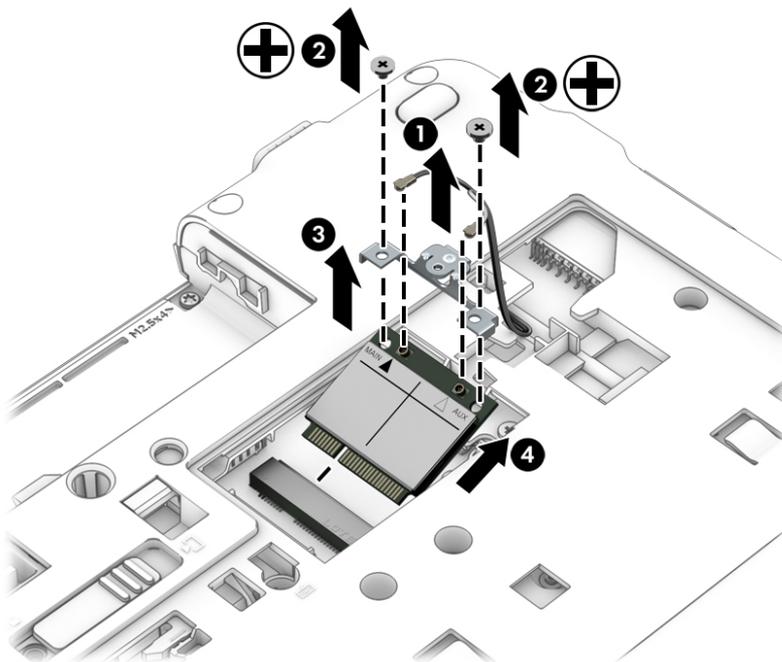
**NOTE:** If the WLAN antenna cables are not connected to the terminals on the WLAN module, protective sleeves should be installed on the antenna connectors, as shown in the following illustration.



Reverse this procedure to install the WLAN module.

# Optical drive

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

| Description | Spare part number |
| --- | --- |
| Blu-ray R/RE DVD±RW SuperMulti Double-Layer Combo Drive | 749959-001 |
| | 739999-001 |
| | 744820-001 |
| DVD±RW SuperMulti Double-Layer Drive | 749958-001 |
| | 744822-001 |
| | 740001-001 |
| DVD-ROM Drive | 749957-001 |
| | 744821-001 |
| | 740000-001 |
| | 735601-001 |

Before removing the optical drive, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

Remove the optical drive:

1. Position the computer with the left side toward you.

2. Loosen the captive screw **(1)** that secures the optical drive to the computer.

3. Insert a thin tool into the optical drive tab access **(2)**, and then press the tab to the left to release the optical drive from the computer.

4. Remove the optical drive **(3)**.
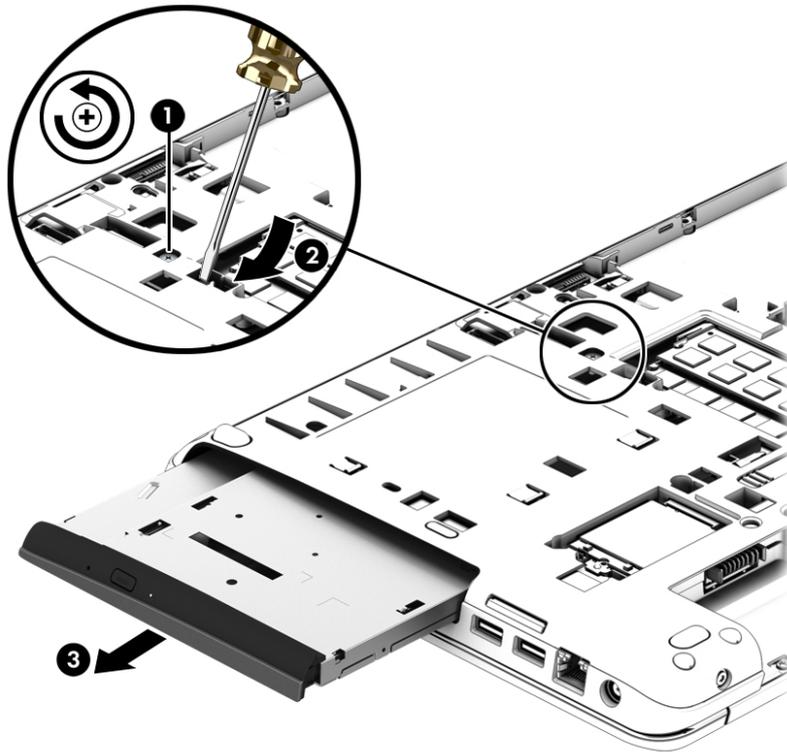
Reverse this procedure to install the optical drive.

# Solid-state drive

| Description | Spare part number |
|---|---|
| 256-GB SATA-3 self-encrypting SSD | 749263-001 |
| 180-GB SATA-3 SSD | 749262-001 |
| | 749278-001 |
| 128-GB SATA-3 SSD | 749261-001 |
| | 749277-001 |
| 128-GB mSATA-3 SSD for use in Brazil | 749280-001 |
| 32-GB mSATA flash cache SSD | 749281-001 |

Before removing the solid-state drive, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

Remove the solid-state drive:

1. Remove the two Phillips screws **(1)** that secure the solid-state drive to the system board. (The solid-state drive tilts up.)

2. Remove the solid-state drive **(2)** by pulling the drive away from the slot at an angle.
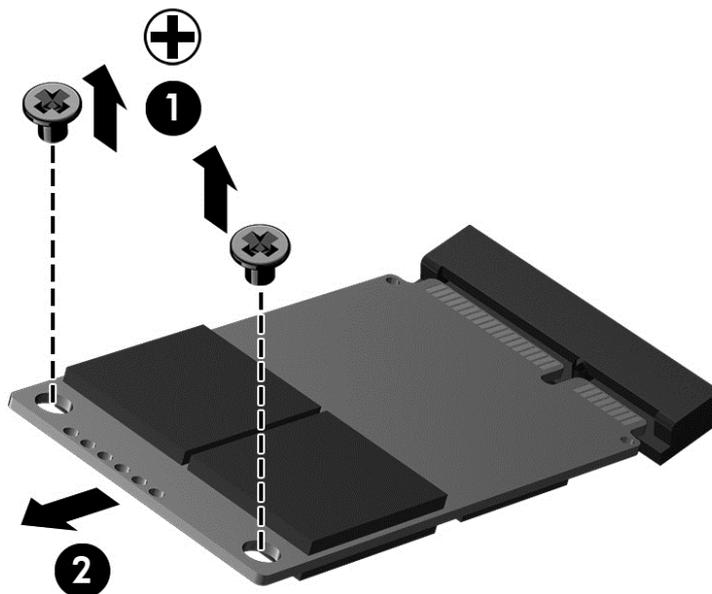


Reverse this procedure to install the solid-state drive.

# Keyboard

| For use in country or region | Spare part number | For use in country or region | Spare part number |
|---|---|---|---|
| **Keyboard for 15.6–inch models (includes keyboard cable):** | | | |
| For use in Belgium | 738696-A41 | For use in the Netherlands | 738696-B31 |
| For use in Brazil | 738696-201 | For use in Northwest Africa | 738696-FP1 |
| For use in Bulgaria | 738696-261 | For use in Norway | 738696-091 |
| For use in Canada | 738696-DB1 | For use in Portugal | 738696-131 |
| For use in the Czech Republic and Slovakia | 738696-FL1 | For use in Romania | 738696-271 |
| For use in Denmark | 738696-051 | For use in Russia | 738696-251 |
| For use in France | 738696-041 | For use in Saudi Arabia | 738696-171 |
| For use in Germany | 738696-151 | For use in Slovenia | 738696-BA1 |
| For use in Greece | 738696-211 | For use in Spain | 738696-071 |
| For use in Hungary | 738696-061 | For use in Sweden and Finland | 738696-B71 |
| For use in Iceland | 738696-DD1 | For use in Switzerland | 738696-BG1 |
| For use in India | 738696-D61 | For use in Taiwan | 738696-AB1 |
| For use in Israel | 738696-BB1 | For use in Thailand | 738696-281 |
| For use in Italy | 738696-061 | For use in Turkey | 738696-141 |
| For use in Japan | 738696-291 | For use in the United Kingdom | 738696-031 |
| For use in Korea | 738696-AD1 | For use in the United States | 738696-001 |
| For use in Latin America | 738696-161 | | |
| **Keyboard for 14–inch models (includes keyboard cable):** | | | |
| For use in Belgium | 738687-A41 | For use in Northwest Africa | 738687-FP1 |
| For use in Bulgaria | 738687-261 | For use in Norway | 738687-091 |
| For use in Canada | 738687-DB1 | For use in Portugal | 738687-131 |
| For use in the Czech Republic and Slovakia | 738687-FL1 | For use in Romania | 738687-271 |
| For use in Denmark | 738687-081 | For use in Russia | 738687-251 |
| For use in France | 738687-051 | For use in Saudi Arabia | 738687-171 |
| For use in Germany | 738687-041 | For use in Slovenia | 738687-BA1 |
| For use in Greece | 738687-151 | For use in South Korea | 738687-AD1 |
| For use in Hungary | 738687-211 | For use in Spain | 738687-071 |
| For use in Iceland | 738687-DD1 | For use in Sweden and Finland | 738687-B71 |
| For use in India | 738687-D61 | For use in Switzerland | 738687-BG1 |
| For use in Israel | 738687-BB1 | For use in Taiwan | 738687-AB1 |
| For use in Italy | 738687-061 | For use in Thailand | 738687-281 |

| For use in country or region | Spare part number | For use in country or region | Spare part number |
|---|---|---|---|
| For use in Japan | 738687-291 | For use in Turkey | 738687-141 |
| For use in Latin America | 738687-161 | For use in the United Kingdom and Singapore | 738687-031 |
| For use in the Netherlands | 738687-B31 | For use in the United States | 738687-001 |
| **Keyboard with pointing stick for 15.6–inch models (includes keyboard cable and pointing stick cable):** | | | |
| For use in Belgium | 738697-A41 | For use in the Netherlands | 738697-B31 |
| For use in Brazil | 738697-201 | For use in Northwest Africa | 738697-FP1 |
| For use in Bulgaria | 738697-261 | For use in Norway | 738697-091 |
| For use in Canada | 738697-DB1 | For use in Portugal | 738697-131 |
| For use in the Czech Republic and Slovakia | 738697-FL1 | For use in Romania | 738697-271 |
| For use in Denmark | 738697-051 | For use in Russia | 738697-251 |
| For use in France | 738697-041 | For use in Saudi Arabia | 738697-171 |
| For use in Germany | 738697-151 | For use in Slovenia | 738697-BA1 |
| For use in Greece | 738697-211 | For use in Spain | 738697-071 |
| For use in Hungary | 738697-061 | For use in Sweden and Finland | 738697-B71 |
| For use in Iceland | 738697-DD1 | For use in Switzerland | 738697-BG1 |
| For use in India | 738697-D61 | For use in Taiwan | 738697-AB1 |
| For use in Israel | 738697-BB1 | For use in Thailand | 738697-281 |
| For use in Italy | 738697-D61 | For use in Turkey | 738697-141 |
| For use in Japan | 738697-291 | For use in the United Kingdom | 738697-031 |
| For use in Korea | 738697-AD1 | For use in the United States | 738697-001 |
| For use in Latin America | 738697-161 | | |
| **Keyboard with pointing stick for 14–inch models (includes keyboard cable and pointing stick cable):** | | | |
| For use in Belgium | 738688-A41 | For use in Northwest Africa | 738688-FP1 |
| For use in Brazil | 738688-201 | For use in Norway | 738688-091 |
| For use in Bulgaria | 738688-261 | For use in Portugal | 738688-131 |
| For use in Canada | 738688-DB1 | For use in Romania | 738688-271 |
| For use in the Czech Republic and Slovakia | 738688-FL1 | For use in Russia | 738688-251 |
| For use in Denmark | 738688-081 | For use in Saudi Arabia | 738688-171 |
| For use in France | 738688-051 | For use in Slovenia | 738688-BA1 |
| For use in Germany | 738688-041 | For use in South Korea | 738688-AD1 |
| For use in Greece | 738688-151 | For use in Spain | 738688-071 |
| For use in Hungary | 738688-211 | For use in Sweden and Finland | 738688-B71 |
| For use in Iceland | 738688-DD1 | For use in Switzerland | 738688-BG1 |

| For use in country or region | Spare part number | For use in country or region | Spare part number |
|---|---|---|---|
| For use in India | 738688-D61 | For use in Taiwan | 738688-AB1 |
| For use in Israel | 738688-BB1 | For use in Thailand | 738688-281 |
| For use in Italy | 738688-061 | For use in Turkey | 738688-141 |
| For use in Japan | 738688-291 | For use in the United Kingdom and Singapore | 738688-031 |
| For use in Latin America | 738688-161 | For use in the United States | 738688-001 |
| For use in the Netherlands | 738688-B31 | | |
| **Backlit keyboard for 15.6–inch models (includes backlight and keyboard cables):** | | | |
| For use in Belgium | 787801-A41 | For use in the Netherlands | 787801-B31 |
| For use in Brazil | 787801-201 | For use in Northwest Africa | 787801-FP1 |
| For use in Bulgaria | 787801-261 | For use in Norway | 787801-091 |
| For use in Canada | 787801-DB1 | For use in Portugal | 787801-131 |
| For use in the Czech Republic and Slovakia | 787801-FL1 | For use in Romania | 787801-271 |
| For use in Denmark | 787801-051 | For use in Russia | 787801-251 |
| For use in France | 787801-041 | For use in Saudi Arabia | 787801-171 |
| For use in Germany | 787801-151 | For use in Slovenia | 787801-BA1 |
| For use in Greece | 787801-211 | For use in Spain | 787801-071 |
| For use in Hungary | 787801-061 | For use in Sweden and Finland | 787801-B71 |
| For use in Iceland | 787801-DD1 | For use in Switzerland | 787801-BG1 |
| For use in India | 787801-D61 | For use in Taiwan | 787801-AB1 |
| For use in Israel | 787801-BB1 | For use in Thailand | 787801-281 |
| For use in Italy | 787801-061 | For use in Turkey | 787801-141 |
| For use in Japan | 787801-291 | For use in the United Kingdom | 787801-031 |
| For use in Korea | 787801-AD1 | For use in the United States | 787801-001 |
| For use in Latin America | 787801-161 | | |
| **Backlit keyboard for 14–inch models (includes backlight and keyboard cables):** | | | |
| For use in Belgium | 787294-A41 | For use in the Netherlands | 787294-B31 |
| For use in Brazil | 787294-201 | For use in Northwest Africa | 787294-FP1 |
| For use in Bulgaria | 787294-261 | For use in Norway | 787294-091 |
| For use in Canada | 787294-DB1 | For use in Portugal | 787294-131 |
| For use in the Czech Republic and Slovakia | 787294-FL1 | For use in Romania | 787294-271 |
| For use in Denmark | 787294-051 | For use in Russia | 787294-251 |
| For use in France | 787294-041 | For use in Saudi Arabia | 787294-171 |
| For use in Germany | 787294-151 | For use in Slovenia | 787294-BA1 |

| For use in country or region | Spare part number | For use in country or region | Spare part number |
|---|---|---|---|
| For use in Greece | 787294-211 | For use in Spain | 787294-071 |
| For use in Hungary | 787294-061 | For use in Sweden and Finland | 787294-B71 |
| For use in Iceland | 787294-DD1 | For use in Switzerland | 787294-BG1 |
| For use in India | 787294-D61 | For use in Taiwan | 787294-AB1 |
| For use in Israel | 787294-BB1 | For use in Thailand | 787294-281 |
| For use in Italy | 787294-061 | For use in Turkey | 787294-141 |
| For use in Japan | 787294-291 | For use in the United Kingdom | 787294-031 |
| For use in Korea | 787294-AD1 | For use in the United States | 787294-001 |
| For use in Latin America | 787294-161 | | |

Before removing the keyboard, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

5. Remove the service cover (see Service cover on page 65).

6. Remove the optical drive (see Optical drive on page 77).

Remove the keyboard:

1. Loosen the two captive screws that secure the keyboard to the computer.
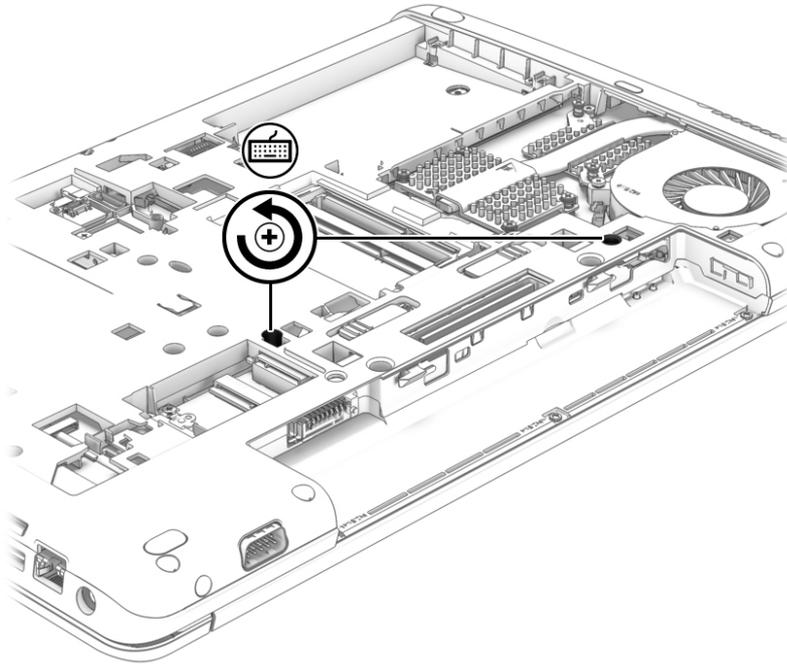
2. Open the computer.

3. Insert a thin tool **(1)** to loosen the tabs on the rear edge of the keyboard **(2)**, and then lift the rear edge of the keyboard **(3)**.
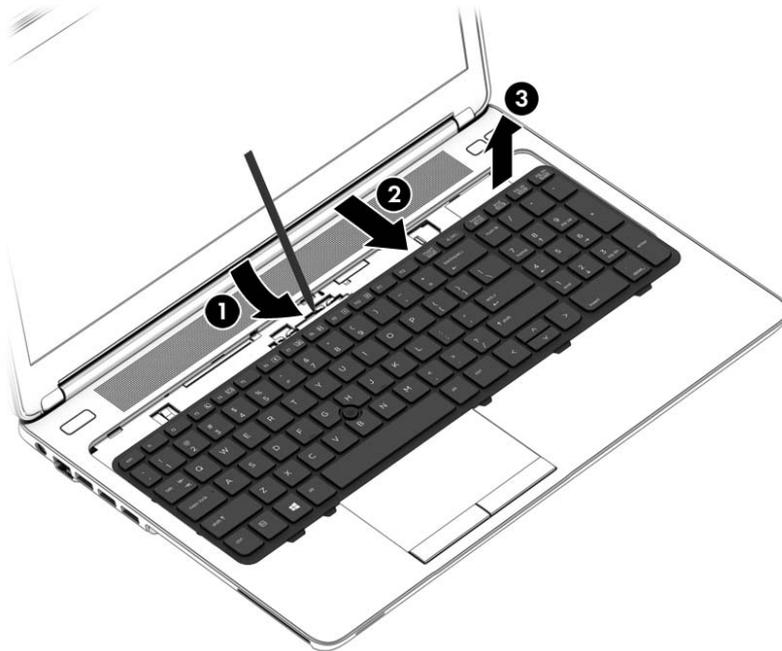


4. Swing the rear edge of the keyboard **(1)** up and forward until it rests upside down on the palm rest.

**5.** For models without a pointing stick, remove the metal shield **(2)** covering the zero insertion force (ZIF) connector, release the ZIF connector to which the keyboard cable is attached **(3)**, remove the keyboard cable **(4)**, and then remove the keyboard **(5)**.
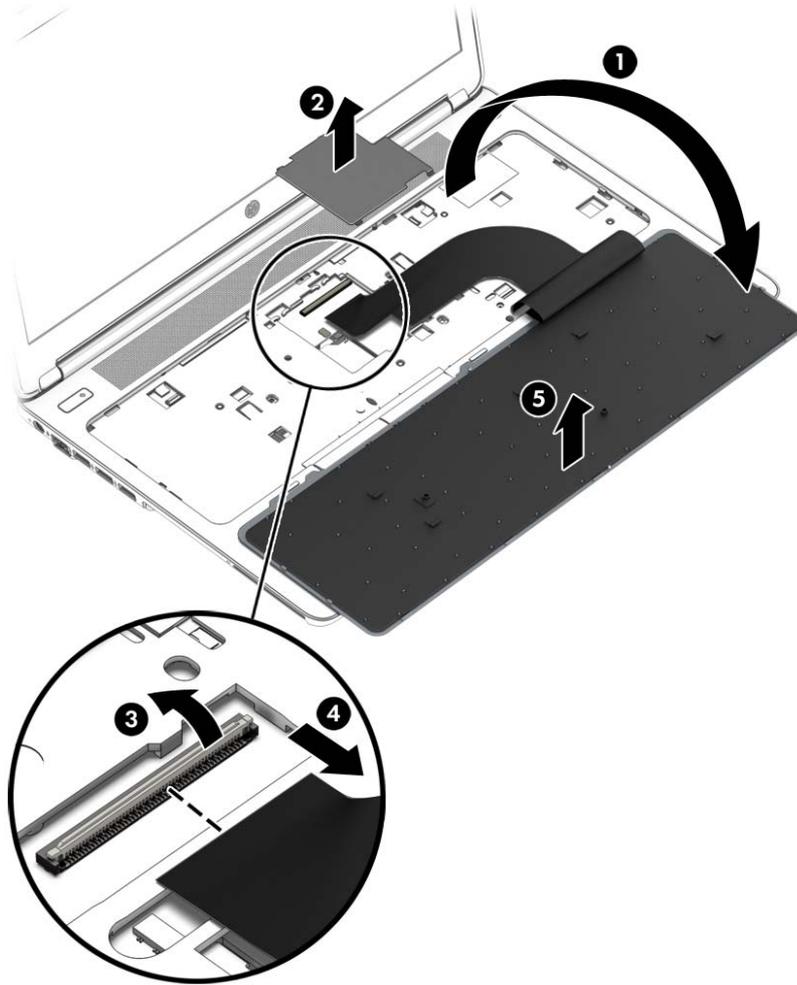
**6.** For models with a pointing stick, disconnect the pointing stick cable from the system board **(32)**, release the zero insertion force (ZIF) connector to which the keyboard cable is attached **(3)**, remove the keyboard cable **(4)**, and then remove the keyboard **(5)**
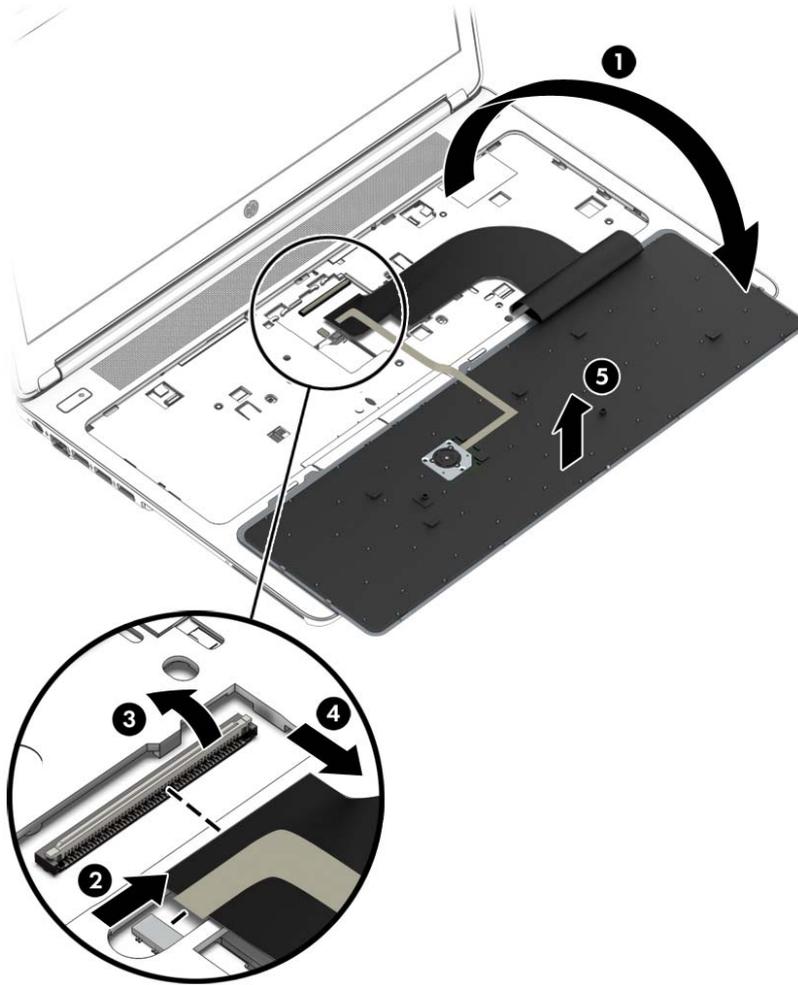
Reverse this procedure to install the keyboard.

# 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.

## Fan and heat sink assembly

📝 **NOTE:** The fan and heat sink assembly spare part kit includes replacement thermal material.

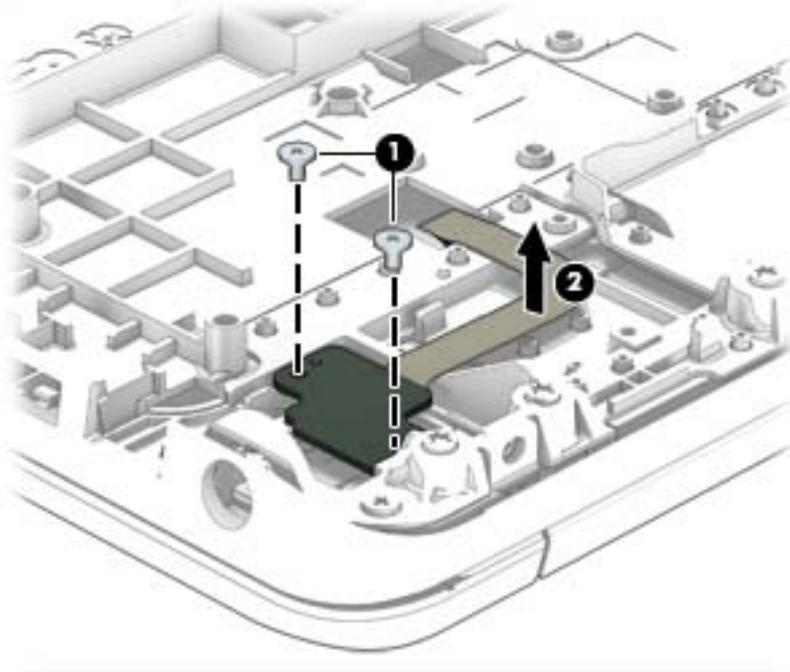| Description | Spare part number |
|---|---|
| Fan | 738685-001 |
| Heat sink for computer models with Intel UMA graphics memory | 738686-001 |
| Heat sink for computer models with discrete graphics | 738393-001 |

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

1.  Turn off 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 the power from the computer by unplugging the power cord from the computer.

3.  Disconnect all external devices from the computer.

4.  Remove the battery (see ), and then remove the following components:

    a.  Service cover (see )

    b.  Hard drive (see )

    c.  Optical drive (see )

    d.  Keyboard (see )

Remove the fan:

1.  Disconnect the fan cable **(1)** from the system board, loosen the two captive screws **(2)**, and then remove the fan.
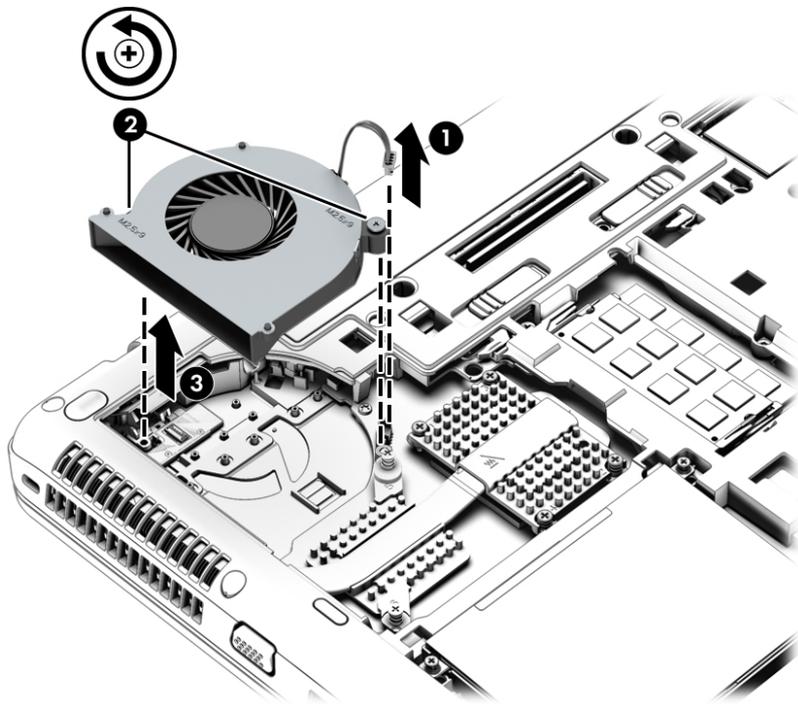
2.  Remove the heat sink assembly:

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

●   For computer models equipped with Intel UMA graphics, following the 1 through 4 sequence stamped into the processor heat sink, loosen the four Phillips captive screws that secure the processor heat sink to the system board, and then remove the heat sink **(2)**.
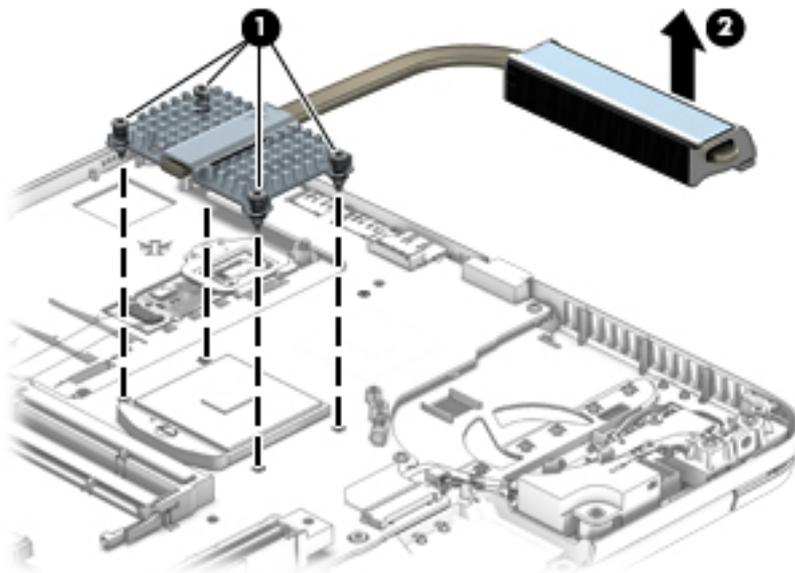
- For computer models equipped with discrete graphics, following the 1 through 2 sequence stamped into the graphics board heat sink, remove the 2 captive screws **(1)**. Following the 1 through 4 sequence stamped into the processor heat sink, loosen the four Phillips captive screws that secure the processor heat sink to the system board **(2)**, and then remove the heat sink assembly **(3)**.
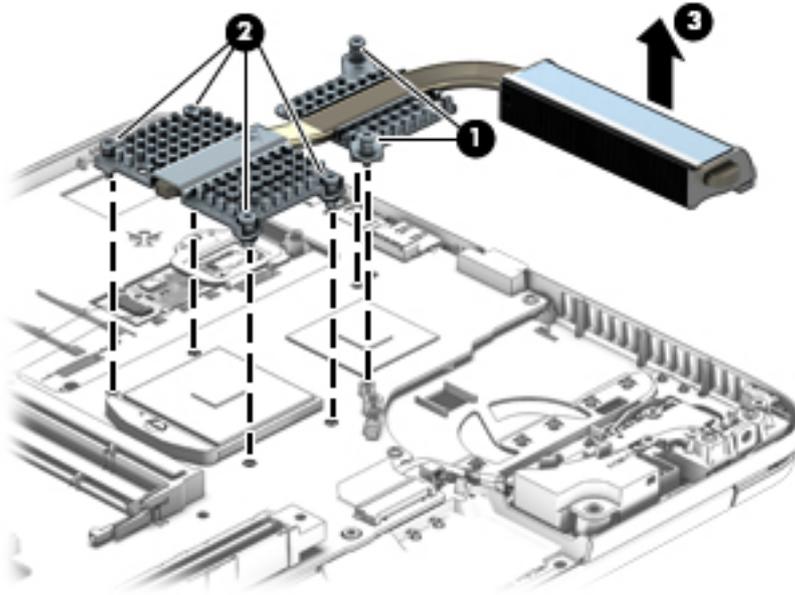


**NOTE:** The thermal material must be thoroughly cleaned from the surfaces of the fan/heat sink assembly and the system board components each time the fan and heat sink assembly is removed. Replacement thermal material is included with the fan/heat sink assembly, processor, and system board spare part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

Thermal locations for computer models equipped with Intel UMA graphics are shown in the following illustration:

- Various thermal pads are used on the processor **(1)** and the heat sink section **(2)** that services it.
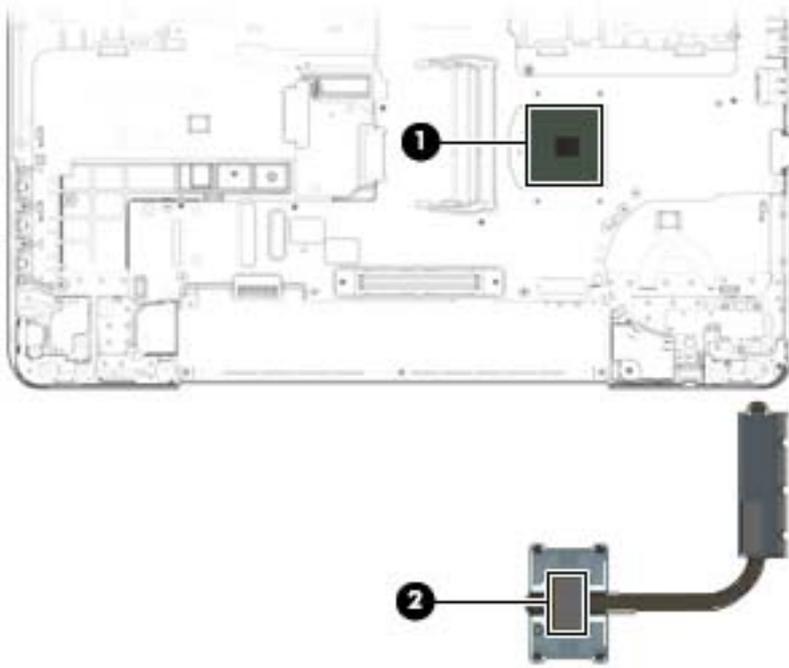
Thermal locations for computer models equipped with discrete graphics are shown in the following illustration:

- Thermal paste is used on the processor **(1)** and the heat sink section **(2)** that services it.
- Thermal paste is used on the graphics board processor **(3)** and the heat sink section **(4)** that services it
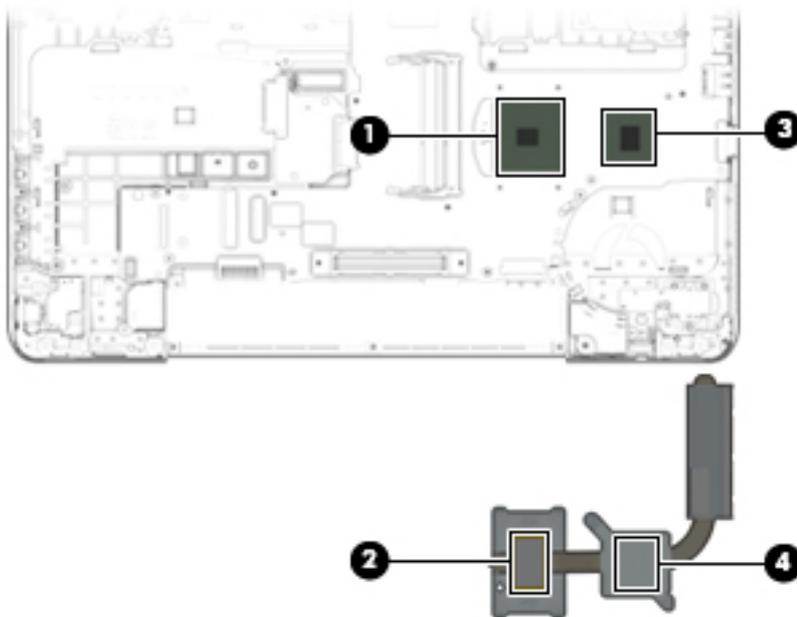


Reverse this procedure to install the fan/heat sink assembly.

# Base enclosure

| Description | Spare part number |
|---|---|
| Base enclosure | |
| For 15.6-in models | 738692-001 |
| For 14-in models | 738681-001 |

Before removing the base enclosure, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

   e. Fan and heat sink assembly (see Fan and heat sink assembly on page 87)

Remove the base enclosure:

1. Remove the rubber screw covers.
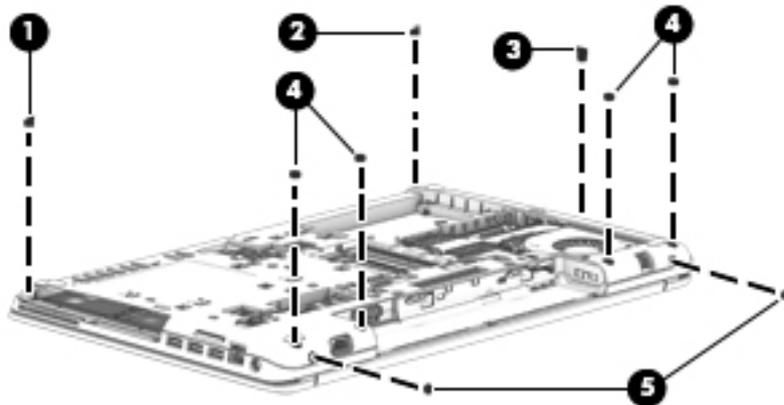
2.  Remove the fourteen Torx T8 screws that secure the top cover to the computer.
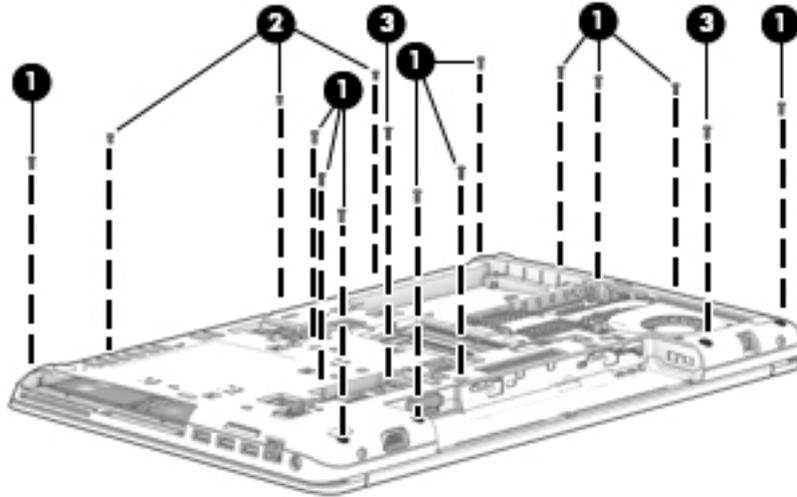
3.  Remove the following screws that secure the base enclosure to the computer:

    **(1)** Two Torx T8 screws in the optical drive bay

    **(2)** Three Torx T8 screws in the battery bay

    **(3)** Two Phillips screws
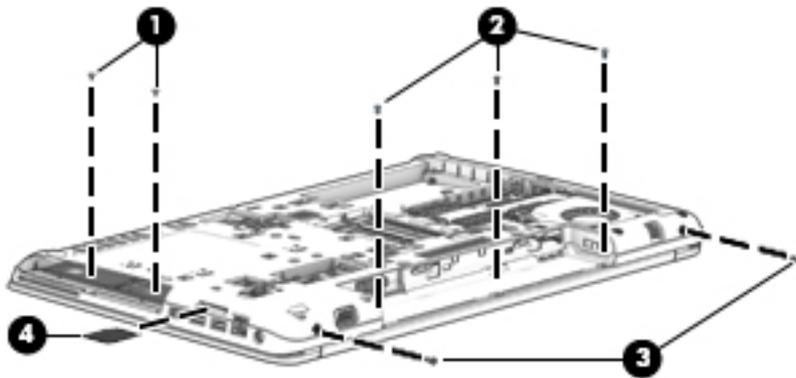
4.  Remove the memory card **(4)**.

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

6.  Lift the front edge of the base enclosure until the left and right sides and the rear edge detach from the computer.

7.  Disconnect the serial connector cable from the system board.

**8.** Remove the base enclosure, making sure that the display panel cables and the wireless antenna cables route through the openings in the base enclosure.
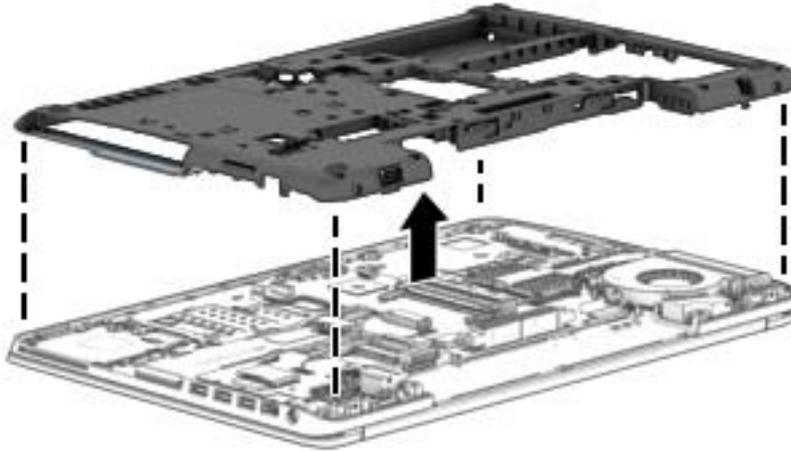
Reverse this procedure to install the base enclosure.

# USB board

| Description | Spare part number |
|---|---|
| USB board (includes cable) | |
| For use in ProBook 650 G1 models equipped with a 15.6–inch display assembly | 738702-001 |
| For use in ProBook 655 G1 models equipped with a 15.6–inch display assembly | 745891-001 |
| For use in computer models equipped with a 14–inch display assembly | 738400-001 |

Before removing the USB board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

    a. Service cover (see Service cover on page 65)

    b. Hard drive (see Hard drive on page 66)

    c. Optical drive (see Optical drive on page 77)

    d. Keyboard (see Keyboard on page 80)

    e. Base enclosure (see Base enclosure on page 91)

Remove the USB board:

1. Remove the four Phillips screws **(3)** that secure the USB board to the base enclosure.
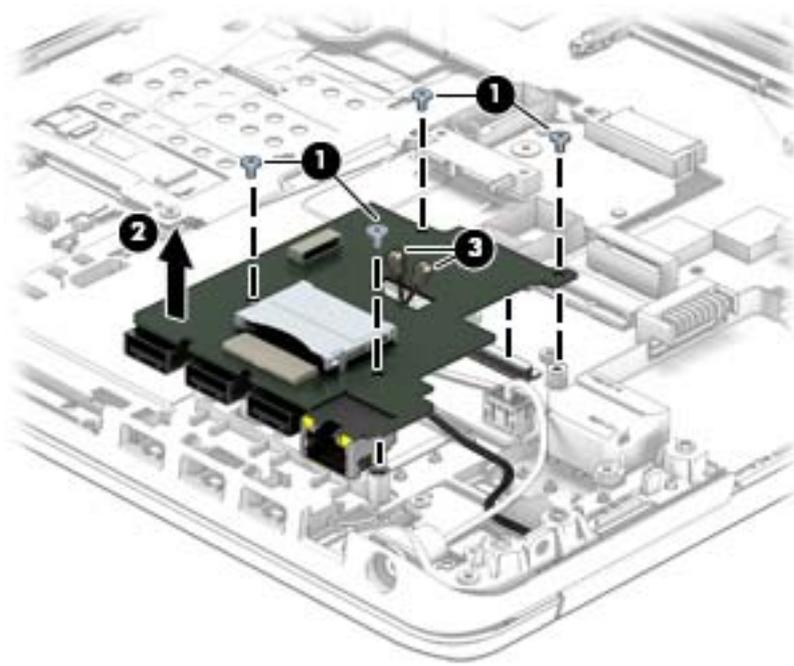
2. Lift up on the left side to disconnect the connector interface **(2)**.

3. Detach the USB board cable from the base enclosure **(3)**, and remove the USB board and cable.

Reverse this procedure to install the USB board.

# Power button board

| Description | Spare part number |
| --- | --- |
| Power button board (includes cable) | |
| For 15.6-in models | 738701-001 |
| For 14-in models | 738399-001 |

Before removing the power button board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

    a. Service cover (see Service cover on page 65)

    b. Hard drive (see Hard drive on page 66)

    c. Optical drive (see Optical drive on page 77)

    d. Keyboard (see Keyboard on page 80)

    e. Base enclosure (see Base enclosure on page 91)

Remove the power button board:

1. Turn the top cover upside down, with the front toward you.

2. Remove the Phillips PM2.0×3.0 screw **(1)** that secures the power button board to the top cover.

3. Release the clips **(2)** that secure the power button board to the top cover.

4. Remove the power button board **(3)** and cable.



Reverse this procedure to install the power button board.

# Fingerprint reader board

| Description | Spare part number |
|---|---|
| Fingerprint reader board (includes cable and double-sided adhesive) | 738394-001 |

Before removing the fingerprint reader board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see ), and then remove the following components:

   a. Service cover (see )

   b. Hard drive (see )

   c. Optical drive (see )

   d. Keyboard (see )

   e. Base enclosure (see )

Remove the fingerprint reader board:

1. Turn the top cover upside down with the front toward you.

2. Detach the fingerprint reader board cable **(1)** from the top cover. (The fingerprint reader board cable is attached to the top cover with tape.)

3. Remove the Phillips screw **(2)** that secures the fingerprint reader board and bracket to the top cover.

**4.** Slide the fingerprint reader board **(2)** bracket forward and remove the fingerprint reader board and cable**(4)**.
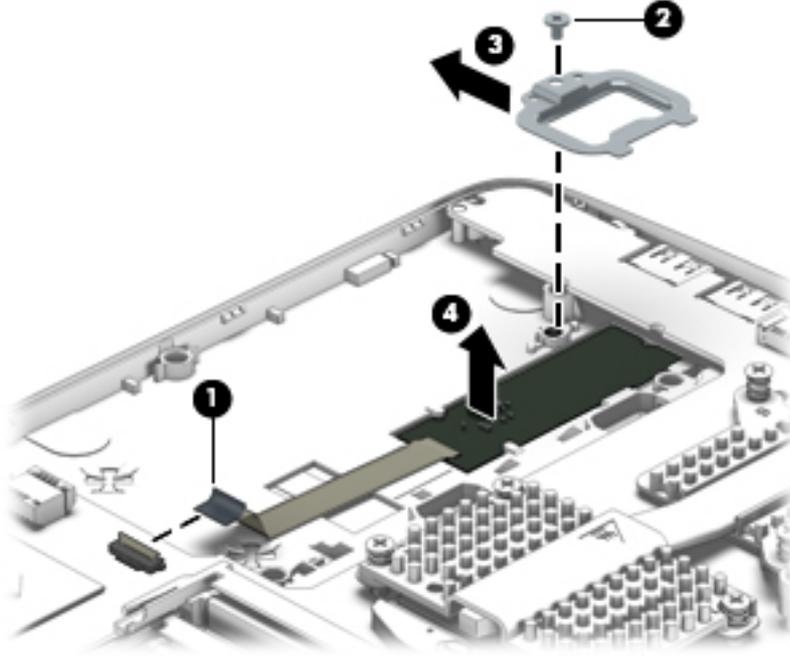
Reverse this procedure to install the fingerprint reader board.

# Smart card reader

| Description | Spare part number |
|---|---|
| Smart card reader for 15.6–in models with TouchPad (includes cable) | 748958-001 |
| Smart card reader for 14-in models with 2-button TouchPad (includes cable) | 738398-001 |
| Smart card reader for 14-in models with 4-button TouchPad (includes cable) | 744005-001 |

Before removing the smart card reader, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

    a. Service cover (see Service cover on page 65)

    b. Hard drive (see Hard drive on page 66)

    c. Optical drive (see Optical drive on page 77)

    d. Keyboard (see Keyboard on page 80)

    e. Base enclosure (see Base enclosure on page 91)

Remove the smart card reader:

1. Release the ZIF connector (1) to which the smart card reader cable is attached, and then disconnect the smart card reader cable from the system board.

2. Remove the two Torx screws (2) that secure the smart card reader to the base enclosure.

3. Remove the smart card reader (3).
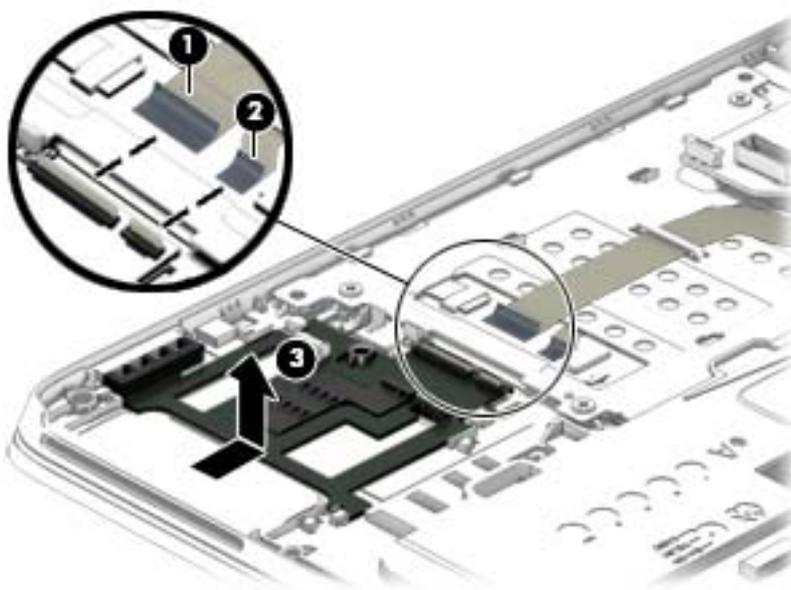
Reverse this procedure to install the smart card reader and cable.

# System board

📝 **NOTE:** The system board spare part kit includes battery connector bracket and replacement thermal material.

| Description | Spare part number |
| --- | --- |
| For 14-in. computer models with shared memory and WWAN capability (includes replacement thermal material) | 744007-001 |
| For 14-in. computer models with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744007-501 |
| For 14-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744007-601 |
| For 14-in. computer models with discrete memory and WWAN capability (includes replacement thermal material) | 744008-001 |
| For 14-in. computer models with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744008-501 |
| For 14-in. computer models with discrete memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744008-601 |
| For 14-in. computer models with discrete memory, WWAN capability (includes replacement thermal material) | 744009-001 |
| For 14-in. computer models with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744009-501 |
| For 14-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744009-601 |
| For 14-in. computer models with discrete memory and WWAN capability (includes replacement thermal material) | 744010-001 |
| For 14-in. computer models with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744010-501 |
| For 14-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744010-601 |
| For 15.6-in. computer models with discrete memory, WWAN capability (includes replacement thermal material) | 744015-001 |
| For 15.6-in. computer models with discrete memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744015-501 |
| For 15.6-in. computer models with discrete memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744015-601 |
| For 15.6-in. computer models with shared memory, WWAN capability (includes replacement thermal material) | 744016-001 |
| For 15.6-in. computer models with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744016-501 |
| For 15.6-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744016-601 |
| For 15.6-in. computer models with shared memory, WWAN capability (includes replacement thermal material) | 744017-001 |

| Description | Spare part number |
|---|---|
| For 15.6-in. computer models with shared memory and the Windows 8 Standard operating system with WWAN capability (includes replacement thermal material) | 744017-501 |
| For 15.6-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability (includes replacement thermal material) | 744017-601 |
| For 14-in. computer models equipped with shared memory with WWAN capability | 745883-001 |
| For 14-in. computer models equipped with shared memory and the Windows 8 Standard operating system with WWAN capability | 745883-501 |
| For 14-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability | 745883-601 |
| For 14-in. computer models shared memory without WWAN capability | 745884-001 |
| For computer models equipped with shared memory and the Windows 8 Standard operating system without WWAN capability | 745884-501 |
| For use only on computer models shared memory and the Windows 8 Professional operating system without WWAN capability | 745884-601 |
| For use only on 15.6-in. computer models equipped with an Intel Quad Core processor with WWAN capability | 745887-001 |
| For use only on 15.6-in. computer models shared memory and the Windows 8 Standard operating system with WWAN capability | 745887-501 |
| For use only on 15.6-in. computer models with shared memory and the Windows 8 Professional operating system with WWAN capability | 745887-601 |
| For use only on 15.6-in. computer models with shared memory and the Windows 8 Standard operating system without WWAN capability | 745888-501 |
| For use only on 15.6-in. computer models with shared memory and the Windows 8 Professional operating system without WWAN capability | 745888-601 |
| For use only on 15.6-in. computer models with shared memory and without WWAN capability | 745888-001 |

Before removing the system board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Fan/heat sink assembly (see Fan and heat sink assembly on page 87)

   e. Keyboard (see Keyboard on page 80)

   f. Display assembly (see Display assembly on page 116)

**g.** Base enclosure (see Base enclosure on page 91)

**h.** USB board (see USB board on page 94)

**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:

- WWAN module (see WWAN module (select models only) on page 74)

- Solid-state drive (see Solid-state drive on page 79)

- WLAN module (see WLAN module on page 75)

- Expansion memory (see Primary memory module on page 69)

- Primary memory (see Expansion memory module on page 72)

- Smart card reader (see Smart card reader on page 100)

- Processor (see Processor on page 109)

Remove the system board:

**1.** Disconnect the following cables from the system board:

**(1)** Card reader cable

**(2)** Power connector cable

Left **(3)** and right **(4)**speaker cables

**(5)** Display panel cable (if display panel is still attached)
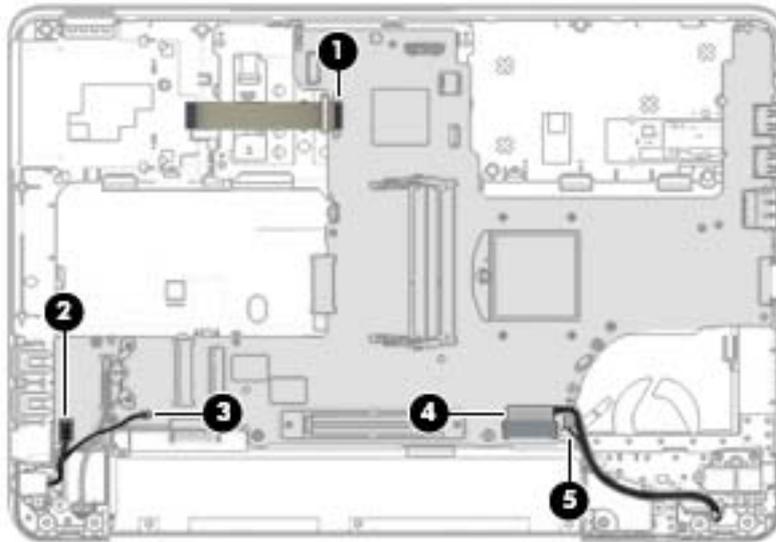
**2.** Remove the five Torx screws **(1)** and the Phillips screw **(2)** that secure the system board to the base enclosure.
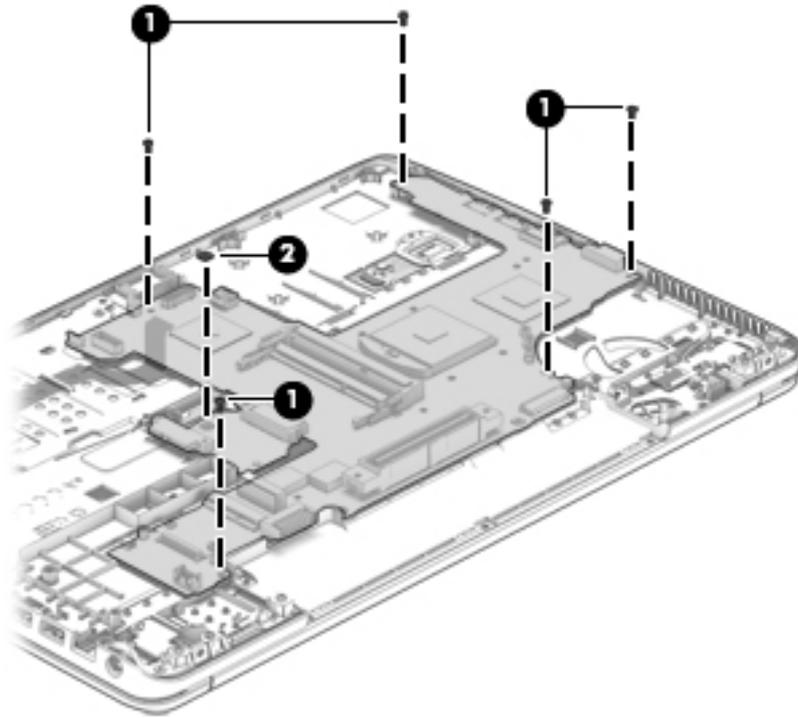
**3.** Lift up on the left side of the system board **(1)** until it rests at an angle.

**4.** Remove the system board **(2)** by sliding it up and to the left at an angle.
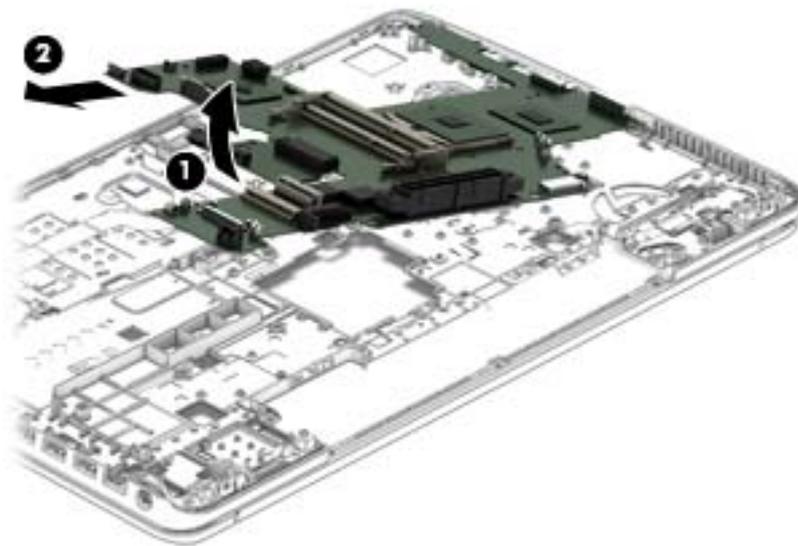
Reverse this procedure to install the system board.

# Speakers

| Description | Spare part number |
| --- | --- |
| Speakers (includes cable) | 738404-001 |

Before removing the speakers, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

   e. Base enclosure (see Base enclosure on page 91)

Remove the speakers:

1. Disconnect the speaker cables **(1)** and **(4)** from the system board.

2. Remove the two Phillips PM2.0×3.0 screws **(2)** and **(5)** that secure the speakers to the base enclosure.

**3.** Remove the speakers **(3)** and **(6)** and cables.
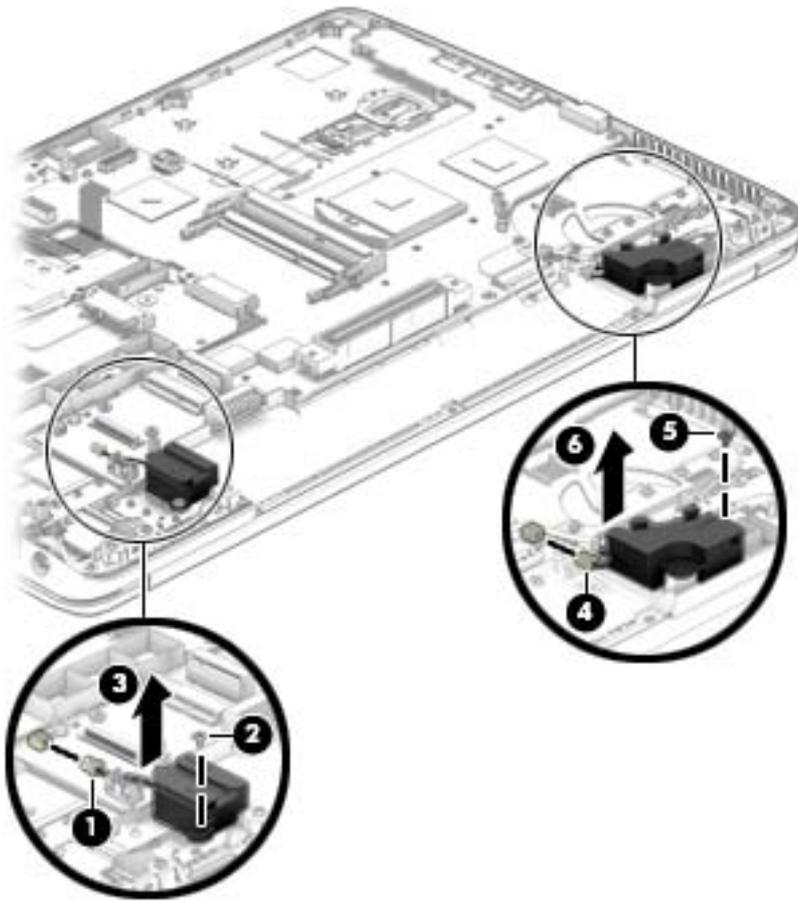


Reverse this procedure to install the speakers.

# Function button board

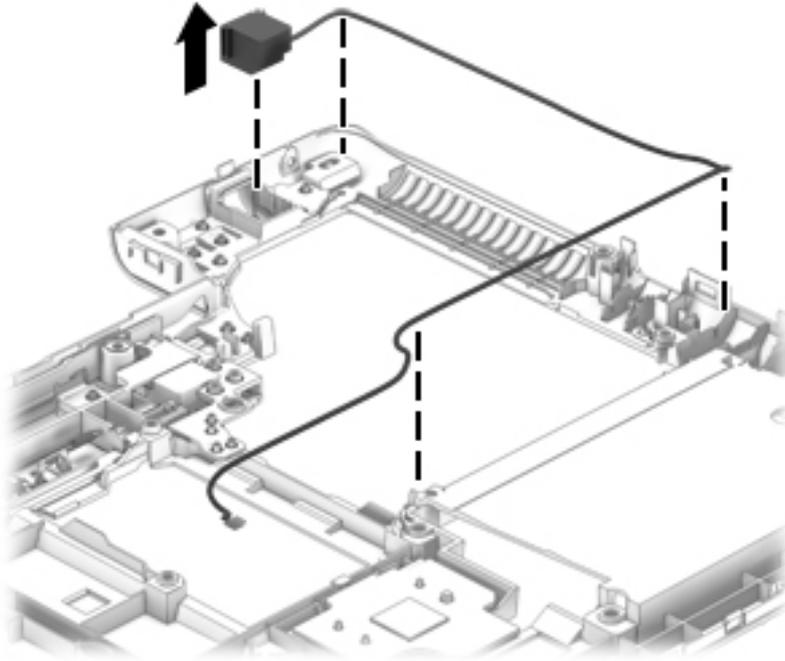| Description | Spare part number |
|---|---|
| Function button board (includes cable and double-sided adhesive) | |
| For use in models equipped with a 15.6–inch display assembly | 738703-001 |
| For use in models equipped with a 14–inch display assembly | 738401-001 |

Before removing the function button board, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

   e. Base enclosure (see Base enclosure on page 91)

Remove the function button board:

1. Turn the top cover upside down, with the front toward you.

2. Disconnect the function button board cable **(1)**.

3. Remove the Phillips PM2.0×3.0 screws **(2)** that secures the function button board to the top cover.

**4.** Lift the function button board **(3)** to remove it.
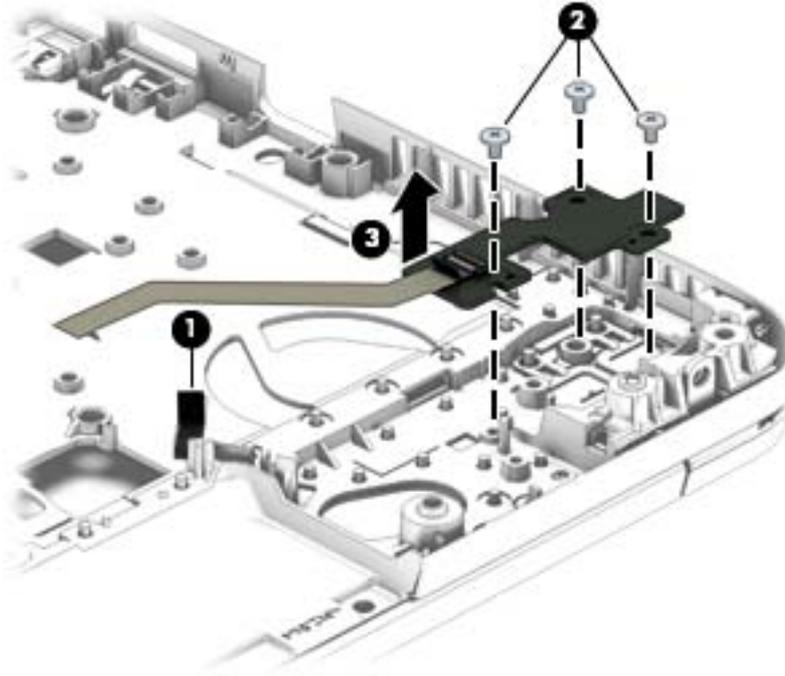
Reverse this procedure to install the function button board.

# Processor

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

| Description | Spare part number |
|---|---|
| Intel Dual Core i7-4600M 2.80-GHz processor (3.0-MB L3 cache, 37 W) | 737330-001 |
| Intel Dual Core i5-4330M 2.80-GHz processor (3.0-MB L3 cache, 37 W) | 738201-001 |
| Intel Dual Core i5-4300M 2.60-GHz processor (3.0-MB L3 cache, 37 W) | 738309-001 |
| Intel Dual Core i5-4200M 2.50-GHz processor (3.0-MB L3 cache, 37 W) | 737328-001 |
| Intel Dual Core i3-4100M 2.50-GHz processor (3.0-MB L3 cache, 37 W) | 737474-001 |
| Intel Dual Core i3-4000M 2.40-GHz (SC turbo up to 3.30-GHz) processor (1600-MHz FSB, 3.0-MB L3 cache, 37 W) | 737327-001 |
| AMD A10-5750M with Radeon HD 8650G Graphics (quad-core; 3.5 GHz/2.5 GHz; 35W, 4 MB L2 cache) | 713548-001 |
| AMD A10-4600M with Radeon HD 7660G Graphics (quad-core; 3.2 GHz/2.3 GHz; 35W; 4 MB L2 cache) | 683046-001 |
| AMD A8-4500M with Radeon HD 7640G Graphics (quad-core; 2.8 GHz/1.9 GHz; 35W; 4 MB L2 cache) | 683048-001 |
| AMD A6-4400M with Radeon HD 7520G Graphics (dual-core; 3.2 GHz/2.7 GHz; 35W; 1 MB L2 cache) | 683047-001 |
| A6-5350M with Radeon HD 8450G Graphics (dual-core; 3.5 GHz/2.9 GHz; 35W; 1 MB L2 cache) | 713550-001 |
| AMD A4-4300M with Radeon HD 7420G Graphics (dual-core; 3.0 GHz/2.5 GHz; 35W; 1 MB L2 cache) | 685990-001 |
| AMD A4-5150M with Radeon HD 8350G Graphics (dual-core; 3.3 GHz/2.7 GHz; 35W; 1 MB L2 cache) | 713549-001 |
| AMD A8-5550M 3.1 GHz/2.1 GHz 4M 35W | 713551-001 |

Before removing the processor, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

   e. Base enclosure (see Base enclosure on page 91)

   f. Fan and heat sink assembly (see Fan and heat sink assembly on page 87)

Remove the processor:

1. Use a Torx8 screw driver to turn the processor locking screw one-half turn counterclockwise **(1)**, until you hear a click.

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

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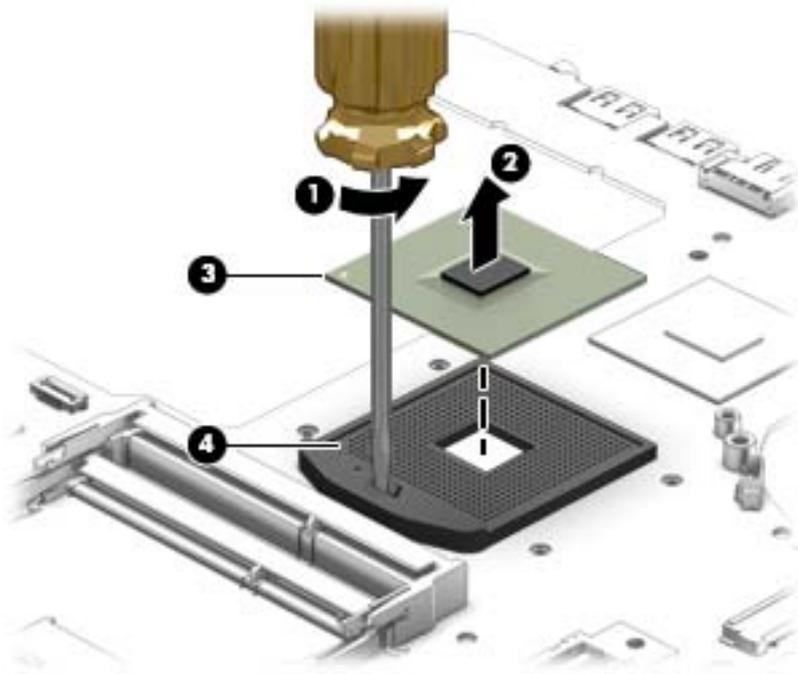


Reverse this procedure to install the processor.

# TouchPad

| Description | Spare part number |
|---|---|
| Top cover | |
| For use on HP ProBook 655 G1 models: | |
| Top cover with 2-button TouchPad | 745889-001 |
| Top cover with 2-button TouchPad and bracket | 738710-001 |
| Top cover with 4-button TouchPad | 745890–001 |
| Top cover with 4-button TouchPad and bracket | 738711–001 |
| Top cover with 2-button TouchPad and backlit keyboard | 805782–001 |
| For use on HP ProBook 650 G1 models: | |
| Top cover with 2-button TouchPad | 738708-001 |
| Top cover with 2-button TouchPad and bracket | 738710-001 |
| Top cover with 4-button TouchPad | 738709–001 |
| Top cover with 4-button TouchPad and bracket | 738711–001 |
| Top cover with 2-button TouchPad and backlit keyboard | 805782–001 |
| For use on models equipped with a 14–inch display assembly: | |
| Top cover with 2-button TouchPad | 738405-001 |
| Top cover with 2-button TouchPad and bracket | 738407-001 |
| Top cover with 4-button TouchPad | 738406–001 |
| Top cover with 4-button TouchPad and bracket | 738408–001 |
| Top cover with 2-button TouchPad and backlit keyboard | 805783–001 |

Before removing the top cover, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

**NOTE:** When replacing the top cover, be sure to remove the following components from the defective top cover and install them on the replacement top cover:

- Function button board (see Function button board on page 107)
- Power button board (see Power button board on page 96)
- Fingerprint reader board (see Fingerprint reader board on page 98)

Remove the TouchPad:

1.  Remove the four Torx screws **(1)** that secure the TouchPad to the top cover.
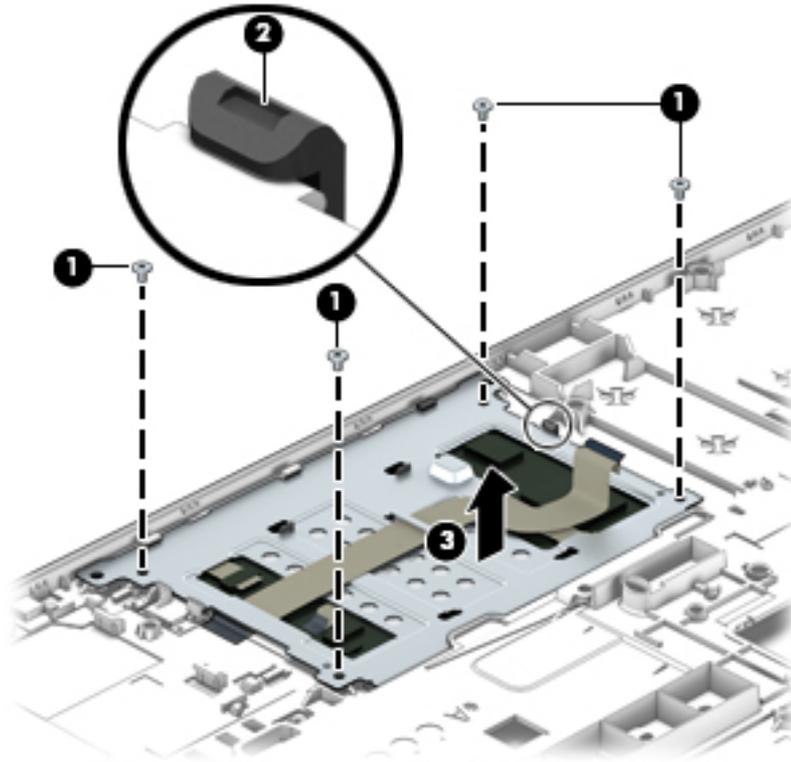


2.  Release the clip **(2)**, and then remove the TouchPad **(3)**.

Reverse this procedure to install the TouchPad.

# Power connector cable

| Description | Spare part number |
|---|---|
| For use on models equipped with a 15.6–inch display assembly | 738694-001 |
| For use on models equipped with a 14–inch display assembly | 738683-001 |

Before removing the power connector cable, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64), and then remove the following components:

   a. Service cover (see Service cover on page 65)

   b. Hard drive (see Hard drive on page 66)

   c. Optical drive (see Optical drive on page 77)

   d. Keyboard (see Keyboard on page 80)

   e. Base enclosure (see Base enclosure on page 91)

   f. USB board (see USB board on page 94)

   g. Speakers (see Speakers on page 105)

   h. Fan and heat sink assembly (see Fan and heat sink assembly on page 87)

Remove the power connector cable:

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

2. Release the power connector cable **(2)** from the clips built into the base enclosure.

**3.** Release the power connector **(3)** from the clips and mold built into the base enclosure.

**4.** Remove the power connector cable.

Reverse this procedure to install the power connector cable.

# RTC battery

| Description | Spare part number |
|---|---|
| RTC battery (includes cable and double-sided adhesive) | 651948-001 |

Before removing the RTC battery, follow these steps:

**1.** Turn off 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 the power from the computer by unplugging the power cord from the computer.

**3.** Disconnect all external devices from the computer.

**4.** Remove the battery (see ).

**5.** Remove the service cover (see ).

Remove the RTC battery:

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

**2.** Detach the RTC battery **(2)** from the base enclosure. (The RTC battery is attached to the base enclosure with double-sided adhesive.)
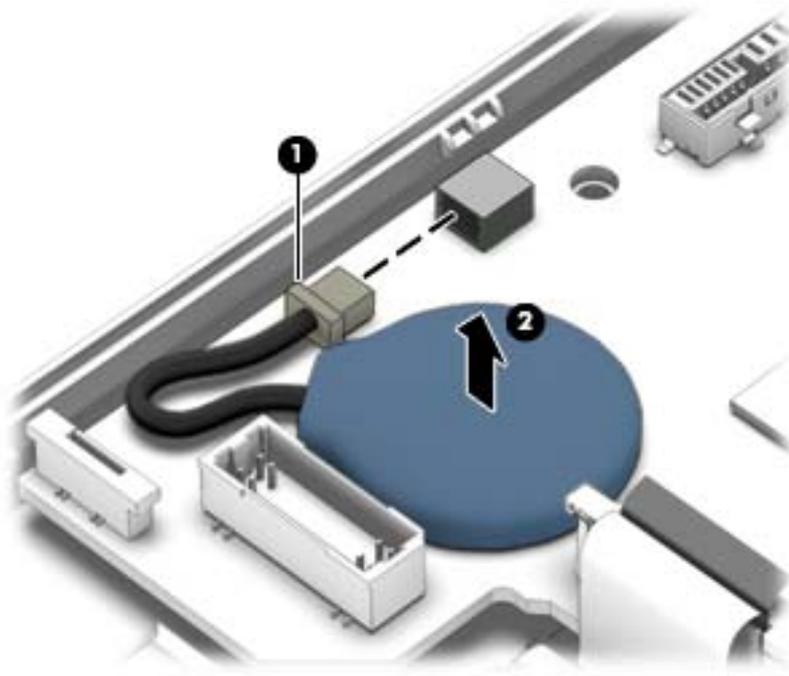


**3.** Remove the RTC battery and cable.

Reverse this procedure to install the RTC battery.

# Display assembly

**NOTE:** The display panel is spared as raw panel only. The Raw Panel Support Kit is also required for full display assembly replacement.

| Description | Spare part number |
|---|---|
| 15.6-in WLED FHD, UWVA display panel | 739998-001 |
| 15.6-in WLED HD, UWVA display panel | 739997-001 |
| 14-in HD AG WLED SVA eDP FLT display panel | 747751-001 |
| 14-in HD+ AG WLED SVA eDP FLT display panel | 747752-001 |
| 14-in FHD AG WLED UWVA eDPslim PSR display panel | 747753-001 |
| **Raw Panel Support Kit** (includes LCD back cover and wireless antennas and transceivers): | |
| For use in models equipped with a 15.6–inch display assembly | 738691-001 |
| For use in models equipped with a 14–inch display assembly | 738680–001 |

To remove the display assembly and access the display assembly subcomponents, follow these steps:

1. Turn off 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 the power from the computer by unplugging the power cord from the computer.

3. Disconnect all external devices from the computer.

4. Remove the battery (see Battery on page 64).

Remove the display assembly:

1. Open the computer.

2. If it is necessary to replace the display bezel or any of the display assembly subcomponents:

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

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

The display bezel is available using spare part numbers 734301-001 (for use only on computer models equipped with a webcamera) and 734302-001 (for use only on computer models not equipped with a webcamera).
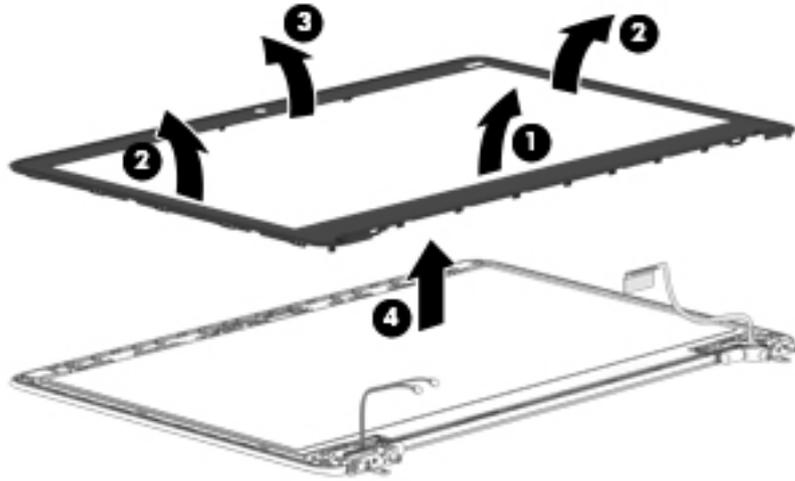
**3.** If it is necessary to replace the display panel:

**a.** Remove the four Phillips PM2.0×3.0 screws that secure the display panel to the display enclosure.
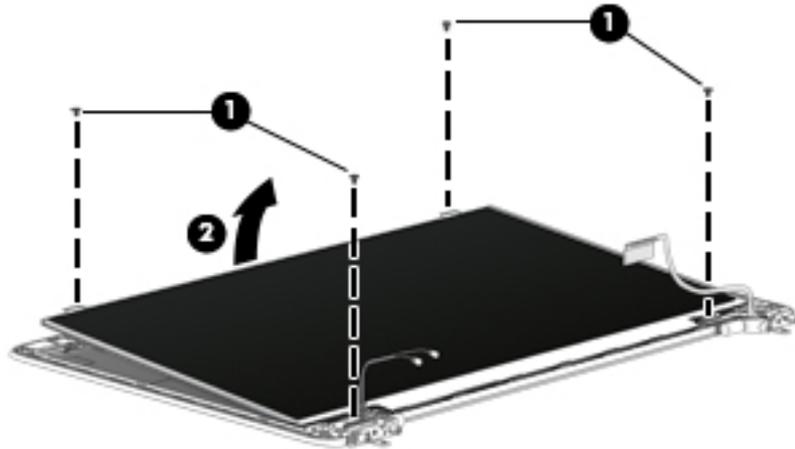
⚠ **CAUTION:** Before turning the display panel upside down, make sure the work surface is clear of tools, screws, and any other foreign objects. Failure to follow this caution can result in damage to the display panel.

**b.** Lift the top edge of the display panel **(1)** and swing it up and forward until it rests upside down in front of the display enclosure.
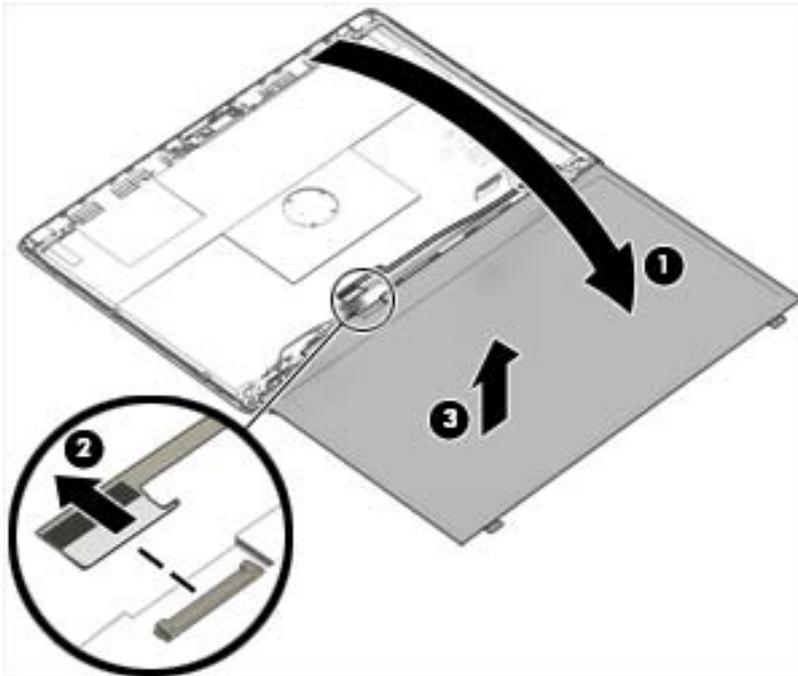


**c.** Release the adhesive strip **(2)** that secures the display panel cable connector to the display panel, and then disconnect the display panel cable from the display panel.

**d.** Remove the display panel.

**4.** Remove the six Torx T8 screws **(1)** and the 2 Torx screws that secure the hinge bracket to the computer.
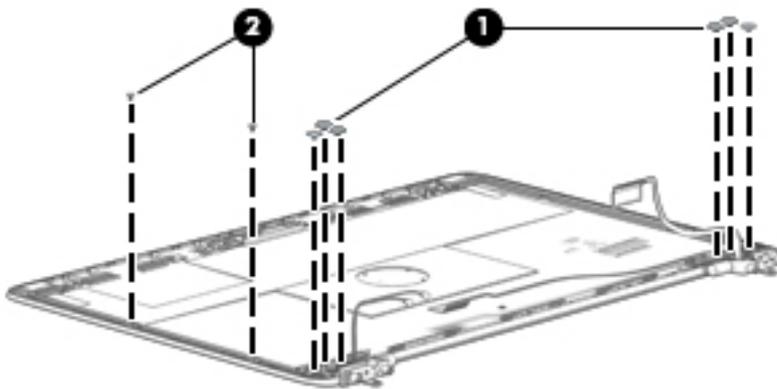
**5.** Remove the WLAN and WWAN transceiver **(1)** and the hinge brackets **(2)**.

The hinge bracket is available using spare part number 738699-001.
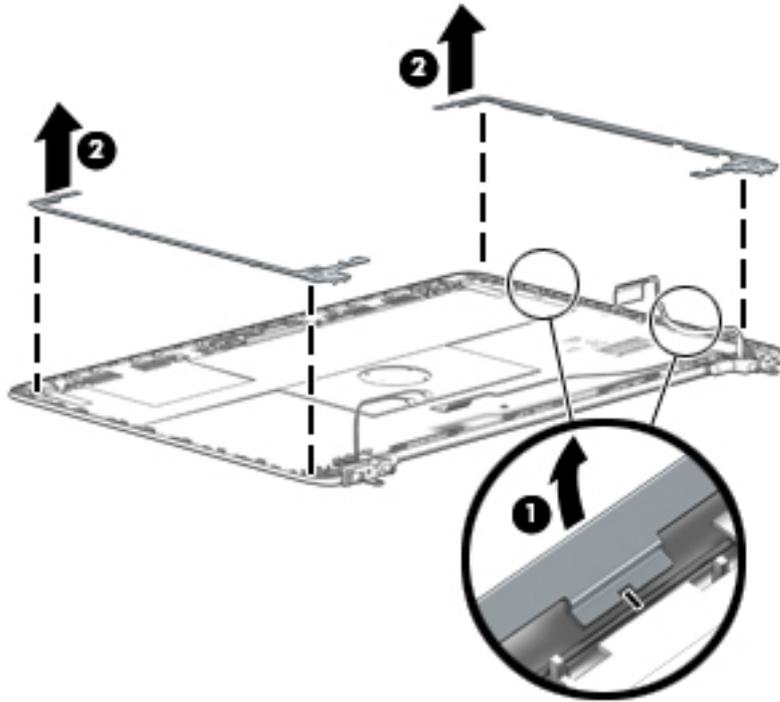
**6.** Remove the display panel cable and the wireless transceiver.
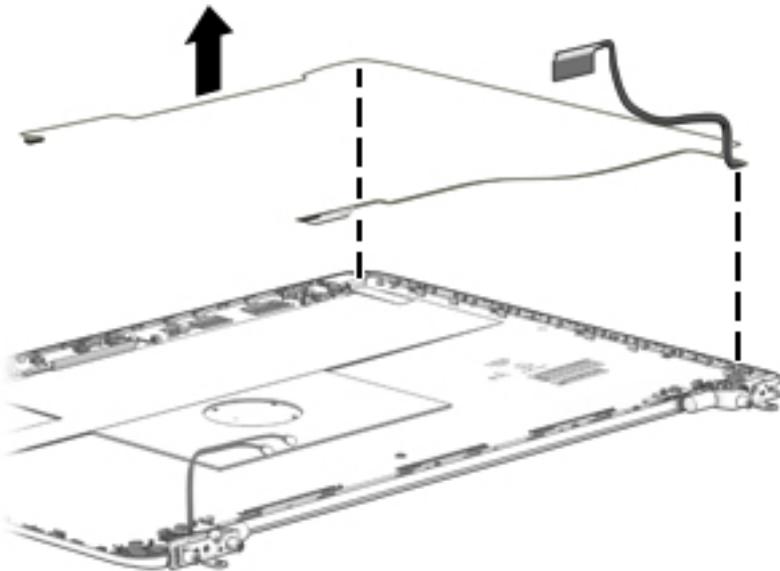
**7.** If it is necessary to replace the webcamera/microphone module or microphone module:

⚠ **CAUTION:** Handle the webcamera/microphone module and microphone module with caution. These modules have a thin profile and are susceptible to damage when not handled carefully.

**a.** Disconnect the webcamera/microphone module cable **(1)** from the webcamera/microphone module.

**b.** Detach the webcamera/microphone module **(2)** from the display enclosure. (The webcamera/microphone module is attached to the display enclosure with double-sided adhesive.)
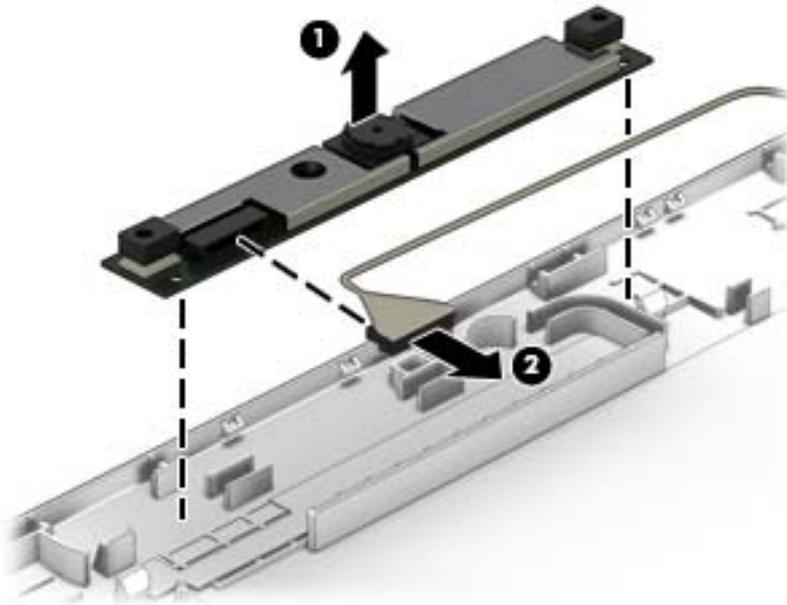


**c.** Remove the webcamera/microphone module.

The webcamera/microphone module is available using spare part number 738409-001. The microphone module is available using spare part number 738397-001.

Reverse this procedure to reassemble and install the display assembly.

# 7 Computer Setup

## Windows 8 — Computer Setup (BIOS), MultiBoot, and System Diagnostics

### Using Computer Setup

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

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

### Starting Computer Setup

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

To start Computer Setup, follow these steps:

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f10 to enter Computer Setup.

### Navigating and selecting in Computer Setup

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

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

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

2. press f10 to enter Computer Setup.

   ● To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.

   ● To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.

   ● To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

● To exit Computer Setup menus without saving your changes:

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

   – or –

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

- To save your changes and exit Computer Setup menus:

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

  – or –

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

Your changes go into effect when the computer restarts.

## Restoring default settings in Computer Setup

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

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

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Main > Restore Defaults**.

4. Follow the on-screen instructions.

5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

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

## 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 Computer Setup.

1. Start Computer Setup.

2. Use a pointing device or the arrow keys to select **Main > System Information**.

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

   – or –

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

### Downloading a BIOS update

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

Do not disconnect power on 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.

1. Access the HP website, http://www.hp.com.

2. Select **Support**, and then select **Download drivers**.

3. Enter the product name in the text box, and then select **Go**.

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

5. In the BIOS section, follow these steps:

   a. Identify the most recent BIOS update and compare it to 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. 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.

**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. From the Start screen, type e, and then click **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.

# Using MultiBoot

## About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.

> **NOTE:** Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then press f9. Pressing f9 displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

## Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

- To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.

- To dynamically choose the boot device, by pressing esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then pressing f9 to enter the Boot Device Options menu.

- To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

### Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Advanced > Boot Options > UEFI Boot Order for UEFI Hybrid or UEFI Native Boot Mode** or select **Advanced > Boot Options > Legacy Boot Order for Legacy Boot Mode**, and then press enter.

4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the + key.

   – or –

   To move the device down in the boot order, use a pointing device to click the down arrow, or press the - key.

5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

### Dynamically choosing a boot device using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1.  Open the Select Boot Device menu by turning on or restarting the computer, and then pressing esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2.  press f9.

3.  Use a pointing device or the arrow keys to select a boot device, and then press enter.

### Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1.  Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2.  press f10 to enter Computer Setup.

3.  Use a pointing device or the arrow keys to select **Advanced > Boot Options > MultiBoot Express Boot Popup Delay (Sec)**, and then press enter.

4.  In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)

5.  To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

    – or –

    Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

### Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

●  To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press enter.

●  To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. the computer will not start until you select a boot device and press enter.

●  To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

## Using HP PC Hardware Diagnostics (UEFI) (select models only)

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

To start System Diagnostics:

1.  Turn on or restart the computer, quickly press esc, and then press f2.

    After pressing f2, the BIOS searches three places for the HP PC Hardware Diagnostics (UEFI) tools in the following order:

    **a.** Connected USB drive

> 📝 **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see .

    **b.** Hard drive

    **c.** BIOS

**2.** Click the type of diagnostic test you want to run, and then follow the on-screen instructions.

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

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

> 📝 **NOTE:** The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.

**1.** Go to http://www.hp.com.

**2.** Select **Support**, and then select **Download drivers**.

**3.** Enter the product name in the text box, and then click **Search**.

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

**5.** In the Diagnostic section, click **HP UEFI Support Environment**.

    – or –

    Select **Download**, and then select **Run**.

# Windows 7 — Computer Setup (BIOS), MultiBoot, and HP PC Hardware Diagnostics (UEFI)

## Using Computer Setup

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

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

## Starting Computer Setup

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

To start Computer Setup, follow these steps:

**1.** Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

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

## Navigating and selecting in Computer Setup

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

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

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

2. press f10 to enter Computer Setup.

   ● To select a menu or a menu item, use the tab key and the keyboard arrow keys and then press enter, or use a pointing device to click the item.

   ● To scroll up and down, click the up arrow or the down arrow in the upper-right corner of the screen, or use the up arrow key or the down arrow key on the keyboard.

   ● To close open dialog boxes and return to the main Computer Setup screen, press esc, and then follow the on-screen instructions.

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

● To exit Computer Setup menus without saving your changes:

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

   – or –

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

● To save your changes and exit Computer Setup menus:

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

   – or –

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

Your changes go into effect when the computer restarts.

## Restoring factory settings in Computer Setup

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

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

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Main > Restore Defaults**.

4. Follow the on-screen instructions.

5. To save your changes and exit, click the **Save** icon in the lower-right corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

Your changes go into effect when the computer restarts.

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

# 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 Computer Setup.

1.  Start Computer Setup.

2.  Use a pointing device or the arrow keys to select **Main > System Information**.

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

    – or –

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

## Downloading a BIOS update

**CAUTION:** 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 on 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.

1.  Access the HP website, http://www.hp.com.

2.  Click **Support**, and then select **Download drivers**.

3.  Enter the product name in the text box, and the click **Go**.

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

5.  In the BIOS section, follow these steps:

    a.  Identify the most recent BIOS update and compare it to 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. 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.

**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.  Select **Start > Computer**.

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.

# Using MultiBoot

## About the boot device order

As the computer starts, the system attempts to boot from enabled devices. The MultiBoot utility, which is enabled at the factory, controls the order in which the system selects a boot device. Boot devices can include optical drives, diskette drives, a network interface card (NIC), hard drives, and USB devices. Boot devices contain bootable media or files that the computer needs to start and operate properly.

> **NOTE:** Some boot devices must be enabled in Computer Setup before they can be included in the boot order.

You can change the order in which the computer searches for a boot device by changing the boot order in Computer Setup. You can also press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then press f9. Pressing f9 displays a menu that shows the current boot devices and allows you to select a boot device. Or, you can use MultiBoot Express to set the computer to prompt you for a boot location each time the computer turns on or restarts.

## Choosing MultiBoot preferences

You can use MultiBoot in the following ways:

●  To set a new boot order that the computer uses each time it is turned on, by changing the boot order in Computer Setup.

●  To dynamically choose the boot device, by pressing esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen, and then pressing f9 to enter the Boot Device Options menu.

●  To use MultiBoot Express to set variable boot orders. This feature prompts you for a boot device each time the computer is turned on or restarted.

### Setting a new boot order in Computer Setup

To start Computer Setup and set a boot device order that the computer uses each time it is turned on or restarted, follow these steps:

1.  Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2.  press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Advanced > Boot Options > UEFI Boot Order for UEFI Hybrid or UEFI Native Boot Mode** or select **Advanced > Boot Options > Legacy Boot Order for Legacy Boot Mode**, and then press enter.

4. To move the device up in the boot order, use a pointing device to click the up arrow, or press the + key.

   – or –

   To move the device down in the boot order, use a pointing device to click the down arrow, or press the - key.

5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

### Dynamically choosing a boot device using the f9 prompt

To dynamically choose a boot device for the current startup sequence, follow these steps:

1. Open the Select Boot Device menu by turning on or restarting the computer, and then pressing esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f9.

3. Use a pointing device or the arrow keys to select a boot device, and then press enter.

### Setting a MultiBoot Express prompt

To start Computer Setup and set the computer to display the MultiBoot startup location menu each time the computer is started or restarted, follow these steps:

1. Turn on or restart the computer, and then press esc while the "press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

2. press f10 to enter Computer Setup.

3. Use a pointing device or the arrow keys to select **Advanced > Boot Options > MultiBoot Express Boot Popup Delay (Sec)**, and then press enter.

4. In the **MultiBoot Express Popup Delay (Sec)** field, enter the length of time in seconds that you want the computer to display the startup location menu before it defaults to the current MultiBoot setting. (When 0 is selected, the Express Boot startup location menu is not displayed.)

5. To save your changes and exit Computer Setup, click the **Save** icon in the lower-left corner of the screen, and then follow the on-screen instructions.

   – or –

   Use the arrow keys to select **Main > Save Changes and Exit**, and then press enter.

### Entering MultiBoot Express preferences

When the Express Boot menu is displayed during startup, you have the following choices:

- To specify a boot device from the Express Boot menu, select your preference within the allotted time, and then press enter.

- To prevent the computer from defaulting to the current MultiBoot setting, press any key before the allotted time expires. The computer will not start until you select a boot device and press enter.

- To allow the computer to start according to the current MultiBoot settings, wait for the allotted time to expire.

# Using HP PC Hardware Diagnostics (UEFI) (select models only)

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

To start HP PC Hardware Diagnostics UEFI:

1. Turn on or restart the computer, quickly press esc, and then press f2.

   After pressing f2, the BIOS searches three places for the HP PC Hardware Diagnostics (UEFI) tools in the following order:

   a. Connected USB drive

   **NOTE:** To download the HP PC Hardware Diagnostics (UEFI) tool to a USB drive, see .

   b. Hard drive

   c. BIOS

2. Click 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 while it is running, press esc.

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

**NOTE:** The HP PC Hardware Diagnostics (UEFI) download instructions are provided in English only.

1. Go to http://www.hp.com.

2. Click **Support**, and then click **Download drivers**.

3. Enter the product name in the text box, and then click **Search**.

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

5. In the Diagnostic section, click **HP UEFI Support Environment**.

   – or –

   Click **Download**, and then select **Run**.

# 8    Specifications

## Computer specifications

|  | Metric | U.S. |
|---|---|---|
| **Dimensions** | | |
| Width | **37.8 cm** | 14.88 in |
| Depth | **25.7 cm** | 10.12 in |
| Height (front to rear, display assembly) | **2.53 cm** | 0.99 in |
| Height (front to rear, LED display assembly) | **2.9** | 1.14 in |
| Weight (computer equipped with 9-cell battery, ODD weight saver, UMA, no FPR, 1 SODIMM, WLAN only, SSD, touchpad only, no camera, no WWAN) | **2.5 kg** | 5.51 lb |
| Weight (computer equipped with 3-cell battery, ODD weight saver, UMA, no FPR, 1 SODIMM, WLAN only, SSD, touchpad only, no camera, no WWAN) | **2.32 kg** | 5.10 lb |
| **Input power** | | |
| Operating voltage and current | 19.5 V dc @ 3.33 A – 65 W, Smart AC Adapter (select models only) | |
| | 119.5 V dc @ 4.62 A – 90 W, Smart AC Adapter (select models only) | |
| **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** (non-condensing) | | |
| 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.

## Hard drive specifications

|  | 1-TB, 5400-rpm* | 750-GB, 5400-rpm** | 500-GB, 5400-rpm** |
|---|---|---|---|
| **Dimensions** | | | |
| Height | 9.5 mm | 9.5 mm | 9.5 mm |

| | 1-TB, 5400-rpm* | 750-GB, 5400-rpm** | 500-GB, 5400-rpm** |
|---|---|---|---|
| Length | 100.4 mm | 100.4 mm | 100.4 mm |
| Width | 69.9 mm | 69.9 mm | 69.9 mm |
| Weight | 110 g | 110 g | 110 g |
| **Interface type** | SATA | SATA | SATA |
| **Transfer rate** | | | |
| Synchronous (maximum) | 1.1 GB/sec | 1.1 GB/sec | 1.1 GB/sec |
| Security | ATA security | ATA security | ATA security |
| **Seek times** (typical read, including setting) | | | |
| Single track | 1.5 ms | 1.5 ms | 1.5 ms |
| Average (read/write) | 11/13 ms | 11/13 ms | 11/13 ms |
| Maximum | 22 ms | 22 ms | 22 ms |
| **Logical blocks** | 1,953,525,168 | 1,465,149,168 | 976,766,112 |
| **Disk rotational speed** | 5400 rpm | | |
| **Operating temperature** | 0°C to 60°C (32°F to 140°F) | | |

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

**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 *(continued)*

| | | 500-GB, 5400-rpm** | 320-GB, 5400-rpm** |
|---|---|---|---|
| **Dimensions** | | | |
| Height | | 9.5 mm | 9.5 mm |
| Length | | 100.4 mm | 100.4 mm |
| Width | | 69.9 mm | 69.9 mm |
| Weight | | 110 g | 110 g |
| **Interface type** | | SATA | SATA |
| **Transfer rate** | | | |
| Synchronous (maximum) | | 1.1 GB/sec | 1.1 GB/sec |
| Security | | ATA security | ATA security |
| **Seek times** (typical read, including setting) | | | |
| 1.5 ms | | 1.5 ms | 1.5 ms |
| 11/13 ms | | 11/13 ms | 11/13 ms |
| 22 ms | | 22 ms | 22 ms |

| | 500-GB, 5400-rpm** | 320-GB, 5400-rpm** |
|---|---|---|
| Single track | 1.5 ms | 1.5 ms |
| Average (read/write) | 11/13 ms | 11/13 ms |
| Maximum | 22 ms | 22 ms |
| **Logical blocks** | 976,773,168 | 628,142,448 |
| **Disk rotational speed** | 5400 rpm | |
| **Operating temperature** | 0°C to 60°C (32°F to 140°F) | |

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

**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.

# 9    Backup and recovery

## Windows 8

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

From the Start screen, type `restore`, click **Settings**, and then select from the list of displayed options.

**NOTE:** For detailed instructions on various backup and restore options, perform a search for these topics in Windows Help and Support.

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

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

### Backing up your information

Recovery after a system failure is as good as your most recent backup. You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. The system repair media (select models only) are used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

For more information on the Windows backup features, see Windows Help and Support.

### Performing a system recovery

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

- Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Automatic Repair to fix problems that might prevent Windows from starting correctly.

- f11 recovery tools: You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

**NOTE:** If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows operating system media (purchased separately) on page 138.

### Using the Windows recovery tools

To recover information you previously backed up, see Windows Help and Support for steps on restoring files and folders.

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

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

1. If possible, back up all personal files.

2. If possible, check for the presence of the Recovery Image partition and the Windows partition.

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

   – or –

   From the Start screen, type `pc`, and then select **This PC**.

   **NOTE:** If the Windows partition and the Recovery Image partition are not listed, you must recover your operating system and programs using the Windows operating system DVD and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 138.

3. If the Windows partition and the Recovery Image partition are listed, restart the computer by pressing and holding the shift key while clicking **Restart**.

4. Select **Troubleshoot**, select **Advanced Options**, and then select **Startup Repair**.

5. Follow the on-screen instructions.

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

## Using f11 recovery tools

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

To recover the original hard drive image using f11:

1. If possible, back up all personal files.

2. If possible, check for the presence of the Recovery Image partition: From the Start screen, type `pc`, and then select **This PC**.

   **NOTE:** If the Recovery Image partition is not listed, you must recover your operating system and programs using the Windows operating system media and the *Driver Recovery* media (both purchased separately). For additional information, see Using Windows operating system media (purchased separately) on page 138.

3. If the Recovery Image partition is listed, restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

4. Press f11 while the "Press <F11> for recovery" message is displayed on the screen.

5. Follow the on-screen instructions.

## Using Windows operating system media (purchased separately)

To order a Windows operating system DVD, contact 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. .

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

To initiate a full install of the operating system using a Windows operating system DVD:

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

1.  If possible, back up all personal files.

2.  Insert the Windows operating system DVD into the optical drive, and then restart the computer.

3.  When prompted, press any keyboard key.

4.  Follow the on-screen instructions.

After the installation is completed:

1.  Eject the Windows operating system media and then insert the *Driver Recovery* media.

2.  Install the Hardware Enabling Drivers first, and then install Recommended Applications.

## Using Windows Refresh or Windows Reset

When your computer is not working properly and you need to regain system stability, the Windows Refresh option allows you to start fresh and keep what is important to you.

The Windows Reset option allows you to perform detailed reformatting of your computer, or remove personal information before you give away or recycle your computer. For more information on these features, see Windows Help and Support.

## Using HP Software Setup

HP Software Setup can be used to reinstall drivers or select software that has been corrupted or deleted from the system.

1.  From the Start screen, type `HP Software Setup`.

2.  Open HP Software Setup.

3.  Follow the on-screen directions to reinstall drivers or select software.

# Windows 7

Your computer includes HP and Windows tools to help you safeguard your information and retrieve it if you ever need to. These tools will help you return your computer to a proper working state, all with simple steps. This section provides information about the following processes:

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

## Creating recovery media and backups

Recovery after a system failure is only as good as your most recent backup.

1. After you successfully set up the computer, create HP Recovery media. This step creates a Windows 7 operating system DVD and a *Driver Recovery* DVD. The Windows DVD can be used to reinstall the original operating system in cases where the hard drive is corrupted or has been replaced. The *Driver Recovery* DVD installs specific drivers and applications. See Creating recovery media with HP Recovery Disc Creator (select models only) on page 140.

2. Use Windows Backup and Recovery tools to perform the following:

    - Back up individual files and folders

    - Back up your entire hard drive (select models only)

    - Create system repair discs (select models only) with the installed optical drive (select models only) or an optional external optical drive

    - Create system restore points

**NOTE:** This guide describes an overview of backing up, restoring, and recovering options. For more details about the tools provided, see Help and Support. To access Help and Support, select **Start > Help and Support**.

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

In case of system failure, you can use the backup files to restore the contents of your computer. See Backing up your information on page 141.

## Guidelines

- When creating recovery media or backing up to discs, use any of the following types of discs (purchased separately): DVD+R, DVD+R DL, DVD-R, DVD-R DL, or DVD±RW. The discs you use will depend on the type of optical drive you are using.

- Be sure that the computer is connected to AC power before you start the recovery media creation process or the backup process.

## Creating recovery media with HP Recovery Disc Creator (select models only)

HP Recovery Disc Creator is a software program that offers an alternative way to create recovery media. After you successfully set up the computer, you can create recovery media using HP Recovery Disc Creator. This recovery media allows you to reinstall your original operating system as well as select drivers and applications if the hard drive becomes corrupted. HP Recovery Disc Creator can create two kinds of recovery DVDs:

●   Windows 7 operating system DVD—Installs the operating system without additional drivers or applications.

●   *Driver Recovery* DVD—Installs specific drivers and applications only, in the same way that the HP Software Setup utility installs drivers and applications.

### Creating recovery media

> **NOTE:** The Windows 7 operating system DVD can be created only once. Thereafter, the option to create that media will not be available after you create a Windows DVD.

To create the Windows DVD:

1.   Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.

2.   Select **Windows disk**.

3.   From the drop-down menu, select the drive for burning the recovery media.

4.   Click the **Create** button to start the burning process.

After the Windows 7 operating system DVD has been created, create the *Driver Recovery* DVD:

1.   Select **Start > All Programs > Productivity and Tools > HP Recovery Disc Creator**.

2.   Select **Driver disk**.

3.   From the drop-down menu, select the drive for burning the recovery media.

4.   Click the **Create** button to start the burning process.

## Backing up your information

You should create system repair media and your initial backup immediately after initial system setup. As you add new software and data files, you should continue to back up your system on a regular basis to maintain a reasonably current backup. You should also create Windows system repair media (select models only) which can be used to start up (boot) the computer and repair the operating system in case of system instability or failure. Your initial and subsequent backups allow you to restore your data and settings if a failure occurs.

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

Note the following when backing up:

●   Store personal files in the Documents library, and back it up regularly.

●   Back up templates that are stored in their associated directories.

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

●   When backing up to discs, number each disc after removing it from the drive.

> **NOTE:** For detailed instructions on various backup and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

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

To create a backup using Windows Backup and Restore:

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

1.  Select **Start > All Programs > Maintenance > Backup and Restore**.

2.  Follow the on-screen instructions to set up your backup, create a system image (select models only), or create system repair media (select models only).

# Performing a system recovery

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

●  Windows recovery tools: You can use Windows Backup and Restore to recover information you have previously backed up. You can also use Windows Startup Repair to fix problems that might prevent Windows from starting correctly.

●  f11 recovery tools (select models only): You can use the f11 recovery tools to recover your original hard drive image. The image includes the Windows operating system and software programs installed at the factory.

**NOTE:**  If you are unable to boot (start up) your computer and you cannot use the system repair media you previously created (select models only), you must purchase Windows 7 operating system media to reboot the computer and repair the operating system. For additional information, see Using Windows 7 operating system media on page 144.

# Using the Windows recovery tools

Using the Windows recovery tools, you can:

- Recover individual files
- Restore the computer to a previous system restore point
- Recover information using recovery tools

**NOTE:** For detailed instructions on various recovery and restore options, perform a search for these topics in Help and Support. To access Help and Support, select **Start > Help and Support**.

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

To recover information you previously backed up:

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

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

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

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

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

   **NOTE:** If the Windows partition is not listed, you must recover your operating system and programs using the Windows 7 operating system DVD and the Driver Recovery media. For additional information, see Using Windows 7 operating system media on page 144.

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

**NOTE:** For additional information on recovering information using the Windows tools, select **Start > Help and Support**.

## Using f11 recovery tools (select models only)

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

To recover the original hard drive image using f11:

1. If possible, back up all personal files.

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

   > **NOTE:**  If the HP Recovery partition is not listed, you must recover your operating system and programs using the Windows 7 operating system media and the Driver Recovery media. For additional information, see Using Windows 7 operating system media on page 144.

3. If the HP Recovery partition is listed, restart the computer, and then press esc while the "Press the ESC key for Startup Menu" message is displayed at the bottom of the screen.

4. Press f11 while the "Press <F11> for recovery" message is displayed on the screen.

5. Follow the on-screen instructions.

## Using Windows 7 operating system media

If you cannot use the recovery media you previously created using the HP Recovery Disc Creator (select models only), you must purchase a Windows 7 operating system DVD to reboot the computer and repair the operating system.

To order a Windows 7 operating system DVD, go to the HP website. For U.S. support, go to http://www.hp.com/support. For worldwide support, go to http://welcome.hp.com/country/us/en/wwcontact_us.html. You can also order the DVD by calling support. For contact information, see the *Worldwide Telephone Numbers* booklet included with the computer.

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

To initiate recovery using a Windows 7 operating system DVD:

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

1. If possible, back up all personal files.

2. Restart the computer, and then insert the Windows 7 operating system DVD into the optical drive before the Windows operating system loads.

3. When prompted, press any keyboard key.

4. Follow the on-screen instructions.

5. Click **Next**.

6. Select **Repair your computer**.

7. Follow the on-screen instructions.

After the repair is completed:

1. Eject the Windows 7 operating system DVD and then insert the *Driver Recovery DVD*.

2. Install the Hardware Enabling Drivers first, and then install Recommended Applications.

# SUSE Linux – Backup and recovery

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

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

## Creating backups

1.   Create restore media immediately after you set up the computer.

2.   As you add files, routinely create a backup of your system and personal information.

## Backing up your information

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

●   At regularly scheduled times

●   Before the computer is repaired or restored

●   Before you add or modify hardware or software

To back up your home directory files using **Backup Manager Settings**:

1.   Select **Computer > More Applications > Tools > Backup Manager Settings**, and click **Backup my home directory**.

2.   Click **Storage Destination Location**, and then select a location to back up your information.

3.   Click **Schedule**, and then select a time schedule to perform backups at a regularly scheduled time.

     To immediately back up your information, click the **Backup Now** check box.

     > **NOTE:**   Before you back up your information, be sure you have designated a location to save the backup files.

4.   Click **Save and Backup** to start the backup and to save the backup settings.

To restore backup files:

1.   Select **Computer > More Applications > Tools > Backup Manager Restore**.

2.   Click **Backup Source**, and then select the location of the backup files.

3.   Click **Restore Destination**, and then select the destination to restore the files.

4.   To restore all files from the selected location, click **Restore all files**. To restore select files only, click **Restore selected files**, click **Select Files** and then select the files to be restored.

5.   Under **Restore Point**, click the time and date of the backup.

     > **NOTE:**   If multiple backups have been performed, click **Use the latest version** to restore the latest version.

6.   Click **Restore** to start restoring the files, or click **Cancel** to cancel the operation.

# Performing a system recovery

Recovery allows you to repair or restore the computer to its original factory state. You can create an HP Factory Image Restore DVD, using an installed or an external DVD±RW optical drive.

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

To restore the computer using the HP Factory Image Restore DVD, you must first create the recovery disc. To create the recovery disc:

📝 **NOTE:** HP recommends that you create the HP Factory Image Restore DVD in the event of a system failure.

1.  Select **Computer > More Applications**.

2.  In the left pane, click **Tools**, and then click **Create HP Factory Image Restore DVD** in the right pane.

3.  Follow the on-screen instructions to create an image file to burn a recovery disc.

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

1.  If possible, back up all personal files.

2.  Insert the HP Factory Image Restore DVD into the optical drive and restart the computer.

3.  As the computer is restarting, press f9 to open the Computer Setup boot option menu.

4.  Press the down arrow to select **Restore SLED HP-BNB preload image** from the **Linux boot** menu, and then press enter.

5.  Using the arrow keys, select **Yes** when prompted: **Do you want to start the System-Restore?**

6.  Follow the on-screen instructions.

# Remove everything and reinstall SLED

Sometimes you want to perform detailed reformatting of your computer, or you want to remove personal information before you give away or recycle your computer. The process described in this section provides a speedy, simple way to return the computer to its original state. This option removes all personal data, applications, and settings from your computer, and reinstalls the Linux operating system.

📝 **IMPORTANT:** This option does not provide backups of your information. Before using this option, back up any personal information you wish to retain.

You can initiate this option by using the f11 key.

To use the f11 key:

Press f11 while the computer boots.

– or –

Press and hold f11 as you press the power button.

The following options are available:

●   Cancel/Reboot—Reboots the system. No recovery or restore activity is performed.

- Recover/Repair System—This option repairs a system that is not working properly and preserves user data.
- Restore Factory System—This option restores the system back to the original factory state. User data is not preserved.

Select an option and follow the on-screen instructions.

# 10 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 re-programming 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, and then press F10 . If the system has a BIOS administrator password, enter the password at the prompt.

    b.  Select the **Main** menu, and then select **Restore Defaults**.

    c.  Select the **Security** menu, and then select **Restore Security Level 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 **Asset Tracking Number**. Press the spacebar once to clear the tag, and then press Enter to return to the prior menu.

    e.  If a DriveLock password is set, select the **Security** menu, select **Hard Drive Tools**, scroll down to **DriveLock**, and then clear the check box for **DriveLock password on restart**. 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, select **Hard Drive Tools**, and then scroll down to **Automatic DriveLock**. A warning screen about automatic drive lock is displayed, Select Yes to continue. Repeat this procedure if more than one hard drive has an Automatic DriveLock password.

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

    h.  Select the **Main** menu, and 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, select **AMT Options**, and then select **Un-configure AMT on next boot**. Select **Save**, and then select **Yes**. Select the **File** menu, and then select **Save Changes and Exit**. Reboot the system and confirm that you want to un-configure AMT.

**j.**  If the optional Intel® Anti-Theft Technology (AT) was activated, contact the provider to de-activate 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 startup menu, and then press F10. Select the **Security** menu, scroll down to the **Utilities** menu, and then select **Hard Drive Tools**. Select **Disk Sanitizer**, and then 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 non-functional. |

| 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? |
|---|---|---|---|---|---|---|
| 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 non-functional. |
| DIMM Serial Presence Detect (SPD) configuration data | 256 Bytes per memory module, 128 Bytes programmable (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 non-functional. |
| Intel Management Engine Firmware (present only in models ending in a 'p','w', or 'm' 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 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. | 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 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. |

| 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? |
|---|---|---|---|---|---|---|
| Webcamera | 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 **Main**, and then select **Restore defaults**.

    c.  Follow the on-screen instructions.

    d.  Select **Main**, **Save Changes and Exit**, and 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.

# 11 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 1.0 m (3.3 ft) and no more than 2.0 m (6.5 ft).

- All power cord sets must be approved by an acceptable accredited agency responsible for evaluation in the country or region where the power cord set will be used.

- The power cord sets must have a minimum current capacity of 10 amps and a nominal voltage rating of 125 or 250 V AC, as required by the power system of each country or region.

- The appliance coupler must meet the mechanical configuration of an EN 60 320/IEC 320 Standard Sheet C13 connector for mating with the appliance inlet on the back of the computer. Requirements for all countries 113

## Requirements for specific countries and regions

| Country/region | Accredited agency | Applicable note number |
|---|---|---|
| Australia | EANSW | 1 |
| Austria | OVE | 1 |
| Belgium | CEBC | 1 |
| Canada | CSA | 2 |
| Denmark | DEMKO | 1 |
| Finland | FIMKO | 1 |
| France | UTE | 1 |
| Germany | VDE | 1 |
| Italy | IMQ | 1 |
| Japan | METI | 3 |
| The Netherlands | KEMA | 1 |
| Norway | NEMKO | 1 |
| The People's Republic of China | CQC | 5 |

| Country/region | Accredited agency | Applicable note number |
|---|---|---|
| South Korea | EK | 4 |
| Sweden | CEMKO | 1 |
| Switzerland | SEV | 1 |
| Taiwan | BSMI | 4 |
| The United Kingdom | BSI | 1 |
| The United States | UL | 2 |

1.  The flexible cord must be Type HO5VV-F, 3-conductor, 1.0-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

2.  The flexible cord must be Type SPT-3 or equivalent, No. 18 AWG, 3-conductor. The wall plug must be a two-pole grounding type with a NEMA 5-15P (15 A, 125 V) or NEMA 6-15P (15 A, 250 V) configuration.

3.  The appliance coupler, flexible cord, and wall plug must bear a "T" mark and registration number in accordance with the Japanese Dentori Law. The flexible cord must be Type VCT or VCTF, 3-conductor, 1.00-mm² conductor size. The wall plug must be a two-pole grounding type with a Japanese Industrial Standard C8303 (7 A, 125 V) configuration.

4.  The flexible cord must be Type RVV, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

5.  The flexible cord must be Type VCTF, 3-conductor, 0.75-mm² conductor size. Power cord set fittings (appliance coupler and wall plug) must bear the certification mark of the agency responsible for evaluation in the country or region where it will be used.

# 12 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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