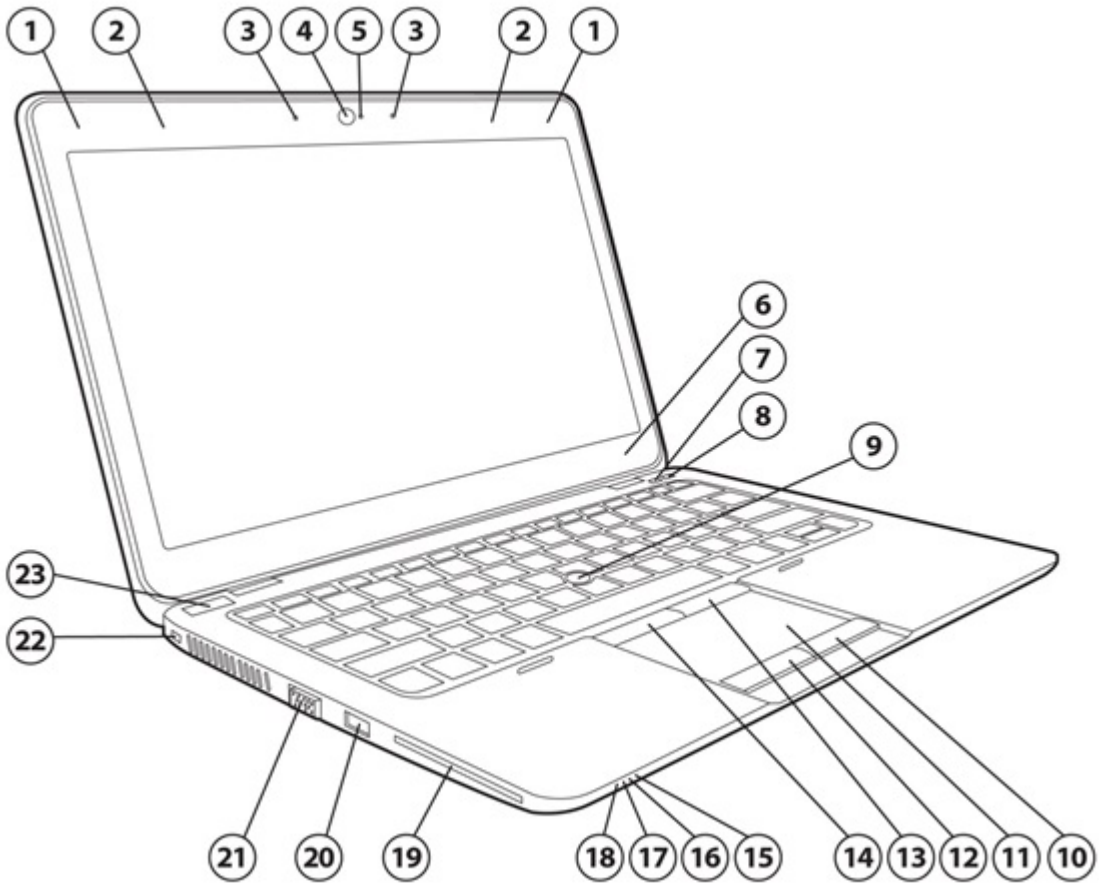
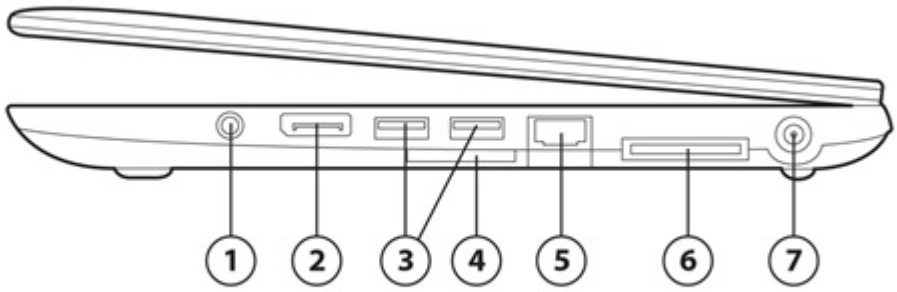
HP EliteBook 820 Notebook PC



Front/Left

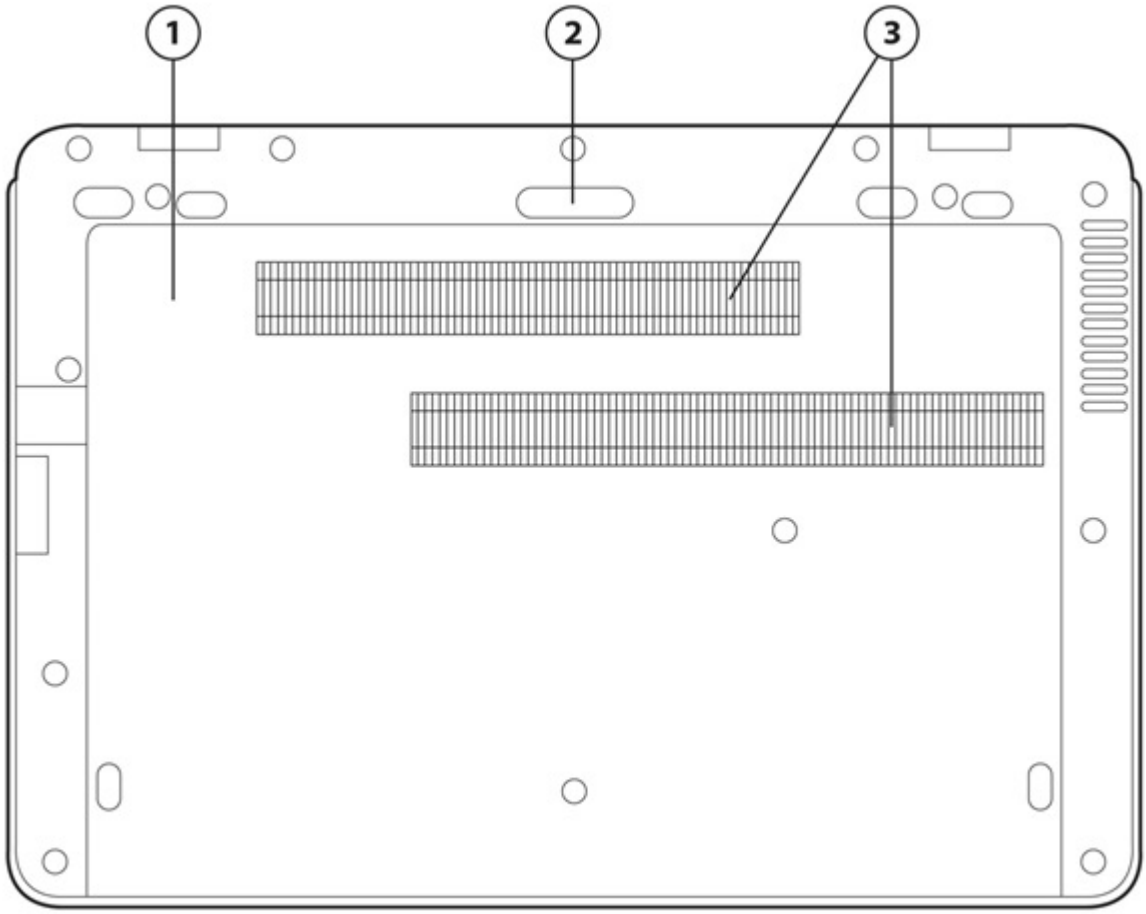
1. WLAN antennas (2)
2. WWAN antennas (2)
3. Internal microphones (2)
4. Webcam (select models only)
5. Webcam light (select models only)
6. Internal display switch
7. Wireless button
8. Volume mute button
9. Pointstick
10. Right TouchPad button
11. TouchPad zone
12. Left TouchPad button
13. Right pointing stick button
14. Left pointing stick button
15. Hard drive light
16. AC adapter/Battery light
17. Power light
18. Wireless light
19. Smart card reader
20. USB 3.0 charging port
21. External VGA monitor port
22. Security cable slot
23. Power button

Overview



Right

1. Audio-out (headphone) jack/Audio-in(microphone) jack
2. DisplayPort
3. USB 3.0 ports (2)
4. Memory card reader
5. Drop-jaw Ethernet port (RJ-45)
6. Docking port
7. Power connector

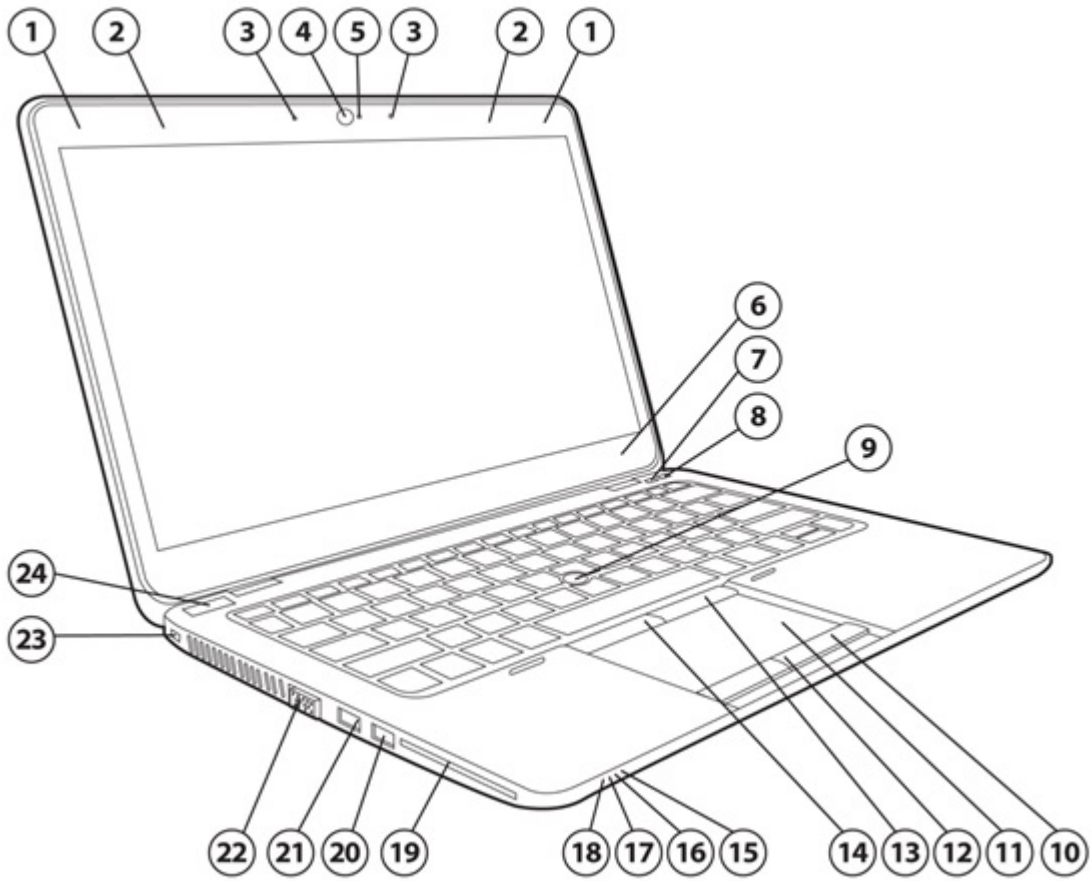


Bottom

1. EasyAccess panel
2. EasyAccess panel release lock
3. Vents (2)

HP EliteBook 840 Notebook PC

Overview



Front/Left

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2. WWAN antennas (2)
3. Internal microphones (2)
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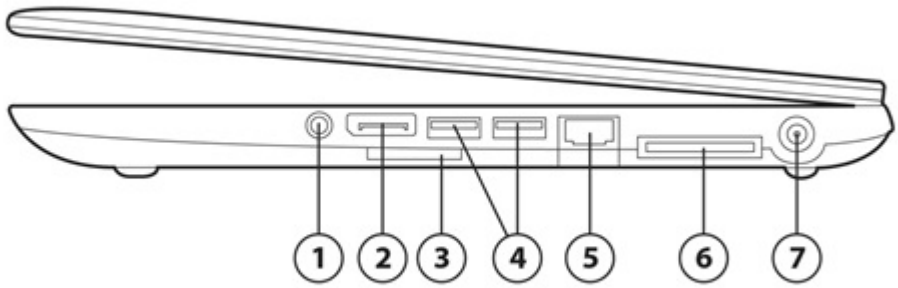
Overview



Right

1. Audio-out (headphone) jack/Audio-in(microphone) jack
2. DisplayPort
3. Memory card reader
4. USB 3.0 ports (2)
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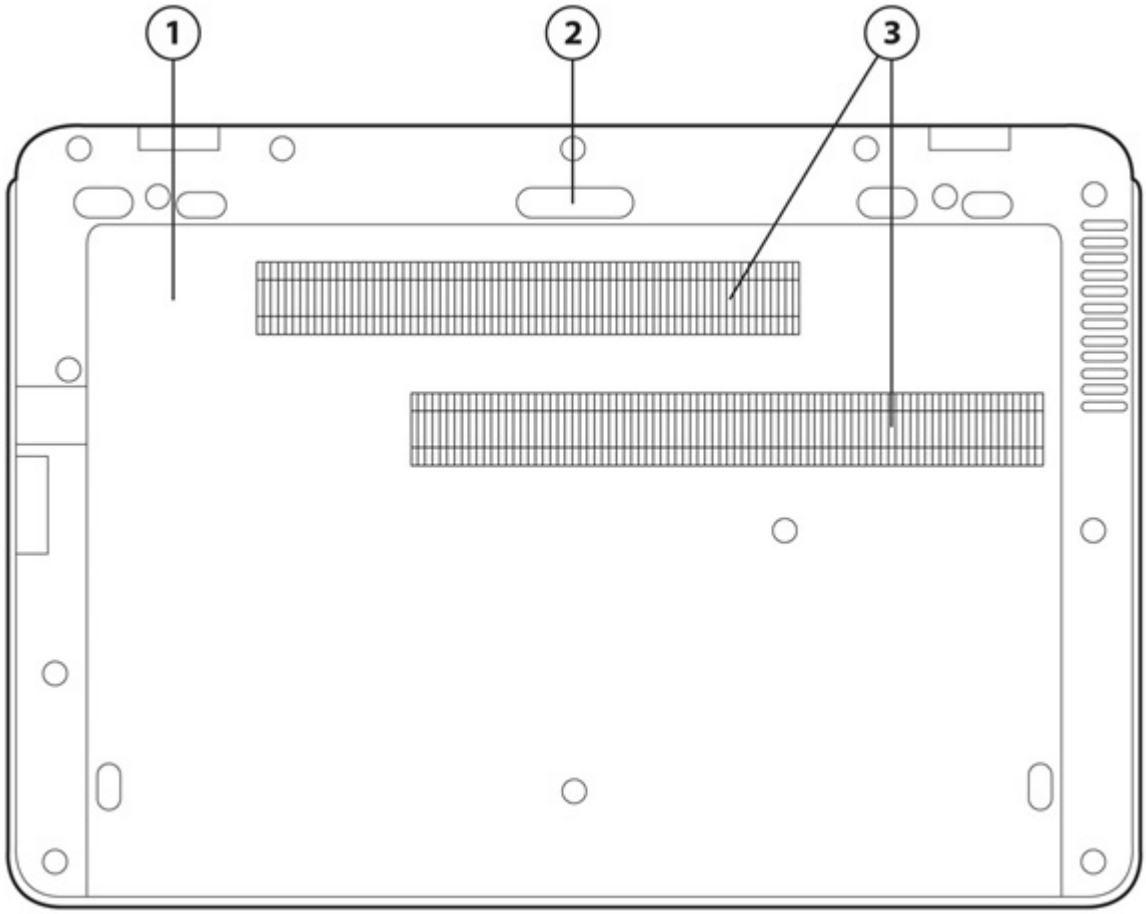
6. Docking port
7. Power connector

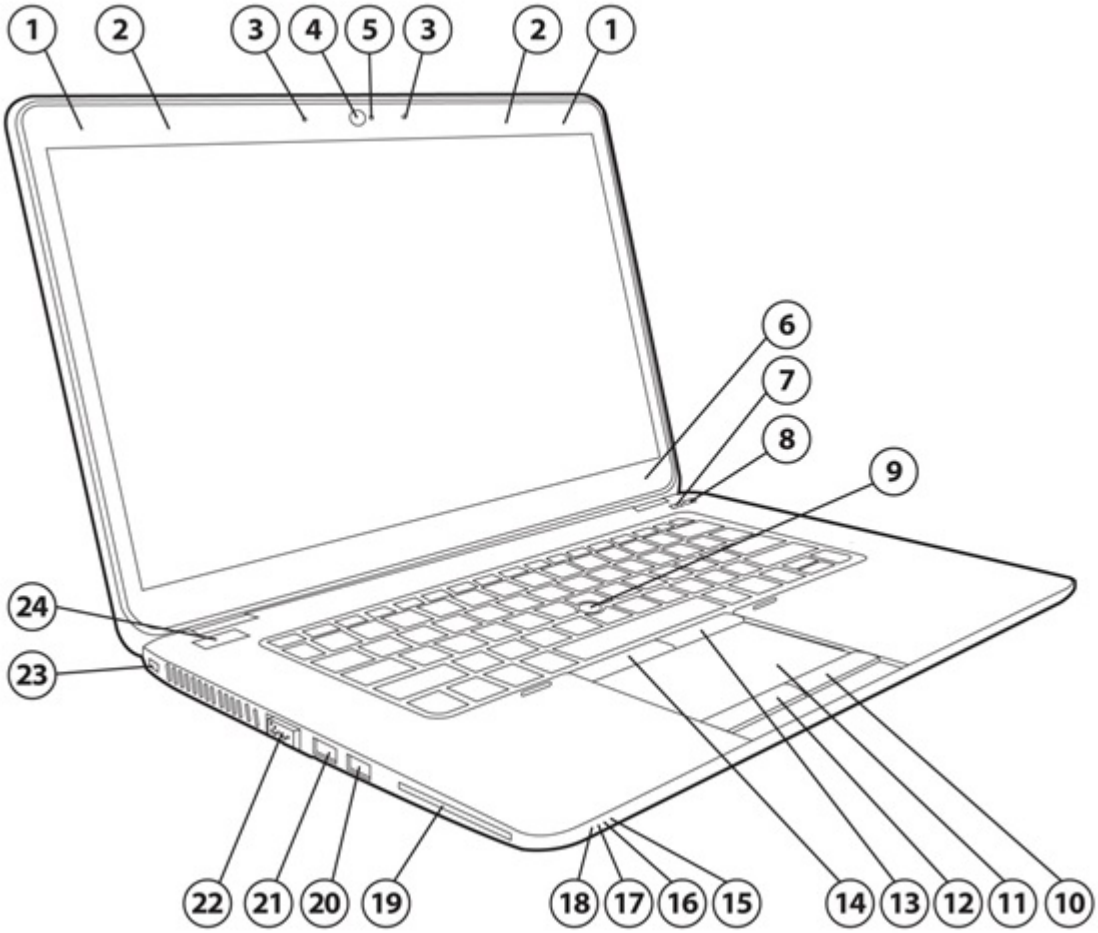


Bottom

1. EasyAccess panel
2. EasyAccess panel release lock
3. Vents (2)

HP EliteBook 850 Notebook PC

Overview



Front/Left

1. WLAN antennas (2)
2. WWAN antennas (2)
3. Internal microphones (2)
4. Webcam (select models only)
5. Webcam light (select models only)
6. Internal display switch
7. Wireless button
8. Volume mute button
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10. Right TouchPad button
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21. USB 3.0 charging port
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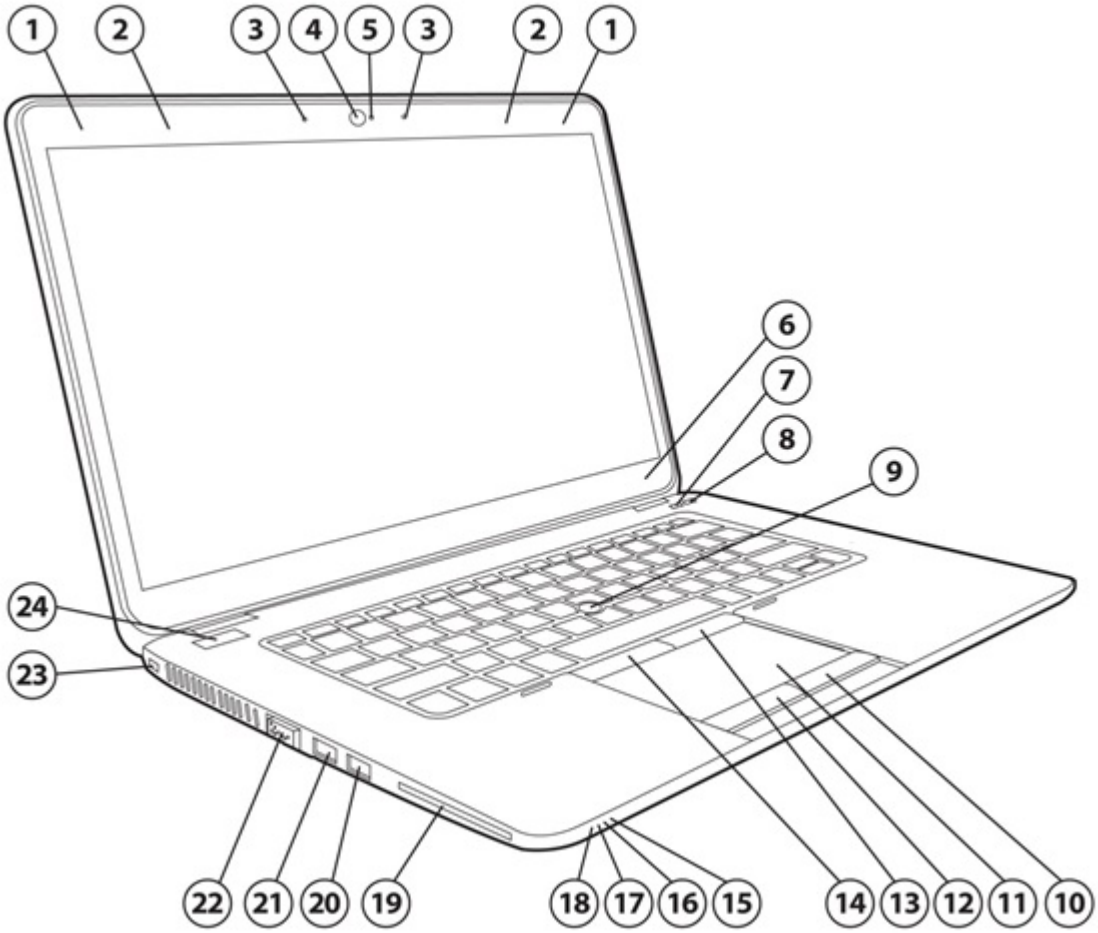
24. Power button

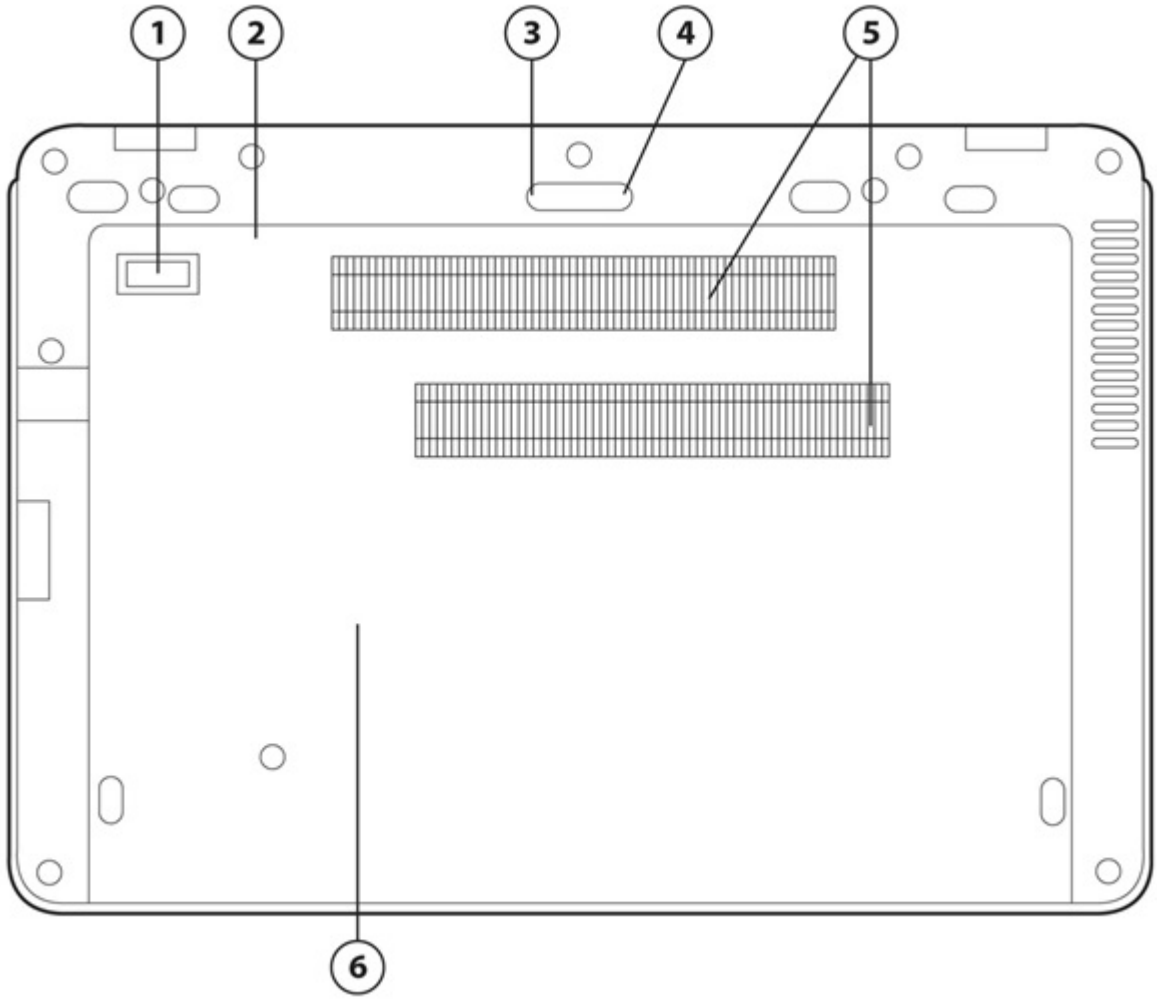
Overview



Right

1. Audio-out (headphone) jack/Audio-in(microphone) jack
2. DisplayPort
3. Memory card reader
4. USB 3.0 ports (2)
5. Drop-jaw Ethernet port (RJ-45)
6. Docking port
7. Power connector

Overview



Bottom

1. Accessory battery connector
2. EasyAccess panel
3. EasyAccess panel release latch

   * Supports full-size 2FF (mini-SIM card)
4. Service door release lock
5. Vents (2)
6. SIM slot *

Overview

At A Glance

- Windows 8 versions, Windows 7 versions, SUSE Linux, or FreeDOS
- Magnesium and aluminum chassis
- 4-step Soft-touch paint process
- Patent-pending Drop-jaw Ethernet port
- EasyAccess door to quickly access most components for easy serviceability
- Full-sized spill-resistant keyboard; optional back-lit keyboard keeps you productive in low-light settings
- Endures strenuous durability testing.
- Choice of 4th generation Intel® Core™ i7, i5 and i3 processors
- Integrated Intel® HD Graphics 4400 or AMD Radeon™ HD 8750M discrete graphics with 1 GB dedicated GDDR5 video memory
- LED-backlit display
  - HP EliteBook 820: 12.5-inch diagonal HD or HD Premium
  - HP EliteBook 840: 14.0-inch diagonal HD, HD+ (including a touch-enabled option), or FHD
  - HP EliteBook 850: 15.6-inch diagonal HD or FHD
- Easily hot dock with the 2013 UltraSlim Docking Station
- DisplayPort for high resolution support
- Touchpad with scroll zone, on/off button with LED indicator
- Enhanced security features including HP Sure Start self-healing BIOS, HP Client Security HP Trust Circles and optional HP Fingerprint Reader
- Optional HD webcam with dual-microphone array for video conferencing
- HD Audio with DTS Studio Sound optimized for high fidelity audio
- Wireless and speaker mute buttons
- Flexible wireless connectivity options:
  - HP Connection Manager allows full control over wireless connections, including 3G and 4G mobile broadband, Wi-Fi, Ethernet and Bluetooth® (Win 7 only)
  - Integrated 4G HP Mobile Broadband Modules
  - HP Wireless Hotspot (Win 8 Only)
  - HP Mobile Connect (EMEA Only) (Win 8 Only)
  - Intel WiDi Software
- Choice of 7200 rpm user-removable hard drive (up to 500 GB) with HP 3D DriveGuard, 5400 rpm user-removable hard drive (up to 1 TB on EliteBook 840 and 850), 500 GB 7200 rpm Self Encrypting Drive, 500 GB 5400 rpm FIPS Self Encrypting Drive, 256 GB SED Solid State Drive, or 128/180/240 GB Solid State Drive
- 120 GB M.2 (NGFF) SSD (Planned to be available 4Q 2013)
- M.2 32GB flash cache for Intel Smart Response Technology

NOTE: See important legal disclosures for all listed specs in their respective features sections.

PRODUCT NAMES

HP EliteBook 820 G1 Notebook PC
HP EliteBook 840 G1 Notebook PC
HP EliteBook 850 G1 Notebook PC

OPERATING SYSTEM

Preinstalled

Windows 8 Pro 64*
Windows 7 Professional (available through downgrade rights from Windows 8 Pro)**
Windows 8 64*
Windows 7 Professional 32***
Windows 7 Professional 64***
Windows 7 Home Premium 32***
Windows 7 Home Premium 64***
SUSE Linux
FreeDOS

* Not all features are available in all editions of Windows 8. Systems 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.
** This system is preinstalled with Windows® 7 Pro software and also comes with a license and media for Windows 8 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.
*** Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

PROCESSOR

4th Generation Intel® Core™ i7-4600U with Intel HD Graphics 4400 (2.1 GHz, 4 MB cache, 2 cores)*
Up to 3.3 GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i5-4300U with Intel HD Graphics 4400 (1.9 GHz, 3 MB cache, 2 cores)*
Up to 2.9 GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i5-4200U with Intel HD Graphics 4400 (1.6 GHz, 3 MB cache, 2 cores)*
Up to 2.6 GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i3-4010U with Intel HD Graphics 4400 (1.7 GHz, 3 MB cache, 2 cores)*

* Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing on Intel® architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. Intel's numbering is not a measurement of higher performance.
NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

Features

INTEL TURBO BOOST TECHNOLOGY*

Intel Turbo Boost is a feature that speeds up the CPU for a short time. It is similar to overclocking the processor, except within a framework provided by Intel. This feature provides additional performance and allows the computer to perform certain tasks more quickly. It also draws additional power and generates additional heat. Therefore, if Turbo Boost is used while powered from battery, it causes additional stress on the battery.

Using Turbo Boost while powered from battery might impact battery cycle life. Cycle life describes how long the battery will last before it needs to be replaced. A cycle refers to one complete charge/discharge cycle of the battery. Because Turbo Boost causes extra stress on the battery, it often shortens the lifetime of the battery.

HP decided not to enable Turbo Boost when powered from battery. This decision was based on the desire to give customers the greatest battery cycle life possible. Turbo Boost is enabled when powered from AC adapter.

Based on customer requests, HP will provide an option to enable Turbo Boost while powered from battery. For the 2013 platform, it will be an F10 option. Turbo Boost will be available for devices powered from battery by the end of the year. The additional performance might cause a slight reduction in battery cycle life, but will not void the battery warranty.

*Implementing Turbo Boost in F10 option is only allowed for batteries over 40WHr. Intel® Turbo Boost technology requires a PC with a processor with Intel Turbo Boost capability. Intel Turbo Boost performance varies depending on hardware, software and overall system configuration. See www.intel.com/technology/turboboost for more information.

CHIPSET

Chipset integrated with processor

GRAPHICS

Integrated:
Intel® HD Graphics 4400
Discrete*:
AMD Radeon™ HD 8750M**, with 1 GB dedicated DDR5 video memory***

* HP EliteBook 840 and 850 only.
** HD content required to view HD images.
*** AMD Dynamic Switchable Graphics technology requires an Intel processor, plus an AMD Radeon™ discrete graphics configuration and is not available on FreeDOS and Linux OS. With AMD Dynamic Switchable Graphics technology, full enablement of all discrete graphics video and display features may not be supported on all systems (e.g. OpenGL applications will run on the integrated GPU or the APU as the case may be).

Features

DISPLAY

HP EliteBook 820

Internal
12.5" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)
12.5" diagonal LED-backlit HD Premium anti-glare UWVA slim (1366 x 768)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 1920 x 1200 external resolution@75 Hz

HP EliteBook 840

Internal
14" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)
14" diagonal LED-backlit HD+ anti-glare SVA flat (1600 x 900)
14" diagonal LED-backlit HD+ SVA flat + touch (1600 x 900)*
14" diagonal LED-backlit FHD anti-glare UWVA slim (1920 x 1080)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 1920 x 1200 external resolution @75 Hz

* Touch panel has chemically-strengthened Gorilla glass top cover
NOTE: HD content required to view HD images.
NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

HP EliteBook 850

Internal
15.6" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)
15.6" diagonal LED-backlit FHD anti-glare SVA slim(1920 x 1080)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 1920 x 1200 external resolution @75 Hz

NOTE: HD content required to view HD images.
NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Features

STORAGE AND DRIVES

Primary Storage Bay
Hard Drives*
320/500 GB/1 TB** 5400 rpm SATA II Hard Drive
320/500 GB 7200 rpm SATA II Hard Drive
500 GB 7200 rpm SED (Self Encrypting Drive) (Expected to be available in November 2013)
500 GB 5400 rpm FIPS*** SED (Self Encrypting Drive) (Expected to be available in November 2013)

Solid State Drive*
120 GB M.2 (NGFF) Solid State Drive (Expected to be available in November 2013)
128/180/240 GB 2.5" Solid State Drive
256 GB SED Solid State Drive (Expected to be available in November 2013)

NOTE: If 120 GB M.2 (NGFF) SSD is selected, any of the HDD and SSD can be configured as secondary storage.

HP 3D DriveGuard (Windows only)
The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive

*For hard drives and solid state drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.
** 1TB only available on EliteBook 840 and 850.
*** FIPS-certified, hardware-based AES-256 encryption image

NOTE: For Solid State Drives (SSD), GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 5GB for Windows 8 is reserved for system recovery software.

FLASH CACHE

32 GB M.2 (NGFF)
Optional 32 GB mSATA flash cache module support for Intel Smart Response Technology. (Available only with standard non-SED hard drive.)

MEMORY

Standard
DDR3L SDRAM (1600 MHz)
Two SODIMM slots supporting dual-channel memory
4 GB and 8 GB* SODIMMs
Maximum
Upgradeable to 16384 MB with optional 8192 MB SODIMMs in slots 1 and 2*
Dual-channel
Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots.

* Maximum memory capacities assume Windows 64-bit operating systems or Linux. With Windows 32-bit operating systems, memory above 3 GB may not all be available due to system resource requirements.
NOTE: Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

Features

NETWORKING/COMMUNICATIONS

Wireless

Support for a broad range of secure, integrated wireless LAN and wireless WAN options featuring support for the latest industry standards. Broadband Wireless (WWAN) requires a Windows operating system and is available in select countries as a standard, factory configurable feature only. Integrated Bluetooth is also available (factory configurable only) and can be combined with any of the supported wireless LAN and wireless WAN options.

Broadband Wireless (WWAN)

HP hs3110 HSPA+ Mobile Broadband Module*
HP lt4111 LTE/EV-DO/HSPA+ Mobile Broadband Module (US)*,**
HP lt4112 LTE/HSPA+ Mobile Broadband Module (EMEA, APJ)

Wireless LAN (WLAN)***

Broadcom 802.11 (2x2) a/b/g/n + Bluetooth 4.0***
Intel Dual Band Wireless-AC 7260 802.11 ac (2x2) WiFi + BT 4.0 combo***, ****
Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi + BT 4.0 combo***
Intel Dual Band Wireless-N 7260NB 802.11 a/b/g/n (2x2) WiFi***
* WWAN is an optional feature sold separately or as an add on feature. WWAN connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors.
** 4G LTE not available on all products, in all regions and only available on products featuring Intel processors.
***Wireless access point and Internet service is required and is not included. Availability of public wireless access points limited.
**** The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.

Communications

Intel® Clarkville (I218-LM) Gigabit* Network Connection (10/100/1000 NIC)
* The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

AUDIO/MULTIMEDIA

Audio

HD Audio with DTS Studio Sound
2 Integrated stereo speakers
Integrated dual-microphone array; located in the display
Function keys for microphone mute, volume up, volume down
Stereo headphone/line out
Stereo microphone/line in

Webcam

Optional 720p HD* webcam

- HD format (widescreen)
- Supports videoconferencing (non-HD) and still image capture
- High quality fixed focus lens
- Video capture at various resolutions up to 1280x720 resolution (720p) and up to 30fps
- M-JPEG compression supports higher frame rates for video capture and videoconferencing
- Improved low light sensitivity

Features

- Improved dynamic range
- Skype-ready**

* HD content required to view HD images.
**Internet access required.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

The HP spill-resistant keyboard is designed using a thin layer of Mylar film under the keyboard and includes an all-metal keyboard deck for greater rigidity, as well as HP DuraKeys. HP DuraKeys are 50 times more resistant to visible wear than keyboards without them.* The 101/102-key compatible keyboard features a full-pitch key layout with desktop keyboard features, such as editing keys, both left and right control and alt keys, and function keys. US and International key layouts are available. Backlit keyboard available as an option.

Pointing Devices

Touchpad with scroll zone, on/off button with LED indicator, two-way scroll, two pick buttons

Buttons and Function Keys

Separate discrete buttons provide easy access to WLAN on/off and speaker mute. Function keys provide control of features including: standby mode, display brightness, external display, microphone mute, volume down, and volume up.

* In independent testing conducted by Trace Laboratories, HP DuraKeys showed no wear after 250,000 cycles. Competitor notebooks showed significant wear after only 5,000 cycles.)

SOFTWARE AND SECURITY

Preinstalled Software with Windows Operating System

BIOS

HP DriveLock | HP Automatic Drive Lock
HP BIOS Protection*
HP Disk Sanitizer **
HP SpareKey***
Update via Network
Master Record Security
Power On Authentication
Pre-Boot Security
Secure Erase****
Hybrid Boot
Measured Boot
Secure Boot
Absolute Persistence Module*****

* HP Tools partition with an HP BIOS required for automatic recovery.
** For the use cases outlined in the DOD 5220.22-M Supplement. Does not support Solid State Drives (SSDs). Initial setup required. Web history deleted only in Internet Explorer and Firefox browsers and must be user enabled.
*** Requires initial user set up.
**** For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
***** The Absolute Persistence agent is shipped turned off, and is activated with customer purchase of a subscription. Service may be limited. Check with Absolute for availability outside the U.S. The optional subscription service of Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. If Data Delete is utilized, the Recovery Guarantee

payment is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either create a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

MultiMedia
CyberLink PowerDVD

Communication
HP Connection Manager (Windows 7 only)
HP GPS and Location*
HP Mobile Connect (Windows 8 only)**
HP Wireless Hotspot*** (Windows 8 only)
Intel WiDi Software****
HP Roaming Alert
Intel My WiFi and Wireless Drivers

HP Value Add Software
Getting Started with Windows 8
HP 3D DriveGuard (Windows required)
HP ePrint Driver (HP Exclusive)*****
HP Hotkey Support
HP PageLift (HP Exclusive with Windows 8)
HP Recovery Manager (Windows 8 only)
HP Support Assistant W8
HP Recovery Disc Creator (Windows 7 only)
UEFI System Diagnostics W8

3rd Party
Adobe® Flash Player (Commercial)
Bing Search
Skype******
Buy Office

NOTE: HP Recovery Manager enables fast recovery of the factory preinstalled image if the system becomes corrupted or if important system files are accidentally deleted. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.

*GPS access requires an unobstructed path to multiple satellites. Performance may be affected if/when used inside of buildings, bridges or heavily congested metropolitan areas. Requires separately purchased GPS navigation software available from multiple GPS applications.
**Internet access required.
*** The wireless hotspot application requires an active internet connection and separately purchased data plan. While HP wireless hotspot is active, on-device applications will continue to work and will use the same data plan as the wireless hotspot. Wireless hotspot data usage may incur additional charges. Check with your service provider for plan details. Requires Windows.
**** Integrated Intel Wi-Di feature is available on select configurations only and requires separately purchased projector, tv or computer monitor with an integrated or external Wi-Di receiver. External Wi-Di receivers connect to the projector, tv or computer monitor via a standard HDMI cable, also sold separately.
*****Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter).Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary. afterwards for full functionality."

Features

***** Skype is not offered in China.

Standard Security Features
HP Client Security (Windows only)
HP Sure Start*
HP Device Access Manager with Just in Time Authentication
Drive Encryption**
HP File Sanitizer***
Microsoft Security Essentials (Windows 7 only)*** *
HP Remote Management of HP Client Security*****
HP Trust Circles Standard********** (Planned to be available Fall 2013)
Central Management of Client Security with DigitalPersona Pro Workgroup******
Computrace Support*******

Optional Security Features
Intel® Anti-Theft (requires a Computrace subscription)********
Intel Identity Protection*********
HP Fingerprint reader

NOTE: The Absolute Persistence agent is shipped turned off, and must be activated by customers when they purchase a subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S.

* HP Sure Start is available only on EliteBook 800 and Workstation ZBook series products. HP Tools partition with HP BIOS required for automatic recovery.
** Requires Windows. Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access. Drive encryption planned to be available in October 2013.
*** For the use cases outlined in the DOD 5220.22-M Supplement. Does not support Solid State Drives (SSDs). Initial setup required. Web history deleted only in Internet Explorer and Firefox browsers and must be user enabled.
**** Opt in and internet connection required for updates.
***** In order to deploy and receive updated policies, the client needs to be connected to the network server and requires separately purchased DigitalPersona Pro software. System access may not prevent users from logging into the system on the first attempt if policy updates haven't yet been received and applied.
****** Not all features are remotely manageable.
******* The Absolute Persistence agent is shipped turned off, and is activated with customer purchase of a subscription. Service may be limited. Check with Absolute for availability outside the U.S. The optional subscription service of Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. If Data Delete is utilized, the Recovery Guarantee payment is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either create a PIN or purchase one or more RSA SecurID tokens from Absolute Software
******** Intel Anti-Theft security is supported on Intel Core i processors and requires a separately purchased Absolute Computrace service subscription and must be activated and configured. Check with Absolute for availability in your country. Intel and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom. See http://www.intel.com/technology/anti-theft/.
********* Intel Identity Protection feature is only available with Intel Core Processors. Intel® IPT security requires separate Symantec VIP software service subscription and must be activated and configured. Requires a website that uses Symantec VIP Authentication Service and Microsoft® Windows. Intel® and HP assume no liability for lost or stolen data and/or systems or any other damages resulting therefrom.
**********HP Trust Circles Standard, when included, allows up to 5 Trust Circles with up to 5 contacts in each Trust Circle. Optional Trust Circles Professional required for unrestricted number of Trust Circles and members contacts. Trust Circles Reader is available to allow a contact to participate in an invited Trust Circle. Requires Windows

Features

For more information on HP security solutions refer to: http://www.hp.com/go/protecttools.

POWER

Power Supply

HP EliteBook 820 Notebook PC
HP 45W Smart AC Adapter
HP 65W Smart EM AC Adapter (China and India only)
HP 65W Slim Smart AC Adapter (Japan and Australia only)
Power cord is configurable; either 3.2 feet or 6 feet (1.0 (+/- 0.1 m) or 1.8 meter (+/- 0.1m))
Total length including external AC adapter is 9.2 feet or 12 feet (2.86 or 3.66 meter).

HP EliteBook 840 Notebook PC
Integrated graphics:
HP 45W Smart AC adapter
HP 65W Smart AC adapter
HP 65W EM Smart AC adapter (China and India only)
HP 65W Slim Smart AC adapter (Japan and Australia only)
Discrete graphics:
HP 65W Smart AC adapter
HP 65W EM Smart AC adapter (China and India only)
HP 65W Slim Smart AC adapter (Japan and Australia only)
Power cord is configurable; either 3.2 feet or 6 feet (1.0 or 1.8 meter)
Total length including external AC adapter is 9.2 feet or 12 feet (2.86 or 3.66 meter).

HP EliteBok 850 Notebook PC
Integrated graphics:
HP 45W Smart AC adapter
HP 65W Smart AC adapter
HP 65W EM Smart AC adapter (China and India only)
HP 65W Slim Smart AC adapter (Japan and Australia only)
Discrete graphics:
HP 65W Smart AC adapter
HP 65W EM Smart AC adapter (China and India only)
HP 65W Slim Smart AC adapter (Japan and Australia only)
Power cord is configurable; either 3.2 feet or 6 feet (1.0 or 1.8 meter)
Total length including external AC adapter is 9.2 feet or 12 feet (2.86 or 3.66 meter).

HP EliteBook 820 Notebook PC

Primary Battery
3-cell HP Long Life 26 WHr
3-cell HP Long Life 46 WHr

HP EliteBook 840 Notebook PC

Primary Battery
3-cell HP Long Life 24WHr
3-cell HP Long Life 50 WHr

Features

Secondary Battery
6-cell HP Long Life Slice 60 WHr (optional)

HP EliteBook 850 Notebook PC

Primary Battery
3-cell HP Long Life 24WHr
3-cell HP Long Life 50 WHr

Battery Life*

	Configurations with integrated graphics	Configurations with discrete graphics
HP EliteBook 820 G1		
3-cell (46 WHr) battery with hard drive	Up to 11 hours 15 minutes	N/A
3-cell (46 WHr) battery with 2.5" solid state drive	Up to 13 hours 15 minutes	N/A
HP EliteBook 840 G1		
3-cell (50 WHr) battery with hard drive	Up to 13 hours 15 minutes	Up to 13 hours 15 minutes
3-cell (50 WHr) battery with 2.5" solid state drive	Up to 15 hours 15 minutes	Up to 14 hours 30 minutes
3-cell (50 WHr) battery + Slice (60 WHr) with 2.5" solid state drive	Up to 33 hours 45 minutes	N/A
HP EliteBook 850 G1		
3-cell (50 WHr) battery with hard drive	Up to 13 hours	Up to 13 hours 15 minutes
3-cell (50 WHr) battery with 2.5" solid state drive	Up to 15 hours	Up to 14 hours 30 minutes

System Standby Time**
Up to TBD days

* Battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See www.bapco.com for additional details.
** Standby life will vary depending on various factors including battery, Memory, CPU, EC and LAN chip. The maximum capacity of the battery will naturally decrease with time and usage.

NOTE: Fast Charge recharges your battery up to 90% within 90 minutes when the system is off (6-cell only).

Power Conservation
Supports enhanced Intel SpeedStep technology (allows Battery Optimized Mode, Maximum Performance Mode, or Automatic mode)
AMD PowerPlay technology (discrete models)
Hibernation
Standby
ACPI compliance

WEIGHTS & DIMENSIONS

HP EliteBook 820 Notebook PC

Weight
Starting at 2.94 lb (1.33 kg) (weight will vary by configuration)
Dimensions (w x d x h)
12.2 x 8.48 x 0.83 in
31 x 21.53 x 2.1 cm

HP EliteBook 840 Notebook PC

Weight
Starting at 3.48 lb (1.58 kg) (non-Touch) (weight will vary by configuration)
Starting at 3.92 lb (1.78 kg) (Touch) (weight will vary by configuration)
Dimensions (w x d x h)
13.34 x 9.33 x 0.83 in (non-Touch)
33.89 x 23.7 x 2.10 cm (at front) (non-Touch)

13.34 x 9.33 x 0.89 in (Touch)
33.89 x 23.7 x 2.25 cm (Touch)

HP EliteBook 850 Notebook

Weight
Starting at 4.15 lb (1.88 kg) (weight will vary by configuration)
Dimensions (w x d x h)
14.78 x 9.98 x 0.84 in
37.5 x 25.3 x 2.142 cm

PORTS/SLOTS

Ports
USB 3.0 - Two for EliteBook 820, Three for EliteBook 840 and EliteBook 850
USB 3.0 (charging) - One
DisplayPort 1.2 - One
VGA - One
Headphone/Microphone combo port - One
RJ-45 (Ethernet) - One
Power connector - One
Side docking connector - One
Secondary battery connector* - One

Expansion Slots
Media Card Reader
- supports SD, SDHC, SDXC

Features

* EliteBook 840 only.

SERVICE AND SUPPORT

Limited 3-year, 1-year and 90-day warranty options available, depending on country, 3-year limited warranty on HP Long Life Battery (only available with 3-year platform warranty). Optional* HP Care Pack Services** are extended service contracts which go beyond your standard warranties. For more details visit: http://www.hp.com/go/lookuptool.

*Sold separately or as an optional feature.
** Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. Consult the HP Customer Support Center for details.
http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp

NOTE: Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit: www.hp.com/go/cpc

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	TBD V		
	Average Operating Power		**Windows 7 (64-bit)**	**Windows8 (64-bit)**
		EliteBook 820 Integrated graphics	TBD W	TBD W
		EliteBook 840 Discrete graphics	TBD W	TBD W
		EliteBook 840 Integrated graphics	TBD W	TBD W
		EliteBook 850 Discrete graphics	TBD W	TBD W
		EliteBook 850 Discrete graphics	TBD W	9.88 W
	Max Operating Power	Discrete < 90W UMA < 65W		
Temperature	**Operating**	32° to 95° F (0° to 35° C) (not writing optical) 41° to 95° F (5° to 35° C) (writing optical)		
	Non-operating	-4° to 140° F (-20° to 60° C)		
Relative Humidity	**Operating**	10% to 90%, non-condensing		
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature		
Shock	**Operating**	40 G, 2 ms, half-sine		
	Non-operating	200 G, 2 ms, half-sine		
Random Vibration	**Operating**	0.75 grms		
	Non-operating	1.50 grms		
Altitude (unpressurized)	**Operating**	-50 to 10,000 ft (-15.24 to 3,048 m)		
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)		
Planned Industry Standard Certifications	**UL**	Yes		
	CSA	Yes		
	FCC Compliance	Yes		
	ENERGY STAR®	Select models*		
	EPEAT	Registered TBD in United States**		
	ICES	Yes		
	Australia / NZ A-Tick Compliance	Yes		
	CCC	Yes		
	Japan VCCI Compliance	Yes		
	KC	Yes		
	BSMI	Yes		
	CE Marking Compliance	Yes		

BNCI or BELUS	Yes
CIT	Yes
GOST	Yes
Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

* Configurations of the HP EliteBook 820, HP EliteBook 840 and HP EliteBook 850 that are ENERGY STAR® qualified are identified as HP EliteBook 820 ENERGY STAR, HP EliteBook 840 ENERGY STAR and HP EliteBook 850ENERGY STAR on HP websites and on www.energystar.gov.
** EPEAT® registration varies by country. See www.epeat.net for registration status by country.
EPEAT status listed above applies to U.S.

For accessibility information on HP products, please visit: http://www.hp.com/accessibility.

DISPLAYS

12.5" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)	**Outline Dimensions** (W x H x D)	11.46 x 7.14 x 0.14 in (29.1 x18.14 x 0.36 cm)	
	Active Area	10.89 x 6.12 in (27.6615 x 15.552 cm)	
	Weight	0.6 lb (270g) (max)	
	Diagonal Size	12.5 in (35.75 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Format**	1366 x 768 (HD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	TN	
	PPI	125 ppi	
	Viewing Angle	SVA 40/40/15/30 (Left/Right/Down/Up)	

Technical Specifications

12.5" diagonal LED-backlit HD Premium anti-glare UWVA slim (1366 x 768)	**Outline Dimensions** (W x H x D)	11.46 x 7.14 x 0.112 in (29.1 x18.14 x 0.285 cm)	
	Active Area	10.85 x 6.1 in (27.559 x 15.494 cm)	
	Weight	0.49 lb (220g) (max)	
	Diagonal Size	12.5 in (35.75 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	500:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	300 nit (typical)	
	Pixel Resolution	**Format**	1366 x 768 (HD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	IPS/FFS/VA	
	PPI	125 ppi	
	Viewing Angle	UWVA 85/85/85/85 (Left/Right/Down/Up)	
14" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)	**Outline Dimensions** (W x H x D)	12.6 x 8.09 x 0.14 in (32.09 x 20.56 x 0.36 cm)	
	Active Area	12.18 x 6.85 in (30.94 x 17.395 cm)	
	Weight	0.71 lb (320g) (max)	
	Diagonal Size	14.0 in (35.6cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Format**	1366 x 768 (HD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	TN	
	PPI	125 ppi	
	Viewing Angle	SVA 40/40/15/30 (Left/Right/Down/Up)	

Technical Specifications

14" diagonal LED-backlit HD+ anti-glare SVA flat (1600 x 900)	**Outline Dimensions** (W x H x D)	12.6 x 8.09 x 0.14 in (32.09 x 20.56 x 0.36 cm)	
	Active Area	12.19 x 6.86 in (30.96 x 17.415 cm)	
	Weight	0.72 lb (325 g) (max)	
	Diagonal Size	14.0 in (35.6cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	250 nit (typical)	
	Pixel Resolution	**Format**	1600 x 900 (HD+)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	TN	
	PPI	131 ppi	
	Viewing Angle	SVA 40/40/15/30 (Left/Right/Down/Up)	
14" diagonal LED-backlit HD+ SVA flat + touch (1600 x 900)	**Outline Dimensions** (W x H x D)	12.6 x 8.09 x 0.14 in (32.09 x 20.56 x 0.36 cm)	
	Active Area	12.19 x 6.86 in (30.96 x 17.415 cm)	
	Weight	0.72 lb (325 g) (max)	
	Diagonal Size	14.0 in (35.6cm)	
	Touch enabled	Yes	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	250 nit (typical)	
	Pixel Resolution	**Format**	1600 x 900 (HD+)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	TN	
	PPI	131 ppi	
	Viewing Angle	SVA 40/40/15/30 (Left/Right/Down/Up)	

Technical Specifications

14" diagonal LED-backlit FHD anti-glare UWVA slim (1920 x 1080)	**Outline Dimensions** (W x H x D)	12.6 x 8.09 x 0.12 in (32.09 x 20.56 x 0.3 cm)	
	Active Area	12.18 x 6.85 in (30.93 x 17.4 cm)	
	Weight	0.75 lb (340 g) (max)	
	Diagonal Size	14.0 in (35.6cm)	
	Touch enabled	Yes	
	Surface Treatment	Anti-glare	
	Contrast Ratio	600:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	300 nit (typical)	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Interface	eDP 1.3+PSR (2 lane)	
	LCD Mode	IPS/FFS/VA	
	PPI	157 ppi	
	Viewing Angle	UWVA 85/85/85/85 (Left/Right/Down/Up)	
15.6" diagonal LED-backlit HD anti-glare SVA flat (1366 x 768)	**Outline Dimensions** (W x H x D)	14.17 x 8.83 x 0.15 in (36.0 x 22.43 x 0.38 cm)	
	Active Area	13.55 x 7.62 in (34.42 x 19.35 cm)	
	Weight	< 1.1 lb (500 g) (max)	
	Diagonal Size	15.6 in (39.62 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	300:1 (min)	
	Refresh Rate	60 Hz	
	Brightness	200 nit (typical)	
	Pixel Resolution	**Format**	1366 x 768 (HD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (1 lane)	
	LCD Mode	TN	
	PPI	101 ppi	
	Viewing Angle	SVA 40/40/15/30 (Left/Right/Down/Up)	

Technical Specifications

15.6" diagonal LED-backlit FHD anti-glare SVA flat (1920 x 1080)	**Outline Dimensions** (W x H x D)	14.17 x 8.83 x 0.15 in (36.0 x 22.43 x 0.32 cm)	
	Active Area	13.55 x 7.62 in (34.42 x 19.36 cm)	
	Weight	< 0.84 lb (380 g) (max)	
	Diagonal Size	15.6 in (39.62 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	400:1 (typical)	
	Refresh Rate	60 Hz	
	Brightness	300 nit (typical)	
	Pixel Resolution	**Format**	1920 x 1080 (FHD)
		Configuration	RGB Stripe
	Interface	eDP 1.2 (2 lane)	
	LCD Mode	TN	
	PPI	142 ppi	
	Viewing Angle	SVA 45/45/25/35 (Left/Right/Down/Up)	

STORAGE AND DRIVES

Internal Storage

320 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

500 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
1 TB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.254 lb (115 g)	
	Capacity	1 TB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	3 ms
		Average	13 ms
		Maximum	24 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

500 GB* 5400 rpm SATA FIPS Hard Drive** (Expected to be available in November 2013)	**Drive Weight**	0.25 lbs (95g)	
	Capacity	500 GB	
	Height	0.28 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Cache	16 MB	
	Rotational Speed	5400 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	
320 GB* 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115 g)	
	Capacity	320 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Cache	16 MB	
	Rotational Speed	7200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

500 GB* 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

500 GB* 7200 rpm SMART SATA II Self Encrypting Drive (Expected to be available in November 2013)	**Drive Weight**	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.37 in (9.5 mm)	
	Width	2.50 in (63.5 mm)	
	Interface	ATA-8, SATA 2.6, 3.0 Gb/s	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
	Seek Time (typical reads, including settling)	**Single Track**	1 ms
		Average	12 ms
		Maximum	20 ms
	Cache	16 MB	
	Rotational Speed	7200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

SATA 6 Gb/s 128 GB*, 2.5-inch Solid State Drive	**Drive Weight**	73 Grams	
	Capacity	128 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		415 MB/s	175 MB/s
	Logical Blocks	250,069,680	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8; SATA 3.0; DIPM; TRIM	
SATA 6 Gb/s 180 GB*, 2.5-inch SATA Solid State Drive	**Drive Weight**	78 Grams	
	Capacity	180 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA Gen 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 550 MB/s	Up to 520 MB/s
	Logical Blocks	351,651,888	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8, SATA 3.0; DIPM; TRIM	
SATA 6 Gb/s 240 GB*, 2.5-inch Solid State Drive	**Drive Weight**	78 Grams	
	Capacity	240 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA Gen 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		550 MB/s	520 MB/s
	Logical Blocks	468,862,128	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8, SATA 3.0; DIPM; TRIM	

Technical Specifications

SATA 6 Gb/s 256 GB*, 2.5-inch SATA SED Solid State Drive (Expected to be available in November 2013)	**Drive Weight**	73 Grams	
	Capacity	256 GB	
	Height	0.276 in (7 mm)	
	Width	2.76 in (70 mm)	
	Interface	SATA 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 460 MB/s	Up to 260 MB/s
	Logical Blocks	500,118,192	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8 compliant; SATA 3.0; DIPM; TRIM	

SATA 6Gb/s 120 GB*, 2242 M.2 Solid State Drive (Expected to be available in November 2013)	**Drive Weight**	Up to 10 Grams	
	Capacity	120 GB	
	Height	0.138 in (3.5mm)	
	Width	0.866 in (22 mm)	
	Interface	M.2 SATA Gen3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 540 MB/s	Up to 520 MB/s
	Logical Blocks	234,441,648	
	Operating Temperature	32° to 158°F (0° to 70°C) [case temp]	
	Features	ATA Security; ATA-8, SATA 3.0; DIPM; TRIM	

* For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.
** * FIPS-certified, hardware-based AES-256 encryption image.

SECURITY

HP Fingerprint Reader (optional)	**Mobile Voltage Operation**	3.0V-3.6V
	Operating Temperature	14° - 167°F (-10° - 75°C)
	Current Consumption Image	36 mA peak
	Low Latency Wait for Finger	950 uA
	Capture Rate	3000. lines/sec
	ESD Resistance	IEC 61000-4-2 4B (±15KV)
	Detection Matrix	200*1 (plus another secondary line) 508 dpi 12*3 mm sensor area

Technical Specifications

Smart Card Reader	**Smart card standard**	PC/SC 2.0 for Windows smart card standard	
	Dimensions (L x W x H)	0.41x 0.08 x 0.32 in (10.5 x 2 x 8.2 mm)	
	Smart Card support	ISO 7816 Class A and AB smart cards	
	Smart Card Interface	Smart Card Interface with T = 0 and T = 1 support Support I2C memory card, SLE4418, SLE4428, SLE4432, SLE4442, SLE4436, SLE5536, SLE6636, AT88SC1608, AT45D041 card and AT45DB041 card via external EEPROM	
	Operating systems	No driver is required for this device. Native support is provided by the operating system.	
	Power	**Normal Mode**	With card present, before being suspended: 40.9 mA Without card present, before being suspended: 33.16 mA After being suspended with smart card present: 380 µA After being suspended without smart card present: 380 µA
		Power Saving Mode	With card present, before being suspended: 40.6 mA Without card present: 380 µA After being suspended with smart card present: 380 µA
	Features	• Support single slot • Support T0, T1 protocol • Support I2C memory card, SLE4418, SLE4428, SLE4432, SLE4442, SLE4436, • SLE5536, SLE6636, AT88SC1608, AT45D041 card and AT45DB041 card via external EEPROM • Support ISO7816 Class A, B and C (5V/3V/1.8V) card • Implemented as an USB full speed device with bulk transfer endpoint, Mass • Storage endpoint • Built-in PLL for USB and Smart Card clocks requirement • Support EEPROM for USB descriptors customization (PID/VID/ iManufacturer/iProduct/Serial Number), Direct Web Page Link, and accessing memory card module. • EEPROM programmable via USB interface • Support software update for memory card module • Support Direct Web Page Link via configuration in external EEPROM • Support short APDU and extended APDU • Compatible with Microsoft USB-CCID driver • Support remote wake up through inserting card/removing card • Support USB selective suspend • Support Power Saving Mode (Using one pin to select between Normal/PWR Saving Mode) • Support card power over current protection mechanism • Built in resonator. • Support USB LPM (Link Power Management) features. • Embedded clock source.	

NETWORKING/COMMUNICATIONS

Intel I218LM Gigabit Network Connection	**Ethernet Features**	TBD
	Power Management	TBD
	Performance Features	TBD
	Manageability	TBD
	Interface	TBD
	NIC Device Driver Name	TBD

HP 3110 HSPA+ Mobile Broadband Module*	**Technology/Operating Bands**	CDMA/1xRTT/EvDO: 800MHz (Cell), 1900MHz (PCS) GSM/GPRS/EDGE: 850MHz (Cell), 900MHz (EGSM), 1800MHz (DCS), 1900MHz (PCS) UMTS/WCDMA with receive diversity: 2100MHz (UTRA FDD Band I), 1900MHz (UTRA FDD Band II), 900MHz (UTRA FDD Band VIII), 850 MHz (UTRA FDD Band V) LTE: 700 MHz (Verizon, Band XIII)
	Mobile Operator	Verizon (US only)
	Wireless Protocol Standards	GSM/GPRS/EDGE: Class B, Multi-slot class 10 operation, coding schemes CS1 - CS4 and MSC1 - MSC9. CDMA: 1xEVDO Release 0 and Release A, IS-95A, IS-95B, IS-856, IS-2000 UMTS/WCDMA: Release 99 and Release 7 LTE: Power Class III as per 3GPP TS 36.101
	Wireless Parametric Standards	Complies with 3GPP specifications Release 8 for LTE
	Maximum Data Rates	EvDO (Revision A) - 3.1 Mbps (Download), 1.8 Mbps (Upload) WCDMA (DC-HSPA+) - 42Mbps (Download) LTE (Category 3) - 100 Mbps (Download), 50Mbps (Upload)
	GPS	Standalone, Assisted, XTRA
	GPS Bands	1575.42 MHz (± 1.023 MHz)
	Maximum Output Power	GSM/GPRS/EDGE: 32dBm (+/-1) WCDMA: 24dBm (+0.7/-2.3) LTE: +23 dBm (+2.7 dBm/-1.7 dBm) 1xRTT/EvDO: +24 dBm (+0.5 dBm/-1.5 dBm)
	Maximum Power Consumption	2700mA (peak)
	Power Consumption, Sleep Mode	10 mA
	Power Management	USB selective suspend Integrated notebook wireless button

	Antenna Type	Dual high efficiency 6 band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	PCI-Express MiniCard, USB 2.0 interface
	Weight	< 10 g
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (51 x 30 x 4.5 mm)
	Voltage, Operating	3.3v +/- 9%
	Temperature, Operating	-4° to 149° F (-20° to 65° C)
	Temperature, Non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
	Humidity, Non-operating	85% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	LED Activity	LED Off - Radio Off; Solid LED On - Radio On

* Mobile Broadband is an optional feature sold separately or as an add on feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors.

HP lt4111 LTE/EV-DO/HSPA+ 4G WWAN*	**Technology/Operating Bands**	LTE FDD all bands with diversity: 1900 MHz (Band II)[1], 1700/2100MHz (Band IV (AWS), 850 MHz (Band V), 700MHz (Band XIII), 700MHZ (Band XVII), 1900MHz G Block (Band XXV) WCDMA/HSDPA/HSUPA/HSPA+: all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II) , AWS 1700/2100MHz (Band IV), 850 MHz (Band V), 800 MHz (Band VIII) GSM/GPRS/EDGE: 1900 MHz, 1800 MHz , 850 MHz , 900 MHz CDMA: Cellular 800MHz (BC0), PCS 1900MHz (BC1)
	Wireless Protocol Standards	3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification EVDO Release 0 and Release A
	Wireless Parametric Standards	Complies with 3GPP specifications Release 8 for LTE
	Maximum Data Rates	LTE (Category 3): 100 Mbps (Download), 50Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
	GPS	Standalone GPS, A-GPS, GPS XTRA
	GPS Bands	1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz
	Maximum Output Power	LTE: +23 dBm (+/- 1 dBm) WCDMA: +23 dBm (+/- 1 dBm) GSM850/900, GMSK: +32dBm (+/- 1dBm) GSM850/900, 8PSK: +27dBm (+/- 1dBm) DCS1800 / PCS 1900, GMSK: +29dBm (+/- 1dBm) DCS1800 / PCS 1900, 8PSK: +26dBm (+/- 1dBm)

		CDMA: +24dBm (+/- 1dBm)
	Maximum Power Consumption	LTE: 1,200 mA (peak); <900 mA (average) WCDMA: 1,100 mA (peak); <800 mA (average) EGPRS: 2,500 mA (peak); <700 mA (average)
	Power Consumption, Sleep Mode	2 mA
	Power Management	USB selective suspend, Integrated notebook wireless button
	Antenna Type	Dual high efficiency multi-band antennae with spatial diversity
	Form Factor	M.2, 3042-S3 Key B
	Weight	6 g
	Dimensions (Length x Width x Thickness)	42 mm × 30 mm × 2.3 mm
	Voltage, Operating	3.135 V to 4.4 V (3.3 V +1.1V/-0.165V)
	Temperature, operating (from TIA/EIA/IS-98-D)	-13° to 140° F (-25° to 60° C)
	Temperature, non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
	Humidity, Non-operating	95% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	LED Activity	LED Off - Radio Off; Solid LED On - Radio On

[1] 1900 MHz (Band II) and 850 MHz (Band V) not supported at launch but support planned in a future firmware update.

* 4G LTE not available on all products, in all regions and only available on products featuring Intel processors. WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors.

HP lt4112 LTE/HSPA+ Gobi 4G Module*	**Technology/Operating Bands**	LTE FDD all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II), 1800 MHz (Band III), 850 MHz (Band V), 2600 MHz (Band VII), 900 MHz (Band VIII), 800 MHz (Band XX, DD800) WCDMA/HSDPA/HSUPA/HSPA+ all bands with diversity: 2100 MHz (Band I), 1900 MHz (Band II), 800 MHz (Band V), 900 MHz (Band VIII) GSM/GPRS/EDGE: 1900 MHz (Band II), 1800 MHz (Band III), 850 MHz (Band V), 900 MHz (Band VIII)
	Wireless Protocol Standards	3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification
	Wireless Parametric Standards	Complies with 3GPP specifications Release 8 for LTE
	Maximum Data Rates	LTE (Category 3): 100 Mbps (Download), 50Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) EDGE: 236.8 kbps (Download), 236.8 kbps (Upload) GPRS: 85.6 kbps(Download), 85.6 kbps (Upload)
	GPS	Standalone

	GPS Bands	1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz
	Maximum Output Power	LTE: +23 dBm (+/- 2 dBm) WCDMA: +23.5 dBm (+/- 1 dBm) GPRS Band II, III: +29.5 dBm (+/- 1 dBm) GPRS Band V, VIII: +32.5 dBm (+/- 1 dBm) EGPRS Band II, III: +26.5 dBM (+/-1.5 dBm) EGPRS Band V, VIII: +27.5 dBM (+/-1.5 dBm)
	Maximum Power Consumption	LTE: 1,200 mA (peak); <900 mA (average) WCDMA: 1,100 mA (peak); <800 mA (average) EGPRS: 2,800 mA (peak); <700 mA (average)
	Power Consumption, Sleep Mode	3 mA
	Power Management	USB selective suspend, Integrated notebook wireless button
	Antenna Type	Dual high efficiency multi-band antennae with spatial diversity
	Form Factor	M.2, USB 2.0 interface
	Weight	6 g
	Dimensions (Length x Width x Thickness)	42 mm × 30 mm × 2.3 mm
	Voltage, Operating	3.135 V to 4.4 V (3.3 V +1.1V/-0.165V)
	Temperature, operating (from TIA/EIA/IS-98-D)	14° to 131° F (-10° to 55° C)
	Temperature, non-operating, 96 hours (from MIL-STD 202 Method 108)	-40° to 185° F (-40° to 85° C)
	Humidity, Non-operating	95% relative humidity for 48 hours @ 185° F (85° C) (non-condensing)
	LED Activity	LED Off - Radio Off; Solid LED On - Radio On

* 4G LTE not available on all products, in all regions and only available on products featuring Intel processors. WWAN use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors.

Broadcom 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n • 2.402 - 2.482 GHz 802.11a/n • 4.9 - 4.95 GHz (Japan) • 5.15 - 5.25 GHz • 5.25 - 5.35 GHz

	• 5.47 - 5.725 GHz • 5.825 - 5.850 GHz • 2.402 - 2.482 GHz
Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through V5 • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum • Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas >20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio disabled: 75 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11a/g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (72.2 Mbps), -66 dBm (300 Mbps)
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)

Weight	3.1g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Bluetooth Specification

V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0

Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)
Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Sleep <17 mW
Antenna	Internally integrated within module
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant
Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves
Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark

	Bluetooth Profiles Supported	Generic Access Profile (GAP) Service Discovery Application Profile (SDAP) Serial Port Profile (SPP) Dial_Up Networking Profile (DUN) Generic Object Exchange Profile (GOEP) Object Push Profile (OPP) File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP) Personal Area Networking Profile (PAN) Human Interface Device Profile (HID) Generic Audio/Video Distribution Profile (GAVDP) Advanced Audio/Video Distribution Profile (A2DP) FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Basic Printing Profile (BPP) VDP (Video Distribution Profile) AVRCP (Audio Video Remote Control Profile)

* Wireless access point and internet service required. Availability of public wireless access points limited.

Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi + Bluetooth 4.0 Combo Adaptor*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n	
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)	
	Frequency Band	802.11b/g/n	2.402 - 2.482 GHz
		802.11a/n	4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz
	Antenna Structure	2 transmit; 2 receive (2x2)	
	Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported.	
	Modulation	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM	
	Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.	

	• WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Network Architecture	Ad-hoc (Peer to Peer)
Models	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum
Power Consumption	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode[3]: 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio off: 75 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (150 Mbps), -66 dBm (300 Mbps)
Antenna Connections	2 U.FL type connectors (output impedance of 50 ± 2 ohms)
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)
Weight	3.1g
Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (-10° to 70° C) Non-operating: -40° to 176° F (-40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet

error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
Dimensions	1.18 x 0.26 x 0.13 in (30 x 6.5 x 3.25 mm)
Frequency Band	2402 to 2480 MHz
Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	-1.5 dBm to 4 dBm (Bluetooth Class II)
Receiver Sensitivity	Better than -20 dBM at 0.1 % raw bit error rate
Power Consumption	Peak (Tx) 264 mW Peak (Rx) 231 mW Sleep <1 mW
Antenna	Internally integrated within module
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant
Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves
Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support Self configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	Serial Port Profile (SPP)[1] Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)[1,2] Generic Object Exchange Profile (GOEP)[1,2] Object Push Profile (OPP)[1,2] File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2]

		Human Interface Device Profile (HID)[1,2] FAX Profile (FAX) Basic Imaging Profile (BIP)[2] Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

1. indicates the profile is supported by Microsoft Windows XP SP2
2. indicates the profile is part of Windows Vista
* Wireless access point and internet service required. Availability of public wireless access points limited.

Intel Dual Band Wireless-AC 7260 802.11 ac (2x2) WiFi + BT 4.0 combo Adapter*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi certified
	Frequency Band	802.11b/g/n • 2.402 - 2.482 GHz 802.11a/n • 4.9 - 4.95 GHz (Japan) • 5.15 - 5.25 GHz • 5.25 - 5.35 GHz\ • 5.47 - 5.725 GHz • 5.825 - 5.850 GHz • 2.402 - 2.482 GHz
	Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI
	Network Architecture	Network Architecture
	Models	Models
	Roaming	IEEE 802.11 compliant roaming between access points

Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum • Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas >20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio disabled: 75 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11a/g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (72.2 Mbps), -66 dBm (300 Mbps)
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
Weight	3.1g
Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (-10° to 70° C) Non-operating: -40° to 176° F (-40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	LED Off - Radio OFF; Solid LED On - Radio ON

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Bluetooth Specification

V4.0 High Speed, V2.1+EDR, backwards compatible with V1.1, 1.2 and 2.0

Number of Available Channels	79 (1 MHz) available channels

Technical Specifications

Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	-6 dBm to 4 dBm (Bluetooth Class II)
Receiver Sensitivity	Better than -80 dBM at 0.1 % raw bit error rate
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Sleep <17 mW
Antenna	Internally integrated within module
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant Microsoft Windows Plug and Play compliant
Bluetooth Software Supported	Broadcom Bluetooth for Windows Microsoft Windows Bluetooth Software
Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves
Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	All necessary regulatory approvals for supported countries, including: FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	Generic Access Profile (GAP) Service Discovery Application Profile (SDAP) Serial Port Profile (SPP) Dial_Up Networking Profile (DUN) Generic Object Exchange Profile (GOEP) Object Push Profile (OPP) File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP) Personal Area Networking Profile (PAN) Human Interface Device Profile (HID) Generic Audio/Video Distribution Profile (GAVDP) Advanced Audio/Video Distribution Profile (A2DP) FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Basic Printing Profile (BPP) VDP (Video Distribution Profile) AVRCP (Audio Video Remote Control Profile)

* Wireless access point and internet service required. Availability of public wireless access points limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices

Intel Dual Band Wireless-N 7260NB 802.11 a/b/g/n (2x2) WiFi Adapter*	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n	
	Interoperability	Wi-Fi certified Cisco Compatible Extensions Program compliant with Microsoft Windows 7, Windows Vista and XP (details at: http://www.hp.com/go/notebooks/WLAN)	
	Frequency Band	802.11b/g/n	2.402 - 2.482 GHz
		802.11a/n	4.9 - 4.95 GHz (Japan) 5.15 - 5.25 GHz 5.25 - 5.35 GHz 5.47 - 5.725 GHz 5.825 - 5.850 GHz
	Antenna Structure	2 transmit; 2 receive (2x2)	
	Data Rates	802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported.	
	Modulation	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM	
	Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI	
	Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.	
	Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
	Roaming	IEEE 802.11 compliant roaming between band Access Points	
	Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum	

Power Consumption	Transmit: 2.0 Watts Receive: 1.6 Watts Idle mode[3]: 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio off: 75 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[4]	802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (150 Mbps), -66 dBm (300 Mbps)	
Antenna Connections	2 U.FL type connectors (output impedance of 50 ± 2 ohms)	
Form Factor	PCI-Express Half-MiniCard	
Dimensions	0.12 x 1.06 x 1.18 in (3.1 x 26.8 x 30.0 mm)	
Weight	3.1g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; Solid LED On - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. In Power Save Polling mode and on battery power.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.
* Wireless access point and internet service required. Availability of public wireless access points limited.

AUDIO/MULTIMEDIA - DTS SOUND+

Technical Specifications

Hardware	**Implementation**	IDT 92HD91
	Function Key Volume Controls	Volume up, volume down, and mute
	Full Duplex	Yes
	Microphone In	Stereo
	Headphone/Line Out	Stereo
	Integrated Microphone	Yes, dual digital microphone array when equipped with optional webcam
Audio Output Quality	**Frequency Response**	20 Hz - 20 kHz
	Signal to Noise Ratio	>85 dB
	Total Harmonic Distortion	0.01%
	Noise Floor	-110 dB
	Play/Record Sampling Rate(s)	8 kHz - 48kHz
	DAC	16, 20 or 24-bit
	ADC	16 or 20-bit
Integrated Stereo Speakers	**Power Rating**	2 Watts
	Impedance	4 Ohms

POWER

HP 45W Smart AC Adapter	**Dimensions**	3.78 x 1.95 x 0.88 in (9.6 x 4.95 x 2.24 cm)	
	Input	90 to 265 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.4 A at 90 VAC and maximum load
	Output	**Output power**	45W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 121° F (-20° to 85° C)
		Altitude	0 to 16,405 ft (0 to 5,000 m)

		Humidity	0% to 95%
		Storage Humidity	0% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.	

HP 65W EM Smart AC Adapter	**Dimensions**	4.98 x 1.97 x 1.18 in (12.65 x 5.0 x 3.0 cm)	
	Weight	0.62 lb (290 g) max	
	Input	90 to 265 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC
	Output	**Output power**	65W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF - over 200,000 hours at 25°C ambient condition.	

Technical Specifications

HP 65W Smart AC Adapter	**Dimensions**	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.62 lb (280 g)	
	Input	100 to 240 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC, 0.85 A at 180 VAC
	Output	**Output power**	65W
		DC output	18.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 104° F (0° to 40° C)
		Non-operating (storage) temperature	-4° to 149° F (-20° to 65° C)
		Altitude	0 to 10,000 ft (0 to 3,048 m)
		Humidity	20% to 80%
		Storage Humidity	10% to 90%
	EMI and Safety Certifications	CE Mark - full compliance with LVD and EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; MTBF - over 200,000 hours at 25°C ambient condition.	

3-cell HP Long Life (24WHr) Lithium-Ion Polymer	**Dimensions** (H x W x L)	0.85 x 1.76 x 10.59 in (2.16 x 4.46 x 26.9cm)	
	Cells/Type	3-cell Lithium-Ion Polymer	
	Energy	Voltage	11.1
		Amp-hour capacity	4.4Ah
		Watt-hour capacity	24Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F(-10° to 50° C)
		Non-operating	-4° to 122° F (-20° to 50° C)
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	

Technical Specifications

3-cell HP Long Life (26WHr) Lithium-Ion Polymer	**Dimensions** (H x W x L)	0.85 x 1.76 x 10.59 in (2.16 x 4.46 x 26.9cm)	
	Cells/Type	3-cell Lithium-Ion Polymer	
	Energy	Voltage	11.1
		Amp-hour capacity	4.4Ah
		Watt-hour capacity	26.3Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F(-10° to 50° C)
		Non-operating	-4° to 122° F (-20° to 50° C)
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	
3-cell HP Long Life (46WHr) Lithium-Ion Polymer	**Dimensions** (H x W x L)	0.85 x 1.76 x 10.59 in (2.16 x 4.46 x 26.9cm)	
	Cells/Type	3-cell Lithium-Ion Polymer	
	Energy	Voltage	11.1
		Amp-hour capacity	4.4Ah
		Watt-hour capacity	46Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F(-10° to 50° C)
		Non-operating	-4° to 122° F (-20° to 50° C)
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	
3-cell HP Long Life (50WHr) Lithium-Ion Polymer	**Dimensions** (H x W x L)	0.85 x 1.76 x 10.59 in (2.16 x 4.46 x 26.9cm)	
	Cells/Type	3-cell Lithium-Ion Polymer	
	Energy	Voltage	11.1
		Amp-hour capacity	4.4Ah
		Watt-hour capacity	50Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F(-10° to 50° C)
		Non-operating	-4° to 122° F (-20° to 50° C)
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	

Technical Specifications

HP 6-cell Lithium-Ion Long Life Slice Battery (60 WHr)	**Dimensions** (H x W x L)	0.28 x 12.6 x 8.39in (0.7 x 32 x 21.3 cm)	
	Weight	1.72 lb (0.78 kg)	
	Cells/Type	6-cell Lithium-Ion	
	Energy	Voltage	11.4V
		Amp-hour capacity	2.0Ah
		Watt-hour capacity	60Wh
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 122° F(-10° to 50° C)
		Non-operating	-4° to 122° F (-20° to 50° C)
	Battery Re-Charge Time	System in OFF or Standby Mode	3.5 to 5 hours
		System ON	4 to 7 hours
	Fuel Gauge LED	No	
	Optional Travel Battery Available	No	

ENVIRONMENTAL

Country of Origin

TBD

Options and Accessories (sold separately and availability may vary by country)

Type	Description	Part #
Cases	HP Essential Top Load Case (up to 15.6")	H2W17AA#xxx
	HP Business Top Load Case	H5M92AA
	HP Business Slim Top Load Case	H5M91AA
	HP Professional Series Carrying Case (up to 15.6")	H4J90AA
	HP Professional Slim Top Load Case (up to 17.3")	H4J91AA
	HP Professional Leather Case (up to 17.3")	H4J94AA
Docking	HP 2013 UltraSlim Docking Station	D9Y32AA#xxx
	HP Display and Notebook Stand	AW662AA#xxx
	HP USB 2.0 Port Replicator	H1L07AA#xxx
	HP USB 3.0 Port Replicator	H1L08AA#xxx
Input/Output - Mice	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-button USB Laser Mouse	H4B81AA
	HP X4000b Bluetooth Mouse	H3T50AA#xxx
	HP Ultra Mobile Wireless Mouse	H6F25AA
Input/Output - Keyboards	HP Stylish Wireless KB/Mouse	H4B79AA
Memory	HP 2GB DDR3L-1600 1.35V SODIMM	H6Y73AA#xxx
	HP 4GB DDR3L-1600 1.35V SODIMM	H6Y75AA#xxx
	HP 8GB DDR3L-1600 1.35V SODIMM	H6Y77AA#xxx
Adapters	90W Slim Combo Adapter	H4A41AA#xxx
	HP Smart 65W Travel AC Adapter	AU155AA#xxx
	90W Smart AC Adapter	ED495AA#xxx
	HP 65W Slim Adapter	H6Y82AA
	HP 90W Slim Combo Adapter w/ USB	H6Y84AA
Batteries	HP CO06XL Notebook Battery (Coming 2H 2013) (EliteBook 840 and 850 only)	E7U23AA
	HP CM03XL Notebook Battery (Coming 2H 2013) (EliteBook 840 only)	E7U24AA
	HP SB03XL Notebook Battery (Coming 2H 2013) (EliteBook 820 only)	E7U25AA
Security	HP ExpressCard Smart Card Reader	AJ451AA
	HP Docking Station Cable Lock	AU656AA#xxx
	HP UltraSlim Keyed Cable Lock	H4D73AA

Options and Accessories (sold separately and availability may vary by country)

Storage - External Storage	HP Mobile USB DVDRW Non-LS	A2U57AA
Storage - SSD	HP 180GB* Solid State Drive	H4T75AA
	HP 256GB* SED Solid State Drive	H2C38AA
	* For hard drives and solid state drives, GB = 1 billion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8) of system disk is reserved for the system recovery software.	
Health and Education	20 Notebook Managed Charging Cart	QL489AA#xxx
	20 Notebook Charging Cart	QL488AA
	30 Notebook Managed Charging Cart	QL490AA
	30 Notebook Charging Cart	H4F31AA#ABA
	HP Presentation Station 1000	QL815AA
Monitors	HP EliteDisplay E231 23-inch LED Monitor	C9V75AA/A8/AS/AT
	HP LA1956x 19-inch LED Monitor	A9S75AA/A8/AS/AT
	HP LA2405x 24-inch LED Monitor	A9P21AA/A8/AT
	HP ProDisplay P221 21.5" LED Monitor	C9E49AA/A8/AS/AT
	HP ProDisplay P201 20" LED Monitor	C9F26AA/A8/AS/AT

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