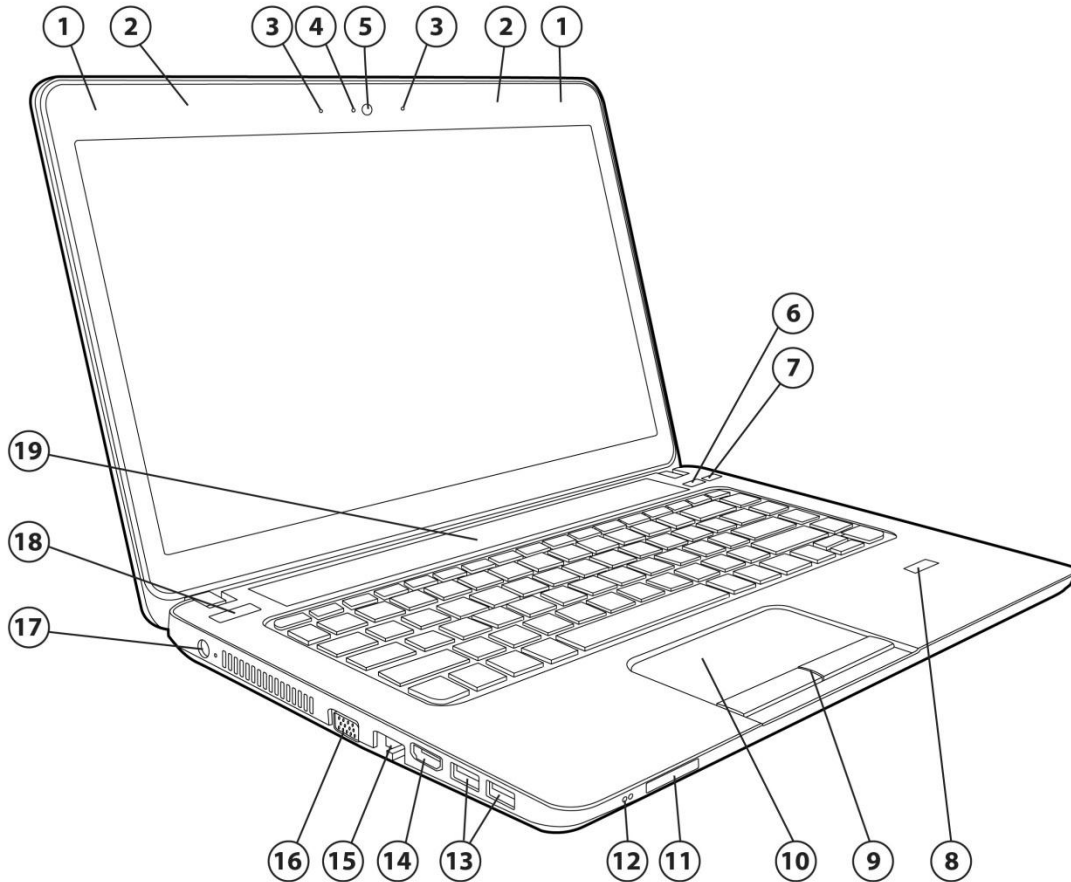


Overview

HP ProBook 440 G1 Notebook PC



Front

- | | |
|--|--|
| 1. WWAN antennas (2)* (select models only) | 11. Media Card Reader |
| 2. WLAN antennas** | 12. Hard drive activity LED indicator |
| 3. Dual-array microphone*** | 13. USB 3.0 ports (2) |
| 4. Webcam light*** | 14. HDMI port |
| 5. Webcam (select model models only) | 15. RJ-45 (network) jack
RJ-45 (network) lights (2) |
| 6. Wireless on/off button | 16. VGA monitor port |
| 7. Speaker mute button | 17. Power connector |
| 8. Optional Fingerprint Reader | 18. Power button |
| 9. Touchpad pick buttons | 19. Speakers (2) |
| 10. Touchpad | |

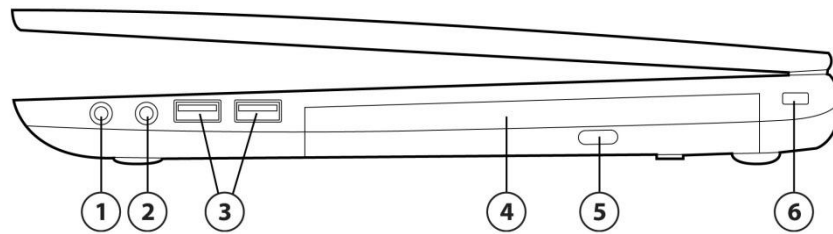
* The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

** The number of WLAN antennas in the displays is determined by the WLAN selected

*** Feature is available with select models with webcam configuration.



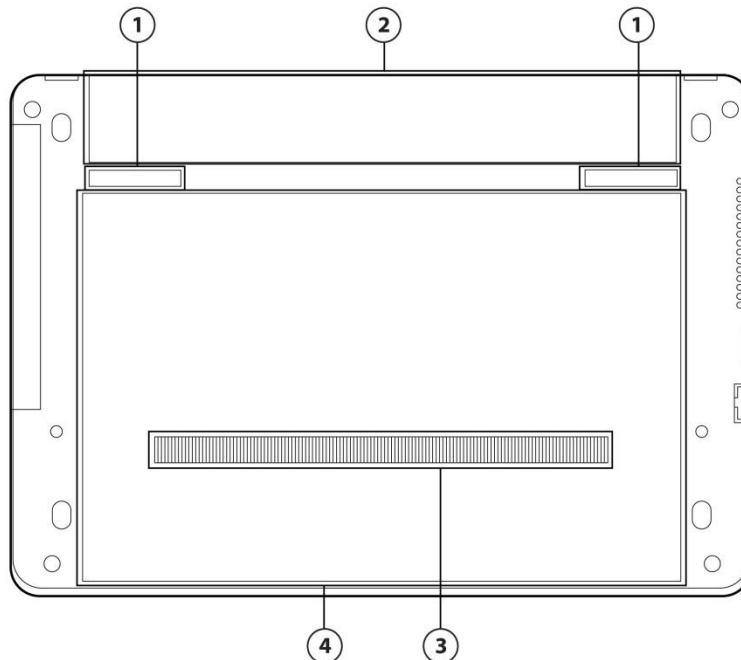
Overview



1. Audio-out (headphone) jack
2. Audio-in (microphone) jack
3. USB 2.0 ports (2)

Right

4. Optical drive (select models only)
5. Optical drive eject button (select models only)
6. Security lock slot



1. Battery and service door release latches
2. Battery bay

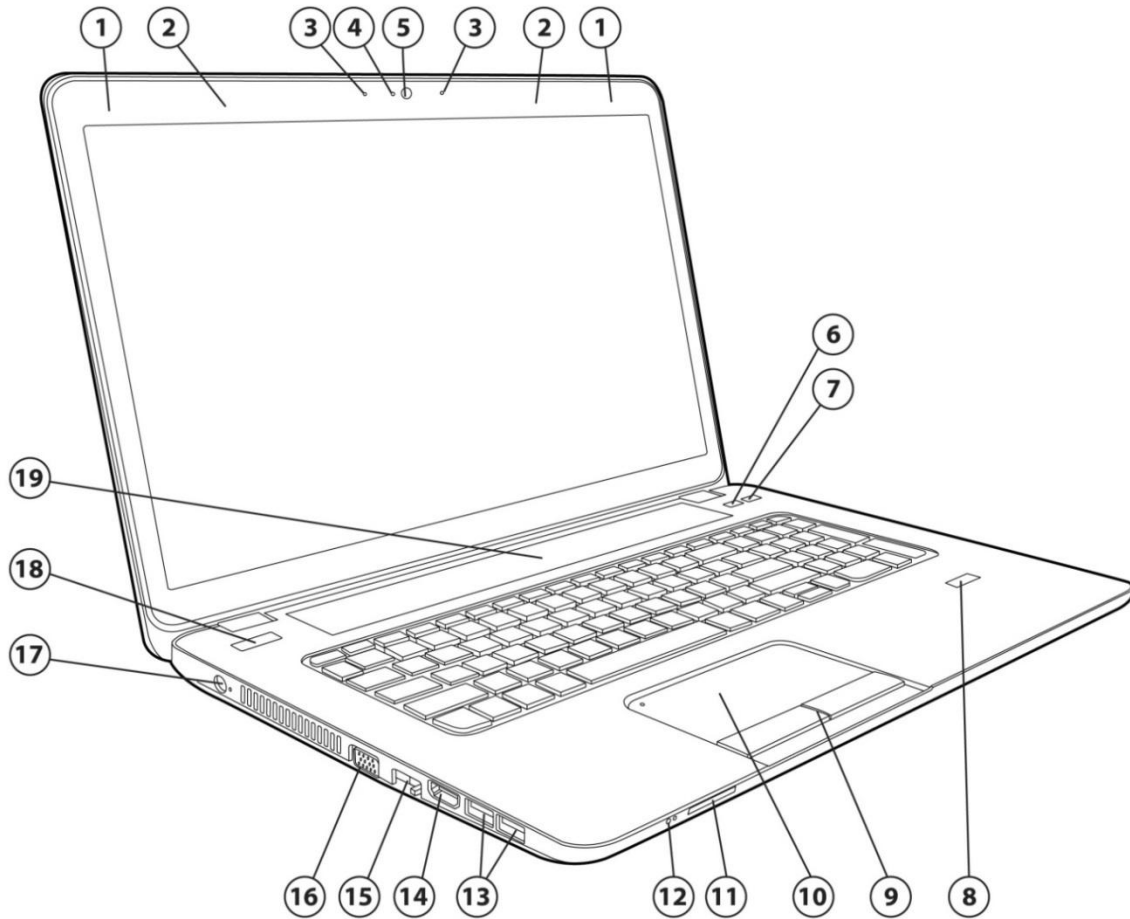
Bottom

3. Vents
4. Service door



Overview

HP ProBook 450 G1 Notebook PC



Front

- | | |
|--|--|
| 1. WWAN antennas (2)* (select models only) | 11. Media Card Reader |
| 2. WLAN antennas** | 12. Hard drive activity LED indicator |
| 3. Dual-array microphone *** | 13. USB 3.0 ports (2) |
| 4. Webcam light*** | 14. HDMI port |
| 5. Webcam (select model models only) | 15. RJ-45 (network) jack
RJ-45 (network) lights (2) |
| 6. Wireless on/off button | 16. VGA monitor port |
| 7. Speaker mute button | 17. Power connector |
| 8. Optional Fingerprint Reader | 18. Power button |
| 9. Touchpad pick buttons | 19. Speakers (2) |
| 10. Touchpad | |

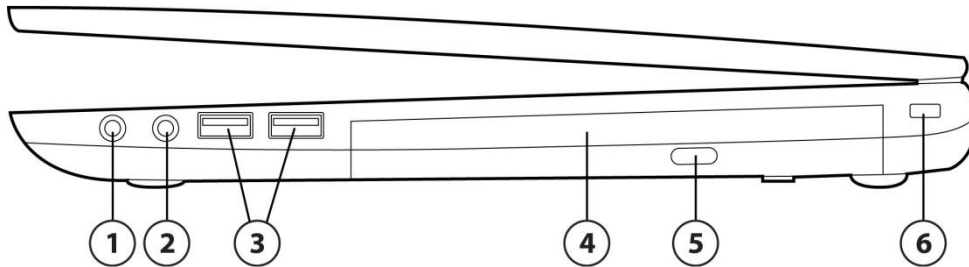
* The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.

** The number of WLAN antennas in the displays is determined by the WLAN selected.

*** Feature is available with select models with webcam configuration.



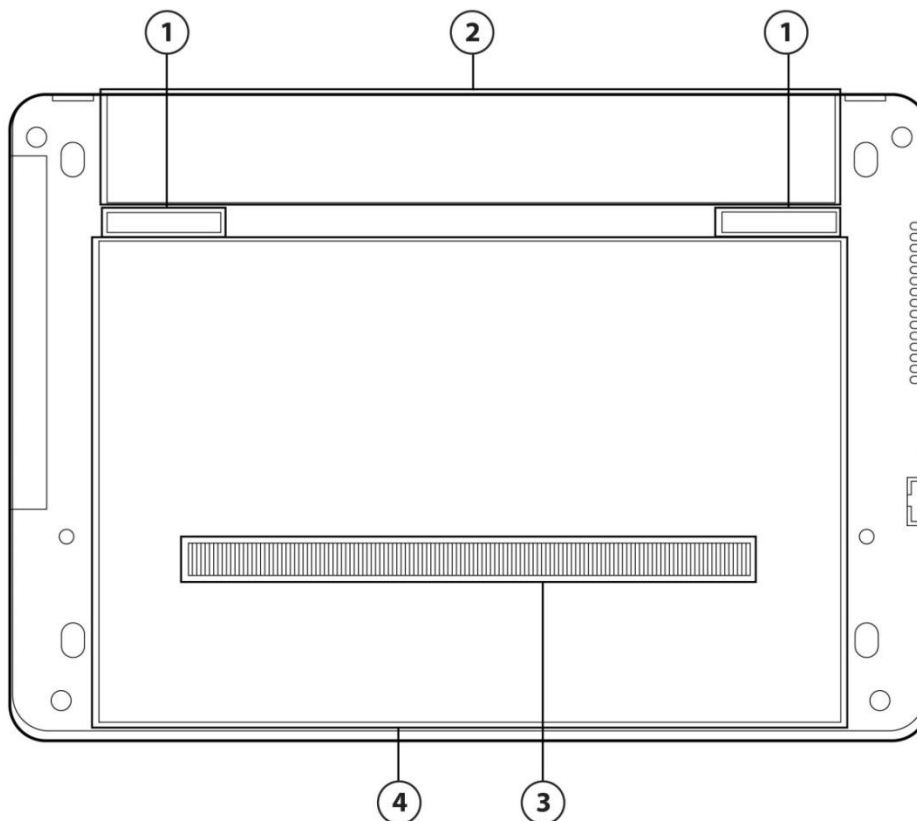
Overview



1. Audio-out (headphone) jack
2. Audio-in (microphone) jack
3. USB 2.0 ports (2)

Right

4. Optical drive (select models only)
5. Optical drive eject button (select models only)
6. Security lock slot



1. Battery and service door release latches
2. Battery bay

Bottom

3. Vents
4. Service door



Overview

AT A GLANCE

- Windows 8 versions, Windows 7 versions, SUSE Linux, or FreeDOS
- Aluminum reinforced chassis with multi-layer soft touch paint that keep system looking good longer
- Full-sized spill-resistant keyboard; full separate numeric keypad (HP ProBook 450 only)
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features including HP Client Security and optional HP Fingerprint Reader
- Optional HD webcam with dual-microphone array for video conferencing*
- HDMI port for connecting to high-resolution displays; USB 3.0 ports
- DTS Sound+ optimized for high fidelity audio
- Widescreen LED-backlit HD display with 16:9 aspect ratio with available 15.6-inch diagonal HD, 15.6-inch diagonal HD with Touch option (HP ProBook 450), 14-inch diagonal HD (HP ProBook 440)
- Choice of 4th generation Intel® Core™ i7, i5 and i3 processors, Intel Celeron and Pentium processor
- Wireless on/off and speaker mute buttons for convenient management of the connectivity and speaker.
- Flexible wireless connectivity options:
 - Integrated HP Mobile Broadband Module
 - Integrated 802.11 b/g/n wireless LAN module
 - Integrated 802.11 a/b/g/n/AC, a/b/g/n or b/g/n with Bluetooth 4.0 combo card

* Optional on models with integrated graphics only.

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



Features

PRODUCT NAME

HP ProBook 440 G1 Notebook PC

HP ProBook 450 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 64***

Windows 7 Home Premium 64***

Windows 7 Home Basic 64***

SUSE Linux Enterprise Desktop 11

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™ i7-4702MQ (2.2GHz, 6MB L3 cache, 4 cores)

Up to 3.2GHz with Intel Turbo Boost Technology

4th Generation Intel® Core™ i5-4200M (2.5GHz, 3MB L3 cache, 2 cores)

Up to 3.1GHz with Intel Turbo Boost Technology

4th Generation Intel® Core™ i3-4100M (2.5GHz, 3MB L3 cache, 2 cores)

4th Generation Intel® Core™ i3-4000M (2.4GHz, 3MB L3 cache, 2 cores)

Intel® Pentium 3550M (2.3GHz, 2MB L3 cache, 2 cores)

Intel® Celeron 2950M (2.0GHz, 2MB L3 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.

CHIPSET

Mobile Intel® HM87 Express

GRAPHICS

Integrated*:

Intel HD** Graphics 4600 (4th Generation Intel Quad-Core i7 and Dual-Core i5 and i3)



Features

Intel HD** Graphics (Celeron and Pentium configurations)

Switchable Discrete:

AMD Radeon™ HD** 8750M, with 1 or 2 GB dedicated DDR3 video memory***

* HP ProBook 440 and 450 only.

** HD content required to view HD images.

*** AMD Dynamic Switchable Graphics technology requires either an AMD "A" series APU or 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).

DISPLAY

HP ProBook 440 G1

Internal

14" diagonal LED-backlit HD anti-glare (1366 x 768)

External

Up to 32-bit per pixel color depth

VGA

Port supports resolutions up to 1920 x 1080 external resolution @60 Hz

HDMI

Supports direct connection to high-definition displays with up to 1920 x 1200@60Hz resolution and 7-channel audio with one convenient cable (not included)

NOTE: HD content required to view HD images.

NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

HP ProBook 450 G1

Internal

15.6" diagonal LED-backlit HD anti-glare Touch Display is shatter, scratch, reflection and smudge resistant (1366 x 768)

15.6" diagonal LED-backlit HD anti-glare (1366 x 768)

External

Up to 32-bit per pixel color depth

VGA

Port supports resolutions up to 1920 x 1080 external resolution @60 Hz

HDMI

Supports direct connection to high-definition displays with up to 1920 x 1200@60Hz resolution and 7-channel audio with one convenient cable (not included)

NOTE: HD content required to view HD images.

NOTE: Resolutions are dependent upon monitor capability, and resolution and color depth settings.

STORAGE AND DRIVES

Primary Storage Bay

Hard Drives

320/500/750 GB**/1 TB** 5400 rpm SMART SATA II HDD;

500 GB** 7200 rpm SMART SATA II HDD

500 GB** 5400 rpm SMART SATA II Hybrid HDD/SSHD

Solid State Drive*



Features

128 GB** 2.5" Solid State Drive

HP 3D DriveGuard (Windows only)

The hard drive is mounted directly to the notebook frame, reducing the transmission of shock to the hard drive

* Available on 450G1 only

**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.

OPTICAL DRIVES

Fixed 9.5 mm SATA optical drive

Blu-ray ROM DVD+/-RW SuperMulti DL Drive*†

DVD+/-RW SuperMulti DL Drive*

DVD-ROM Drive

No optical drive option

* Sold separately as an optional feature.

† For Blu-ray drives, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require an HDMI digital connection and your display may require HDCP support. HD-DVD disks cannot be played on this drive. Note that DVD-RAM cannot read or write to 2.6GB Single Sided/5.2 GB Double Sided – Version 1.0 media. Actual speeds may vary. Don't copy copyright-protected materials. Double Layer discs can store more data than single layer discs; discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

MEMORY

Standard

DDR3L 1.35V 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.

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. With Windows Starter 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

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*

Wireless LAN (WLAN)**

Realtek 802.11 b/g/n (1x1)**



Features

Mediatek 802.11 b/g/n (1x1) with Bluetooth v4.0 combo**

Intel Dual Band Wireless-AC 3160 802.11 a/b/g/n/ac (1x1) WiFi with Bluetooth 4.0 combo**, ***

Intel Dual Band Wireless-N 7260AN 802.11 a/b/g/n (2x2) WiFi with Bluetooth 4.0 combo***

NOTE: Supports Bluetooth® v2.1 on Linux operating systems

* 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.

***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

Realtek 10/100/1000* Ethernet Controller

* 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

DTS Sound+

Integrated stereo speakers

Integrated digital microphone (dual-microphone array when equipped with optional webcam)

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
- Improved dynamic range
- Skype-ready***

* Sold separately as an optional feature.

** 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. 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. Includes a separate numeric keypad (HP ProBook 450 only).

Pointing Devices



Features

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

Buttons and Function Keys

Separate launch buttons provide easy access to wireless 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.

SOFTWARE AND SECURITY

Preinstalled Software with Windows Operating System

HP Wireless Hotspot*

HP ePrint (HP Exclusive)**

HP Hotkey support

HP 3D DriveGuard (Windows required)

PDF Complete Corporate Edition***

Skype ready ****

HP Recovery Manager

HP Support Assistant

Buy Office

Intel Wireless Display*****

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.

* 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.

** 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.

*** PDF Complete Corporate Edition includes 50 PDF creations or six months, whichever comes first. Purchase license afterwards for full functionality.

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

***** 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.

Security

Standard

HP Client Security (Windows only)

HP Trust Circles Standard (Available in Fall 2013)

Microsoft Security Essentials(Windows 7)/Microsoft Defender (Windows 8)*

HP Drive Encryption**

HP BIOS Protection***

Security lock slot

Optional

Intel® Anti-Theft (requires a Computrace subscription)*****

Intel Identity Protection*****

HP Fingerprint reader



Features

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.

* Opt in and internet connection required for updates.

** 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.

*** HP Tools partition with an HP BIOS required for automatic recovery.

**** 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.

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

POWER

Power Supply

HP ProBook 440 G1 Notebook PC

Models with discrete graphics:

External 90W HP Smart AC Adapter

Models with integrated graphics:

External 65W HP Smart AC Adapter

Power cord included is 3.28-foot (1 meter).

Total length including external AC adapter is 9.38 feet (2.86 meter).

HP Fast Charge*

HP ProBook 450 G1 Notebook PC

Models with discrete graphics:

External 90W HP Smart AC Adapter

Models with integrated graphics:

External 65W HP Smart AC Adapter

Power cord included is 3.28-foot (1 meter).

Total length including external AC adapter is 9.38 feet (2.86 meter).

HP Fast Charge*

Primary Battery

HP 9-cell Lithium-Ion Battery (93 WHr)

HP 6-cell Lithium-Ion Battery (47 WHr)

Battery Life with Windows 7

Configurations with integrated graphics (Windows 7)

Configurations with discrete graphics (Windows 7)

HP ProBook 440

9-cell (93 WHr) battery Up to 17 hours 30 mins

6-cell (47 WHr) battery Up to 9 hours 15 mins

Up to 17 hours 30 mins

Up to 9 hours

HP ProBook 450



Features

9-cell (93 WHr) battery	Up to 17 hours 15 mins	Up to 17 hours
6-cell (47 WHr) battery	Up to 9 hours 15 mins	Up to 9 hours

System Standby Time**
Up to 12 days

* Windows 7 battery life will vary depending on numerous 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 ProBook 440 G1 Notebook PC

Weight

Starting at 4.63 lb (2.10 kg) with optical drive (weight will vary by configuration)

Starting at 4.34 lb (1.97 kg) without optical drive (weight will vary by configuration)

Dimensions (w x d x h)

13.35 x 9.38 x 0.88 (front) -1.12 in (at rear)

33.92 x 23.85 x 2.24 (front) - 2.86 cm (at rear)

HP ProBook 450 G1 Notebook PC

Weight

Starting at 5.22 lb (2.37 kg) with optical drive without touch (weight will vary by configuration)

Starting at 4.98 lb (2.26 kg) without optical drive without touch (weight will vary by configuration)

Starting at 5.84 lb (2.65 kg) with optical drive with touch (weight will vary by configuration)

Starting at 5.6 lb (2.54 kg) without optical drive with touch (weight will vary by configuration)

Dimension (wxdxh)

14.76x10.09x0.9 (front) – 1.14 in (at rear) (non-Touch)

37.5x25.6x2.28 (front)-2.9 cm (at rear) (non-Touch)

14.76x10.09x0.95(front)-1.20in(at rear) (Touch)

37.5x25.6x2.42(front)-3.04cm(at rear) (Touch)

PORTS/SLOTS

Ports

USB 3.0 – Two



Features

USB 2.0 – Two
HDMI 1.4a – One
Stereo microphone input – One
Headphone/line out – One
RJ-45 (Ethernet) – One
Power connector – One
VGA - One

Digital Media Slots

Multi Media Reader Slot supporting SD, SDHC, SDXC, Memory Stick, MSXC

SERVICE AND SUPPORT

HP Services offers limited 1-year warranty

1-year limited warranty on primary battery. On-site service and warranty upgrades are also available. HP Care Pack Services extend service contracts beyond the standard warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. 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 <http://www.hp.com/go/cpc>.



Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	19 V	Windows 7 (64-bit)	Windows8 (64-bit)
	Average Operating Power			
	ProBook 440 Integrated graphics		8.81 W	9.08 W
	ProBook 440 Discrete graphics		9.38 W	9.65 W
	ProBook 450 Integrated graphics		8.8 W	8.7 W
	ProBook 450 Discrete graphics		9.68 W	9.22 W
	ProBook 470 Discrete graphics		9.55 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 Gold 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 ProBook 440 G1 and HP ProBook 450 G1 that are ENERGY STAR® qualified are identified as HP ProBook 440 G1 ENERGY STAR and HP ProBook 450 G1 ENERGY 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



Technical Specifications

14.0-inch LED HD (1366 x 768) anti-glare	Dimensions (W x H)	12.63 x 7.39 in (32.09 x 18.76 cm)
	Weight	320g max.
	Diagonal Size	14.0 in (35.6cm)
	Surface Treatment	Anti-glare
	Contrast Ratio	400:1 (typical)
	Refresh Rate	60 Hz
	Brightness	200 nit (typical)
	Pixel Resolution	Pitch 0.227 mm
		Format 1366 x 768
		Configuration RGB Stripe
	Backlight	LED
	PPI	112 ppi
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)
15.6-inch LED HD (1366 x 768) anti-glare with Touch	Dimensions (W x H)	13.54 x 7.64 in (34.39 x 19.41 cm)
	Weight	500g max.
	Diagonal Size	15.6 in (39.6cm)
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (min)
	Refresh Rate	60 Hz
	Brightness	200 nit (typical)
	Pixel Resolution	Pitch 0.252 x 0.252
		Format 1366 x 768
		Configuration RGB Stripe
	Backlight	LED
	PPI	106 ppi
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)
15.6-inch LED HD (1366 x 768) anti-glare	Dimensions (W x H)	14.17 x 8.83 in (36.0 x 22.43 cm)
	Weight	500g max.
	Diagonal Size	15.6 in (39.6cm)
	Surface Treatment	Anti-glare
	Contrast Ratio	400:1 (min)
	Refresh Rate	60 Hz
	Brightness	200 nit (typical)
	Pixel Resolution	Pitch 0.252 mm
		Format 1366 x 768
		Configuration RGB Stripe
	Backlight	LED



Technical Specifications

	PPI	106 ppi	
	Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)	
17.3-inch LED HD+ anti-glare	Active Area (W x H)	15.0 x 8.5 in (38.2 x 21.5 cm)	
	Weight	570g max.	
	Diagonal Size	17.3 in (43.9 cm)	
	Surface Treatment	Anti-glare	
	Contrast Ratio	400:1 typical	
	Refresh Rate	60 Hz	
	Brightness	200 nit typical	
	Pixel Resolution	Pitch	0.23868 x 0.23868 mm
		Format	1600 x 900
		Configuration	RGB Stipe
		Backlight	LED
		PPI	106
		Viewing Angle	±30° Horizontal, ±10° Vertical (minimum) 30/30/20/10 (Left/Right/Down/Up) (minimum) or 45/45/35/25 (Left/Right/Down/Up) (typical)

STORAGE AND DRIVES

Internal Storage

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	
320 GB* 5400rpm 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)	



Technical Specifications

	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
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
750 GB* 5400 rpm SATA Hard Drive	Drive Weight	0.22 lb (101 g)
	Capacity	750 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 300 MB/s (Drive Capability) (maximum)
	Seek Time (typical reads, including settling)	Single Track 3 ms Average 13 ms Maximum 24 ms
	Rotational Speed	5400 rpm
	Logical Blocks	1,465,149,168
	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 300 MB/s (Drive Capability) (maximum)
	Seek Time (typical reads, including settling)	Single Track 3 ms Average 13 ms Maximum 24 ms
	Rotational Speed	5400 rpm



Technical Specifications

	Logical Blocks	1,953,525,168		
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]		
	Features	ATA Security		
500 GB* 5400 rpm SMART SATA II Hybrid HDD/SSHD	Drive Weight	0.209 lb (95 g)		
	Capacity	500 GB		
	Height	0.276 in (7 mm)		
	Width	2.76 in (70.1 mm)		
	Interface	ATA-8, SATA 2.6, 6.0 Gb/s, NCQ		
	Transfer Rate	Synchronous (maximum)	600 MB/s (Drive Capability)	
	Seek Time (typical reads, including settling)	Single Track	2 ms	
		Average	12 ms	
		Maximum	NIL 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		
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	415 MB/s	Maximum Sequential Write 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	

* 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.

Optical Drives

DVD+/-RW SuperMulti DL Drive	Access Times	Random	<140ms CD (typical)
			< 160 ms DVD (typical)
	Weight	170g max.	
	Max Data Transfer Rate	24X CD-ROM	
		8X DVD	
		24X CD-R	
		24X CD-RW	
		8X DVD+R	
		8X DVD+RW	
		8X DVD-R	
		6X DVD-RW	



Technical Specifications

		6X - DVD+R Dual Layer		
		6X - DVD-R Dual Layer		
		5X DVD-RAM		
	Transfer Mode	UDMA Mode 5		
	Interface	Gen 1 SATA		
	Supported Media (read)	CD-DA, CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW, DVD-RAM		
	Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+RW, DVD-R, DVD-RW, DVD-RAM, DVD+R DL, DVD-R DL		
	Max Media Capacity (read)	8.5 GB		
	Max Media Capacity (write)	8.5 GB		
	Transport	Tray Loading		
Blu-ray ROM DVD+/-RW SuperMulti DL Drive	Access Times	Random	<190 ms CD-ROM (typical)	
			<180ms DVD-ROM (typical)	
			<230 ms BD-ROM (typical)	
	Weight	170g max.		
	Max Data Transfer Rate	24X CD-ROM		
		8X DVD-ROM		
		24X CD-R		
		16X CD-RW		
		8X DVD+R		
		8X DVD+RW		
		8X DVD-R		
		6X DVD-RW		
		4X - DVD+R Dual Layer		
		4X - DVD-R Dual Layer		
		5X DVD-RAM		
		6X BD-ROM		
		Transfer Mode	UDMA Mode 5	
		Interface	Gen 1 SATA	
		Supported Media (read)	CD-DA, , CD-TEXT, CD-ROM, CD-ROM XA, MIXED MODE CD, CD-I, CD-I Bridge (Photo-CD, Video CD), Multisession CD (Photo-CD, CD-EXTRA, Portfolio, CD-R, CD-RW), CD-R, CD-RW, DVD-ROM (DVD-5, DVD-9, DVD-10, DVD-18), DVD-R, DVD-RW, DVD+R, DVD+RW. DVD-RAM, BD-ROM, BD-R, BD-RE	
		Supported Media (write)	CD-R, CD-RW, DVD+R, DVD+R DL, DVD+RW, DVD-R, DVD-R DL, DVD-RW,	



Technical Specifications

	DVD-RAM
Max Media Capacity (read)	50.0 GB
Max Media Capacity (write)	8.5GB
Transport	Tray Loading

SECURITY

HP Fingerprint Reader (optional)	Mobile Voltage Operation	3.0V-3.6V Single Supply
	Weight	TBD
	Operating Temperature	32° – 158°F (0° – 70°C)
	Current Consumption @ 3.3V	Less than 70 mA peak imaging and scrolling Less than 25 mA hardware finger detection Advanced Power Management
	High-Rate Image Capture	Up to 240 image frames /sec
	ESD Resistance	IEC 61000-4-2 Level 4 (±15KV)
	Detection Matrix	192 x 16 Pixels 9.7 mm x 0.81 mm 500 ppi High-Resolution Images

NETWORKING/COMMUNICATIONS

Integrated Realtek RTL8151FH-CG 10/100/1000 NIC	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet) Jumbo Frame 9K Auto MDI/MDIX Crossover cable detection
	Weight	TBD
	Power Management	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)



Technical Specifications

		PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller
HP hs3110 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 (\pm 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	-40° to 185° F (-40° to 85° C)



Technical Specifications

MIL-STD 202 Method 108)

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.

Realtek 802.11 b/g/n (1x1)*

Wireless LAN Standards IEEE 802.11b
IEEE 802.11g
IEEE 802.11n

Interoperability Wi-Fi certified

Frequency Band 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
802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval will be supported.

Modulation Direct Sequence Spread Spectrum
BPSK, QPSK, CCK, 16-QAM, 64-QAM

Security¹ IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
AES-CCMP: 128 bit in hardware 802.1x authentication types 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 Ad-hoc (Peer to Peer)

Models Infrastructure (Access Point Required)

Roaming IEEE 802.11 compliant roaming between access points

Output Power² 13.5 dBm, nominal

Power Consumption Transmit: 2.0 W (max)
Receive: 1.6 W (max)
Associated to Access Point, Idle: 250 mW nominal
Wireless Button Off: 100 mW nominal
Radio disabled: 75 mW nominal

Power Management ACPI compliant power management
802.11 compliant power saving mode

Receiver Sensitivity³ 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: -70dBm (72.2 Mbps)

Antenna type High efficiency antenna with spatial diversity, mounted in the display enclosure



Technical Specifications

Form Factor	PCI-Express Half-MiniCard	
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)	
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	
	<ol style="list-style-type: none"> 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). 	

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

Mediatek 802.11 b/g/n (1x1) with Bluetooth® v4.0 combo*

Wireless LAN Standards	IEEE 802.11b IEEE 802.11g IEEE 802.11n
Interoperability	Wi-Fi certified
Frequency Band	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
	802.11n: card will support rates for NSS=1 for RX and TX for 20 MHz channels. Short and long guard interval shall be supported.
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM
Security¹	Support for WPA and WPA2
	Support for CCX version up to and including CCXv5
	Support for the following EAP types: EAP-TLS, EAP-PEAPv0, EAP-PEAPv1, EAP-PEAPv2, EAP-FAST, EAP-SIM
	Support for using both machine and user credentials in a single profile. The same profile must be able to be used both before user login and after user login
	Support the use of Windows Domain credentials
	IP provider shall have support for an auto-logout to Windows using a PLC and LEAP via the IP provider UI (http://support.microsoft.com/default.aspx/kb/315231).
	Must have Windows Single Sign On support so that customers can use the WLAN as their primary domain network. With regard to SSO, network association and authentication must occur and be successful before Windows domain authentication is attempted
Support for use of the UI client in a user account with limited local security privileges	
Client service / profile manager must support the WiFi Alliance's WiFi Protected Setup specification.	



Technical Specifications

	Any credentials saved in a profile must be done securely such that they cannot be re-used by any other user or machine.
Network Architecture	Ad-hoc (Peer to Peer)
Models	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power²	2.4G:+13.5dBm, minimum
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Associated to Access Point, Idle: 250 mW nominal (WLAN Associated) Wireless Button Off: 100 mW nominal (WLAN unassociated) Radio disabled: 75 mW nominal
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity³	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:-70dBm (72.2 Mbps)
Antenna type	Two embedded single band 2.4 antennas
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
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
	<ol style="list-style-type: none"> 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 802.11 a/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)



Technical Specifications

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-AC 3160 802.11
ac (1x1) WiFi and
Bluetooth 4.0 Combo*
Adaptor**

General

Dimensions (H x W x D)

Standard: 26.80 mm x 30.00 mm x 2.4 mm Max (Top Side) / 1.35 mm Max (Bottom Side)
Low profile: 22 mm x 30.00 mm x 1.5 mm Max (Top Side) / 0.6 mm Max (Bottom Side)
NGFF: 22 mm x 30 mm, single sided

Weight

TBD

Diversity

No diversity support

Radio ON/OFF Control

Supported in both hardware and software



Technical Specifications

	Connector interface	Half Mini Card form factor, based on PCIe electrical interface Next Generation Form Factor, A-SD electrical interface definition support
	LED Output	On/Off
	Operating Temperature (Adapter Shield)	0° to +80° C
	Humidity Non-Operating	50% to 90% RH non-condensing (at temperatures of 25°C to 35°C)
	Operating Systems	Microsoft Windows 7, Microsoft Windows 8, Linux
	Wi-Fi Alliance	Wi-Fi CERTIFIED for 802.11ac, Wi-Fi CERTIFIED a/b/g, Wi-Fi CERTIFIED n, WMM, WPA, WPA2, and WPS, WPS 2.0, Protected Management Frames, Wi-Fi Direct for peer to peer device connections
	Microsoft WHQL	Yes
	IEEE WLAN Standard	IEEE 802.11abgn, 802.11ac, 802.11d, 802.11e, 802.11i, 802.11h, 802.11w
	Architecture	Infrastructure and SoftAP; Supports simultaneous Client and SoftAP modes in 2.4 GHz or 5GHz
	Roaming¹	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Security	Authentication	WPA and WPA2, 802.1X (EAP-TLS, TTLS, PEAP, LEAP, EAP-FAST), EAP-SIM, EAP-AKA
	Authentication Protocols	PAP, CHAP, TLS, GTC, MS-CHAP, MS-CHAPv2
	Encryption	64-bit and 128-bit WEP, AES-CCMP, TKIP
	Wi-Fi Direct Encryption and Authentication	WPA2, AES-CCMP
	Product Safety	UL, C-UL, CB (IEC 60950-1)
	Management Frame Protection	802.11w (WFA- Protected Management Frames)
Compliance	Retail (Credit Card Processing)	PCI, CISP
	Government	FIPS ² , FISMA

1. Roaming is supported only within each respective band and mode of access points.
2. Microsoft Windows 7 only.

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification	Dual Mode Bluetooth* 2.1, 2.1+EDR, 3.0, 3.0+HS, 4.0 (BLE)
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	3 Mbps data rate; throughput up to 2.17 Mbps



Technical Specifications

Throughput	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 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	
Temperature	Operating	-14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 212° F (-40° to 100° C)
Humidity	Operating	0% to 90%
	Non-operating	0% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
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)	



Technical Specifications

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. 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 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
Security¹	<ul style="list-style-type: none"> • 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
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 Power²	<ul style="list-style-type: none"> • 2.4G: +13.5dBm minimum



Technical Specifications

	<ul style="list-style-type: none"> • 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 Sensitivity⁴	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)
Operating Voltage	3.3V +/- 9%
Temperature	Operating 32° to 176° F (0° to 80° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 90% (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
	<ol style="list-style-type: none"> 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	3 Mbps data rate; throughput up to 2.17 Mbps



Technical Specifications

Throughput	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 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	
Temperature	Operating	-14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 212° F (-40° to 100° C)
Humidity	Operating	0% to 90%
	Non-operating	0% to 95%
Altitude	Operating	15,000 ft (4,572 m)
	Non-operating	40,000 ft (12,192 m)
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)	



Technical Specifications

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.

AUDIO/MULTIMEDIA - DTS SOUND+

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
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 90W Smart AC Adapter (discrete configurations)	Dimensions	5.00 x 1.97 x 1.1 in (12.7 x 5.0 x 2.9 cm)		
	Weight	0.84 lb (381 g) Max.		
	Input	Input	100 to 240 VAC	
		Input Efficiency	87% min at 115 VAC	
		Input frequency range	47 to 63 Hz	
		Input AC current	1.5 A at 90 VAC, 0.75 A at 180 VAC PFC Version 2.4 A at 90 VAC, 1.2 A at 180 VAC NON PFC Version	
		Output	Output power	90W
		DC output	19.0V	
		Hold-up time	5 msec at 115 VAC input	
		Output current limit	<11A, Over voltage protection- 29V max	



Technical Specifications

		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.	
HP 65W Smart AC Adapter (Configurations with integrated graphics)	Dimensions	4.17 x 1.85 x 1.1 in (10.6 x 4.7 x 2.8 cm)	
	Weight	0.66 lb (300 g) Max.	
	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.	
	9-Cell (93 WHr) Lithium-Ion battery	Dimensions (H x W x L)	1.57 x 1.85 x 10.59 in (4.0 x 4.7 x 26.9 cm)
		Weight	1.07 lb (0.488 kg)
		Cells/Type	9-cell Lithium-Ion
	Energy	Watt-hour Capacity 93 WHr Amp-hour capacity 8.4Ah Watt-hour capacity 11.1V	
	Temperature	Operating (Charging) 32° to 113° F (0° to 45° C) Operating (Discharging) 14° to 140° F (-10° to 60° C)	



Technical Specifications

		Non-operating	-4° to 140° F (-20° to 60° C)	
	Battery Re-Charge Time	System in OFF mode or Standby	3 to 4 hours	
		System ON	4 to 6 hours (depending on system power consumption)	
6-Cell (47 WHr) Lithium-Ion battery	Dimensions (H x W x L)	0.85 x 1.76 x 10.59 in (2.16 x 4.46 x 26.9cm)		
	Weight (max)	.70lb, (.312kg)		
	Cells/Type	6-cell Lithium-Ion		
	Energy	Voltage	10.8V	
		Amp-hour capacity	4.4Ah	
		Watt-hour capacity	47Wh	
	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	2.5 hours	
System ON		3 to 5 hours		
Fuel Gauge LED	No			
Warranty	1 year			
Optional Travel Battery Available	No			

ENVIRONMENTAL

HP ProBook 440 G1 Notebook PC

Environmental Data

Eco-Label Certifications	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:		
	US ENERGY STAR qualified		
	IT ECO declaration		
	EPEAT Gold		
System Configuration	The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook"		
Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	6.828 W	6.924 W	6.372 W
Sleep (Energy Star low power mode)	0.732 W	0.852 W	0.804 W
Off	0.456 W	0.432 W	0.432 W
Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	23 BTU/hr	24 BTU/hr	22 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	0.3 BTU/hr



Technical Specifications

Off	2 BTU/hr	1 BTU/hr	1 BTU/hr
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* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.6	32
Fixed Disk (random writes)	4.5	41

System fan is usually off except when charging the battery

Batteries

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight

The battery type and chemistry used in the product is:
CR2032 (common) (Li-MNO2) = PANDA CR2032
lithium/manganese dioxide

Additional information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post-consumer recycled plastic (by wt.)

This product is greater than 95.04% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
 - PAPER/Corrugated 51 g
 - OTHER/OTHER 20 g
 - PAPER/Cardboard & misc 325 g
- Internal:



Technical Specifications

- PLASTIC/Polyethylene low density 15 g
- PLASTIC/EPE-Expanded Polyethylene 68 g
- PLASTIC/PET 20 g
- The PAPER/Corrugated packing material is made from 80 % recycled content
- The Other/Other packing material is made from 80 % recycled content
- The PAPER/Corrugated& misc packing material is made from 80 % recycled content
- The PLASTIC/Polyethylene low density packing materials contains at least 65 % recycled content
- The PLASTIC/EPE-Expanded Polyethylene packing materials contains at least 65 % recycled content
- The PLASTIC/Pet low density packing materials contains at least 65 % recycled content

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

HP ProBook 450 G1 Notebook PC

Environmental Data

Eco-Label Certifications	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:		
	US ENERGY STAR qualified		
	IT ECO declaration		
	EPEAT Gold		
System Configuration	The configuration used for the Energy Consumption and Declared Noise Emissions data is based on a "Typically Configured Notebook"		
Energy Consumption	115 VAC	230 VAC	100 VAC
Normal Operation	6.252 W	7.392 W	6.192 W
Sleep (Energy Star low power mode)	0.816 W	0.924 W	0.816 W
Off	0.444 W	0.456W	0.444 W



Technical Specifications

Heat Dissipation*	115 VAC	230 VAC	100 VAC
Normal Operation	21 BTU/hr	25 BTU/hr	21 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	2 BTU/hr	2 BTU/hr	0.1 BTU/hr

* Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)

System Fan Off	Sound Power (LWAd, bels)	Sound Pressure (LpAm, decibels)
Idle	3.6	32
Fixed Disk (random writes)	4.4	40

System fan is usually off except when charging the battery

Batteries This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries used in the product do not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight

The battery type and chemistry used in the product is:
CR2032 (common) (Li-MNO2) = PANDA CR2032
lithium/manganese dioxide

Additional information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

This product contains 0% post-consumer recycled plastic (by wt.)

This product is greater than 96.44% recycle-able when properly disposed of at end of life.

Packaging Materials

- External:
 - PAPER/Corrugated 560.5 g



Technical Specifications

- Others/Others 20 g
- Internal:
 - PLASTIC/Polyethylene low density 24 g
 - PLASTIC/EPE-Expanded Polyethylene 37 g
 - PLASTIC/PET 2.5 g
- The Others/Others packing material is made from 80 % recycled content
- The PAPER/Corrugated packing material is made from 80 % recycled content
- The PLASTIC/Polyethylene low density packing materials contains at least 65 % recycled content
- The PLASTIC/Pet packing materials contains at least 65 % recycled content

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

ALL MODELS

MATERIAL USAGE

This product does not contain any of the following substances in excess of regulatory limits (for reference of these limits please refer to the HP General Specification of the Environment

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)



Technical Specifications

- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
- Nickel finishes that release greater than 0.5 µgrams/cm²/week, measured according to EN 1811:1998, are not used on any product surface designed to be frequently handled or touched by users.

END-OF-LIFE MANAGEMENT AND RECYCLING

Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

HEWLETT-PACKARD CORPORATE ENVIRONMENTAL INFORMATION

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/qcreport/index.html>

Environment website

<http://www.hp.com/environment>

Eco-label certifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

Country of Origin

China



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

Type	Description	Part #
Cases	HP Business Top Load (up to 15.6")	H5M92AA
	HP Business 4 Wheel Roller Case	H5M93AA
	HP Business Backpack (up to 17.3")	H5M90AA
Docking	HP LCD Monitor Stand	QM196AA
	HP Dual Hinge Notebook Stand	AW661AA#xxx
	HP USB 2.0 Port Replicator	H1L07AA#xxx
	HP USB 3.0 Port Replicator	H1L08AA#xxx
Input/Output – Mice	HP Wireless Mobile Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA#xxx
Input/Output – Keyboards	HP USB Essential Keyboard/Mouse	H6L29AA
	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
	90W w/USB Universal Adapter	H4A43AA#ABA
	90W Smart Auto/Truck Adapter	ED493AA
	HP 65W Slim Adapter	AX727AA#XXX
Security	HP Notebook Combo Lock	AY475AA#XXX
	HP UltraSlim Keyed Cable Lock	H4D73AA
Storage - External Storage	HP Mobile USB DVDRW Non-LS	A2U57AA
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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