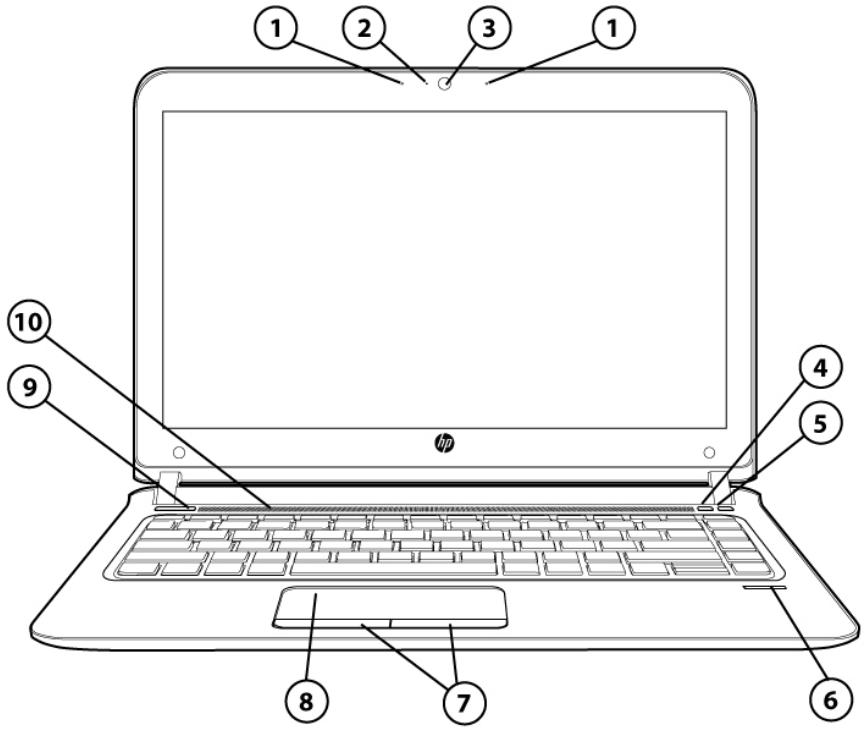
QuickSpecs

Overview

HP ProBook 430 G3 Notebook PC

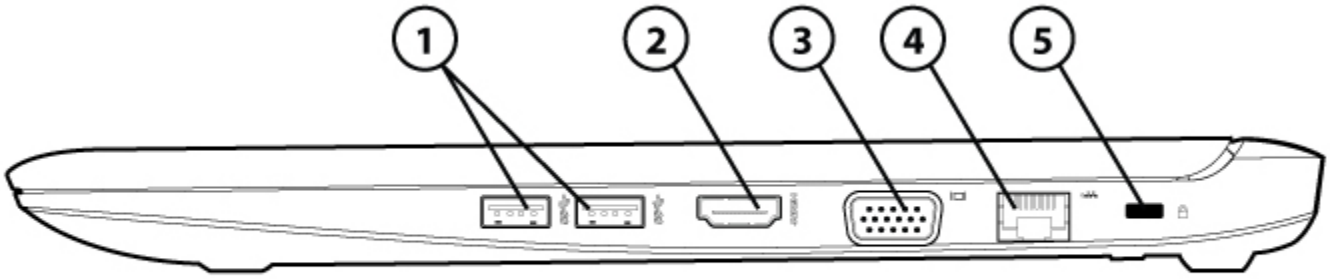


Front

1. Microphones (2)
2. Webcam light
3. Webcam
4. Wireless on/off button
5. Speaker mute button
6. Fingerprint reader
7. Touchpad pick buttons
8. Touchpad
9. Power button
10. Speaker array

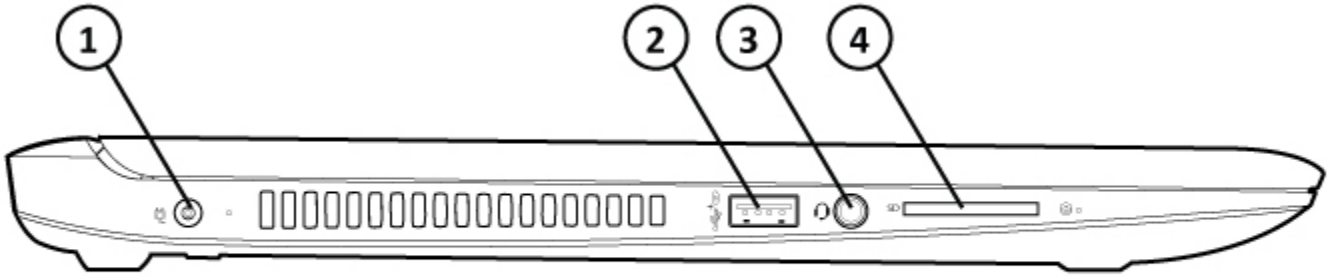
QuickSpecs

Overview



Right

1. USB 3.0 ports (2)
2. HDMI port
3. External VGA monitor port
4. Ethernet port (RJ-45)
5. Security lock slot



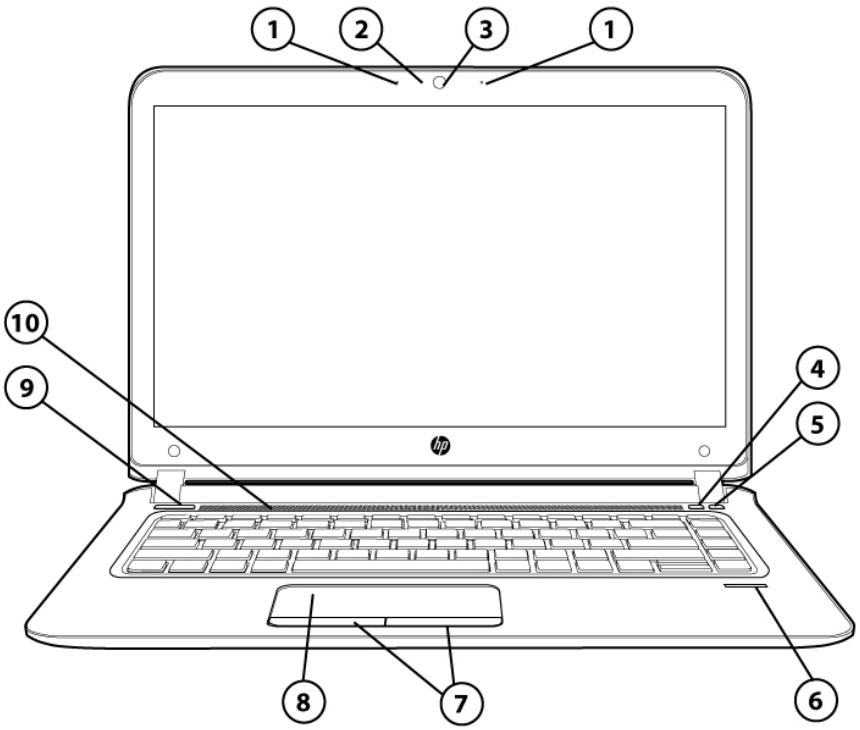
Left

1. Power connector
2. USB 2.0 port (power port)
3. Headphone/Microphone combo jack
4. SD Card reader

QuickSpecs

Overview

HP ProBook 440 G3 Notebook PC

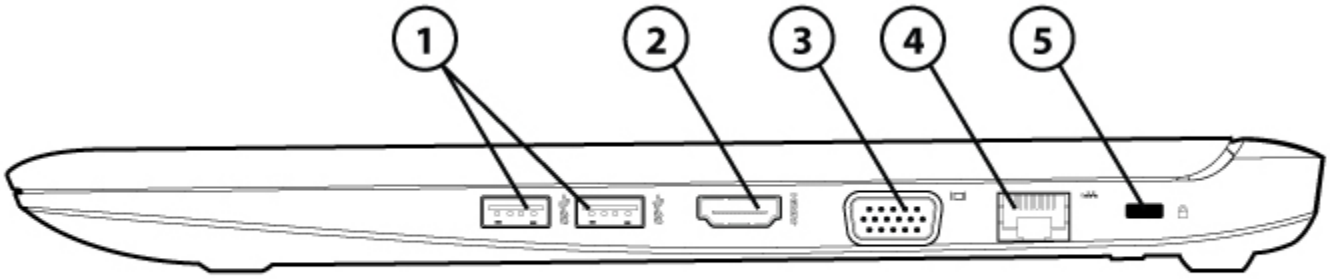


Front

1. Microphones (2)
2. Webcam light
3. Webcam
4. Wireless on/off button
5. Speaker mute button
6. Fingerprint reader
7. Touchpad pick buttons
8. Touchpad
9. Power button
10. Speaker array

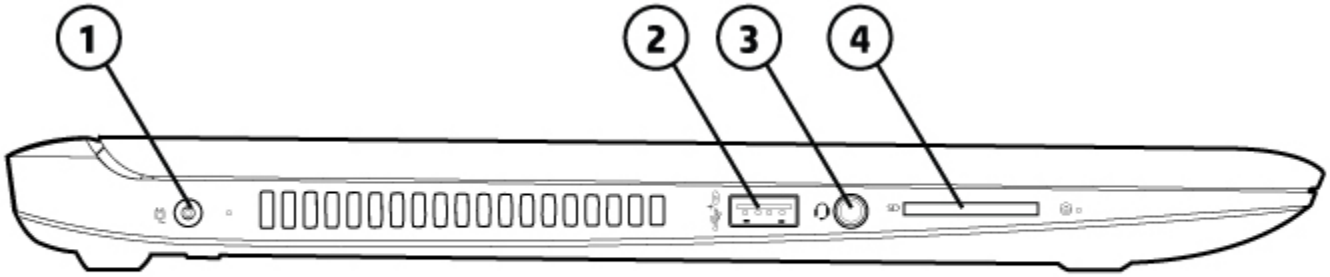
QuickSpecs

Overview



Right

1. USB 3.0 ports (2)
2. HDMI port
3. External VGA monitor port
4. Ethernet port (RJ-45)
5. Security lock slot



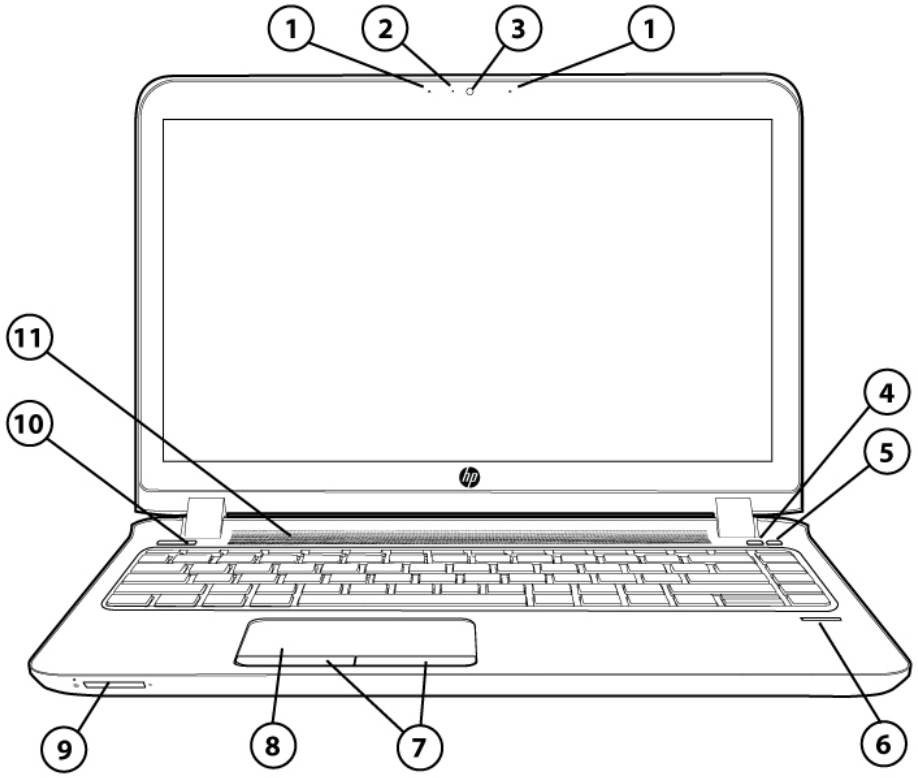
Left

1. Power connector
2. USB 2.0 port (power port)
3. Headphone/Microphone combo jack
4. SD Card reader

QuickSpecs

Overview

HP ProBook 450 G3 Notebook PC

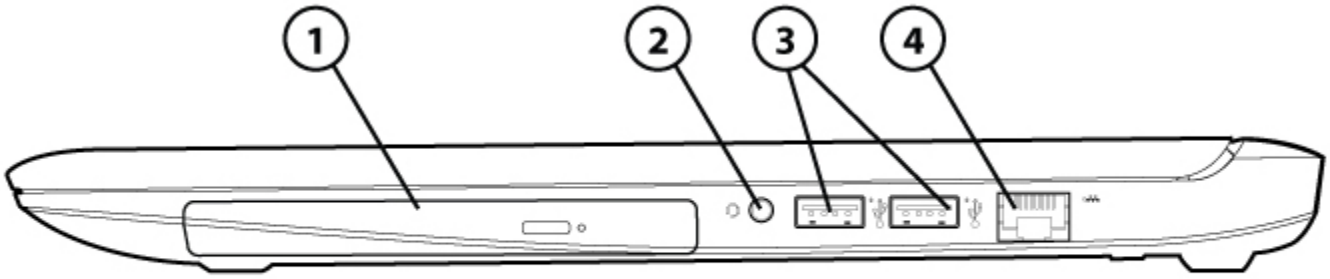


Front

1. Microphones (2)
2. Webcam light
3. Webcam
4. Wireless on/off button
5. Speaker mute button
6. Fingerprint reader
7. Touchpad pick buttons
8. Touchpad
9. SD Card reader
10. Power button
11. Speaker array

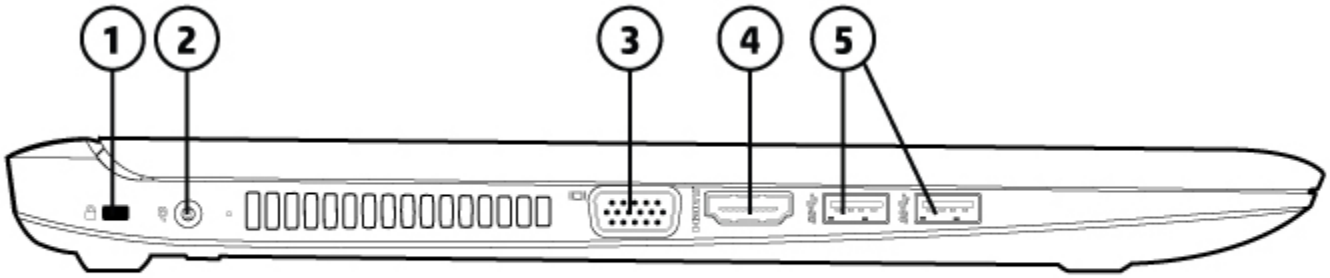
QuickSpecs

Overview



Right

1. Optical drive
2. Headphone/Microphone combo jack
3. USB 2.0 ports (2)
4. Ethernet port (RJ-45)



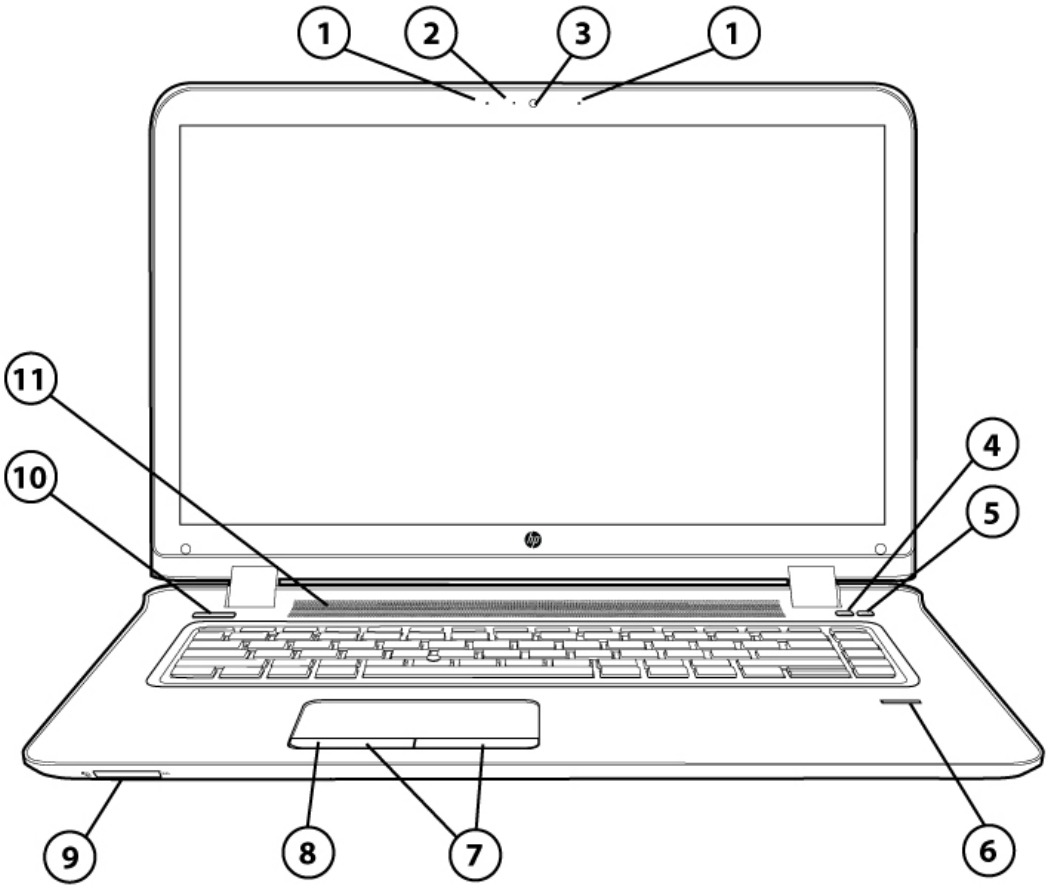
Left

1. Security lock slot
2. Power connector
3. External VGA monitor port
4. HDMI port
5. USB 3.0 ports (2)

QuickSpecs

Overview

HP ProBook 470 G3 Notebook PC

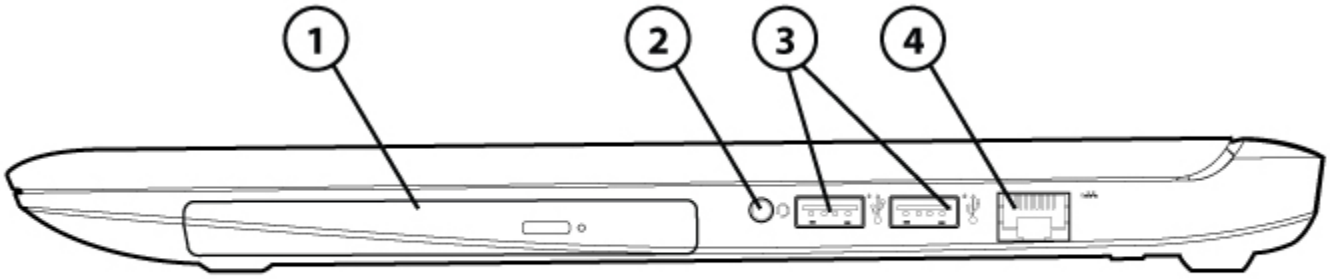


Front

1. Microphones (2)
2. Webcam light
3. Webcam
4. Wireless on/off button
5. Mute button
6. Fingerprint reader
7. Touchpad pick buttons
8. Touchpad
9. SD card reader
10. Power button
11. Speaker array

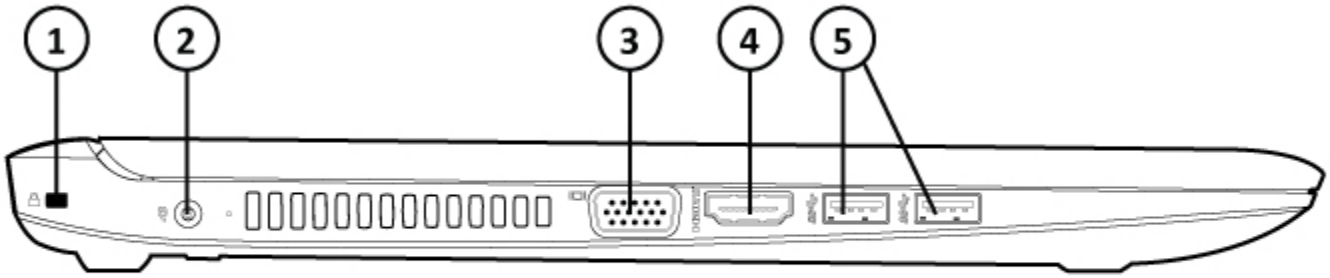
QuickSpecs

Overview



Right

1. Optical drive
2. Headphone/Microphone combo jack
3. USB 2.0 ports (2)
4. Ethernet port (RJ-45)



Left

1. Security lock slot
2. Power connector
3. External VGA monitor port
4. HDMI port
5. USB 3.0 ports (2)

Overview

AT A GLANCE

- Windows 10, Windows 8.1, Windows 7 editions or FreeDOS 2.0
- Choice of Intel® Core™ or Intel® Pentium® processors
- Full size HP Premium Keyboard, spill-resistant keyboard with a thin layer of Mylar film to prevent minor spills; full separate numeric keypad
- 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).
- Larger Touchpad with gestures support, on/off button with LED indicator
- Enhanced security features with preinstalled software and hardware options
- Optional HD webcam with dual-microphone array for video conferencing
- HDMI port for connecting to high-resolution displays
- HD audio with DTS Studio Sound™
- Choice of 13.3" diagonal, 14" diagonal, 15.6" diagonal or 17.3" diagonal flat screens or 13.3" diagonal, 14" diagonal, 15.6" diagonal Touch screens
- Flexible wireless connectivity options
- Battery life
  - HP ProBook 430 G3 up to 14 hours and 15 minutes
  - HP ProBook 440 G3 up to 13 hours and 30 minutes
  - HP ProBook 450 G3 up to 13 hours and 15 minutes
  - HP ProBook 470 G3 up to 12 hours and 15 minutes
- Choice of HP 4-cell, 44 WHr Li-ion battery or optional HP 6-cell, Long Life 55 WHr Li-ion battery
- Passed MIL-STD testing[1]

1. MIL STD 810G testing is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Damage under the MIL STD test conditions or any accidental damage requires an optional HP Accidental Damage Protection Care Pack.

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

QuickSpecs

Technical Specifications

PRODUCT NAMES

HP ProBook 430 G3 Notebook PC
HP ProBook 440 G3 Notebook PC
HP ProBook 450 G3 Notebook PC
HP ProBook 470 G3 Notebook PC

OPERATING SYSTEMS

Preinstalled

Windows 10 Pro 64[1]
Windows 10 Home 64[1]
Windows 8.1 Pro 64[1]
Windows 8.1 64[1]
Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)[2]
Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)[2]
Windows 7 Professional 64[1]
Windows 7 Professional 32[1]
FreeDOS 2.0

Web only support

Windows 10 Enterprise 64[1]
Windows 8.1 Enterprise 64[1]
Windows 7 Enterprise 64[1]
Windows 7 Enterprise 32[1]

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.microsoft.com.
2. This system is preinstalled with Windows 7 Professional software and also comes with a license and media for Windows 10 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.

PROCESSORS

HP ProBook 430 G3

Intel® Core™ i7-6500U with Intel® HD Graphics 520 (2.5 GHz, up to 3.1 GHz with Intel® Turbo Boost Technology, 4 MB cache, 2 cores)[1,2]
Intel® Core™ i5-6300U with Intel® HD Graphics 520 (2.4 GHz, up to 3 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i5-6200U with Intel® HD Graphics 520 (2.3 GHz, up to 2.8 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i3-6100U with Intel® HD Graphics 520 (2.3 GHz, 3 MB cache, 2 cores) [1,2]
Intel® Pentium® 4405U with Intel® HD Graphics 510 (2.1 GHz, 2 MB cache, 2 cores) [1,2]

HP ProBook 440 G3

Intel® Core™ i7-6500U with Intel® HD Graphics 520 (2.5 GHz, up to 3.1 GHz with Intel® Turbo Boost Technology,

Technical Specifications

4 MB cache, 2 cores) [1,2]
Intel® Core™ i5-6300U with Intel® HD Graphics 520 (2.4 GHz, up to 3 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i5-6200U with Intel® HD Graphics 520 (2.3 GHz, up to 2.8 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i3-6100U with Intel® HD Graphics 520 (2.3 GHz, 3 MB cache, 2 cores) [1,2]
Intel® Pentium® 4405U with Intel® HD Graphics 510 (2.1 GHz, 2 MB cache, 2 cores) [1,2]

HP ProBook 450 G3
Intel® Core™ i7-6500U with Intel® HD Graphics 520 (2.5 GHz, up to 3.1 GHz with Intel® Turbo Boost Technology, 4 MB cache, 2 cores) [1,2]
Intel® Core™ i5-6200U with Intel® HD Graphics 520 (2.3 GHz, up to 2.8 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i3-6100U with Intel® HD Graphics 520 (2.3 GHz, 3 MB cache, 2 cores) [1,2]
Intel® Pentium® 4405U with Intel® HD Graphics 510 (2.1 GHz, 2 MB cache, 2 cores) [1,2]

HP ProBook 470 G3
Intel® Core™ i7-6500U with Intel® HD Graphics 520 (2.5 GHz, up to 3.1 GHz with Intel® Turbo Boost Technology, 4 MB cache, 2 cores) [1,2]
Intel® Core™ i5-6200U with Intel® HD Graphics 520 (2.3 GHz, up to 2.8 GHz with Intel® Turbo Boost Technology, 3 MB cache, 2 cores) [1,2]
Intel® Core™ i3-6100U with Intel® HD Graphics 520 (2.3 GHz, 3 MB cache, 2 cores) [1,2]

1. 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.
2. HD content required to view HD images.

NOTE: Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

CHIPSET

Integrated with processor

GRAPHICS

Integrated
Intel® HD Graphics 520[1]
Intel® HD Graphics 510[1]

NOTE: View processor section for details.

Discrete[2]
HP ProBook 440/450/470 G3
AMD Radeon™ R7 M340 (1 or 2 GB DDR3 dedicated, switchable)
1. HD content required to view HD images.

2. AMD Dynamic Switchable Graphics technology requires either an AMD "A" series APU or an Intel processor, plus optional 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).

DISPLAYS

HP ProBook 430 G3
Internal
Non-Touch
13.3" diagonal HD[1] anti-glare LED-backlit (1366 x 768)
Touch
13.3" diagonal HD[1] LED-backlit touch screen (1366 x 768)
NOTE: Only available with Windows 10 or Windows 8.1.
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048 x 1536 external resolution @60 Hz
HDMI
Supports direct connection to high-definition displays with up to 4096 x 2160 @24 Hz resolution and 7-channel audio with one convenient cable (Cable not included.)

HP ProBook 440 G3
Internal
Non-Touch
14" diagonal HD[1] anti-glare LED-backlit (1366 x 768)
14" diagonal full HD[1] anti-glare slim LED-backlit (1920 x 1080)
Touch
14" diagonal HD[1] LED-backlit touch screen (1366 x 768)
NOTE: Only available with Windows 10 or Windows 8.1.
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048 x 1536 external resolution @60 Hz
HDMI
Supports direct connection to high-definition displays with up to 4096 x 2160 @24 Hz resolution and 7-channel audio with one convenient cable (Cable not included.)

HP ProBook 450 G3
Internal
Non-Touch
15.6" diagonal HD[1] anti-glare flat LED-backlit (1366 x 768)
15.6" diagonal full HD[1] anti-glare slim LED-backlit (1920 x 1080)
Touch
15.6" diagonal HD[1] flat LED-backlit touch screen (1366 x 768)
External
Up to 32-bit per pixel color depth
VGA

Port supports resolutions up to 2048 x 1536 external resolution @ 60 Hz
HDMI
Supports direct connection to high-definition displays with up to 4096 x 2160 @24 Hz resolution and 7-channel audio with one convenient cable (not included)

HP ProBook 470 G3
Internal
Non-Touch
17.3" diagonal HD+[1] SVA anti-glare flat LED backlit (1600 x 900)
17.3" diagonal FHD anti-glare flat LED backlit (1920 x 1080)
External
Up to 32-bit per pixel color depth
VGA
Port supports resolutions up to 2048x1536 external resolution @ 60 Hz
HDMI
Supports direct connection to high-definition displays with up to 4096 x 2160 @24 Hz resolution and 7-channel audio with one convenient cable (not included)

1. 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
HP 3D DriveGuard (Windows only)

HP ProBook 430 and 440 G3
Hard Drives
Supports SATA, 7mm, 2.5" Hard Drives
500 GB - 5400 RPM Hard Drive
500 GB - 5400 RPM Solid State Hard Drive (8 GB Cache)
500 GB - 7200 RPM Hard Drive
1 TB - 5400 RPM Hard Drive

Solid State Drives
128/256 GB* M2 Solid State Drive

HP ProBook 450 and 470 G3
Hard Drives
Supports SATA, 7mm/9.5mm, 2.5" Hard Drives
500 GB - 5400 RPM Hard Drive
500 GB - 5400 RPM Solid State Hard Drive (8 GB Cache)
500 GB - 7200 RPM Hard Drive
1 TB - 5400 RPM Hard Drive
2 TB - 5400 RPM Hard Drive

Solid State Drives
128/256 GB* M2 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

NOTE: For Solid State Drives or Hard Drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and up to 30 GB (for Windows 8.1 and 10) is reserved for system recovery software.

OPTICAL DRIVES

HP ProBook 430 and 440 G3
External
Support Optional[1] External USB Drive CD/DVD R/RW

HP ProBook 450 and 470 G3
Fixed Optional[1] Optical Drive
9.5mm SATA:
DVD-ROM[1]
DVD+/-RW SuperMulti DL Drive[1,2]
Blu-ray ROM DVD+/-RW SuperMulti DL Drive[1,2]
Weight saver

1. Sold separately as an optional feature.
2. 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 2.6 GB 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

Two SODIMM slots
Both slots are customer accessible / upgradeable
DDR3L PC3-12800 (Transfer rates up to 1600 MT/s)
DDR4 PC4-2133 (Transfer rates up to 2133 MT/s)
Supports Dual Channel Memory

Standard
2048 MB Total System Memory (2048 MB x 1)
4096 MB Total System Memory (4096 MB x 1)
6144 MB Total System Memory (4096 MB + 2048 MB) (Dual Channel)
8192 MB Total System Memory (4096 MB x 2) (Dual Channel)
8192 MB Total System Memory (8192 MB x 1)
12288 MB Total System Memory (8192 MB + 4096 MB) (Dual Channel)
16384 MB Total System Memory (8192 MB x 2) (Dual Channel)

Maximum
Upgradeable to 16384 MB 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

HP ProBook 430 G3
Broadband Wireless (WWAN)[1,2]
HP hs3110 HSPA+ Mobile Broadband
HP lt4110 LTE/HSPA+ 4G Mobile Broadband[3]
Wireless LAN (WLAN)[1,2]
Realtek 802.11b/g/n (1x1)
Realtek 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11a/b/g/n (2x2) and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo

HP ProBook 440 G3
Wireless LAN (WLAN)[1,2]
Realtek 802.11b/g/n (1x1)
Realtek 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11a/b/g/n (2x2) and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 3160 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo

HP ProBook 450 G3
Broadband Wireless (WWAN)[1,2]
HP hs3110 HSPA+ Mobile Broadband
HP lt4110 LTE/HSPA+ 4G Mobile Broadband[3]
Wireless LAN (WLAN)[1]
Realtek 802.11b/g/n (1x1)
Realtek 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11a/b/g/n (2x2) and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo

HP ProBook 470 G3
Wireless LAN (WLAN)[1,2]
Realtek 802.11b/g/n (1x1)
Realtek 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo
Broadcom 802.11b/g/n (1x1) and Bluetooth® 4.0 Combo

Broadcom 802.11a/b/g/n (2x2) and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo
Intel® Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo

1. Wireless access point and Internet service required and sold separately.
Availability of public wireless access points limited.
2. Sold separately or as an optional feature.
3. 4G LTE not available on all products, and in all regions.

Communications
Realtek Ethernet (10/100/1000)

NOTE: The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

AUDIO/MULTIMEDIA

Audio
HD audio with DTS Studio Sound™
Two stereo speakers
Integrated microphone (dual-microphone array when equipped with optional webcam)
Headphone/microphone combo jack

Webcam
Optional[1] 720p HD[2] webcam[3]

1. Sold separately as an optional feature.
2. HD content required to view HD images.
3. Internet access required.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

HP Premium 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 and 470 only.)
Backlit keyboard available as an option.

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).

Function Keys
ESC: system information
F1 - Sleep
F2 - Blank
F3 - Backlight Toggle (for backlit keyboard) or Blank
F4 - Display Switching
F5 - Brightness Down
F6 - Brightness Up
F7 - Blank
F8 - Volume Down
F9 - Volume Up
F10 - Mic Mute
F11 - Blank
F12 – NumLock (430/440); Blank (450/470)

Hidden Fuctions
o Fn+R --> Break
o Fn+S --> Sys Rq
o Fn+C --> Scroll Lock

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

Touchpad
On/off button (on board)
Taps enabled as default

Gestures
Enabled by default
2 Finger Scrolling
2 Finger Zoom (Pinch)
OSD (enable/disable)
Win8 2 Finger tap = right click
Win8 Edge Swipes

Disabled by default
3 Finger Flick
2 Finger Rotate
Momentum Motion
1 Finger Vertical Scroll

SOFTWARE AND SECURITY

Preinstalled Software
BIOS

HP BIOSphere[1]

HP DriveLock | HP Automatic DriveLock

Technical Specifications

HP BIOS Protection[2]
Master Boot Record Security
Power On Authentication
Pre-Boot Security
Secure Erase[3]
Hybrid Boot (Windows 8.1 & later)
Measure Boot (Windows 8.1 & later)
Secure Boot (Windows 8.1 & later)
Absolute Persistence Module[4]

Multi Media

Cyberlink Power DVD, BD
Cyberlink Power2Go (Secure Burn)
Cyberlink YouCam BE (Windows 7 only)

Communication

HP GPS and Location (Windows 7 only)[5]
HP Connection Manager with support for HP Mobile Connect (Windows 7 only)[6]
HP Mobile Connect (Windows 8.1 & later)[6]
Intel® Wireless Display (WiDi) Software for Windows[7]
Native Miracast Support[8]

HP Value Add Software

HP 3D DriveGuard
HP ePrint Driver[9]
HP Hotkey
HP Recovery Manager
HP Recovery Disc Creator
HP Unified Recovery Manager (Windows 8.1 and 10 only)
HP Registration App (Windows 8.1 & later)
HP Support Assistant
HP Noise Reduction Software

3rd Party

Foxit PhantomPDF Express for HP

Microsoft Products

Buy Office
Bing Search
Skype[10]

Manageability

HP Driver Packs[11]
HP SoftPaq Download Manager (SDM)
HP System Software Manager (SSM)[11]
HP BIOS Config Utility (BCU)[11]
HP Client Catalog[11]
HP CIK for Microsoft SCCM[11]
LANDESK Management[12]

For more information on HP Client Management Solutions refer to: http://www.hp.com/go/clientmanagement.

Client Security Software

Absolute Persistence Module
HP Drive Encryption[13]
HP Security Manager
Microsoft Security Essentials [14]
Microsoft Defender

Security

Pre-boot Authentication
Security lock slot (Lock sold separately.)
Optional[15] Fingerprint Reader
TPM 1.2/2.0[16]

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.

For more information on HP Client Security Software Suite, refer to http://www.hp.com/go/clientsecurity.

1. Available only on business PCs with HP BIOS.
2. May require a manual recovery step if all copies of BIOS are compromised or deleted. BIOS adheres to NIST SP800-147
3. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
4. Absolute 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.

5. 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.
6. HP Mobile Connect is only available on preconfigured devices with WWAN. For geographic availability refer to http://www.hp.com/go/mobileconnect
7. Integrated Intel® Wi-Di Display is available on select configurations only and requires a separate projector, TV or monitor with an integrated or external Wi-Di receiver. For more information on Intel® Wi-Di Display visit http://www.intel.com/go/wirelessdisplay
8. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast
9. 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 http://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.
10. Skype is not offered in China.
11. Not preinstalled, however available on manageability website.
12. Subscription required.
13. Data is protected prior to Drive Encryption login. Turning the PC off or into hibernate logs out of Drive Encryption and prevents data access.
14. Opt in and internet connection required for updates.
15. Sold separately as an optional feature.
16. This product ships with TPM 1.2 with option to upgrade to TPM 2.0. Upgrade utility is expected to be available by the second half of 2016 via HP Customer Support.

POWER

Power Supply
HP ProBook 430 /440 /450 G3
45 W Smart AC adapter
45 W Smart AC adapter 2-prong (Japan only)
65 W EM Smart AC adapter (China and India only)

HP ProBook 470 G3
65 W Smart AC adapter
65 W EM Smart AC adapter (PRC and India only)

Battery
HP 4-cell, 44 WHr Li-ion
Optional[1] HP 4-cell, Long Life 40 WHr Li-ion
Optional[1] HP 6-cell, Long Life 55 WHr Li-ion
(HP Fast Charge is available on 6-cell battery only.)

1. Sold separately as an optional feature.

Battery Life

Technical Specifications

Platform	Memory/OS	Battery	UMA Graphics	Discrete Graphics
HP Probook 430 G3	DDR3/Windows 8.1	4 cell (44Whr)	Up to 9 hrs 30 mins[1]	N/A
	DDR3/Windows 8.1	6 cell (55Whr)	Up to 13 hrs[1]	N/A
	DDR4/Windows 10	4 cell (44Whr)	Up to 10 hrs 15mins[1]	N/A
	DDR4/Windows 10	6 cell (55Whr)	Up to 14 hrs 45 mins[1]	N/A
HP Probook 440 G3	DDR3/Windows 8.1	4 cell (44Whr)	Up to 9 hrs[1]	Up to 9 hrs[1]
	DDR3/Windows 8.1	6 cell (55Whr)	Up to 12 hrs 30 mins[1]	Up to 12 hrs 30 mins[1]
	DDR4/Windows 10	4 cell (44Whr)	Up to 9 hrs 30 mins[1]	Up to 9 hrs 30 mins[1]
	DDR4/Windows 10	6 cell (55Whr)	Up to 13 hrs 30 mins[1]	Up to 13 hrs 15 mins[1]
HP Probook 450 G3	DDR3/Windows 8.1	4 cell (44Whr)	Up to 8 hrs 30 mins[1]	Up to 8 hrs 30 mins[1]
	DDR3/Windows 8.1	6 cell (55Whr)	Up to 11 hrs 45 mins[1]	Up to 12 hrs[1]
	DDR4/Windows 10	4 cell (44Whr)	Up to 9 hrs 15 mins[1]	Up to 9 hrs 15 mins[1]
	DDR4/Windows 10	6 cell (55Whr)	Up to 13 hrs 15 mins[1]	Up to 13 hrs 15 mins[1]
HP Probook 470 G3	DDR3/Windows 8.1	4 cell (44Whr)	N/A	Up to 9 hrs[1]
	DDR3/Windows 8.1	6 cell (55Whr)	N/A	Up to 11 hrs 30 mins[1]
	DDR4/Windows 10	4 cell (44Whr)	N/A	Up to 9 hrs[1]
	DDR4/Windows 10	6 cell (55Whr)	N/A	Up to 12 hrs 15 mins[1]

1. Windows 8.1 and Windows 10 MM14 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

4-cell (44 WHr) battery	Up to 15 days
6-cell (55 WHr) long life battery	Up to 16 days

Technical Specifications

NOTE: Standby time 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.

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 430 G3
Weight
Starting at 3.31 lbs (1.5 kg)
Dimensions
Non-Touch
12.83 x 9.19 x 0.78 to 0.83 in (front to rear)
32.6 x 23.35 x 1.99 to 2.09 cm (front to rear)
Touch
12.83 x 9.2 x 0.84 to 0.88 in (front to rear)
32.6 x 23.37 x 2.14 to 2.24 cm (front to rear)

HP ProBook 440 G3
Weight
Starting at 3.69 lbs (1.68 kg)
Dimensions
Non-Touch
13.35 x 9.61 x 0.78 to 0.83 in (front to rear)
33.92 x 24.4 x 1.99 to 2.09 cm (front to rear)
Touch
13.35 x 9.61 x 0.85 to 0.89 in (front to rear)
33.92 x 24.42 x 2.15 to 2.25 cm (front to rear)

HP ProBook 450 G3
Weight
Starting at 4.56 lbs (2.07 kg)
Dimensions
Non-Touch
14.88 x 10.41 x 0.94 to 0.98 in
37.8 x 26.43 x 2.38 to 2.48 cm (front to rear)
Touch
14.88 x 10.42 x 1 to 1.04 in (front to rear)
37.8 x 26.46 x 2.55 to 2.65 cm (front to rear)

HP ProBook 470 G3

Technical Specifications

Weight
Starting at 5.75 lbs (2.61 kg)
Dimensions
Non-Touch
16.41 x 11.44 x 0.98 to 1.02 in (front to rear)
41.68 x 29.05 x 2.5 to 2.6 cm (front to rear)

NOTE: Height varies depending upon where on the notebook the measurement is made.
Weight varies by configuration and components.

PORTS/SLOTS

Ports
430/440
2 USB 3.0
1 USB 2.0 (power port)
1 HDMI
1 headphone/microphone combo
1 AC power
1 RJ-45
1 VGA

450/470
2 USB 3.0
2 USB 2.0
1 HDMI
1 headphone/microphone combo
1 AC power
1 RJ-45
1 VGA

NOTE: All cables are not included and sold separately.

Digital Media Slots
Multi Media Reader Slot
Supports SD, SDHC, SDXC

SERVICE AND SUPPORT

HP Services offers 3 year, 1 year and 90 day limited warranty options depending on country. 1 year limited warranty on primary battery. On-site service and optional extended service contracts are also available. Optional[1] HP Services[2] are extended service contracts which go beyond your standard limited warranties. For more details visit: http://www.hp.com/go/lookuptool.

1. Sold separately or as an optional feature.

2. 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. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product. 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.

QuickSpecs

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 430 G3, HP ProBook 440 G3, HP ProBook 450 G3 and HP ProBook 470 G3 that are ENERGY STAR® qualified are identified as HP ProBook 430 G3 ENERGY STAR, HP ProBook 440 G3 ENERGY STAR, HP ProBook 450 G3 ENERGY STAR and HP ProBook 470 G3 ENERGY STAR on HP websites and on http://www.energystar.gov.
** EPEAT® registration varies by country. See http://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.

Technical Specifications

DISPLAYS

13.3" diagonal HD1 anti-glare LED-backlit (1366 x 768)	**Outline Dimensions** (W x H x D)	314.6 x 189.2 mm max. (w/ bracket & PCB) D(Flat): 3.6mm max. D(Slim): 3.0mm max.
	Active Area	293.42 x 164.97 mm
	Weight	Flat: 290g max. Slim: 260 max.
	Diagonal Size	13.3”
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (typ)
	Refresh Rate	60Hz
	Brightness	220 nit typ
	Pixel Resolution	1366 x 768 (HD)
	Interface	eDP 1.2 (1 lane)
	LCD Mode	SVA
	PPI	118
	Viewing Angle	SVA 45/45/25/35
14” diagonal FHD anti-glare flat LED backlit (1920 x 1080)	**Outline Dimensions** (W x H x D)	320.9x205.6x3.0mm max (panel + PCBA)
	Active Area	309.14x173.89
	Weight	290g max. (To be updated w/ real measure data)
	Diagonal Size	14.0"
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (typ) - AG
	Refresh Rate	60Hz
	Brightness	220 nit typ
	Pixel Resolution	1920 x 1080 (FHD)
	Interface	eDP 1.2 (2 lane)
	LCD Mode	SVA
	PPI	157
	Viewing Angle	SVA 45/45/25/35
14" diagonal 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)

Technical Specifications

Refresh Rate	60 Hz	
Brightness	220 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" diagonal HD SVA anti-glare flat LED backlit (1366 x 768)	**Outline Dimensions (W x H x D)**	360.0 x 224.3 x 3.8mm max.
	Active Area	344.2 x 193.5
	Weight	420 max.
	Diagonal Size	15.6"
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (typ) - AG
	Refresh Rate	60Hz
	Brightness	220 nit typ
	Pixel Resolution	1366 x 768 (HD)
	Interface	eDP 1.2 (1 lane)
	LCD Mode	SVA
	PPI	101
	Viewing Angle	SVA 40/40/15/30

15.6" diagonal FHD anti-glare flat LED backlit (1920 x 1080)	**Outline Dimensions (W x H x D)**	360.0 x 224.3 x 3.2mm max.
	Active Area	344.16 x 193.59
	Weight	370g max.
	Diagonal Size	15.6"
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (typ) - AG
	Refresh Rate	60Hz
	Brightness	220 nit typ
	Pixel Resolution	1920 x 1080 (FHD)

Technical Specifications

	Interface	eDP 1.2 (2 lane)
	LCD Mode	SVA
	PPI	142
	Viewing Angle	SVA 45/45/25/35
17.3" diagonal HD+1 SVA anti-glare flat LED backlit (1600 x 900)	**Outline Dimensions** (W x H x D)	398.6 x 251 x 4.0 (max.) mm
	Active Area	382.08 x 214.92 mm
	Weight	550g max.
	Diagonal Size	17.3”
	Surface Treatment	Anti-glare
	Contrast Ratio	300:1 (typ)
	Refresh Rate	60Hz
	Brightness	220 nit typ
	Pixel Resolution	1600 x 900 (HD+)
	Interface	eDP1.3 w/o PSR (2-lane)
	LCD Mode	SVA
	PPI	106
	Viewing Angle	40/40/15/30 (typ)
17.3" diagonal FHD anti-glare flat LED backlit (1920 x 1080)	**Outline Dimensions** (W x H x D)	400 x 233.3 x 4.0 (max.) mm
	Active Area	381.888 x 214.812
	Weight	550g max.
	Diagonal Size	17.3”
	Surface Treatment	Anti-glare
	Contrast Ratio	600:1 (typ)
	Refresh Rate	60Hz
	Brightness	300 nit typ
	Pixel Resolution	1920 x 1080 (FHD)
	Interface	eDP1.3 w/o PSR (2-lane)
	LCD Mode	UWVA
	PPI	128
	Viewing Angle	85/85/85/85 (typ)

STORAGE AND DRIVES

500 GB* 5400 rpm SATA Hard Drive	**Drive Weight**	0.22 lb (101 g)	
	Capacity	500 GB	
	Height	0.276 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 3.0, 6.0 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	
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 3.0, 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	
500 GB* 7200 rpm SATA Hard Drive	**Drive Weight**	0.25 lbs (115g)	
	Capacity	500 GB	
	Height	0.276 in (7 mm)	
	Width	2.75 in (70 mm)	
	Interface	ATA-8, SATA 3.0, 6.0 Gb/s, NCQ	
	Transfer Rate	**Synchronous** (maximum)	300 MB/s (Drive Capability)
		Single Track	1.5 ms
		Average	11 ms

Technical Specifications

	Seek Time (typical reads, including settling)	**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	

1 TB* 5400 rpm SATA Hard Drive	**Drive Weight**	117g	
	Capacity	1TB	
	Height	9.5mm	
	Width	70.1mm	
	Interface	ATA-8, SATA 3.0	
	Transfer Rate	Synchronous 600MB/s (maximum)	
	Seek Time (typical reads, including settling)	**Single Track**	2ms
		Average	12ms
		Maximum	22ms
	Rotational Speed	5400rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	0-60℃	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	
2 TB* - 5400 RPM Hard Drive	**Drive Weight**	130g	
	Capacity	2TB	
	Height	9.5mm	
	Width	70.1mm	
	Interface	ATA-8, SATA 3.0	
	Transfer Rate	**Synchronous** (maximum)	600MB/s
	Seek Time (typical reads, including settling)	**Single Track**	2ms
		Average	12ms
		Maximum	22ms
	Rotational Speed	5400rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	0-60℃	
	Features	ATA Security, S.M.A.R.T., NCQ, Ultra DMA	

SOLID STATE DRIVES

SSD 128GB 2280 M2 SATA-3	**Drive Weight**	0.022 lb (10 g)
	Capacity	128 GB
	Height	0.14 in (3.7 mm)

	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 520 MB/s	Up to 140 MB/s
	Logical Blocks	250069680	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	DIPM; TRIM; DEVSLP	
	Security Features	ATA Security	
SSD 256GB 2280 M2 SATA-3	**Drive Weight**	0.022 lb (10 g)	
	Capacity	256 GB	
	Height	0.14 in (3.58 mm)	
	Width	0.87 in (22 mm)	
	Interface	ATA-8, SATA 3.0	
	Performance	**Maximum Sequential Read**	**Maximum Sequential Write**
		Up to 520 MB/s	Up to 270 MB/s
	Logical Blocks	250069680	
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
	Features	DIPM; TRIM; DEVSLP	
	Security Features	ATA Security	

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	
	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	

Technical Specifications

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 Synaptics 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

WWAN

	HP hs3110HSPA+ Mobile Broadband Module*
Technology/Operating bands	HSPA+: 2100 (Band1), 1900 (Band 2), 1700 (Band 4), 850 (Band 5), 900 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3), 850 MHz (Band 5), 900 (Band 8) MHz
Wireless protocol standards	E-GPRS: Class B, Multi-slot class 33, coding schemes CS1 - CS4 and MSC1 - MSC9. UMTS/WCDMA: Release 99 and Release 7
GPS	Standalone, A-GPS
GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz
Maximum data rates	HSPA+: 21.6 Mbps (Download), 5.76 Mbps (Upload) HSPA: 7.2 Mbps (Download), 5.76 Mbps (Upload) WCDMA PS: 384 kbps (Download), 384 kbps (Upload) WCDMA CS: 64 kbps (Download), 64 kbps (Upload)

Technical Specifications

	E-GPRS: 296 kbps (Download), 236.8 kbps (Upload) GPRS: 107 kbps (Download), 85.6 kbps (Upload)
Maximum output power	HSPA+: 24 dBm E-GPRS 1800/1900: 26 dBm E-GPRS 850/900: 27 dBm GPRS 1800/1900: 30 dBm GPRS 850/900: 33 dBm
Maximum power consumption	2500 mA (peak); 600 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6 g
Dimensions (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)

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

	HP lt4110 LTE/HSPA+ 4G Mobile Broadband*
Technology/Operating bands	LTE: 1900 (Band 2) , 1700/2100 (Band 4), 850 (Band 5), 700 (Band 13), 700 (Band 17), 1900 (Band 25) MHz HSPA+: 2100 (Band 1), 1900 (Band 2) , AWS 1700/2100 (Band 4), 850 (Band 5), 800 (Band 8) MHz E-GPRS: 1900 (Band 2), 1800 (Band 3) , 850 (Band 5) , 900 (Band 8) MHz EV-DO: 800 (BC0), 1900 (BC1) MHz
Wireless protocol standards	3GPP Release 8 LTE Specification WCDMA R99, 3GPP Release 5, 6 and 7 UMTS Specification EVDO Release 0 and Release A
GPS	Standalone GPS, A-GPS, GPS XTRA
GPS bands	1575.42 MHz (± 1.023 MHz), GLONASS 1596-1607MHz
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)
Maximum output power	LTE: +23 dBm WCDMA: +23 dBm GSM 850/900, GMSK: +32dBm GSM 850/900, 8PSK: +27dBm DCS1800 / PCS 1900, GMSK: +29dBm DCS1800 / PCS 1900, 8PSK: +26dBm CDMA: +24dBm
Maximum power consumption	LTE: 1,200 mA (peak); 900 mA (average) WCDMA: 1,100 mA (peak); 800 mA (average) EGPRS: 2,500 mA (peak); 700 mA (average)
Form Factor	M.2, 3042-S3 Key B

Technical Specifications

Weight	6 g
Dimensions (Length x Width x Thickness)	1.65 x 1.18 x 0.09 in (42 x 30 x 2.3 mm)

* Mobile Broadband is an optional 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. 4G LTE not available on all products or in all countries.

WLAN
Intel® Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) WiFi and Bluetooth® 4.2 Combo – TBD

Intel® Dual Band Wireless-AC 3160 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo

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

Interoperability
Wi-Fi certified

Frequency Band
802.11b/g/n
- 2.402 – 2.482 GHz

802.11a/n
- 4.9 – 4.95 GHz (Japan)
- 5.15 – 5.25 GHz
- 5.25 – 5.35 GHz
- 5.47 – 5.725 GHz
- 5.825 – 5.850 GHz
- 2.402 – 2.482 GHz

Data Rates
- 802.11b: 1, 2, 5.5, 11 Mbps
- 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
- 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)

Modulation
Direct Sequence Spread Spectrum
BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM

Security[1]
- IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
- WPA2 certification
- IEEE 802.11i
- Cisco Certified Extensions, all versions through CCX4 and CCX Lite
- WAPI

Technical Specifications

Network Architecture	Ad-hoc (Peer to Peer)
Models	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	• 2.4G: +13.5dBm minimum • 5G: +12dBm minimum • Maximum output power must be able to achieve modular regulatory certification with notebooks that have antennas >20cm from the user and peak gain of +3dBi at 2.4GHz and +4dBi at 5GHz
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 250 mW (WLAN Associated) Idle mode: 100 mW (WLAN unassociated) Radio disabled: 75 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b:-95 dBm (1 Mbps), -93 dBm (2 Mbps), -91 dBm (5.5 Mbps), -88 dBm (11 Mbps) 802.11a/g:-90 dBm (6 Mbps), -89 dBm (9 Mbps), -87 dBm (12 Mbps), -85 dBm (18 Mbps), -82 dBm (24 Mbps), -79 dBm (36 Mbps), -76 dBm (48 Mbps), -74 dBm (54 Mbps) 802.11n:-69 dBm (72.2 Mbps), -66 dBm (300 Mbps) 802.11ac: -83 dBm (65Mbps), -79 dBm (195Mbps), -73 dBm (390Mbps), -66 dBm (650Mbps), -60 dBm (867Mbps)
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express Half-MiniCard
Dimensions	0.19 x 1.06 x 1.18 in (4.75 x 26.8 x 30 mm)
Weight	3.1g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (–10° to 70° C) Non-operating –40° to 176° F (–40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON

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

Bluetooth Specification

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

Number of Available Channels 79 (1 MHz) available channels

Technical Specifications

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

Intel® Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) WiFi and Bluetooth® 4.0 Combo

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

Interoperability
Wi-Fi certified

Frequency Band
802.11b/g/n
- 2.402 – 2.482 GHz

Note:
The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

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

Note:
Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)

Data Rates
- 802.11b: 1, 2, 5.5, 11 Mbps
- 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps
- 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
- 802.11ac : MCS0 ~ MCS7, (1SS) (20MHz, 40MHz, and 80MHz)

Modulation
Direct Sequence Spread Spectrum
BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM

Security[1]
- IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
- WPA2 certification
- IEEE 802.11i
- Cisco Certified Extensions, all versions through CCX4 and CCX Lite
- WAPI

Network Architecture
Ad-hoc (Peer to Peer)

Models
Infrastructure (Access Point Required)

Roaming
IEEE 802.11 compliant roaming between access points

Output Power[2]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum • 802.11ac 80MHz(5GHz) : +11dBm minimum
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm
Weight	Type 2230 : 2.8g Or Type 1630 : 2g
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 Amber – Radio OFF; LED White – Radio ON

4. Check latest software/driver release for updates on supported security features.
5. Maximum output power may vary by country according to local regulations.

6. 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).

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.
Receiver Sensitivity	

Modulation	0.01% BER	0.001% BER
GFSK	-80 dBm	-70 dBm
π/4-DQPSK	-80 dBm	-70 dBm
8DPSK	-80 dBm	-70 dBm

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Electrical Interface	Point to Point, Multipoint Pico Nets up to 7 slaves
Bluetooth Software Supported Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support
Power Management Certifications	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Security	All necessary regulatory approvals for supported countries, including:
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Bluetooth Profiles Supported	
Power Management	ETS 300 328, ETS 300 826
Certifications	Low Voltage Directive IEC950 UL, CSA, and CE Mark
Certifications	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]
Bluetooth Profiles Supported	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)

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	802.11b/g/n • 2.402 – 2.482 GHz Note: The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 07, (20MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM,
Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • 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]	• 802.11b : +16dBm minimum

- 802.11g : +14dBm minimum
- 802.11a : +14dBm minimum
- 802.11n HT20(2.4GHz) : +13dBm minimum
- 802.11n HT40(2.4GHz) : +13dBm minimum
- 802.11n HT20(5GHz) : +12dBm minimum
- 802.11n HT40(5GHz) : +12dBm minimum

Power Consumption

Transmit: 2.0 W (max)

Receive: 1.6 W (max)

Idle mode (PSP): 180 mW (WLAN Associated)

Idle mode: 60 mW (WLAN unassociated)

Radio disabled: 30 mW

Power Management

ACPI and PCI Express compliant power management
802.11 compliant power saving mode

Receiver Sensitivity[3]

802.11b, 1Mbps : -94dBm maximum

802.11b, 11Mbps : -86dBm maximum

802.11g, 6Mbps : -88dBm maximum

802.11g, 54Mbps : -74dBm maximum

802.11a, 6Mbps : -86dBm maximum

802.11a, 54Mbps : -72dBm maximum

802.11n, MCS07 : -69dBm maximum

802.11n, MCS15 : -66dBm maximum

Antenna type

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

Two embedded 2.4 GHz antennas are provided to the card to support WLAN and Bluetooth communications
(Support Dual antenna or Single antenna, depend on platform requirement)

Form Factor

PCI-Express M.2 MiniCard

Dimensions

Type 2230 : 2.3 x 22.0 x 30.0 mm

	Or Type 1630 : 2.3 x 16.0 x 30.0 mm
Weight	Type 2230 : 2.8g Or Type 1630 : 2g
Operating Voltage	3.3v +/- 9%
Temperature	Operating Non-operating
Humidity	Operating Non-operating
Altitude	Operating Non-operating
LED Activity	LED Amber – Radio OFF; LED White – 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).

Realtek 802.11 b/g/n (1x1) + Bluetooth® Combo

Wireless LAN Standards	IEEE 802.11b IEEE 802.11g IEEE 802.11n
Interoperability	Wi-Fi certified
Frequency Band	802.11b/g/n • 2.402 – 2.482 GHz Note: The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of

	transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 07, (20MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM,
Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • 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]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum

	802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded antennas for 2.4GHz are provided to the card to support WLAN and Bluetooth communications. (Support Dual antenna or Single antenna, depend on platform requirement)	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – 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).

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.

Receiver Sensitivity

Modulation	0.01% BER	0.001% BER
GFSK	-80 dBm	-70 dBm
π/4-DQPSK	-80 dBm	-70 dBm
8DPSK	-80 dBm	-70 dBm

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Electrical Interface	Point to Point, Multipoint Pico Nets up to 7 slaves
Bluetooth Software Supported	Full support of Bluetooth Security Provisions
Security	

Technical Specifications

Power Management	Microsoft Windows ACPI, and USB Bus Support
Power Management	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	
Security	All necessary regulatory approvals for supported countries, including:
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Bluetooth Profiles Supported	
Power Management	ETS 300 328, ETS 300 826
Certifications	Low Voltage Directive IEC950
	UL, CSA, and CE Mark
	Serial Port Profile (SPP)[1]
	Service Discovery Application Profile (SDAP)
	Dial-Up Networking (DUN)[1,2]
	Generic Object Exchange Profile (GOEP)[1,2]
Certifications	Object Push Profile (OPP)[1,2]
	File Transfer Profile (FTP)
Bluetooth Profiles Supported	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)

Broadcom 802.11 b/g/n (1x1) + Bluetooth® Combo

Wireless LAN Standards	IEEE 802.11b
	IEEE 802.11g
	IEEE 802.11n
Interoperability	Wi-Fi certified

Technical Specifications

Frequency Band	802.11b/g/n • 2.402 – 2.482 GHz Note: The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
Data Rates	802.11b: 1, 2, 5.5, 11 Mbps 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps 802.11n: MCS 0 ~ MCS 07, (20MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM,
Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • 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]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum
Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum

	802.11b, 11Mbps : -86dBm maximum	
	802.11g, 6Mbps : -88dBm maximum	
	802.11g, 54Mbps : -74dBm maximum	
	802.11n, MCS07 : -69dBm maximum	
	802.11n, MCS15 : -66dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure	
	Two embedded antennas for 2.4GHz are provided to the card to support WLAN and Bluetooth communications. (Support Dual antenna or Single antenna, depend on platform requirement)	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm	
	Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g	
	Or	
	Type 1630 : 2g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – 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).

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification 4.0+EDR Compliant

Frequency Band 2402 to 2480 MHz

Number of Available Channels 79 (1 MHz) available channels

Data Rates and Throughput 3 Mbps data rate; throughput up to 2.17 Mbps

Synchronous Connection Oriented links up to 3, 64 kbps, voice channels

Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric

Transmit Power The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.

Receiver Sensitivity

Modulation	0.01% BER	0.001% BER
GFSK	-80 dBm	-70 dBm
π/4-DQPSK	-80 dBm	-70 dBm
8DPSK	-80 dBm	-70 dBm

Power Consumption
Peak (Tx) 330 mW
Peak (Rx) 230 mW
Selective Suspend 17 mW

Range Up to 33 ft (10 m)

Electrical Interface USB 2.0 compliant

Bluetooth Software Supported Microsoft Windows Bluetooth Software

Link Topology

Electrical Interface Point to Point, Multipoint Pico Nets up to 7 slaves

Bluetooth Software Supported Full support of Bluetooth Security Provisions

Technical Specifications

Security	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Power Management	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Certifications	
Security	All necessary regulatory approvals for supported countries, including:
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Bluetooth Profiles Supported	
Power Management	ETS 300 328, ETS 300 826
Certifications	Low Voltage Directive IEC950
	UL, CSA, and CE Mark
Certifications	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)
Bluetooth Profiles Supported	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)

Broadcom 802.11a/b/g/n (2x2) and Bluetooth® 4.0 Combo

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n
Interoperability	Wi-Fi certified

Technical Specifications

Frequency Band	802.11b/g/n • 2.402 – 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels. 802.11a • 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 Note: Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)
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: MCS 0 ~ MCS 15, (20MHz, and 40MHz)
Modulation	Direct Sequence Spread Spectrum CCK, BPSK, QPSK, 16-QAM, 64-QAM
Security[1]	• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations.
Network Architecture	Ad-hoc (Peer to Peer)
Models	Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output Power[2]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum

Technical Specifications

Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; LED White - 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).

HP Integrated Module with Bluetooth 4.0+EDR Wireless Technology

Bluetooth Specification	4.0+EDR Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	79 (1 MHz) available channels
Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps Synchronous Connection Oriented links up to 3, 64 kbps, voice channels

	Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.

Receiver Sensitivity

Modulation	0.01% BER	0.001% BER
GFSK	-80 dBm	-70 dBm
π/4-DQPSK	-80 dBm	-70 dBm
8DPSK	-80 dBm	-70 dBm

Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Range	Up to 33 ft (10 m)
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Electrical Interface	Point to Point, Multipoint Pico Nets up to 7 slaves
Bluetooth Software Supported Security	Full support of Bluetooth Security Provisions
Power Management	Microsoft Windows ACPI, and USB Bus Support
Power Management Certifications	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Security	All necessary regulatory approvals for supported countries, including:
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Bluetooth Profiles Supported	
Power Management	ETS 300 328, ETS 300 826
Certifications	Low Voltage Directive IEC950
	UL, CSA, and CE Mark
	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]
Certifications	File Transfer Profile (FTP)
Bluetooth Profiles Supported	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)

Realtek Ethernet (10/100/1000)	**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
	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

AUDIO/MULTIMEDIA

DTS STUDIO SOUND™

Hardware	**Implementation**	Conexant

		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**	20Hz – 20kHz
		Signal to Noise Ratio	106 dB (DAC), 102dB (ADC)
		Total Harmonic Distortion	91dB THD+n on Line Out/HP (0.003%)
		Play Sampling Rate(s)	Up to 192kHz
		Record Sampling Rate(s)	Up to 96Khz
		DAC	16, 20 or 24-bit
		ADC	16, 20 or 24-bit
Integrated Speakers	**Stereo**	Power Rating	2 Watts
		Impedance	4 Ohms

POWER

HP 45W Smart AC Adapter	**Dimensions**	3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)	
	Weight	0.386 lb (175g) max	
	Input	90 to 265 VAC	
		Input Efficiency	87.74% at 115Vac and 88.4% at 230Vac
		Input frequency range	47 to 63 Hz
		Input AC current	1.4 A at 90 VAC
	Output	**Output power**	45W

		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8.0A
		Over voltage protection	< 29V max automatic shutdown
		Over short protection	Auto-recovery and no damage
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	
HP 65W EM Smart AC Adapter (PRC, India only)	**Dimensions**	4.98 x 1.97 x 1.18 in (12.65 x 5.0 x 3.0 cm)	
	Weight	0.62 lb (290g) max	
	Input	90 to 265 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC
	Output	**Output power**	65W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11.0A
		Over voltage protection	< 29V max automatic shutdown
		Over short protection	Auto-recovery and no damage
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN,	

		EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	
HP 65W Smart AC Adapter	**Dimensions**	4.98 x 1.97 x 1.18 in (12.65 x 5.0 x 3.0 cm)	
	Weight	0.62 lb (290g) max	
	Input	90 to 265 VAC	
		Input Efficiency	87% min at 115 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC
	Output	**Output power**	65W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<11.0A
		Over voltage protection	< 29V max automatic shutdown
		Over short protection	Auto-recovery and no damage
	Connector	3 pin/grounded, mates with interchangeable cords	
	Environmental Design	**Operating temperature**	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

Battery
430/440 G3

HP 4-cell, Long Life 44 WHr Li-ion

Dimensions (H x W x L)	34.96x277.2x21.63 mm (1.38x10.91x0.85 inch)	
Weight	0.32 kg (0.72lb)	
Cells/Type	4cell Lithium-Ion	
Energy	**Voltage**	14.8V
	Amp-hour capacity	3.0Ah
	Watt-hour capacity	44Wh
Temperature	**Operating (Charging)**	32˚ to 113˚ F (0˚ to 45˚ C)
	Operating (Discharging)	14˚ to 122˚ F(-10˚ to 60˚ C)

	Non-operating	-4˚ to 122˚ F (-20˚ to 60˚ C)
Battery Re-Charge Time	**System in OFF or Standby Mode**	<3 hours
Fuel Gauge LED	No	
Warranty	1 year	
Optional Travel Battery Available	No	

HP 6-cell, Long Life 55 WHr Li-ion.	**Dimensions (H x W x L)**	35.31x49.59x277.2	
	Weight	340g	
	Cells/Type	Cylindrical ICR18650 C4	
	Energy	10.68V	**Voltage**
		5.15Ah	**Amp-hour capacity**
		55Wh	**Watt-hour capacity**
	Temperature	32˚ to 113˚ F (0˚ to 45˚ C)	**Operating (Charging)**
		14 to 140˚ F (-10˚ to 60˚ C)	**Operating (Discharging)**
		-4˚ to 140˚ F (-20˚ to 60˚ C)	**Non-operating**
	Battery Re-Charge Time	3 hours	**System in OFF or Standby Mode**
		3 to 5 hours	**System ON**
	Fuel Gauge LED	NA	
	Warranty	3years or 1000 cycles	
	Optional Travel Battery Available	NA	

450/470 G3

HP 4-cell, Long Life 44 WHr Li-ion	**Dimensions (H x W x L)**	33.40*275.80*20.60 mm (1.32x10.86x0.81 inch)
	Weight	0.3 kg (0.66lb)

QuickSpecs

Technical Specifications

Cells/Type		4cell Lithium-Ion	
	Energy	**Voltage**	14.8V
		Amp-hour capacity	3.0Ah
		Watt-hour capacity	44Wh
	Temperature	**Operating (Charging)**	32˚ to 113˚ F (0˚ to 45˚ C)
		Operating (Discharging)	14˚ to 122˚ F(-10˚ to 60˚ C)
		Non-operating	-4˚ to 122˚ F (-20˚ to 60˚ C)
	Battery Re-Charge Time	**System in OFF or Standby Mode**	<3 hours
	Fuel Gauge LED	No	
	Warranty	1 year	
	Optional Travel Battery Available	No	

HP 6-cell, Long Life 55 WHr Li-ion	**Dimensions (H x W x L)**	45.59x275.8x33.89	
	Weight	330g	
	Cells/Type	Cylindrical ICR18650 C4	
	Energy	10.68V	**Voltage**
		5.15Ah	**Amp-hour capacity**
		55Wh	**Watt-hour capacity**
	Temperature	32˚ to 113˚ F (0˚ to 45˚ C)	**Operating (Charging)**
		14 to 140˚ F (-10˚ to 60˚ C)	**Operating (Discharging)**
		-4˚ to 140˚ F (-20˚ to 60˚ C)	**Non-operating**
	Battery Re-Charge Time	3 hours	**System in OFF or Standby Mode**
		3 to 5 hours	**System ON**
	Fuel Gauge LED	NA	
	Warranty	3years or 1000 cycles	
	Optional Travel Battery Available	N0	

ENVIRONMENTAL

TBD

Country of Origin

China

ENVIRONMENTAL

HP ProBook 430 G3 Notebook PC

Eco-Label Certifications & declarations

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:

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

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	1
Normal Operation (Short idle)	6.66 W	7.03 W	6
Normal Operation (Long idle)	3.72 W	3.92 W	3
Sleep	0.64 W	0.69 W	0
Off	0.32 W	0.37 W	0

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

Technical Specifications

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**	**1**
Normal Operation (Short idle)	23 BTU/hr	24 BTU/hr	24
Normal Operation (Long idle)	13 BTU/hr	13 BTU/hr	13
Sleep	2 BTU/hr	2 BTU/hr	2
Off	1 BTU/hr	1 BTU/hr	1

*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	22
Fixed Disk – Random writes	3.0	21

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??

<edit list of features as required>

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 95.6% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	337.2 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	22 g
	PLASTIC/Polyethylene low density	20 g

The PAPER/Corrugated packaging material is made from 80 % recycled content.
The PLASTIC/EPE (Expanded Polyethylene) packaging materials contains at least 0% recycled content.
The PLASTIC/Polyethylene low density packaging materials contains at least 0% recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):

- 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
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- 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)

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
Eco-label certifications
http://www8.hp.com/us/en/hp-information/environment/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

HP ProBook 440 G3 Notebook PC
TBD
HP ProBook 450 G3 Notebook PC

Technical Specifications

Eco-Label Certifications & declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one o

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

System Configuration

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

Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz
Normal Operation (Short idle)	5.58 W	5.86 W
Normal Operation (Long idle)	3.51 W	3.67 W
Sleep	0.82 W	0.86 W
Off	0.39 W	0.42 W

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

Heat Dissipation*

	115VAC, 60Hz	230VAC, 50Hz
Normal Operation (Short idle)	19 BTU/hr	20 BTU/hr
Normal Operation (Long idle)	12 BTU/hr	13 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr
Off	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	2.8	18
Fixed Disk – Random writes	2.7	19

Longevity and Upgrading

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or compone 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??

<edit list of features as required>

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 – 20
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic E
- 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 90.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	378 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	25.7 g

PLASTIC/Polyethylene low density 20 g

The PAPER/Corrugated packaging material is made from 80 % recycled content.
The PLASTIC/EPE (Expanded Polyethylene) packaging materials contains at least 0% recycled content.
The PLASTIC/Polyethylene low density packaging materials contains at least 0% recycled content.

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):

- 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
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- 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)

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.

Technical Specifications

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
Eco-label certifications
http://www8.hp.com/us/en/hp-information/environment/ecolabels.html
ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

HP ProBook 470 G3 Notebook PC

Eco-Label Certifications & declarations

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:

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

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)	7.58 W	7.82 W	7.70 W

Technical Specifications

Normal Operation (Long idle)	6.58 W	6.76 W	6.49 W
Sleep	0.69 W	0.75 W	0.69 W
Off	0.39 W	0.45 W	0.39 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	27 BTU/hr	26 BTU/hr
Normal Operation (Long idle)	23 BTU/hr	23 BTU/hr	22 BTU/hr
Sleep	2 BTU/hr	3 BTU/hr	2 BTU/hr
Off	1 BTU/hr	2 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	3.2	24
Fixed Disk – Random writes	3.0	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??

<edit list of features as required>

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

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- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
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- This product is 90.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	423 g
Internal:	PLASTIC/EPE (Expanded Polyethylene)	23 g
	PLASTIC/Polyethylene low density	20 g

The PAPER/Corrugated packaging material is made from 80 % recycled content.
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Eco-label certifications
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ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

QuickSpecs

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
	HP Business Backpack (up to 17.3")	H5M90AA
	HP Business Case(up to 15.6")	H5M92AA
Docking	HP 3001pr USB 3 Port Replicator	F3S42AA
	HP 3005pr USB 3.0 Port Replicator	H1L08AA
	HP Adjustable Display Stand	AW663AA
Input/Output – Mice	HP Stylish USB Keyboard and Mouse	H4B80AA
	HP Stylish Wireless Keyboard and Mouse	H4B79AA
	HP 2.4 GHz Keyboard and Mouse	G1K29AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP Ultrathin Wireless Mouse	L9V78AA
	HP Conferencing Keyboard	K8P74AA
	HP Speaker Phone	K7V16AA
	HP Wired Headset	K7V17AA
	HP HDMI to DVI Adapter	F5A28AA
	HP Wireless Display Adapter	J1V25AA
Power	HP 45W Smart AC Adapter 4.5mm	H6Y88AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 65W Slim AC Adapter	H6Y82AA
	HP Power Bank	N9F71AA
Storage	HP External USB Optical Drive	F2B56AA
	HP 500GB 7200rpm HDD	F3B97AA
	HP External Portable USB3.0 HDD	K6A93AA
Security	HP UltraSlim Keyed Cable Lock	H4D73AA
	HP USB Smart Card Reader	F6V67AA
	HP 14.0" NB Privacy Filter	J6E65AA
Displays	HP ProDisplay P242va 24-inch Monitor	K7X32AA
	HP EliteDisplay E222 21.5-inch Monitor	M1N96AA
	HP EliteDisplay E240 23.8-inch Monitor	M1N99AA
	HP EliteDisplay E240c 23.8-inch Monitor	M1P00AA
	HP EliteDisplay S270c 27-inch Curved Display	K1M38AA

QuickSpecs

Summary of Changes

Date of change:	Version History:		Description of change:
September 30, 2015	Version 1 to 2	Added	Environmental information pages 60 to 71
October 28, 2015	Version 2 to 3	Updated	3rd Party software list
December 9, 2015	Version 2 to 3	Added	SSD list to Storage section at the top
January 20, 2016	Version 3 to 4	Added	BIOS adheres to NIST SP800-147 to footnote 2 on Software Bios section
February 1, 2016	Version 4 to 5	Added	Passed MIL-STD testing and footnote
February 3, 2016	Vesion 5 to 6	Updated	Battery times
March 29, 2016	Version 6 to 7	Added	440 G3 HDD Battery times
March 31, 2016	Version 7 to 8	Changed	TPM upgrade footnote
April 11, 2016	Version 8 to 9	Updated	Battery life page 9 and 21
April 25, 2016	Version 9 to 10	Added	New optional battery and memory units.
May 11, 2016	Version 10 to 11	Added	SSD to 450 and 470 G3.
May 26, 2016	Version 11 to 12	Changed	SATA interfaces to HDDs to 3.0, 6.0 Gb/s

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