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HP ProBook 470 G3 - Specification

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Product description

Specifications	Description
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Specifications	Description
Operating system	<p>Preinstalled</p> <ul style="list-style-type: none"> • Windows 10 Pro 64 • Windows 10 Home 64 • Windows 8.1 Pro 64 • Windows 8.1 64 • Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro) • Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro) • Windows 7 Professional 64 • Windows 7 Professional 32 • FreeDOS 2.0 <p>Web only support</p> <ul style="list-style-type: none"> • Windows 10 Enterprise 64 • Windows 8.1 Enterprise 64 • Windows 7 Professional 32 • Windows 7 Enterprise 64 • Windows 7 Enterprise 32
Processors	<p>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)</p> <p>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)</p> <p>Intel Core i3-6100U with Intel HD Graphics 520 (2.3 GHz, 3 MB cache, 2 cores)</p>
Chipset	Chipset is integrated with processor
Graphics (integrated)	<p>Intel HD Graphics 510 or Intel HD Graphics 520</p> <p>NOTE: HD content required to view HD images.</p>



Specifications	Description
Display	<p>Internal: 17.3 in diagonal HD+1 SVA anti-glare flat LED backlit (1600 x 900)</p> <p>17.3 in diagonal FHD anti-glare flat LED backlit (1920 x 1080)</p> <p>External: Up to 32-bit per pixel color depth</p> <p>HDMI: Supports direct connection to high-definition displays with up to 4096 x 2160 at 24 Hz resolution and 7-channel audio with one convenient cable (not included)</p> <p>VGA: Port supports resolutions up to 2048x1536 external resolution at 60 Hz</p> <p>NOTE: HD content required to view HD images Resolutions are dependent upon monitor capability, and resolution and color depth settings.</p>
Storage and drives	<p>Supports SATA, 7 mm/9.5 mm, 2.5 in Hard Drives</p> <ul style="list-style-type: none"> • 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 <p>NOTE: For hard drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up 30 GB for Windows 10 is reserved for system recovery software.</p>
Optical drives (fixed optional optical drive)	<p>9.5 mm SATA</p> <p>DVD-ROM</p> <p>DVD+/-RW SuperMulti DL Drive</p> <p>Blu-ray ROM DVD+/-RW SuperMulti DL Drive</p> <p>Weight saver</p>



Specifications	Description
Memory	<p>Two SODIMM slots. Both slots are customer accessible / upgradeable. DDR3L PC3-12800 (Transfer rates up to 1600 MT/s.) Supports Dual Channel Memory.</p> <p>Standard</p> <ul style="list-style-type: none">• 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) <p>Maximum</p> <ul style="list-style-type: none">• Upgradeable to 16384 MB in slots 1 and 2 <p>Dual-channel</p> <ul style="list-style-type: none">• Maximized dual-channel performance requires SODIMMs of the same size and speed in both memory slots. <p>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.</p>



Specifications	Description
Networking	<p>Wireless LAN (WLAN)</p> <p>Realtek 802.11b/g/n (1x1)</p> <p>Realtek 802.11b/g/n (1x1) and Bluetooth 4.0 Combo</p> <p>Broadcom 802.11b/g/n (1x1) and Bluetooth 4.0 Combo</p> <p>Broadcom 802.11a/b/g/n (2x2) and Bluetooth 4.0 Combo</p> <p>Intel Dual Band Wireless-AC 3165 802.11a/b/g/n/ac (1x1) Wi-Fi and Bluetooth 4.0 Combo</p> <p>Intel Dual Band Wireless-AC 8260 802.11a/b/g/n/ac (2x2) Wi-Fi and Bluetooth 4.2 Combo</p> <p>NOTE: Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Sold separately or as an optional feature.</p>
Communications	<p>Realtek Ethernet (10/100/1000)</p> <p>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.</p>
Audio	<p>HD audio with DTS Studio Sound</p> <p>Two stereo speakers</p> <p>Integrated microphone (dual-microphone array when equipped with optional webcam)</p> <p>Headphone/microphone combo jack</p>



Specifications	Description
Webcam	<p>Optional 720p HD webcam</p> <p>NOTE: Sold separately as an optional feature. HD content required to view HD images. Internet access required.</p>
Ports/slots	<p>USB 3.0 (2)</p> <p>USB 2.0 (2)</p> <p>HDMI (1)</p> <p>headphone/microphone combo (1)</p> <p>AC power (1)</p> <p>RJ-45 (1)</p> <p>VGA (1)</p>
Digital media slots	<p>Multi Media Reader Slot</p> <p>Supports SD, SDHC, SDXC</p>
Keyboards/pointing devices/buttons and function keys	<p>HP premium keyboard</p> <ul style="list-style-type: none"> 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. <p>Buttons and function keys</p> <ul style="list-style-type: none"> 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). <p>Function keys</p> <p>ESC: system information</p>



Specifications	Description
	<p>F1 - Sleep</p> <p>F2 - Blank</p> <p>F3 - Backlight toggle (for backlit keyboard) or Blank</p> <p>F4 - Display switching</p> <p>F5 - Brightness down</p> <p>F6 - Brightness up</p> <p>F7 - Blank</p> <p>F8 - Volume down</p> <p>F9 - Volume up</p> <p>F10 - Mic mute</p> <p>F11 - Blank</p> <p>F12 – NumLock (430/440); Blank (450/470)</p> <p>Hidden functions</p> <p>Fn+R keys (Break)</p> <p>Fn+S keys (Sys Rq)</p> <p>Fn+C keys (Scroll lock)</p> <p>Pointing devices</p> <p>Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons</p> <p>Touchpad</p> <p>On/off button (on board)</p> <p>Taps enabled as default</p> <p>Gestures (enabled by default)</p> <p>2 finger scrolling</p> <p>2 finger zoom (pinch)</p> <p>OSD (enable/disable)</p>



Specifications	Description
	<p>Win8 2 Finger tap = right click</p> <p>Win8 Edge Swipes</p> <p>Disabled by default</p> <p>3 finger flick</p> <p>2 finger rotate</p> <p>Momentum motion</p> <p>1 finger vertical scroll</p>

Software and security

Specifications	Description
BIOS	<p>HP BIOSphere</p> <p>HP DriveLock</p> <p>HP Automatic DriveLock</p> <p>HP BIOS Protection</p> <p>Master Boot Record Security</p> <p>Power On Authentication Pre-Boot Security Secure Erase</p> <p>Hybrid Boot (Windows 8.1 & later)</p> <p>Measure Boot (Windows 8.1 & later)</p> <p>Secure Boot (Windows 8.1 & later)</p> <p>Absolute Persistence Module</p>



Specifications	Description
Multimedia	<p>Cyberlink Power DVD, BD</p> <p>Cyberlink Power2Go (Secure Burn)</p> <p>Cyberlink YouCam BE (Windows 7 only)</p>
Communication	<p>HP GPS and Location (Windows 7 only)</p> <p>HP Connection Manager with support for HP Mobile Connect (Windows 7 only)</p> <p>HP Mobile Connect (Windows 8.1 & later)</p> <p>Intel Wireless Display (WiDi) Software for Windows</p> <p>Native Miracast Support</p>
HP value add software	<p>HP 3D DriveGuard</p> <p>HP ePrint Driver</p> <p>HP Hotkey</p> <p>HP Recovery Manager</p> <p>HP Recovery Disc Creator</p> <p>HP Unified Recovery Manager (Windows 8.1 and 10 only)</p> <p>HP Registration App (Windows 8.1 & later)</p> <p>HP Support Assistant</p> <p>HP Noise Reduction Software</p>
3rd party	<p>Foxit PhantomPDF Express for HP</p> <p>HP Caller Dashboard Built by Thug Labs</p>



Specifications	Description
Microsoft products	<p>Buy Office</p> <p>Bing Search</p> <p>Skype</p>
Manageability	<p>HP Driver Packs</p> <p>HP SoftPaq Download Manager (SDM)</p> <p>HP System Software Manager (SSM)</p> <p>HP BIOS Config Utility (BCU)</p> <p>HP Client Catalog</p> <p>HP CIK for Microsoft SCCM</p> <p>LANDESK Management</p>
Client security software	<p>Absolute Persistence Module</p> <p>HP Drive Encryption</p> <p>HP Security Manager</p> <p>Microsoft Security Essentials</p> <p>Microsoft Defender</p>
Security	<p>Pre-boot Authentication</p> <p>Security lock slot (Lock sold separately.)</p> <p>Optional Fingerprint Reader</p> <p>TPM</p>

NOTE: HP Cloud Recovery download tool (Cloud Recovery Client) is available under Software and Drivers section on the support page.



Power

Specifications	Description
Power supply	65 W Smart AC adapter 65 W EM Smart AC adapter (PRC and India only)
Battery	HP 4-cell, 44 WHr Li-ion Optional HP 6-cell, Long Life 55 WHr Li-ion (HP Fast Charge is available on 6-cell battery only.)
System standby time	4-cell (44 WHr) battery: Up to 15 days 6-cell (55 WHr) long life battery: Up to 16 days
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

Dimensions

Specifications	Description
Weight	Starting at 2.61 kg (5.75 lb)



Specifications	Description
Dimensions	41.68 x 29.05 x 2.5 to 2.6 cm (16.41 x 11.44 x 0.98 to 1.02 in)

System unit

Specifications	Description
Temperature	<p>Operating: 0° to 35° C (32° to 95° F)</p> <p>Non-operating: -20° to 60° C (-4° to 140° F)</p>
Relative humidity	<p>Operating: 10% to 90%, non-condensing</p> <p>Non-operating: 5% to 95%, 38.7° C (101.6° F) maximum wet bulb temperature</p>
Shock	<p>Operating: 40 G, 2 ms, half-sine</p> <p>Non-operating: 200 G, 2 ms, half-sine</p>
Random vibration	<p>Operating: 0.75 g</p> <p>Non-operating: 1.5 g</p>
Altitude (unpressurized)	<p>Operating: -15.24 to 3,048 m (-50 to 10,000 ft)</p> <p>Non-operating: -15.24 to 12,192 m (-50 to 40,000 ft)</p>



Specifications	Description
Planned industry standard certifications	UL: Yes CSA: No 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

Display

17.3 in diagonal HD+1 SVA anti-glare flat LED backlit (1600 x 900)

Specifications	Description
Outline dimensions (W x H x D)	398.6 x 251 x 4 mm (15.69 x 9.88 x 0.15 in)



Specifications	Description
Active area	382.08 x 214.92 mm (15.04 x 8.46 in)
Weight	550 g
Diagonal size	17.3 in
Surface treatment	Anti-glare
Contrast ratio	300:1
Refresh rate	60 Hz
Brightness	220 nits (typical)
Pixel resolution	1600 x 900
Interface	eDP 1.3 without PSR (2 lane)
LCD mode	SVA
PPI	106

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Specifications	Description
Viewing angle	40/40/15/30

17.3 in diagonal FHD anti-glare flat LED backlit (1920 x 1080)

Specifications	Description
Outline dimensions (W x H x D)	400 x 233.3 x 4 mm (15.74 x 9.18 x 0.15 in)
Active area	381.88 x 214.81
Weight	550 g
Diagonal size	17.3 in
Surface treatment	Anti-glare
Contrast ratio	600:1
Refresh rate	60 Hz
Brightness	300 nits (typical)
Pixel resolution	1920 x 1080



Specifications	Description
Interface	eDP 1.3 (2 lane)
LCD mode	UWVA
PPI	128
Viewing angle	85/85/85/85

Storage and drives

500 GB 5400 rpm SATA hard drive

Specifications	Description
Drive weight	101 g (0.22 lb)
Capacity	500 GB
Height	7 mm (0.276 in)
Width	70 mm (2.75 in)
Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ



Specifications	Description
Transfer rate	Synchronous (maximum) 300 MB/s (Drive Capability)
Seek time	Single track: 3 ms Average: 13 ms Maximum: 24 ms
Rotational speed	5400 rpm
Logical blocks	976,773,168
Operating temperature	0° to 60° C (32° to 140° F) (case temperature)
Featuers	ATA security

500 GB 5400 rpm SMART SATA II hybrid HDD/SSHD

Specifications	Description
Drive weight	95 g (0.209 lb)
Capacity	500 GB
Height	7 mm (0.276 in)



Specifications	Description
Width	70.1 mm (2.76 in)
Interface	ATA-8, SATA 2.6, 6.0 Gb/s, NCQ
Transfer rate	600 MB/s
Seek time	Single track: 2 ms Average: 12 ms Maximum: NIL ms
Rotational speed	5400 rpm
Logical blocks	976,773,168
Operating temperature	0° to 60° C (32° to 140° F) (case temperature)
Features	ATA security

500 GB 7200 rpm SATA hard drive

Specifications	Description
Drive weight	115 g (0.25 lb)



Specifications	Description
Capacity	500 GB
Height	7 mm (0.276 in)
Width	70 mm (2.75 in)
Interface	ATA-8, SATA 2.6, 3.0 Gb/s, NCQ
Transfer rate	300 MB/s
Seek time	Single track: 1.15 ms Average: 11 ms Maximum: 22 ms
Rotational speed	7200 rpm
Logical blocks	976,773,168
Operating temperature	0° to 60° C (32° to 140° F) (case temperature)
Features	ATA security

1 TB 5400 rpm SATA hard drive



Specifications	Description
Drive weight	117 g (0.25 lb)
Capacity	1 TB
Height	9.5 mm (0.37 in)
Width	70 mm (2.75 in)
Interface	ATA-8, SATA 3.0
Transfer rate	Synchronous 600MB/s (maximum)
Seek time	Single track: 2 ms Average: 12 ms Maximum: 22 ms
Rotational speed	5400 rpm
Logical blocks	1,953,525,168
Operating temperature	0° to 60° C (32° to 140° F) (case temperature)
Features	ATA security, S.M.A.R.T., NCQ, Ultra DMA

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2 TB 5400 rpm hard drive

Specifications	Description
Drive weight	130 g (0.28 lb)
Capacity	2 TB
Height	9.5 mm (0.37 in)
Width	70 mm (2.75 in)
Interface	ATA-8, SATA 3.0
Transfer rate	Synchronous 600MB/s (maximum)
Seek time	Single track: 2 ms Average: 12 ms Maximum: 22 ms
Rotational speed	5400 rpm
Logical blocks	3,907,029,168
Operating temperature	0° to 60° C (32° to 140° F) (case temperature)



Specifications	Description
Features	ATA security, S.M.A.R.T., NCQ, Ultra DMA

Solid state drive 128 GB 2280 M2 SATA-3

Specifications	Description
Drive weight	10 g (0.022 lb)
Capacity	128 GB
Height	3.7 mm (0.14 in)
Width	22 mm (0.87 in)
Interface	ATA-8, SATA 3.0
Performance	Maximum sequential read: up to 520 MB/s Maximum sequential write: up to 140 MB/s
Logical blocks	250,069,680
Operating temperature	0° to 70° C (32° to 158° F) (ambient temperature)



Specifications	Description
Features	DIPM; TRIM; DEVSLP
Security features	ATA security

Optical drives

DVD+/-RW SuperMulti DL drive

Specifications	Description
Access times (typical)	< 140 ms CD < 160 ms DVD
Weight	170 g
Maximum 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

Blue-ray ROM DVD+/-RW SuperMulti DL drive

Specifications	Description
Access times (typical)	< 190 ms CD-ROM < 180 ms DVD-ROM

	< 230 ms BD-ROM
Weight	170 g
Max data transfer rate	<p>24X CD-ROM</p> <p>8X DVD-ROM</p> <p>24X CD-R</p> <p>16X CD-RW</p> <p>8X DVD+R</p> <p>8X DVD+RW</p> <p>8X DVD-R</p> <p>6X DVD-RW</p> <p>4X DVD+R Dual Layer</p> <p>4X DVD-R Dual Layer</p> <p>5X DVD-RAM</p> <p>6X BD-ROM</p>
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 GB
Max media capacity (write)	8.5 GB
Transport	Tray loading

DVD-ROM drive

Specifications	Description
Access times (typical)	< 140 ms CD-ROM < 160 ms DVD-ROM
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)	8.5 GB
Max media capacity (write)	8.5 GB
Transport	Tray loading

Security

HP synaptics VFM 495 fingerprint reader (optional)

Specifications	Description
Mobile voltage operations	Realtek ALC 3227 low power high definition audio codec
Operating temperature	0° – 70° C (32° – 158° F)
Current consumption at 3.3 V	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 (± 15 KV)
Detection matrix	200 pixel wide fingerprinting image 16.5 x 3 mm sensor area 508 dpi resolution, 256 levels of grayscale

Networking/communications

Realtek 802.11 b/g/n (1x1)

Specifications	Description
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	<p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM</p>
Security	<p>IEEE and Wi-Fi compliant 64 / 128 bit WEP encryption for a/b/g mode only</p> <p>AES-CCMP: 128 bit in hardware</p> <p>802.1x authentication</p> <p>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES</p> <p>WPA2 certification</p> <p>IEEE 802.11i</p> <p>Cisco Certified Extensions, all versions through CCX4 and CCX Lite</p> <p>WAPI</p>
Network architecture models	<p>Ad-hoc (peer to peer)</p> <p>Infrastructure (access point required)</p>
Roaming	IEEE 802.11 compliant roaming between access points
Output power	<p>802.11b : +16dBm minimum</p> <p>802.11g : +14dBm minimum</p> <p>802.11a : +14dBm minimum</p> <p>802.11n HT20(2.4GHz) : +13dBm minimum</p> <p>802.11n HT40(2.4GHz) : +13dBm minimum</p> <p>802.11n HT20(5GHz) : +12dBm minimum</p> <p>802.11n HT40(5GHz) : +12dBm minimum</p>
Power	Transmit: 2.0 W



consumption	<p>Receive: 1.6 W</p> <p>Idle mode (PSP): 180 mW (WLAN Associated)</p> <p>Idle mode: 60 mW (WLAN unassociated)</p> <p>Radio disabled: 30 mW</p>
Power management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver sensitivity	<p>802.11b, 1Mbps: -94dBm maximum</p> <p>802.11b, 11Mbps: -86dBm maximum</p> <p>802.11g, 6Mbps: -88dBm maximum</p> <p>802.11g, 54Mbps: -74dBm maximum</p> <p>802.11a, 6Mbps: -86dBm maximum</p> <p>802.11a, 54Mbps: -72dBm maximum</p> <p>802.11n, MCS07: -69dBm maximum</p> <p>802.11n, MCS15: -66dBm maximum</p>
Antenna type	<p>High efficiency antenna with spatial diversity, mounted in the display enclosure.</p> <p>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)</p>
Form factor	PCI-Express M.2 MiniCard
Dimensions	<p>Type 2230: 2.3 x 22 x 30 mm (0.09 x 0.86 x 1.18 in)</p> <p>Type 1630: 2.3 x 16 x 30 mm (0.09 x 0.62 x 1.18 in)</p>
Weight	Type 2230: 2.8 g



	Type 1630: 2 g
Operating voltage	3.3v +/- 9%
LED activity	LED Amber – Radio OFF; LED White – Radio ON

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

Specifications	Description
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	<p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM</p>
Security	<p>IEEE and Wi-Fi compliant 64 / 128 bit WEP encryption for a/b/g mode only</p> <p>AES-CCMP: 128 bit in hardware</p> <p>802.1x authentication</p> <p>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES</p> <p>WPA2 certification</p> <p>IEEE 802.11i</p> <p>Cisco Certified Extensions, all versions through CCX4 and CC</p> <p>WAPI</p>
Network architecture models	<p>Ad-hoc (peer-to-peer)</p> <p>Infrastructure (access point required)</p>
Roaming	IEEE 802.11 compliant roaming between access points
Output power	<p>802.11b : +16dBm minimum</p> <p>802.11g : +14dBm minimum</p> <p>802.11n HT20(2.4GHz) : +13dBm minimum</p> <p>802.11n HT40(2.4GHz) : +13dBm minimum</p> <p>802.11n HT20(5GHz) : +12dBm minimum</p> <p>802.11n HT40(5GHz) : +12dBm minimum</p>
Power consumption	<p>Transmit: 2.0 W</p> <p>Receive: 1.6 W</p>



	<p>Idle mode (PSP): 180 mW (WLAN Associated)</p> <p>Idle mode: 60 mW (WLAN unassociated)</p> <p>Radio disabled: 30 mW</p>
Power management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver sensitivity	<p>802.11b, 1Mbps : -94 dBm maximum</p> <p>802.11b, 11Mbps : -86 dBm maximum</p> <p>802.11g, 6Mbps : -88 dBm maximum</p> <p>802.11g, 54Mbps : -74 dBm maximum</p> <p>802.11n, MCS07 : -69 dBm maximum</p> <p>802.11n, MCS15 : -66 dBm maximum</p>
Antenna type	<p>High efficiency antenna with spatial diversity, mounted in the display enclosure.</p> <p>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)</p>
Form factor	PCI-Express M.2 MiniCard
Dimensions	<p>Type 2230: 2.3 x 22 x 30 mm</p> <p>Type 1630: 2.3 x 16 x 30 mm</p>
Weight	<p>Type 2230: 2.8 g</p> <p>Type 1630: 2 g</p>
Operating	3.3v +/- 9%



voltage	
Temperature	Operating: -10° to 70° C (14° to 158° F) Non-operating: -40° to 80° C (-40° to 176° F)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 3,048 m (10,000 ft) Non-operating: 0 to 15,240 m (50,000 ft)
LED activity	LED Amber – Radio OFF; LED White – Radio ON

HP integrated module with Bluetooth 4.0+ EDR wireless technology

Specifications	Description
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 channel



	Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric												
Transmit power	The Bluetooth component operates as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.												
Receiver sensitivity	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>$\pi/4$-DQPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>8DPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>	Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm	$\pi/4$ -DQPSK	-80 dBm	-70 dBm	8DPSK	-80 dBm	-70 dBm
Modulation	0.01% BER	0.001% BER											
GFSK	-80 dBm	-70 dBm											
$\pi/4$ -DQPSK	-80 dBm	-70 dBm											
8DPSK	-80 dBm	-70 dBm											
Power consumption	<p>Peak (Tx) 330 mW</p> <p>Peak (Rx) 230 mW</p> <p>Selective Suspend 17 mW</p>												
Range	Up to 10 m (33 ft)												
Electrical interface	USB 2.0 compliant												
Bluetooth software supported	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
Security certifications	All necessary regulatory approvals for supported countries, including FCC (47 CFR) Part 15C, Section 15.247 and 15.249
Power management	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950
Certifications	UL, CSA, and CE Mark Serial Port Profile (SPP) Service Discovery Application Profile (SDAP) Dial-Up Networking (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) FAX Profile (FAX) Basic Imaging Profile (BIP) Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

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



Specifications	Description
Wireless LAN standards	IEEE 802.11b IEEE 802.11g IEEE 802.11n
Interoperability	Wi-Fi certified
Frequency band	802.11 b/g/n 2.402 - 2.482 GHz <div style="background-color: #f0f0f0; padding: 5px; margin-top: 10px;"> <p>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.</p> </div>
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	IEEE and Wi-Fi 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



	<p>IEEE 802.11i</p> <p>Cisco Certified Extensions, all versions through CCX4 and CCX</p> <p>WAPI</p>
Network architecture models	<p>Ad-hoc (peer-to-peer)</p> <p>Infrastructure (access point required)</p>
Roaming	IEEE 802.11 compliant roaming between access points
Output power	<p>802.11b : +16dBm minimum</p> <p>802.11g : +14dBm minimum</p> <p>802.11n HT20(2.4GHz) : +13dBm minimum</p> <p>802.11n HT40(2.4GHz) : +13dBm minimum</p> <p>802.11n HT20(5GHz) : +12dBm minimum</p> <p>802.11n HT40(5GHz) : +12dBm minimum</p>
Power consumption	<p>Transmit: 2.0 W</p> <p>Receive: 1.6 W</p> <p>Idle mode (PSP): 180 mW (WLAN Associated)</p> <p>Idle mode: 60 mW (WLAN unassociated)</p> <p>Radio disabled: 30 mW</p>
Power management	<p>ACPI and PCI Express compliant power management</p> <p>802.11 compliant power saving mode</p>
Receiver sensitivity	802.11b, 1Mbps : -94dBm maximum



	<p>802.11b, 11Mbps : -86dBm maximum</p> <p>802.11g, 6Mbps : -88dBm maximum</p> <p>802.11g, 54Mbps : -74dBm maximum</p> <p>802.11n, MCS07 : -69dBm maximum</p> <p>802.11n, MCS15 : -66dBm maximum</p>
Antenna type	<p>High efficiency antenna with spatial diversity, mounted in the display enclosure</p> <p>Two embedded antennas for 2.4 GHz are provided to the card to support WLAN and Bluetooth communications. (Support Dual antenna or Single antenna, depend on platform requirement)</p>
Form factor	PCI-Express M.2 MiniCard
Dimensions	<p>Type 2230: 2.3 x 22 x 30 mm</p> <p>Type 1630: 2.3 x 16 x 30 mm</p>
Weight	<p>Type 2230: 2.8 g</p> <p>Type 1630: 2 g</p>
Operating voltage	3.3v +/- 9%
Temperature	<p>Operating: -10° to 70° C (14° to 158° F)</p> <p>Non-operating: -40° to 80° C (-40° to 176° F)</p>
Humidity	<p>Operating: 10% to 90% (non-condensing)</p> <p>Non-operating: 5% to 95% (non-condensing)</p>



Altitude	Operating: 0 to 3,048 m (10,000 ft) Non-operating: 0 to 15,240 m (50,000 ft)
LED activity	LED Amber – Radio OFF; LED White – Radio ON

HP integrated module with Bluetooth 4.0+ EDR wireless technology

Specifications	Description						
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	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Modulation	0.01% BER	0.001% BER			
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	Modulation	0.01% BER	0.001% BER
	GFSK	-80 dBm	-70 dBm
	$\pi/4$ -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 10 m (33 ft)		
Electrical interface	USB 2.0 compliant Point to Point, Multipoint Pico Nets up to 7 slaves		
Bluetooth software supported	Microsoft Windows Bluetooth software 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		
Security	All necessary regulatory approvals for supported countries, including FCC (47 CFR) Part		

	15C, Section 15.247 and 15.249
Certifications	<p>ETS 300 328, ETS 300 826</p> <p>Low Voltage Directive IEC950</p> <p>UL, CSA, and CE Mark</p> <p>Serial Port Profile (SPP)</p> <p>Service Discovery Application Profile (SDAP)</p> <p>Dial-Up Networking (DUN)</p> <p>Generic Object Exchange Profile (GOEP)</p> <p>Object Push Profile (OPP)</p> <p>File Transfer Profile (FTP)</p> <p>Synchronization Profile (SYNC)</p> <p>Hard Copy Cable Replacement (HCRP)</p> <p>Personal Area Networking Profile (PAN)</p> <p>Human Interface Device Profile (HID)</p> <p>FAX Profile (FAX)</p> <p>Basic Imaging Profile (BIP)</p> <p>Headset Profile (HSP)</p> <p>Hands Free Profile (HFP)</p> <p>Advanced Audio Distribution Profile (A2DP)</p>

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

Specifications	Description
Wireless LAN standards	<p>IEEE 802.11a</p> <p>IEEE 802.11b</p>



	<p>IEEE 802.11g</p> <p>IEEE 802.11n</p>
Interoperability	Wi-Fi certified
Frequency band	<p>802.11b/g/n</p> <ul style="list-style-type: none"> • 2.402 - 2.482 GHz <p>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.</p> <p>802.11a</p> <ul style="list-style-type: none"> • 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 <p>NOTE: Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)</p>
Antenna structure	2 transmit; 2 receive (2x2)
Data rates	<p>802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</p> <p>802.11b: 1, 2, 5.5, 11 Mbps</p> <p>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</p> <p>802.11n: MCS 0 ~ MCS 15, (20 MHz, and 40 MHz)</p>
Modulation	<p>Direct sequence spread spectrum</p> <p>CCK, BPSK, QPSK, 16-QAM, 64-QAM</p>



Security	<p>IEEE and Wi-Fi compliant 64 / 128 bit WEP encryption for a/b/g mode only</p> <p>AES-CCMP: 128 bit in hardware</p> <p>802.1x authentication</p> <p>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES</p> <p>WPA2 certification</p> <p>IEEE 802.11i</p> <p>Cisco Certified Extensions, all versions through CCX4 and CCX Lite</p> <p>WAPI</p>
Sub-channels	Multinational support with frequency bands and channels compliant to local regulations
Network architecture models	<p>Ad-hoc (peer to peer)</p> <p>Infrastructure (access point required)</p>
Roaming	IEEE 802.11 compliant roaming between band Access Points
Output power	<p>802.11b : +16 dBm minimum</p> <p>802.11g : +14 dBm minimum</p> <p>802.11a : +14 dBm minimum</p> <p>802.11n HT20(2.4GHz) : +13 dBm minimum</p> <p>802.11n HT40(2.4GHz) : +13 dBm minimum</p> <p>802.11n HT20(5GHz) : +12 dBm minimum</p> <p>802.11n HT40(5GHz) : +12 dBm minimum</p>
Power consumption	<p>Transmit: 2.0 W</p> <p>Receive: 1.6 W</p>



	<p>Idle mode (PSP): 180 mW (WLAN Associated)</p> <p>Idle mode: 60 mW (WLAN unassociated)</p> <p>Radio disabled: 30 mW</p>
Power management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver sensitivity	<p>802.11b, 1Mbps : -94 dBm maximum</p> <p>802.11b, 11Mbps : -86 dBm maximum</p> <p>802.11g, 6Mbps : -88 dBm maximum</p> <p>802.11g, 54Mbps : -74 dBm maximum</p> <p>802.11a, 6Mbps : -86 dBm maximum</p> <p>802.11a, 54Mbps : -72 dBm maximum</p> <p>802.11n, MCS07 : -69 dBm maximum</p> <p>802.11n, MCS15 : -66 dBm maximum</p>
Antenna type	<p>High efficiency antenna with spatial diversity, mounted in the display enclosure</p> <p>Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO and Bluetooth communications</p>
Form factor	PCI-Express M.2 MiniCard
Dimensions	<p>Type 2230: 2.3 x 22 x 30 mm (0.09 x 0.86 x 1.18 in)</p> <p>Type 1630: 2.3 x 16 x 30 mm (0.09 x 0.62 x 1.18 in)</p>
Weight	<p>Type 2230: 2.8 g</p> <p>Type 1630: 2 g</p>



Operating voltage	3.3v +/- 9%
Humidity	Operating: -10° to 70° C (14° to 158° F) Non-operating: -40° to 80° C (-40° to 176° F)
Altitude	Operating: 0 to 3,048 m (10,000 ft) Non-operating: 0 to 15,240 m (50,000 ft)
LED activity	LED Amber - Radio OFF; LED White - Radio ON

HP integrated module with Bluetooth 4.0+ EDR wireless technology

Specifications	Description
Bluetooth specification	4.0+ EDR compliant
Frequency band	2402 to 2480 MHz
Number of available channels	79 (1 MHz) available channels
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Transmit power	The Bluetooth component operates as a Class II Bluetooth device with a maximum transmit power of +4 for BR and EDR.												
Receiver sensitivity	<table border="1"> <thead> <tr> <th>Modulation</th> <th>0.01% BER</th> <th>0.001% BER</th> </tr> </thead> <tbody> <tr> <td>GFSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>$\pi/4$-DQPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> <tr> <td>8DPSK</td> <td>-80 dBm</td> <td>-70 dBm</td> </tr> </tbody> </table>	Modulation	0.01% BER	0.001% BER	GFSK	-80 dBm	-70 dBm	$\pi/4$ -DQPSK	-80 dBm	-70 dBm	8DPSK	-80 dBm	-70 dBm
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Power consumption	<p>Peak (Tx) 330 mW</p> <p>Peak (Rx) 230 mW</p> <p>Selective suspend 17 mW</p>												
Range	Up to 10 m (33 ft)												
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	Full support of Bluetooth security provisions												



supported	
Power management	<p>Microsoft Windows ACPI, and USB Bus Support</p> <p>Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff</p>
Security	All necessary regulatory approvals for supported countries, including FCC (47 CFR) Part 15C, Section 15.247 and 15.249
Certifications	<p>ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE</p> <p>Mark Serial Port Profile (SPP)</p> <p>Service Discovery Application Profile (SDAP)</p> <p>Dial-Up Networking (DUN)</p> <p>Generic Object Exchange Profile (GOEP)</p> <p>Object Push Profile (OPP)</p> <p>File Transfer Profile (FTP)</p> <p>Synchronization Profile (SYNC)</p> <p>Hard Copy Cable Replacement (HCRP)</p> <p>Personal Area Networking Profile (PAN)</p> <p>Human Interface Device Profile (HID)</p> <p>FAX Profile (FAX)</p> <p>Basic Imaging Profile (BIP)</p> <p>Headset Profile (HSP)</p> <p>Hands Free Profile (HFP)</p> <p>Advanced Audio Distribution Profile (A2DP)</p>

Realtek ethernet (10/100/1000)



Specifications	Description
Ethernet features	<p>10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14)</p> <p>100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30)</p> <p>1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40)</p> <p>Auto-Negotiation (Automatic Speed Selection)</p> <p>Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s</p> <p>IEEE 802.1p QoS (Quality of Service) Support</p> <p>IEEE 802.1q VLAN support</p> <p>IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)</p> <p>IEEE 802.3az EEE (Energy Efficient Ethernet)</p> <p>Jumbo Frame 9K</p> <p>Auto MDI/MDIX Crossover cable detection</p>
Power management	<p>ACPI compliant - multiple power modes</p> <p>Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption</p>
Performance features	<p>TCP/IP/UDP Checksum Offload (configurable)</p> <p>Protocol Offload (ARP & NS)</p> <p>Large send offload and Giant send offload Receiving Side Scaling</p>
Manageability	<p>Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only)</p> <p>PXE 2.1 Remote Boot</p> <p>Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))</p> <p>Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status</p>



Interface	PCI Express 1.1 to fully support ASPM L0s/L1 and CLKREQ
NIC device driver name	Realtek PCIe GBE Ethernet Family Controller

Audio/multimedia

DTS studio sound

Specifications	Description
Hardware	<p>Implementation: conexant</p> <p>Function controls: volume up, volume down, and mute</p> <p>Full duplex: yes</p> <p>Microphone in: stereo</p> <p>Headphone/line out: stereo</p> <p>Integrated microphone: yes, dual digital microphone array</p>
Audio output quality	<p>Frequency response: 20 Hz - 20k Hz</p> <p>Signal to noise ratio: 106 dB (DAC), 102 dB (ADC)</p> <p>Total harmonic distortion: 91 dB THD+n on line out/HP (0.003%)</p> <p>Play sampling rate: up to 192 k Hz</p> <p>Record sampling rate: up to 96 k Hz</p> <p>DAC: 16, 20, or 24-bit</p> <p>ADC: 16, 20, 24-bit</p>
Integrated stereo speakers	Power rating: 2 watts



Impedance: 4 ohms

Power

HP 45W smart AC adapter

Specifications	Description
Dimensions	9.5 x 4.0 x 2.65 cm (3.74 x 1.57 x 1.04 in)
Weight	175 g (0.386 lb)
Input	90 to 265 VAC
Input efficiency	87.74% at 115 VAC and 88.4% at 230 VAC
Input frequency range	47 to 63 Hz
Input AC current	1.4 A at 90 VAC
Output power	45 W
DC output	19.5 V



Hold-up time	5 MS at 115 VAC input
Output current limit	< 8.0 A
Over voltage protection	< 29 V max automatic shutdown
Over short protection	Auto-recovery and no damage
Connector	3-pin, grounded, mates with interchangeable cords
Environmental design	<p>Operating temperature: 0° to 35° C (32° to 95° F)</p> <p>Non-operating (storage) temperature: -20° to 85° C (-4° to 185° F)</p> <p>Altitude: 0 to 5,000 m (0 to 16,400 ft)</p> <p>Humidity: 20% to 95%</p> <p>Storage humidity: 10% to 95%</p>
EMI and safety certifications	<p>CE Mark - full compliance with LVD and EMC directives</p> <p>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.</p> <p>MTBF - over 200,000 hours at 25°C ambient condition.</p>

HP 65W EM smart AC adapter (PRC, India only)

Specifications	Description



Dimensions	12.65 x 5 x 3 cm (4.98 x 1.97 x 1.18 in)
Weight	290 g (0.62 lb)
Input	90 to 265 VAC
Input efficiency	87% at 115 VAC
Input frequency range	47 to 63 Hz
Input AC current	1.7 A at 90 VAC
Output power	65 W
DC output	19.5 V
Hold-up time	5 MS at 115 VAC input
Output current limit	< 11.0 A
Over voltage protection	< 29 V max automatic shutdown



Over short protection	Auto-recovery and no damage
Connector	3-pin, grounded, mates with interchangeable cords
Environmental design	<p>Operating temperature: 0° to 35° C (32° to 95° F)</p> <p>Non-operating (storage) temperature: -20° to 85° C (-4° to 185° F)</p> <p>Altitude: 0 to 5,000 m (0 to 16,400 ft)</p> <p>Humidity: 20% to 95%</p> <p>Storage humidity: 10% to 95%</p>
EMI and safety certifications	<p>CE Mark - full compliance with LVD and EMC directives</p> <p>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.</p> <p>MTBF - over 200,000 hours at 25°C ambient condition.</p>

HP 65W smart AC adapter

Specifications	Description
Dimensions	12.65 x 5 x 3 cm (4.98 x 1.97 x 1.18 in)
Weight	290 g (0.62 lb)
Input	90 to 265 VAC



Input efficiency	87% at 115 VAC
Input frequency range	47 to 63 Hz
Input AC current	1.7 A at 90 VAC
Output power	65 W
DC output	19.5 V
Hold-up time	5 MS at 115 VAC input
Output current limit	< 11.0 A
Over voltage protection	< 29 V max automatic shutdown
Over short protection	Auto-recovery and no damage
Connector	3-pin, grounded, mates with interchangeable cords
Environmental design	Operating temperature: 0° to 35° C (32° to 95° F) Non-operating (storage) temperature: -20° to 85° C (-4° to 185° F)



	<p>Altitude: 0 to 5,000 m (0 to 16,400 ft)</p> <p>Humidity: 20% to 95%</p> <p>Storage humidity: 10% to 95%</p>
EMI and safety certifications	<p>CE Mark - full compliance with LVD and EMC directives</p> <p>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.</p> <p>MTBF - over 200,000 hours at 25°C ambient condition.</p>

Batteries

HP 4-cell, long life 44 WHr Li-ion

Specifications	Description
Dimensions (H x W x L)	33.4 x 275.8 x 20.6 mm (1.32 x 10.86 x 0.81 in)
Weight	0.3 kg (0.66 lb)
Cells/type	4 cell Lithium-Ion
Voltage	14.8 V
Amp-hour capacity	3 Ah
Watt-hour capacity	44 Wh



Temperature	<p>Operating (charging): 0° to 45° C (32° to 113° F)</p> <p>Operating (discharging): -10° to 60° C (14° to 122° F)</p> <p>Non-operating: -20° to 60° C (-4° to 122° F)</p>
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

Specifications	Description
Dimensions (H x W x L)	45.59 x 275.8 x 33.89 mm (1.79 x 10.85 x 1.33 in)
Weight	330 g (0.72 lb)
Cells/type	Cylindrical ICR18650 C4
Voltage	10.68 V
Amp-hour capacity	5.15 Ah



Watt-hour capacity	55 Wh
Temperature	Operating (charging): 0° to 45° C (32° to 113° F) Operating (discharging): -10° to 60° C (14 to 140° F) Non-operating: -20° to 60° C (-4° to 140° F)
Battery re-charge time	System in off or standby mode: < 3 hours System on: 3 - 5 hours
Fuel gauge LED	No
Warranty	3 year or 1000 cycles
Optional travel battery available	No

[Link to product overview page](#)

[Go to the HP ProBook 470 G3 overview page for more information.](#)

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