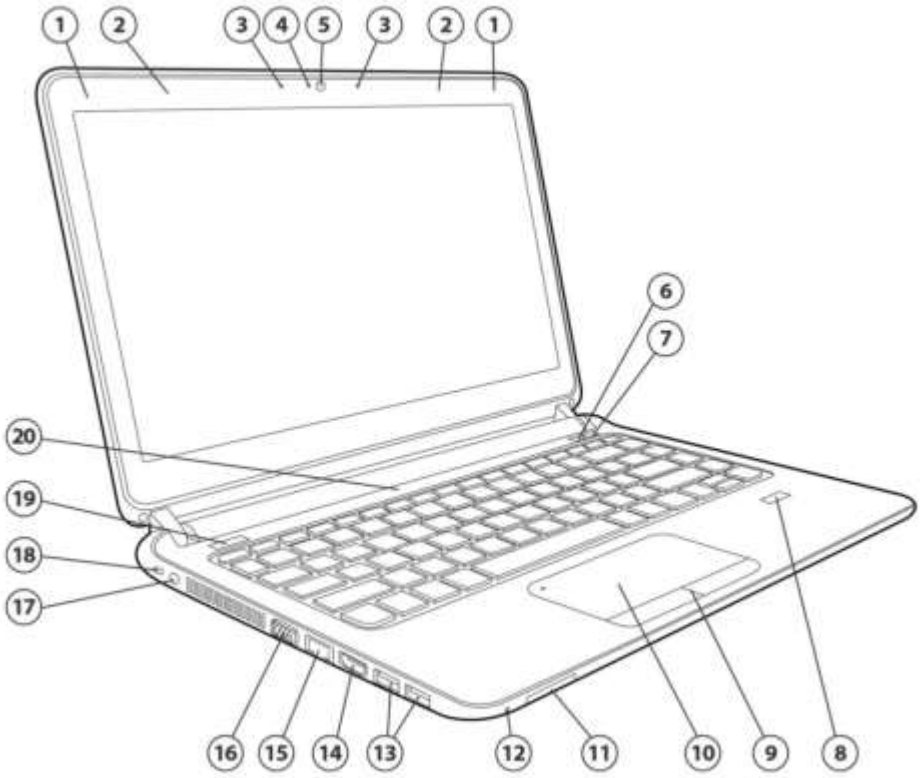
Overview

HP ProBook 440 G2 Notebook PC



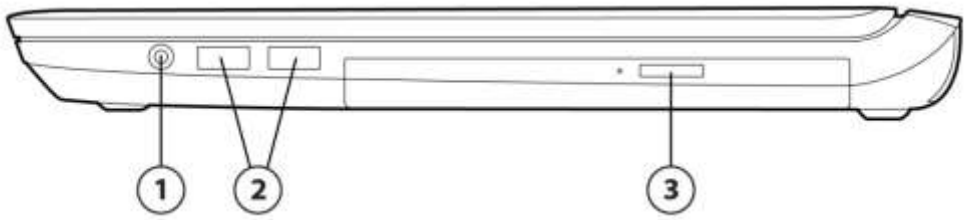
Front

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

* Only available with optional webcam.

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

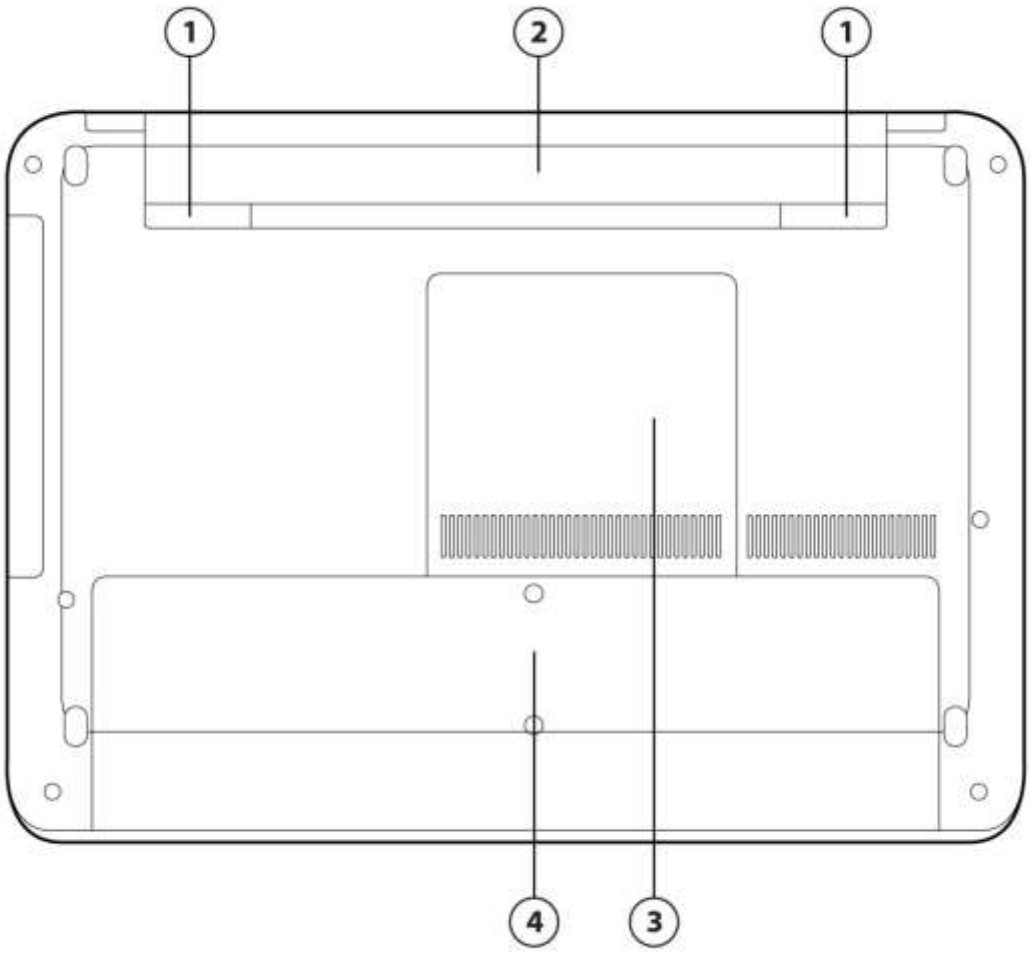
Overview



Right

1. Headphone/Microphone combo jack
2. USB 2.0 ports (2)
3. Optical drive eject button (select models only)

Overview

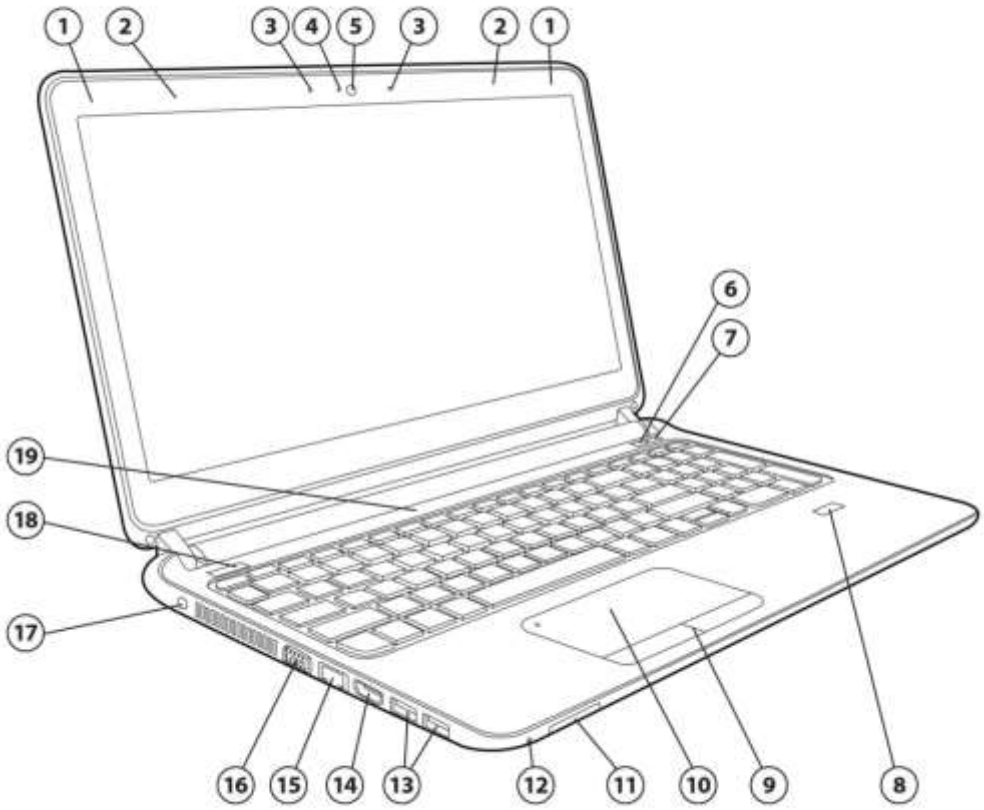


Bottom

1. Battery release latches
2. Battery bay
3. Service door
4. Service door

Overview

HP ProBook 450 G2 Notebook PC



Front

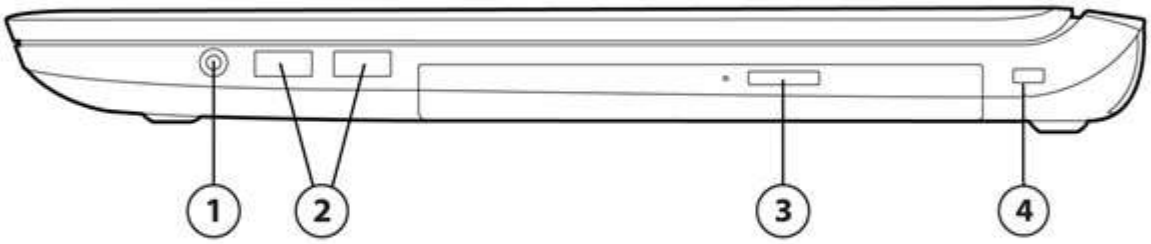
1. WLAN antennas (available on select models only)
2. WWAN antennas (available on select models only)
3. Dual-microphone array*
4. Webcam light*
5. Optional Webcam
6. Wireless on/off button
7. Speaker mute button
8. Optional Fingerprint Reader
9. Touchpad pick buttons
10. Touchpad

* Only available with optional webcam.

11. Media Card Reader
12. Hard drive activity LED indicator
13. USB 3.0 ports (2)
14. HDMI port
15. RJ-45 (network) jack
    RJ-45 (network) lights (2)
16. VGA monitor port
17. Power connector
18. Power button
19. Speakers (2)

Overview

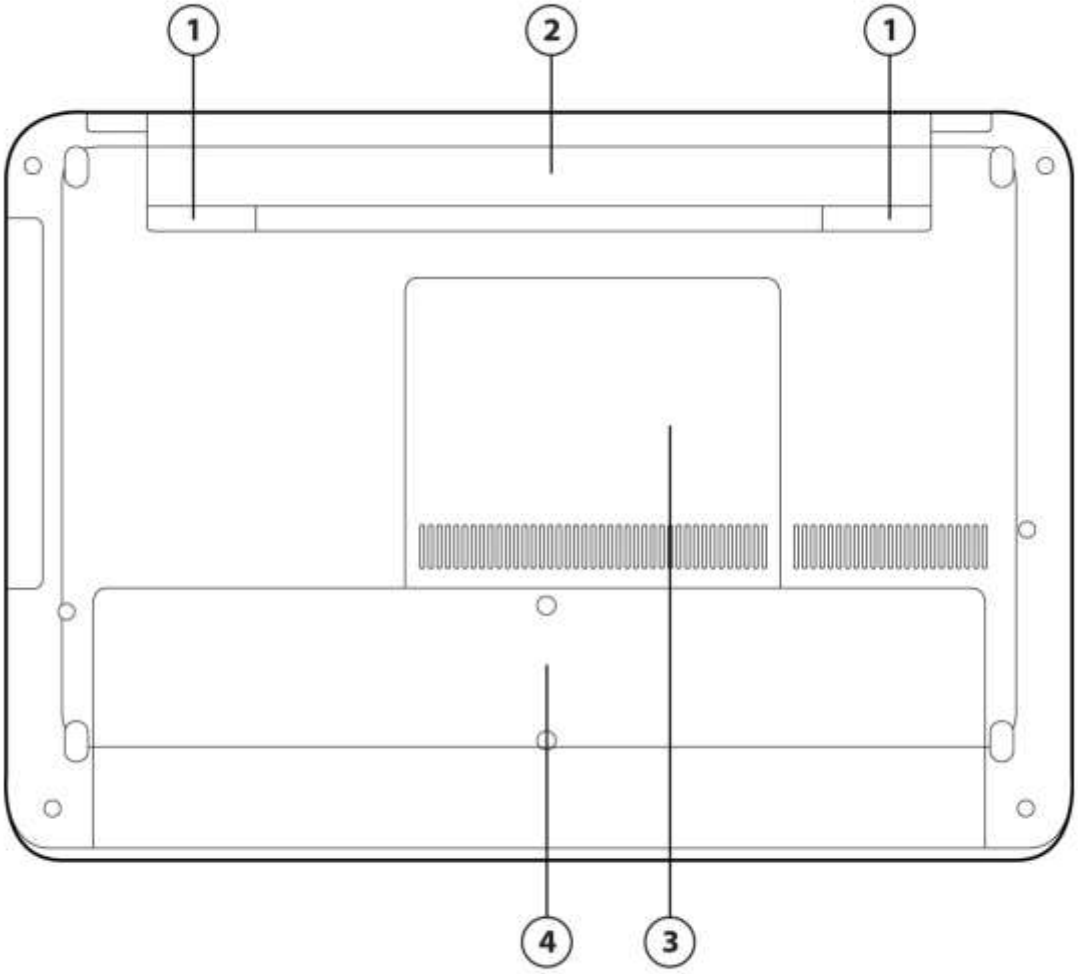
** The antennas are not visible from the outside of the computer. For optimal transmission, keep the areas immediately around the antennas free from obstructions.



Right

1. Headphone/Microphone combo jack
2. USB 2.0 ports (2)
3. Optical drive eject button (select models only)
4. Security lock slot

Overview

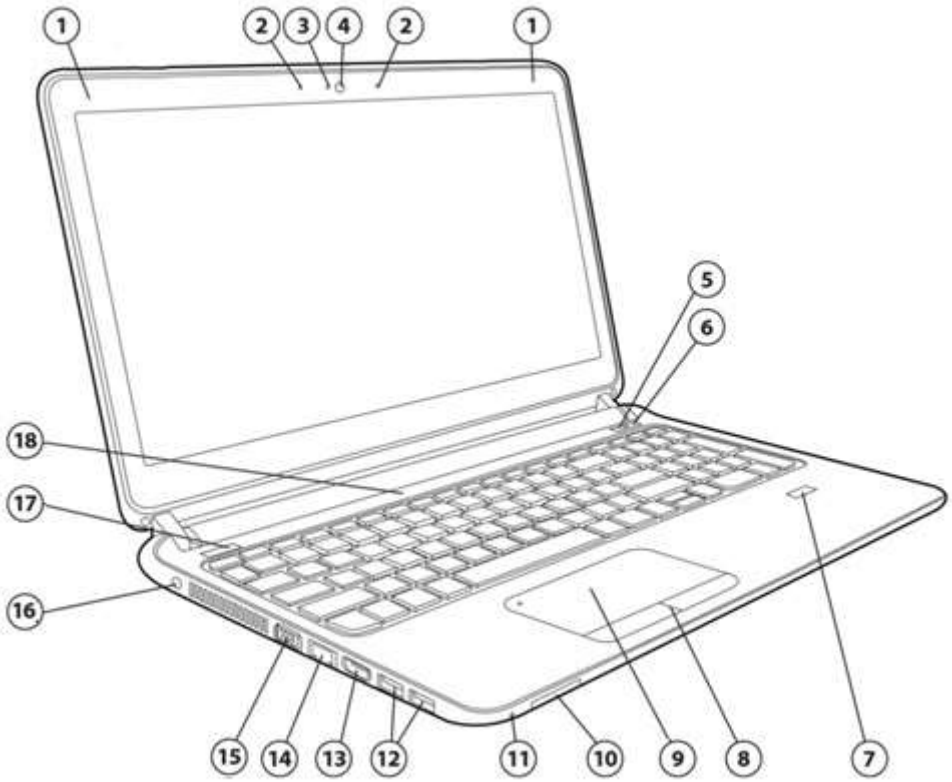


Bottom

1. Battery release latches
2. Battery bay
3. Service door
4. Service door

Overview

HP ProBook 470 G2 Notebook PC



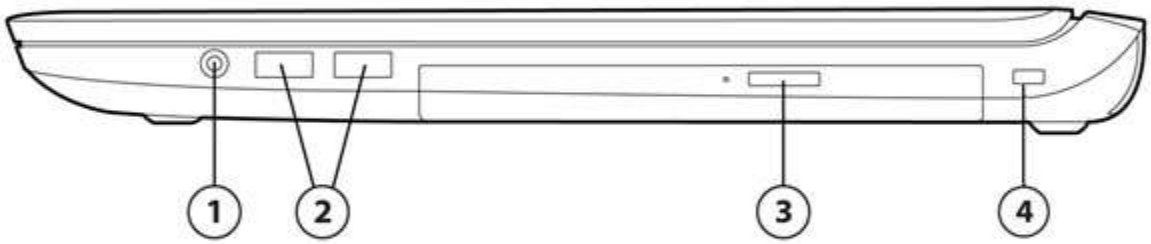
Front

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

* Only available with optional webcam.

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

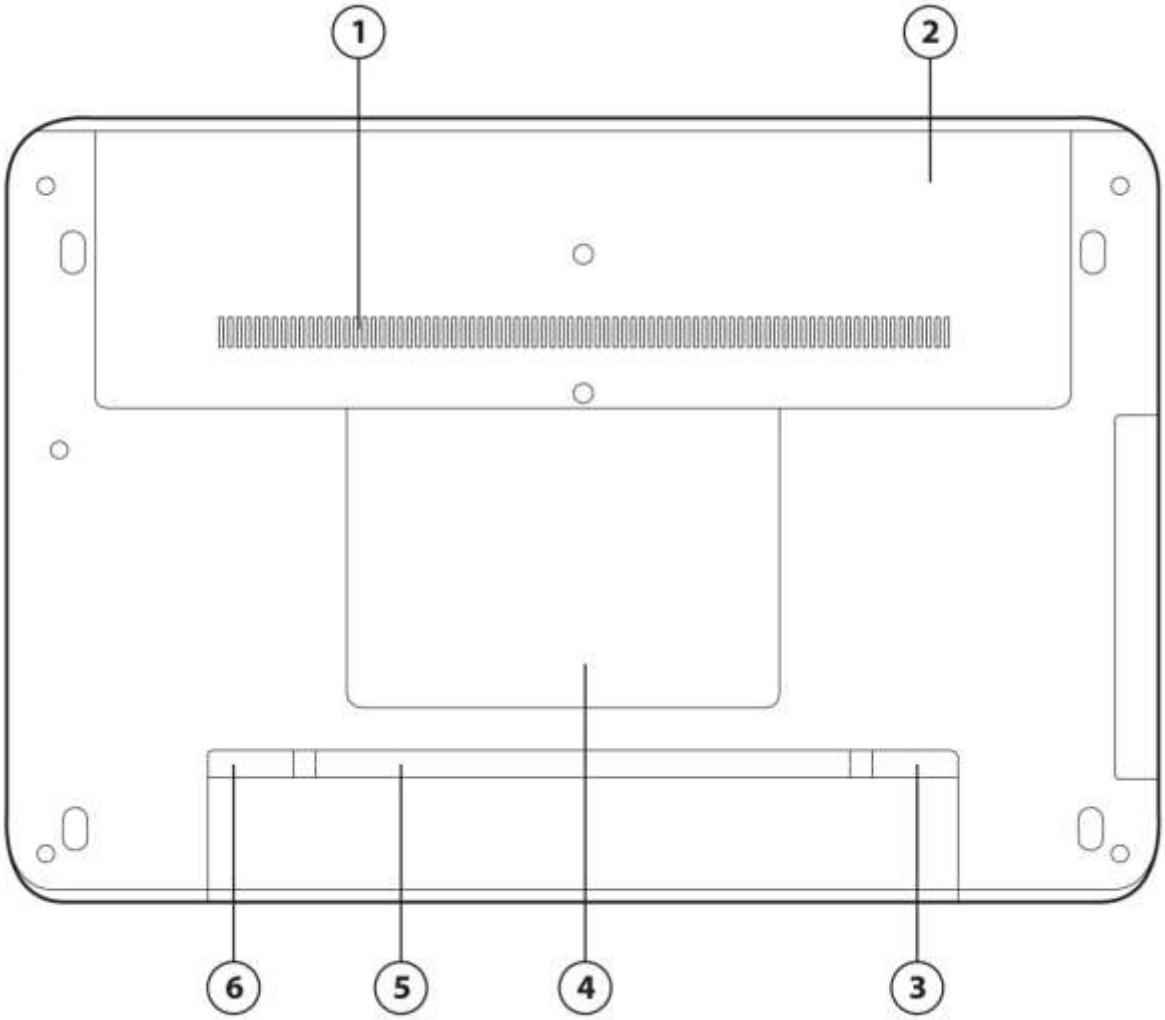
Overview



Right

1. Headphone/Microphone combo jack
2. USB 2.0 ports (2)
3. Optical drive eject button (select models only)
4. Security lock slot

Overview



Bottom

1. Vent
2. Service door
3. Battery release latch
4. Service door
5. Battery bay
6. Battery release latch

Overview

AT A GLANCE

- Windows 8.1 versions, Windows 7 Professional (available through downgrade rights from Windows 8.1 Pro), Ubuntu Linux or FreeDOS 2.0
- Durable multi-layer soft touch painted LCD cover and brushed aluminum keyboard deck that keeps system looking good longer
- Full-sized spill-resistant keyboard with a thin layer of Mylar film to prevent minor spills; full separate numeric keypad (HP ProBook 450 and 470 only)
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features including HP Client Security, optional HP Fingerprint Reader and TPM 1.2
- 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 displays with available touch panels
    - 17.3-inch diagonal HD+, 17.3-inch diagonal FHD (HP ProBook 470 G2)
    - 15.6-inch diagonal HD, 15.6-inch diagonal HD with Touch (available in Summer 2014), 15.6-inch diagonal FHD (HP ProBook 450 G2)
    - 14-inch diagonal HD, 14-inch diagonal HD with Touch (available in Summer 2014), and 14-inch diagonal HD+ (HP ProBook 440 G2)
- Choice of 5th or 4th generation Intel® Core™ i7, i5 and i3 processors, Intel Celeron™(select models only) or Intel Pentium™ (select models only) 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 (HP ProBook 440 G2 and 450 G2 select models)
    - 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
- Spill-resistant backlit keyboard available on select models (available in Summer 2014)
- Optional 4-cell (40 WHr) HP Long Life battery available on HP ProBook 440, 450 G2
- Optional 6-cell (51 WHr) HP Long Life battery available on HP ProBook 470 G2

* 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 G2 Notebook PC
HP ProBook 450 G2 Notebook PC
HP ProBook 470 G2 Notebook PC

OPERATING SYSTEM

Preinstalled

Windows 8.1 Pro 64*
Windows 7 Professional (available through downgrade rights from Windows 8.1 Pro)**
Windows 8.1 64*
Windows 7 Professional 64***
Ubuntu Linux
FreeDOS 2.0

* Not all features are available in all editions of Windows 8.1. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8.1 functionality. See http://www.microsoft.com for details.
** 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® Dual-Core™ processors Core i7, i5, and i3
4th Generation Intel® Core™ i7-4558U (2.8GHz, 4 MB L3 cache, 2 cores)* (available on 470 G2 only)
Up to 3.3GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i7-4510U (2.0GHz, 4 MB L3 cache, 2 cores)*
Up to 3.1GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i5-4310U (2.0GHz, 3 MB L3 cache, 2 cores)* (available on 440 G2 only)
Up to 3.0GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i5-4210U (1.7GHz, 3 MB L3 cache, 2 cores)*
Up to 2.7GHz with Intel Turbo Boost Technology
4th Generation Intel® Core™ i3-4030U (1.9GHz, 3 MB L3 cache, 2 cores)*
4th Generation Intel® Core™ i3-4005U (1.7GHz, 3 MB L3 cache, 2 cores) (available on 440 and 450 G2 only)
4th Generation Intel® Pentium 3558U (1.7GHz, 2MB L3 cache, 2 cores)* (available on 450 G2 only)
4th Generation Intel® Celeron 2957U (1.4GHz, 2MB L3 cache, 2 cores)*(available on 440 and 450 G2 only)

5th generation Intel® Dual-Core™ processors Core i7, i5, and i3
5th Generation Intel® Core™ i7-5500U (2.4GHz, 4 MB L3 cache, 2 cores)*
Up to 3.0GHz with Intel Turbo Boost Technology
5th Generation Intel® Core™ i5-5300U (2.3GHz, 3 MB L3 cache, 2 cores)* (available on 440 G2 only)
Up to 2.9GHz with Intel Turbo Boost Technology
5th Generation Intel® Core™ i5-5200U (2.2GHz, 3 MB L3 cache, 2 cores)*
Up to 2.7GHz with Intel Turbo Boost Technology
5th Generation Intel® Core™ i3-5010U (2.1GHz, 3 MB L3 cache, 2 cores)*
5th Generation Intel® Pentium 3805U (1.9 GHz, 2MB L3 cache, 2 cores)* (available on 450 G2 only)

Features

5th Generation Intel® Celeron 3205U (1.5GHz, 2MB L3 cache, 2 cores)* (available on 440 and 450 G2 only)

* 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

Integrated with processor

GRAPHICS

Integrated
4th Generation Intel® Core™ i7-4558U (2.8GHz, 4 MB L3 cache, 2 cores)/ Intel® Iris Graphics 5100 (available on 470 G2 only)
4th Generation Intel® Core™ i7-4510U (2.0GHz, 4 MB L3 cache, 2 cores)/ Intel® HD Graphics 4400
4th Generation Intel® Core™ i5-4310U (2.0GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 4400 (available on 440 G2 only)
4th Generation Intel® Core™ i5-4210U (1.7GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 4400
4th Generation Intel® Core™ i3-4030U (1.9GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 4400
4th Generation Intel® Core™ i3-4005U (1.7GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 4400 (available on 440 and 450 G2 only)
4th Generation Intel® Pentium 3558U (1.7GHz, 2 MB L3 cache, 2 cores)/ Intel® HD Graphics (HP ProBook 450 G2 only)
4th Generation Intel® Celeron 2957U (1.4GHz, 2MB L3 cache, 2 cores) / Intel® HD Graphics (HP ProBook 440 G2 and 450 G2 only)

5th Generation Intel® Core™ i7-5500U (2.4GHz, 4 MB L3 cache, 2 cores)/ Intel® HD Graphics 5500
5th Generation Intel® Core™ i5-5300U (2.3GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 5500 (available on 440 G2 only)
5th Generation Intel® Core™ i5-5200U (2.2GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 5500
5th Generation Intel® Core™ i3-5010U (2.1GHz, 3 MB L3 cache, 2 cores)/ Intel® HD Graphics 5500
5th Generation Intel® Pentium 3805U (1.9GHz, 2 MB L3 cache, 2 cores)/ Intel® HD Graphics (available on 450 only)
5th Generation Intel® Celeron 3205U (1.5GHz, 2 MB L3 cache, 2 cores)/ Intel® HD Graphics (available on 440 and 450 only)

Switchable Discrete
AMD Radeon™ R5 M255, with 1 or 2 GB dedicated DDR3 video memory***

* HP ProBook 440 G2 and 450 G2 only. HP ProBook 470 G2 supports switchable discrete graphics 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 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 G2

Features

Internal
14” diagonal LED-backlit HD anti-glare (1366 x 768)
14” diagonal LED-backlit HD Touch Display is shatter, scratch, and smudge resistant (1366 x 768)
14” diagonal LED-backlit HD+ anti-glare (1600 x 900)

External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048 x 1536 external resolution @50 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 G2

Internal
15.6” diagonal LED-backlit HD anti-glare (1366 x 768)
15.6” diagonal LED-backlit HD Touch Display is shatter, scratch, and smudge resistant (1366 x 768)
15.6” diagonal LED-backlit FHD anti-glare (1920 x 1080)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048x1536 external resolution @ 50 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 470 G2

Internal
17.3” diagonal LED-backlit HD+ anti-glare (1600 x 900)
17.3” diagonal LED-backlit FHD anti-glare (1920 x 1080)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048x1536 external resolution @ 50 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.

Features

STORAGE AND DRIVES

Primary Storage Bay
Hard Drives
320/500/750 GB**/1.0 TB** 5400 rpm SMART SATA HDD; 500GB/750GB** 7200 rpm SMART SATA HDD
500 GB** 5400 rpm SMART SATA Hybrid SSHD with 8GB Cache (440 and 450 G2 only)

Solid State Drive*
120 GB* M.2 Solid State Drive (440 G2 and 450 G2 only)
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

*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 - 1600 (Transfer rates up to 1600 MT/s)
Two SODIMM slots supporting dual-channel memory
2 GB, 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

Features

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) (WWAN and LTE are not available on the HP ProBook 470 G2)
HP hs3110 HSPA+ Mobile Broadband Module*
HP lt4112 LTE/HSPA+ Gobi™ 4G Module*,**
Wireless LAN (WLAN)***
Realtek RTL8188EE 802.11b/g/n (1x1) ***
Realtek RTL8723BE 802.11b/g/n (1x1) with Bluetooth® v4.0 combo***
Broadcom BCM943228HMB 802.11 a/b/g/n (2x2) with Bluetooth® v4.0 combo*
Intel Dual Band Wireless-AC 3160 802.11 a/b/g/n/ac (1x1) with Bluetooth 4.0 combo***
Intel Dual Band Wireless-AC 7260 802.11 a/b/g/n/ac (2x2) with Bluetooth 4.0 combo***

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

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, and volume down
Headphone/Microphone Combo Jack
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.
**** Not available in China

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Features

Keyboard
The HP spill-resistant keyboard and optional HP spill-resistant backlit keyboard are 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 and 470 only).
Optional backlit keyboard is available (available in Summer 2014).

Pointing Devices
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, volume up, and backlight toggle for backlit keyboard (select models only).

SOFTWARE AND SECURITY

Software Included

	Windows 8.1	Windows 7
Security	Absolute Persistence Module[1]	Absolute Persistence Module
	Device Access Manager with Just In Time Authentication	Device Access Manager with Just In Time Authentication
	HP File Sanitizer[2]	HP File Sanitizer[2]
	HP Client Security[3]	HP Client Security[3]
	HP SpareKey	HP SpareKey
	Microsoft Defender	Microsoft Security Essentials[4]
	DigitalPersona Fingerprint Driver	DigitalPersona Fingerprint Driver
	Validity Fingerprint Driver	Validity Fingerprint Driver
	Hardware Root of Trust	Hardware Root of Trust
	HP Automatic DriveLock	HP Automatic DriveLock
	HP BIOS Protection	HP BIOS Protection
	HP Disk Sanitizer[5]	HP Disk Sanitizer[5]
	DASH Support	DASH Support
	HP DriveLock	HP DriveLock
	HP SpareKey[6]	HP SpareKey[6]
	Hybrid Boot	Hybrid Boot
	Master Record Security	Master Record Security
	Measured Boot	Measured Boot
	Power On Authentication	Power On Authentication
	Pre-Boot Security	Pre-Boot Security
	Secure Boot (Windows 8.1)	Secure Boot (Windows 7)
	Secure Erase[7]	Secure Erase[7]
	Touch enabled F10 Setup with virtual KB	Touch enabled F10 Setup with virtual KB
MultiMedia	Cyberlink Power2Go	Cyberlink Power2Go
	Cyberlink PowerDVD	Cyberlink PowerDVD
	Cyberlink YouCam BE	Cyberlink YouCam BE
Communications	HP Connection Manager	HP Connection Manager
	HP GPS and Location[8]	HP GPS and Location[8]
	HP Mobile Connect[9]	Intel WiDi Software[11]
	HP Wireless Hotspot[10]	Intel My WiFi and Wireless Drivers for Microsoft
	Intel WiDi Software[11]	
	Intel My WiFi and Wireless Drivers for Microsoft	

Features

HP Value Add Software	Digital Energy Star Logo W8	Digital Energy Star Logo W8
	Getting Started with Windows 8	Getting Started with Windows 8
	HP 3D DriveGuard	HP 3D DriveGuard
	HP Ceement	HP Ceement
	HP ePrint Driver[12]	HP ePrint Driver[12]
	HP Hotkey	HP Hotkey
	HP PageLift App (Requires Windows 8)	HP PageLift for Win 7
	HP Recovery Manager	HP Recovery Manager
	HP Registration App	HP Registration App
	HP Setup	HP Setup
	HP Softpaq Download Manager	HP Softpaq Download Manager
	HP Software Setup	HP Software Setup
	HP Support Assistant[13]	HP Support Assistant[13]
	HP Recovery Disc Creator (HPRDC)	HP Recovery Disc Creator (HPRDC)
	HP WallPaper	HP WallPaper
	System Default Settings for Win8	System Default Settings for Win8
	UEFI System Diagnostics W8	UEFI System Diagnostics W8
3rd Party	Box 50GB Offer Desktop Icon[14]	Box 50GB Offer Desktop Icon[14]
	Box App	Box App
	Foxit PhantomPDF Express	Foxit PhantomPDF Express
	Buy Office	Buy Office

[1]The Absolute Persistence agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

[2]For the use cases outlined in the DOD 5220.22-M Supplement. Supports standard Hard Drives. Initial setup required.

[3]Not all features are remotely manageable.

[4]Opt in and internet connection required for updates.

[5]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.

[6]Requires initial user set up.

[7]For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.

[8]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.

[9]Internet access required.

[10] 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.

[11]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.

[12]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.

Features

[13] Internet access required.
[14] Offer available on new 2014 HP commercial PC and requires Box registration. Offer subject to change without notice.
Security

Standard
HP Client Security (Windows only)
Microsoft Security Essentials(Windows 7)/Microsoft Defender (Windows 8)*
HP Drive Encryption**
HP BIOS Protection***
Security lock slot
TPM 1.2 Embedded Security Chip

Optional
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.
* Opt in and internet connection required for updates.
** HP Drive Encryption 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.
*** HP Tools partition with an HP BIOS required for automatic recovery.
**** 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 G2 Notebook PC
Models with discrete graphics:
65W Smart AC Adapter
65W EM Smart AC Adapter
Models with integrated graphics:
45W Smart AC Adapter
45W Smart AC Adapter (two prong) (Japan only) (1.0 m power cord only)
Power cord included is 1.8m (+/- 0.1m) or 1.0m (+/- 0.1m) (1.8m power cord not available in Japan).

HP ProBook 450 G2 Notebook PC
Models with discrete graphics:
65W Smart AC Adapter
65W EM Smart AC Adapter
Models with integrated graphics:
45W Smart AC Adapter
45W Smart AC Adapter (two prong) (Japan only) (1.0 m power cord only)
Power cord included is 1.8m (+/- 0.1m) or 1.0m (+/- 0.1m) (1.8m power cord not available in Japan).

Features

HP ProBook 470 G2 Notebook PC
Models with discrete graphics:
65W Smart AC Adapter
65W EM Smart AC Adapter
90W Smart AC Adapter
90W EM Smart AC Adapter

HP Fast Charge (available on 470 G2 standard battery only, not available for the Long Life Battery or for the 440 G2 or 450 G2)

Primary Battery

HP ProBook 440 G2 and 450 G2 Notebook PCs

4-cell (44 WHr) Lithium-Ion battery
4-cell (40 WHr) Long Life Lithium-Ion battery

HP ProBook 470 G2 Notebook PC
6-cell (47 WHr) Lithium-Ion battery
6-cell (51 WHr) Long Life Lithium-Ion battery

Battery Life *

	Configurations with integrated graphics (Windows 7)	Configurations with discrete graphics (Windows 7)
HP ProBook 440 and 450		
4-cell (44 WHr) battery	Up to 11 hours*	Up to 10 hours 15 min*
4-cell (40 WHr) long life battery	Up to 9 hours 15 min*	Up to 9 hours*
HP ProBook 470		
6-cell (47 WHr) battery	NA	Up to 9 hours 15 min*
6-cell (51 WHr) long life battery	NA	Up to 10 hours 15 min*

* Windows 7 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.

System Standby Time*

HP ProBook 440 and 450

4-cell (44 WHr) battery	Up to 15 days*
4-cell (40 WHr) long life battery	Up to 14 days*

HP ProBook 470

4-cell (47 WHr) battery	Up to 19 days*
4-cell (51 WHr) long life battery	Up to 17 days*

* Standy 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.

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 G2 Notebook PC

Weight
Lightest possible configuration across battery and panel options (HD Panel, Non-Touch, No-ODD, 4-cell (44Whr) Battery, M.2 120GB SSD) at 3.97lb/1.80kg

Lightest Weight Configurations (across panel, battery and ODD options, if applicable)

	4-cell (44Whr)
Non-Touch, No-ODD, M.2 SSD	3.97lb/1.80kg
Non-Touch, ODD, M.2 SSD	4.21lb/1.91kg
Non-Touch, No-ODD, HDD	4.17lb/1.89kg
Non-Touch, ODD, HDD	4.41lb/2.00kg
Touch, No-ODD, HDD	4.70lb/2.14kg
Touch, ODD, HDD	4.95lb/2.25kg

Dimensions (w x d x h)

Non-Touch Models
13.35 x 9.61 x 0.91 (front) - 0.99 in (rear)
33.92 x 24.4 x 2.31 (front) - 2.52 cm (at rear)

Touch Models
13.35 x 9.62 x 0.96 (front) – 1.05 in (rear)
33.92 x 24.45 x 2.45 (front) - 2.66 cm (rear)

HP ProBook 450 G2 Notebook PC

Weight

Features

Lightest possible configuration across battery and panel options (HD Panel, Non-Touch, No-ODD, 4-cell (44Whr) Battery, M.2 120GB SSD) at 4.54lb/2.06kg

Lightest Weight Configurations (across panel, battery and ODD options, if applicable)

	4-cell (44Whr)
Non-Touch, No-ODD, M.2 SSD	4.54lb/2.06kg
Non-Touch, ODD, M.2 SSD	4.78lb/2.17kg
Non-Touch, No-ODD, HDD	4.74lb/2.15kg
Non-Touch, ODD, HDD	4.98lb/2.26kg
Touch, No-ODD, HDD	5.51lb/2.50kg
Touch, ODD, HDD	5.75lb/2.61kg

Dimensions (w x d x h)

Non-Touch Models
14.76 x 10.35 x 0.92 (front) - 1.00 in (rear)
37.50 x 26.28 x 2.34 (front) - 2.55 cm (at rear)

Touch Models
14.76 x 10.36 x 0.98 (front) - 1.07 in (rear)
37.50 x 26.32 x 2.50 (front) - 2.71 cm (rear)

HP ProBook 470 G2 Notebook PC

Weight
Lightest possible configuration across battery and panel options (HD+ Panel, No-ODD, 6-cell (47Whr) Battery, HDD) at 6.26lb/2.84kg

Lightest Weight Configurations (across panel, battery and ODD options, if applicable)

	6-cell (47Whr)
No-ODD	6.26lb/2.84kg
ODD	6.50lb/2.95kg

Dimensions (w x d x h)
16.29 x 11.0 x 1.02 (front) - 1.27 in (rear)
41.38 x 27.95 x 2.60 (front) - 3.22 cm (at rear)

NOTE: Height varies depending upon where on the notebook the measurement is made. Weight varies by configuration and components. 440/450G2 lightest weight requires optional 120GB M.2 SSD drive.

PORTS/SLOTS

Ports

Features

USB 3.0 – Two
USB 2.0 – Two
HDMI 1.4a – One
Headphone/Microphone Combo Jack – One
RJ-45 (Ethernet) – One
Power connector – One
VGA - One

Digital Media Slots
Multi Media Reader Slot supporting SD, SDHC, and SDXC

SERVICE AND SUPPORT

HP Services offers 2-year, 1-year and 90 day limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 2-year limited warranty as the platform. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited 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/cpc.

NOTE: Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.
http://h20000.www2.hp.com/bizsupport/TechSupport/ProductRoot.jsp

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	**Nominal Operating Voltage**	19 V			
	Average Operating Power	**Win 7**		**Win8**	**Max**
	ProBook 440				
	Integrated graphics		6.78W	6.78W	38.88W
	Discrete graphics		4.49W	4.49W	31.87W
	ProBook 450				
	Integrated graphics		8.89W	8.89W	39.33W
	Discrete graphics		6.79W	6.79W	38.42W
	ProBook 470		5.71W	5.71W	23.56W
	Discrete graphics				
	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 6.0®	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 G2, HP ProBook 450 G2 and HP ProBook 470 G2 that are ENERGY STAR® qualified are identified as HP ProBook 440 G2 ENERGY STAR, HP ProBook 450 G2 ENERGY STAR and HP ProBook 470 G2 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

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) 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)	
	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	
	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			
750 GB* 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115g)	
	Capacity	750 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**	1.5 ms
		Average	11 ms
		Maximum	22 ms
	Rotational Speed	7200 rpm	
	Logical Blocks	1,465,149,168	
	Operating Temperature	32° to 140° F (0° to 60° C) [case temp]	
	Features	ATA Security	

Technical Specifications

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)	
	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** (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	1,465,149,168	
	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)	

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**	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	
1.5 TB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.26 lb (118 g)	
	Capacity	1.5 TB	
	Height	0.37 in (9.5 mm)	
	Width	2.5 in (63.5 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**	2.2 ms
		Average	13 ms
		Maximum	25 ms
	Rotational Speed	5400 rpm	
	Logical Blocks	293,0277,168	
	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**	**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	
120 GB* M.2 Solid State Drive	**Drive Weight**	< 10 Grams	
	Capacity	120 GB	
	Height	0.276 in (22 mm)	
	Width	2.76 in (42 mm)	
	Interface	SATA 3 (6 Gb/s)	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		540 MB/s	480 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; TRIM	

* For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB (for Windows 8) of system disk is reserved for 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 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	

Technical Specifications

	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, DVD-RAM	
	Max Media Capacity (read)	50.0 GB	
	Max Media Capacity (write)	8.5GB	
	Transport	Tray Loading	
DVD-ROM Drive	**Access Times**	Random	< 140 ms CD (typical) < 160 ms DVD (typical)

	Max Data Transfer Rate	24X CD-ROM 8X-DVD
	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)	None
	Max Media Capacity (read)	8.5GB
	Transport	Tray Loading

SECURITY

HP Validity VFM 495 Fingerprint Reader (optional)	**Mobile Voltage Operation**	3.0V-3.6V Single Supply
	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	200 pixel wide fingerpring image 16.5 mm x 3 mm sensor area 508 dpi resolution, 256 levels of grayscale

NETWORKING/COMMUNICATIONS

Integrated Realtek RTL8161GSH-CH 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
	Power Management	ACPI compliant - multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption

Technical Specifications

	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) 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 1.1to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller
HP hs3110/3114 HSPA+ Mobile Broadband* Module	**Technology/Operating bands**	Modes: WCDMA/HSDPA/HSUPA/HSPA+/AWS/GSM/EDGE/GPRS Penta-band WCDMA/HSDPA/HSUPA/HSPA+/AWS: 850/900/1900/2100/AWS MHz GSM/GPRS/EDGE: 850/900/1800/1900 MHz
	Wireless protocol standards	GSM/GPRS/EDGE: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9. UMTS/WCDMA: Release 99 and Release 7 Advanced Receiver Type 3i
	GPS	GPS Standalone, A-GPS: L1 (Internet- and Network assisted)
	Wireless parametric standards	Complies with 3GPP specifications
	Maximum data rates	GPRS/EDGE: Multi-slot Class 33, Class B WCDMA PS: UL (384 kbps) / DL (384 kbps) UL/DL HSPA: UL (5.76 Mbps)/ DL (7.2 Mbps) UL/DL HSPA+: UL (5.76 Mbps)/ DL (21Mbps)
	Maximum output power	WCDMA/HSPA/HSPA+ 2100/1900/900/850/AWS MHz: +24dBm (Power Class 3) GPRS 1900/1800 MHz: +30dBm (Power Class 1) GPRS 900/850 MHz: +33dBm (Power Class 4) EDGE 1900/1800 MHz: +26dBm (Power Class E2) EDGE 900/850 MHz: +27dBm (Power Class E2)
	Maximum power consumption	2500mA (peak); 600mA (average)
	Power consumption, sleep mode	3.6 mA
	Power management	USB selective suspend, Connected Standby Integrated notebook wireless button
	Antenna type	Dual high efficiency 5 band antennae with spatial diversity, mounted in the display enclosure
	Form Factor	M.2 Socket 2, USB 2.0 interface high speed
	Weight	<6 g
	Dimensions (Length x Width x Thickness)	2.01 x 1.18 x 0.18 in (42 x 30 x 2.3 mm)

Technical Specifications

	SIM card supply voltage	1.8 V/3.0 V UICC (SIM/UICC/USIM)
	Voltage, Operating	3.135V~4.4V (3.3 V recommended)
	Temperature, operating	14° to 131° F (-10° to 55° C) (Normal operation) -4° to 158° F (-20° to 70° C) (Extended operation)
	Temperature, storage	-40° to 185° F (-40° to 85° C)
	Humidity	5% to 95%
	Configuration utilities	HP Connection Manager
	LED activity	LED Off - Radio Off; Solid LED On - Radio On

*Mobile Broadband is an optional feature and requires factory configuration. 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. 4G LTE not available on all products, and in all regions.

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

Technical Specifications

	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

** Mobile Broadband is an optional feature and requires factory configuration. 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. 4G LTE not available on all products, and in all regions.

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
	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 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 Power[2]	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

Technical Specifications

Power Management	ACPI 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) 802.11g:-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	
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	

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.

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
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
	Roaming[1]	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 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

Technical Specifications

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)	
	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.

AUDIO/MULTIMEDIA - DTS SOUND+

Hardware	**Implementation**	Realtek ALC3227-CG
	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
Audio Output Quality	**Frequency Response**	10 Hz – .454*Fs
	Signal to Noise Ratio	95 dB (DAC), 88dB (ADC)
	Total Harmonic Distortion	0.01%
	Play/Record Sampling Rate(s)	44.1k/48k/96k/192kHz
	DAC	16, 20 or 24-bit
	ADC	16, 20 or 24-bit
Integrated Stereo Speakers	**Power Rating**	2 Watts
	Impedance	4 Ohms

POWER

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.	
HP 45W Smart AC Adapter	**Dimensions**	3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)	
	Input	90 to 265 VAC	
		Input Efficiency	87.74% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	2.31 A at 100 VAC and maximum load
	Output	**Output power**	45W
		DC output	19.5V +5.0%/-5%
		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 40W Smart AC Adapter	**Dimensions**	3.67 x 1.57 x 1.18 in (93 x 40 x 30 mm)	
	Weight	8.64 oz (245 g)	
	Input	90 to 265 VAC	
	Input Efficiency	84% min at 115 VAC	
	Input frequency range	47 to 63 Hz	

Technical Specifications

	Input AC current	1.1 A at 90 VAC	
	Output		
	Output power	40W	
	Output Voltage	19.5V +5.0%/-5.0%	
	Output current limit	3.08A	
	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		
	Humidity	Up to 95%	
	Storage humidity	Up to 95%	
	EMI and safety certifications	Worldwide safety and EMC approvals including CE, UL, cUL, GS, Australian Electric Permit, RCM, NOM, CCC, KC, CU, S mark, BSMI, ISC, PSE, PSB, NRcan, Ukraine and SII	
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	
6-cell (51 WHr) Long Life Lithium-Ion battery	**Cells/Type**	6-cell Lithium-Ion	
	Energy	Amp-hour capacity	2.55Ah
		Watt-hour Capacity	51 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)

	Fuel Gauge LED	No	
	Warranty	Up to 3 years (depending on system warranty)	
	Optional Travel Battery Available	No	
4-Cell (44 WHr) Lithium-Ion battery	**Dimensions** (H x W x L)	0.86 x 1.4 x 8.0 in (2.18 x 3.56 x 27.72 cm)	
	Weight	≤0.551 lb (250 g)	
	Cells/Type	4-cell Lithium-Ion	
	Energy	Voltage	14.8V DC
		Amp-hour capacity	2850mAh
		Watt-hour Capacity	44 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	
4-cell (40 WHr) Long Life Lithium-Ion battery	**Cells/Type**	4-cell Lithium-Ion	
	Energy	Amp-hour capacity	3.0Ah
		Watt-hour Capacity	40 WHr
	Temperature	Operating (Charging)	32° to 113° F (0° to 45° C)
		Operating (Discharging)	14° to 140° F (–10° to 60° C)
		Non-operating	–4° to 140° F (–20° to 60° C)
	Battery Re-Charge Time	System in OFF mode or Standby	2.5 hours
		System ON	3 to 5 hours (depending on system power consumption)
	Fuel Gauge LED	No	
	Warranty	Up to 3 years (depending on system warranty)	
	Optional Travel Battery Available	No	

ENVIRONMENTAL

Technical Specifications

HP ProBook 440 G2 Notebook PC

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	7.02 W	7.04 W	6.89 W
Normal Operation (Long idle)	5.24 W	5.27 W	5.20 W
Sleep	0.65 W	0.68 W	0.65 W
Off	0.31 W	0.35 W	0.31 W

Note:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	24 BTU/hr	24 BTU/hr	24 BTU/hr
Normal Operation (Long idle)	18 BTU/hr	18 BTU/hr	18 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr

*NOTE: 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)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.1	24

Technical Specifications

Fixed Disk – Random writes	3.1	24

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 3 USB ports
- 1 PC card slot (type I/II)
- 1 ExpressCard/54 slot
- 1 IEEE 1394 Port
- 2 SODIMM memory slots
- Optional expansion base docking station
- 1 multi-bay II storage port
- Interchangeable HDD

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Batteries

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

Batteries used in the product do not contain:
Mercury greater the1ppm by weight
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium
Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)
Battery type:

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/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 ISO11469 and ISO1043.
- This product contains 0% post-consumer recycled plastic (by wt.)
- This product is 95.9% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	387.8 g
Internal:	PLASTIC/Polyethylene low density	18.1 g
	PLASTIC/EPE-Expanded Polyethylene	38 g

The plastic packaging material contains at least 75% recycled content.
The corrugated paper packaging materials contains at least 75% recycled content.

Technical Specifications

HP ProBook 450 G2 Notebook PC

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	7.88 W	7.31 W	7.78 W
Normal Operation (Long idle)	4.88 W	5.84 W	6.28 W
Sleep	0.95 W	0.95 W	0.92 W
Off	0.34 W	0.37 W	0.34 W

Note:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	27 BTU/hr	25 BTU/hr	27 BTU/hr
Normal Operation (Long idle)	17 BTU/hr	20 BTU/hr	21 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	1 BTU/hr	1 BTU/hr	xxx BTU/hr

*NOTE: 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)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.1	22

Technical Specifications

Fixed Disk – Random writes	3.1	22

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 3 USB ports
- 1 PC card slot (type I/II)
- 1 ExpressCard/54 slot
- 1 IEEE 1394 Port
- 2 SODIMM memory slots
- Optional expansion base docking station
- 1 multi-bay II storage port
- Interchangeable HDD

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Batteries

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

Batteries used in the product do not contain:
Mercury greater the1ppm by weight
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium
Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)
Battery type:

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/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 ISO11469 and ISO1043.
- This product contains 0% post-consumer recycled plastic (by wt.)
- This product is 96.2% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	398 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	36 g
	PLASTIC/Polyethylene low density	18.1 g

The plastic packaging material contains at least 75% recycled content.
The corrugated paper packaging materials contains at least 75% recycled content.

System Configuration The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".

Energy Consumption (in accordance with US ENERGY STAR® test method)	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	7.60 W	7.50 W	7.57 W
Normal Operation (Long idle)	3.42 W	3.62 W	3.43 W
Sleep	0.66 W	0.71 W	0.66 W
Off	0.34 W	0.37 W	0.34 W

Note:
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	26 BTU/hr	26 BTU/hr	26 BTU/hr
Normal Operation (Long idle)	12 BTU/hr	12 BTU/hr	12 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr

*NOTE: 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)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	2.9	23
Fixed Disk – Random writes	2.9	24

Technical Specifications

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:

- 3 USB ports
- 1 PC card slot (type I/II)
- 1 ExpressCard/54 slot
- 1 IEEE 1394 Port
- 2 SODIMM memory slots
- Optional expansion base docking station
- 1 multi-bay II storage port
- Interchangeable HDD

Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.

Batteries

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

Batteries used in the product do not contain:
Mercury greater the1ppm by weight
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)
Battery type: Lithium
Battery size: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)
Battery type:

Additional Information

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/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 ISO11469 and ISO1043.
- This product contains 0% post-consumer recycled plastic (by wt.)
- This product is 96.9% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	454.8 g
Internal:	PLASTIC/Polyethylene low density	68.5 g

The plastic packaging material contains at least 75% recycled content.
The corrugated paper packaging materials contains at least 75% recycled content.

All models

Technical Specifications

Eco-Label Certifications & declarations

These products have received or are in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. See http://www.epeat.net for registration status in your country.

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)
- 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.

PACKAGING USAGE

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.

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/gcreport/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 Essential Top Load Case	H2W17AA
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Messenger Case (up to 17.3")	H1D25AA
Docking	HP 3005pr USB 3.0 Port Replicator	H1L08AA
Input/Output – Mice	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Optical Travel mouse	RH304AA
Adapters	HP 45W Smart AC Adapter 4.5mm	H6Y88AA
Security	HP UltraSlim Keyed Cable Lock	H4D73AA
Displays	HP ProDisplay P201 20-inch LED Backlit Monitor	C9F26AA
	HP ProDisplay P201m 20-inch LED Backlit Monitor (With Integrated Speakers)	C9F73AA
	HP ProDisplay P221 21.5-inch LED Backlit Monitor	C9E49AA
	HP ProDisplay P231 23-inch LED Backlit Monitor	E4S07AA

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Summary of Changes

Date of change:	Version History:		Description of change:
June 5, 2014	From vMar'14 to vJun'14	Changed	Environmental data for the 440 & 470
June 9, 2014	From June 6 to June 9	Added	Environmental data for the 450
June 19, 2014	From June 9 to June 19	Added	Changes throughout the document
July 7, 2014	From v4 to v5	Changed	Weight specs
October 22, 2014	From v5 to v6	Changed	Operating System and Processor changes on pages 4-14
October 28, 2014	From v6 to v7	Removed	Windows 7 Home, Home Premium & Ultimate OS
November 13, 2014	From v7 to v8	Added	5th Generation Intel processors and graphics.
November 17, 2014	From v8 to v9	Changed	Warranty specs on page 22
March 13, 2015	From v9 to v10	Changed	Memory speed transfer units on page 14
April 8, 2015	From v10 to v11	Added	Average Operating Power page 23