

Overview

HP ProBook 470 G5 Notebook PC



Front

- | | |
|-----------------------|--|
| 1. Microphones (2) | 8. Headphone/microphone combo jack |
| 2. Webcam | 9. USB 2.0 (power port) |
| 3. Webcam light | 10. Power button |
| 4. Fingerprint reader | 11. Security lock slot (Lock sold separately.) |
| 5. Clickpad | |
| 6. Hard drive LED | |
| 7. SD Card reader | |

Overview



Rear

- | | |
|------------------------------|------------------------------------|
| 1. Power connector | 4. HDMI port (Cable not included.) |
| 2. Ethernet port (RJ-R45) | 5. USB 3.1 Gen 1 (2) |
| 3. External VGA monitor port | 6. USB Type-C™ port |

Overview

At a Glance

1. Preinstalled with Windows 10 versions or FreeDOS 2.0
2. Choice of Intel® Core™ processors
3. HP Premium Keyboard, full-sized, spill resistant with numeric keypad and optional backlit
4. 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.)
5. Large Clickpad with gestures support
6. Enhanced security features with preinstalled software and hardware options
7. Optional HD webcam with dual-microphone array for video conferencing ¹
8. HDMI port for connecting to high-resolution displays
9. Choice of displays
 - 43.9 cm (17.3") diagonal FHD UWVA anti-glare LED-backlit non-touch; 220 cd/m²; 45% sRGB (1920 x 1080)
 - 43.9 cm (17.3") diagonal HD+ anti-glare LED-backlit non-touch; 220 cd/m²; 45% sRGB (1600 x 900)
10. Flexible wireless connectivity options
11. Battery life up to 14 hours 15 mins (i3, HD with SSD)
12. HP 3-cell, 48 WHr Li-ion battery
13. Passed MIL-STD testing ²

1. Sold separately or as an optional feature.
2. MIL-STD-810G testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. 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.



Features

PRODUCT NAMES

HP ProBook 470 G5 Notebook PC

OPERATING SYSTEMS

Preinstalled

Windows 10 Pro 64 – HP recommends Windows 10 Pro ¹
Windows 10 Pro 64 (National Academic License) ^{1,2}
Windows 10 Home 64 ¹
Windows 10 Home Single Language 64 ¹
Windows 10 Home 64 (National Academic License) ^{1,2}
FreeDOS 2.0

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update 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.windows.com/>.
2. **Note:** Some devices for academic use will automatically be updated to Windows 10 Pro Education with the Windows 10 Anniversary Update. Features vary; see <https://aka.ms/ProEducation> for Windows 10 Pro Education feature information.

PROCESSORS

Intel® Core™ i7-8550U Intel® UHD graphics 620 (1.8 GHz, up to 4.0 GHz with Intel® Turbo Boost Technology 2.0, 8 MB cache, 4 cores) ^{3,4,5}

Intel® Core™ i7-7500U with Intel® HD Graphics 620 (2.7 GHz, up to 3.5 GHz with Intel® Turbo Boost Technology, 4 MB cache, 2 cores) ^{3,4,5}

Intel® Core™ i5-8250U Intel® UHD Graphics 620 (1.6 GHz, up to 3.4 GHz with Intel® Turbo Boost Technology 2.0, 6 MB cache, 4 cores) ^{3,4,5}

Intel® Core™ i3-8130U with Intel® HD Graphics 620 (2.2GHz/3.4GHz Dual Core Turbo, 4MB L3 Cache 15W)

Intel® Core™ i3-7100U with Intel® HD Graphics 620 (2.4 GHz, 3 MB cache, 2 cores) ^{3,4,5}

Processors Family

8th Generation Intel® Core™ i7 processor (i7-8550U model) ⁵

8th Generation Intel® Core™ i5 processor (i5-8250U model) ⁵

8th Generation Intel® Core i3 processor (Intel® Core™ i3-8130U model)

7th Generation Intel® Core™ i7 processor (i7-7500U model)

7th Generation Intel® Core™ i3 processor (i3-7100U model) ⁵

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.
4. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
5. **NOTE:** In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on <http://www.support.hp.com>.



Features

CHIPSET

Integrated with processor

GRAPHICS

Integrated

Intel® UHD graphics 620 ⁶

Intel® HD graphics 620 ⁶

NOTE: View processor section for details.

Discrete

NVIDIA® GeForce® 930MX (2 GB DDR3 dedicated, switchable) ⁷

Supports

Support HD decode, DX12, HDMI 1.4b

6. HD content required to view HD images.
 7. NVIDIA® technology requires an Intel® processor, plus an NVIDIA® GeForce® discrete graphics configuration and is available on Windows 10 Professional OS. With NVIDIA® Optimus™ 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).
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DISPLAYS

Internal

eDP FHD Flat

43.9 cm (17.3") diagonal FHD UWVA anti-glare LED-backlit, 220 cd/m², 45% sRGB (1920 x 1080) ^{6,8}

eDP HD Flat

43.9 cm (17.3") diagonal HD+ anti-glare LED-backlit, 220 cd/m², 45% sRGB (1600 x 900) ^{6,8}

Display Size

17.3"

43.9 cm (17.3")

6. HD content required to view HD images.
 8. Resolutions are dependent upon monitor capability, and resolution and color depth settings.
-



Features

| Docking station model | Total number of supported displays (incl. the notebook display) | Max. resolutions supported | Dock Connect3ors | Technical limitations |
|------------------------------|---|---|------------------------------------|--|
| HP UltraSlim Docking Station | 3 | Dual 2.5K @ 60Hz | 2xDP, 1xVGA | Dual 2.5k only with both displays into DP |
| HP Thunderbolt Dock 120W G2 | 3 | Dual 4k @60Hz | 2xDP, 1xVGA, 1xTB,1xUSB-C alt-mode | Dual 4k only with one display in to DP and + TB port or USB-C alt mode + TB port |
| HP USB-C Dock G4 | 3 | Dual 2K @ 60Hz Single 4K @ 60Hz (3840 x 1440) | 1xHDMI, 2xDP | |
| HP USB-C Universal Dock | 3 | Dual 4K @ 60Hz Single 5K @ 60Hz | 2xDP | |
| HP USB-C Travel Dock | 2 | Single 2K @ 60Hz | 1xHDMI, 1xVGA | Single external display Only HDMI or VGA at the time |
| HP USB-C Mini Dock | 2 | Single 4K @ 30Hz | 1xHDMI, 1xVGA | Single external display Only HDMI or VGA at the time |

STORAGE AND DRIVES

Hard Drives

500 GB SATA (7200 rpm) ⁹

500 GB (8 GB cache) SATA SSHD (5400 rpm) ⁹

1 TB SATA (5400 rpm) ⁹

Primary M.2 Storage

16 GB Intel® Optane™ Memory

128 GB M.2 SATA TLC SSD ⁹

256 GB M.2 PCIe NVMe Value SSD [9]

512 GB M.2 PCIe NVMe TLC SSD [9]

9. For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10) is reserved for system recovery software.

MEMORY

Standard

16 GB DDR4-2400 SDRAM (1 x 16 GB) ¹⁰

16 GB DDR4-2400 SDRAM (2 x 8 GB) ¹⁰

12 GB DDR4-2400 SDRAM (4 and 8 GB) ¹⁰

8 GB DDR4-2400 SDRAM (1 x 8 GB) ¹⁰

8 GB DDR4-2400 SDRAM (2 x 4 GB) ¹⁰

4 GB DDR4-2400 SDRAM (1 x 4 GB) ¹⁰



Features

Maximum

32 GB DDR4-2400 SDRAM ¹⁰

2 SODIMM

Both slots are customer accessible / upgradeable

DDR4 PC4 SODIMMS, system runs at 2133 (Intel 8th Gen CPU runs at 2400)

Supports Dual Channel Memory

10. 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.

NETWORKING/COMMUNICATIONS

Wireless LAN (WLAN)

Realtek 802.11ac (1x1) WiFi® and Bluetooth® 4.2 Combo ¹¹

Realtek 802.11ac (2x2) WiFi® and Bluetooth® 4.2 Combo ¹¹

Intel® Dual Band Wireless-AC 3168 802.11 a/b/g/n/ac (1x1) WiFi® and Bluetooth® 4.2 Combo (non-vPro™) ¹¹

Intel® Dual Band Wireless-AC 8265 802.11 a/b/g/n/ac (2x2) WiFi® and Bluetooth® 4.2 Combo (non-vPro™) ¹¹

Ethernet

Realtek RTL8111HSH Gigabit Ethernet

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

AUDIO/MULTIMEDIA

Audio

2 Integrated stereo speakers

Integrated dual array microphone

Webcam

HD webcam ^{6,12}

6. HD content required to view HD images.

12. Internet access required.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard

Full-sized island-style, spill resistant

Pointing Device

Clickpad with multi-touch gesture support image sensor, taps enabled as default



Features

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 - Display Switching
F2 - Blank
F3 - Brightness Down
F4 - Brightness Up
F5 - Speaker Mute
F6 - Volume Down
F7 - Volume Up
F8 - Mic Mute
F9 - Backlight Toggle (for backlit keyboard) or Blank
F10 - Blank
F11 - Wifi Toggle
F12 - Sleep

Hidden Functions

Fn+R = Break
Fn+S = Sys Rq
Fn+C = Scroll Lock

Gestures

Enabled by default Win 10

2 Finger Scrolling
2 Finger Zoom (Pinch)
OSD (enable/disable)
3 finger tap = Cortana
3 finger flick = App switch
4 finger tap = Action Center

Disabled by default Win 10

3 Finger Flick
2 Finger Rotate
Momentum Motion
1 Finger Vertical Scroll

SOFTWARE AND SECURITY

BIOS

HP BIOSphere Gen4¹³
HP DriveLock & Automatic DriveLock
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Secure Erase¹⁴
Absolute Persistence Module¹⁵
Pre-boot Authentication



Features

Software

HP Native Miracast Support ¹⁶
HP LAN-Wireless Protection
HP Wireless Wakeup
HP Connection Optimizer
HP 3D DriveGuard 6
HP ePrint + JetAdvantage ¹⁷
HP Hotkey Support
HP Recovery Manager
HP Jumpstart
HP Support Assistant ¹⁸
HP Noise Cancellation Software
Buy Office
Bing Search

Manageability Features

HP Driver Packs ¹⁹
HP System Software Manager
HP BIOS Config Utility (BCU)
HP Client Catalog
HP Management Integration Kit for Microsoft System Center Configuration Manager ²⁰
LANDESK Management ²¹

Client Security Software

HP Client Security Suite Gen3 ²² including:
HP Security Manager (including Credential Manager and Password Manager)
HP DriveLock
HP Fingerprint Sensor
HP Password Manager ²³
Microsoft Defender ²⁴
TPM 2.0

13. HP BIOSphere Gen4 requires Intel® 7th or 8th Generation processors.
14. Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. Supported on Elite platforms with BIOS version F.03 or higher.
15. 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.
16. 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>.



Features

17. HP ePrint Drive requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter). Print times and connection speeds may vary.
18. HP Support Assistant requires Windows and Internet access.
19. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
20. HP Management Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.
21. LANDESK Management subscription required.
22. HP Client Security Suite Gen3 requires Windows and Intel® or AMD 7th or 8th Generation processors.
23. HP Password Manager requires Internet Explorer or Chrome or FireFox. Some websites and applications may not be supported. User may need to enable or allow the add-on / extension in the internet browser.
24. Microsoft Defender Opt in and internet connection required for updates.

POWER

Power Supply

- 65 W HP Smart AC adapter ²⁵
- 65 W EM Smart AC adapter ²⁵

Battery

- 3-cell, 48 Wh Long Life Li-ion ²⁶

Power Cord

- 3-wire plug - 1m
- 3-wire plug - 1.8m

Battery life

- Up to 14 hours and 15 mins (i3, HD with SSD) ²⁷
- Up to 13 hours and 45 mins (i5 quad core, HD with SSD) ²⁷

25. Availability may vary by country.
26. Battery is internal and not replaceable by customer. Serviceable by warranty.
27. 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.

WEIGHTS & DIMENSIONS

Weight

- Starting at 5.5 lb ²⁸
- Starting at 2.5 kg ²⁸

Dimensions (w x d x h)

- 14.8 x 10.4 x 0.82 in
- 41.38 x 27.6 x 2.25 cm

28. Weight will vary by configuration.

PORTS/SLOTS



Features

Ports

- 1 USB 3.1 Type-C™
- 1 USB 2.0 (powered port)
- 2 USB 3.1 Gen 1
- 1 HDMI 1.4b ²⁹
- 1 RJ-45
- 1 VGA
- 1 AC power
- 1 headphone/microphone combo jack

Expansion Slots

- 1 multi-format digital media reader
- Supports SD, SDHC, SDXC.

29. HDMI cable sold separately.

ENVIRONMENTAL & INDUSTRY

| | | | | |
|-------------------------------|--|--|---------------------|---------------------|
| Environmental Data | Eco-Label Certifications & declarations | <p>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:</p> <ul style="list-style-type: none"> • IT ECO declaration • US ENERGY STAR® • EPEAT[□] Gold registered in the United States. See http://www.epeat.net for registration status in your country. Search keyword <i>generator</i> on HP's 3rd party option store for solar energy accessory at http://www.hp.com/go/options | | |
| | System Configuration | <p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook".</p> | | |
| | Energy Consumption (in accordance with US ENERGY STAR® test method) | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |
| Normal Operation (Short idle) | | 9.69 W | 9.70 W | 9.55 W |
| Normal Operation (Long idle) | | 3.43 W | 3.48 W | 3.45 W |
| Sleep | | 0.67 W | 0.69 W | 0.67 W |
| Off | | 0.40 W | 0.45 W | 0.42 W |
| | | <p>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.</p> | | |
| | Heat Dissipation* | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 60Hz |



Features

| | | | |
|--|---|--|-----------|
| Normal Operation (Short idle) | 33 BTU/hr | 33 BTU/hr | 33 BTU/hr |
| Normal Operation (Long idle) | 12 BTU/hr | 12 BTU/hr | 12 BTU/hr |
| Sleep | 2 BTU/hr | 2 BTU/hr | 2 BTU/hr |
| Off | 1 BTU/hr | 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 _{WA} d, bels) | Sound Pressure (L _{pAm} , decibels) | |
| Typically Configured – Idle | 2.9 | 22 | |
| Fixed Disk – Random writes | 3.2 | 26 | |
| 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: 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 the 1ppm by weight Cadmium greater than 20ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium" | | |
| Additional Information | <ul style="list-style-type: none"> • 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 94.4% recycle-able when properly disposed of at end of life." | | |
| Packaging Materials | External: | PAPER/Corrugated | 410 g |
| | Internal: | PLASTIC/EPE (Expanded Polyethylene) | 70 g |
| | | PLASTIC/Polyethylene low density | 11 g |
| | The plastic packaging material contains at least 50% recycled content. | | |
| | The corrugated paper packaging materials contains at least 75% 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 | | |



Features

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| | | <p>http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):</p> <ul style="list-style-type: none"> • 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, has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO) |
| | <p>Packaging Usage</p> | <p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> • 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. |
| | <p>End-of-life Management and Recycling</p> | <p>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.</p> <p>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</p> |



Features

| | | |
|--|--|---|
| | | <p>by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p> |
| | <p>HP, Inc. Corporate Environmental Information</p> | <p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</p> <p>ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</p> |



Features

SERVICE AND SUPPORT

Warranty

3 year and 1 year limited warranties and 90-day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at <http://www.hp.com/go/cpc>³⁰

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

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage

19V

Average Operating Power

Win 10

Integrated graphics

N/A

Discrete Graphics

8.89W

Max Operating Power

Discrete < 65W

Temperature

Operating

32° to 95° F (0° to 35° C)

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 7.0®

Selected models ³³

EPEAT

Registered Gold in United States ³¹

ICES

Yes

Australia /

Yes

NZ A-Tick Compliance

Yes

CCC

Yes

Japan VCCI Compliance

Yes



Technical Specifications

| | |
|---------------------------------|-----|
| 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 |

31. EPEAT® registered where applicable. EPEAT registration varies by country. See <http://www.epeat.net> for registration status by country. Search keyword generator on HP's 3rd party option store for solar generator accessories at <http://www.hp.com/go/options>.

33. Configurations of the HP ProBook 470 G4 is ENERGY STAR® qualified are identified as HP ProBook 470 G4 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

DISPLAYS

Note: All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

| | | |
|---|---------------------------------------|----------------------|
| 17.3" diagonal FHD UWVA anti-glare LED-backlit non-touch; 220 cd/m²; 45% sRGB (1920 x 1080) | Outline Dimensions (W x H x D) | 400 x 233.3 (mm) max |
| | Active Area | 381.89 x 214.81 (mm) |
| | Weight | 550 g max |
| | Diagonal Size | 17.3 (inch) |
| | Thickness | 4.0 (mm) max |
| | Interface | eDP 1.3 |
| | LCD Mode | IPS |
| | PPI | |
| | Surface Treatment | Anti-Glare (AG) |
| | Touch Enabled | None |
| | Contrast Ratio | 600:1 (typical) |
| | Refresh Rate | 60 Hz |
| | Brightness | 300 nits |
| | Pixel Resolution | 1920 x 1080 (FHD) |
| | Format | RGB |
| | Backlight | LED |
| | Color Gamut Coverage | 72% |
| Color Depth | 6 bits + Hi FRC | |
| Viewing Angle | UWVA 85/85/85/85 | |

Outline Dimensions (W x H x D) 398.6 x 251 (mm) max



Technical Specifications

| | | |
|---|-----------------------------|----------------------|
| 17.3" diagonal HD+ anti-glare LED-backlit non-touch; 220 cd/m²; 45% sRGB (1600 x 900) | Active Area | 382.08 x 214.92 (mm) |
| | Weight | 550 g max |
| | Diagonal Size | 17.3 (inch) |
| | Thickness | 4.0 (mm) max |
| | Interface | eDP 1.3 |
| | LCD Mode | TN |
| | PPI | |
| | Surface Treatment | Anti-Glare (AG) |
| | Touch Enabled | None |
| | Contrast Ratio | 300:1 (typical) |
| | Refresh Rate | 60 Hz |
| | Brightness | 220 nits |
| | Pixel Resolution | 1600 x 900 (HD+) |
| | Format | RGB |
| | Backlight | LED |
| | Color Gamut Coverage | 60% |

STORAGE AND DRIVES

HARD DRIVES

| | | |
|--|---|--|
| 500 GB 7200 rpm SATA Hard Drive | Drive Weight | 0.20 lbs (92 g) ~ 0.21 lbs (95 g) |
| | Rotation Speed | 7200 rpm |
| | Cache Buffer | Up to 32 MB |
| | NAND Type/Size | N/A |
| | Height | 0.28 in (7 mm) |
| | Width | 2.75 in (69.85 mm) |
| | Interface | ATA-8, SATA 3.0 |
| | Interface Transfer Rate | 600 MB/s |
| | Seek Time | Single Track 2 ~ 1.5 ms Average 11 ~ 13 ms Maximum 18 ~ 22 ms |
| | Logical Blocks | 976,773,168 |
| | Operating Temperature | 32° to 140° F (0° to 60° C) [top cover temp] |
| | Security Features | ATA Security |
| | Other Features | S.M.A.R.T., NCQ, Ultra DMA |
| | 500 GB 5400 rpm SMART SATA Hybrid HDD/SSHD | Drive Weight |
| Rotation Speed | | 5400 rpm |
| Cache Buffer | | 64 MB |
| NAND Type/Size | | TLC/8GB |
| Height | | 0.28 in (7 mm) |



Technical Specifications

| | |
|--------------------------------|--|
| Width | 2.75 in (69.85 mm) |
| Interface | ATA-8, SATA 3.0 |
| Interface Transfer Rate | 600 MB/s |
| Seek Time | Single Track 2 ms Average 12 ms Maximum 22 ms |
| Logical Blocks | 976,773,168 |
| Operating Temperature | 32° to 140° F (0° to 60° C) [top cover temp] |
| Security Features | ATA Security |
| Other Features | S.M.A.R.T., NCQ, Ultra DMA |

1TB 5400 rpm SATA Hard Drive

| | |
|--------------------------------|--|
| Drive Weight | 0.21 lbs (94 g) |
| Rotation Speed | 5400 rpm |
| Cache Buffer | Up to 32 MB |
| NAND Type/Size | N/A |
| Height | 0.28 in (7.2 mm) |
| Width | 2.75 in (69.85 mm) |
| Interface | ATA-8, SATA 3.0 |
| Interface Transfer Rate | 600 MB/s |
| Seek Time | Single Track 2 ms Average 12 ~ 13 ms Maximum 18 ~ 22 ms |
| Logical Blocks | 1,953,525,168 |
| Operating Temperature | 32° to 140° F (0° to 60° C) [top cover temp] |
| Security Features | ATA Security |
| Other Features | S.M.A.R.T., NCQ, Ultra DMA |

SOLID STATE DRIVES

128GB 2280 M2 SATA-3 TLC Solid State Drive

| | |
|---------------------------------|--|
| Form Factor | M.2 2280 |
| Capacity | 127 GB |
| NAND Type | TLC |
| Height | 0.09 in (2.3 mm) |
| Width | 0.87 in (22 mm) |
| Weight | 0.01 lb (6 g) ~ 0.02 lb (10 g) |
| Interface | ATA-8, SATA 3.0 |
| Maximum Sequential Read | Up To 535 MB/s |
| Maximum Sequential Write | Up To 515 MB/s |
| Logical Blocks | 250,069,680 |
| Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| Features | DIPM; TRIM; DEVSLP |

Not all configuration components are available in all regions/countries.
 c05572890 — DA 16006— Worldwide — Version 15 — October 2, 2018



Technical Specifications

| | | |
|---|---------------------------------|--|
| 256GB 2280 PCIe NVMe Value Solid State Drive | Form Factor | M.2 2280 |
| | Capacity | 256 GB |
| | NAND Type | TLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (22 mm) |
| | Interface | PCIe NVMe Gen3X4 |
| | Maximum Sequential Read | Up To 1700 MB/s |
| | Maximum Sequential Write | Up To 600 MB/s |
| | Logical Blocks | 500,118,192 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | TRIM; L1.2 |

| | | |
|--|---------------------------------|--|
| 512GB 2280 M2 PCIe NVMe TLC Solid State Drive | Form Factor | M.2 2280 |
| | Capacity | 512 GB |
| | NAND Type | TLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (22 mm) |
| | Interface | PCIe NVMe Gen3X4 |
| | Maximum Sequential Read | Up To 2600 MB/s |
| | Maximum Sequential Write | Up To 1400 MB/s |
| | Logical Blocks | 1,000,215,216 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | TRIM; L1.2 |

NETWORKING/COMMUNICATIONS

WLAN

| | | | |
|--|-------------------------------|---|---|
| Intel 802.11 a/b/g/n/AC (2x2) WiFi and Bluetooth® 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 | <ul style="list-style-type: none"> • 2.402 – 2.482 GHz |
| | | 802.11a/n | <ul style="list-style-type: none"> • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz |



Technical Specifications

| | |
|---|---|
| | <ul style="list-style-type: none"> • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz |
| Data Rates | <ul style="list-style-type: none"> • 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 |
| Security¹ | <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI |
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| Roaming | IEEE 802.11 compliant roaming between access points |
| Output Power² | <ul style="list-style-type: none"> • 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +14dBm minimum • 802.11n HT40(2.4GHz) : +12dBm minimum • 802.11n HT20(5GHz) : +14dBm 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: 50 mW (WLAN unassociated) Connect Standby: 10 mW (WLAN+BT) Radio disabled: 5 mW |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
| Receiver Sensitivity³ | 802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum |
| Antenna type | High efficiency antenna with spatial diversity, mounted in the display |

Technical Specifications

| | |
|--------------------------|---|
| | 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 |
| Weight | Type 2230 : 2.8g |
| 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 |
| | <ol style="list-style-type: none"> 1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). |

HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology

| | |
|-------------------------------------|--|
| Bluetooth Specification | 4.0/4.1/4.2 Compliant |
| Frequency Band | 2402 to 2480 MHz |
| Number of Available Channels | Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| 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. |
| Power Consumption | Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW |
| Electrical Interface | USB 2.0 compliant |
| Bluetooth Software Supported | Microsoft Windows Bluetooth Software |
| Link Topology | |
| Power Management | Microsoft Windows ACPI, and USB Bus Support |
| Certifications | FCC (47 CFR) Part 15C, Section 15.247 & 15.249 |
| Power Management | ETS 300 328, ETS 300 826 |
| Certifications | Low Voltage Directive IEC950 UL, CSA, and CE Mark |



Technical Specifications

| | |
|-------------------------------------|---|
| Bluetooth Profiles Supported | <p>BT4.1-ESR 5/6/7 Compliance</p> <p>LE Link Layer Ping</p> <p>LE Dual Mode</p> <p>LE Link Layer</p> <p>LE Low Duty Cycle Directed Advertising</p> <p>LE L2CAP Connection Oriented Channels</p> <p>Train Nudging & Interlaced Scan</p> <p>BT4.2 ESR08 Compliance</p> <p>LE Secure Connection- Basic/Full</p> <p>LE Privacy 1.2 –Link Layer Privacy</p> <p>LE Privacy 1.2 –Extended Scanner Filter Policies</p> <p>LE Data Packet Length Extension</p> <p>FAX Profile (FAX)</p> <p>Basic Imaging Profile (BIP)2</p> <p>Headset Profile (HSP)</p> <p>Hands Free Profile (HFP)</p> <p>Advanced Audio Distribution Profile (A2DP)</p> |
|-------------------------------------|---|

| | | |
|--|--|---|
| Intel 802.11 a/b/g/n/AC (1x1) WiFi and Bluetooth® Combo¹ | Wireless LAN Standards | <p>IEEE 802.11a</p> <p>IEEE 802.11b</p> <p>IEEE 802.11g</p> <p>IEEE 802.11n</p> <p>IEEE 802.11ac</p> |
| | Interoperability Frequency Band | <p>Wi-Fi certified</p> <p>802.11b/g/n</p> <ul style="list-style-type: none"> • 2.402 – 2.482 GHz <p>802.11a/n</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 |
| | Data Rates | <ul style="list-style-type: none"> • 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 | <p>Direct Sequence Spread Spectrum</p> <p>BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p> |
| | Security³ | <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite |



Technical Specifications

| | |
|---|---|
| | <ul style="list-style-type: none"> WAPI |
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| Roaming | IEEE 802.11 compliant roaming between access points |
| Output Power² | <ul style="list-style-type: none"> 802.11b : +14dBm minimum 802.11g : +12dBm minimum 802.11a : +12dBm minimum 802.11n HT20(2.4GHz) : +12dBm minimum 802.11n HT40(2.4GHz) : +12dBm minimum 802.11n HT20(5GHz) : +10dBm minimum 802.11n HT40(5GHz) : +10dBm minimum 802.11ac VHT80(5GHz) : +10dBm minimum |
| Power Consumption | Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connect Standby: 10 mW (WLAN+BT) Radio disabled: 8 mW |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
| Receiver Sensitivity³ | 802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm 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 |
| Weight | Type 2230 : 2.8g |
| 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 \(OFDM modulation\).](#)



Technical Specifications

HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology

| | |
|-------------------------------------|--|
| Bluetooth Specification | 4.0/4.1/4.2 Compliant |
| Frequency Band | 2402 to 2480 MHz |
| Number of Available Channels | Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| 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. |
| Power Consumption | Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW |
| Electrical Interface | USB 2.0 compliant |
| Bluetooth Software Supported | Microsoft Windows Bluetooth Software |
| Link Topology | |
| Power Management | Microsoft Windows ACPI, and USB Bus Support |
| Certifications | FCC (47 CFR) Part 15C, Section 15.247 & 15.249 |
| Power Management | ETS 300 328, ETS 300 826 |
| Certifications | Low Voltage Directive IEC950 |
| Bluetooth Profiles Supported | UL, CSA, and CE Mark BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) |

| | |
|-------------------------------|------------------------------|
| Wireless LAN Standards | IEEE 802.11a IEEE 802.11b |
|-------------------------------|------------------------------|

Not all configuration components are available in all regions/countries.
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Technical Specifications

| | |
|--|---|
| <p>Realtek 802.11a/b/g/n/AC (2x2) WiFi and Bluetooth® 4.2 Combo¹</p> | <p>IEEE 802.11g IEEE 802.11n IEEE 802.11ac Wi-Fi certified 802.11b/g/n</p> <ul style="list-style-type: none"> • 2.402– 2.482 GHz <p>802.11a/n</p> <ul style="list-style-type: none"> • 5.15 – 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>Interoperability Frequency Band</p> | |
| <p>Data Rates</p> | <p>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)</p> |
| <p>Modulation</p> | <p>Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM,</p> |
| <p>Security¹</p> | <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI |
| <p>Network Architecture Models</p> | <p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p> |
| <p>Roaming</p> | <p>IEEE 802.11 compliant roaming between access points</p> |
| <p>Output Power²</p> | <ul style="list-style-type: none"> • 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 |
| <p>Power Consumption</p> | <p>Transmit mode 2.0 W Receive mode 1.6 W Idle mode (PSP) 180 mW (WLAN Associated) Idle mode 50 mW (WLAN unassociated) Connected Standby 10mW Radio disabled 8 mW</p> |



Technical Specifications

| | |
|---|---|
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
| Receiver Sensitivity³ | 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 |
| Weight | Type 2230 : 2.8g |
| 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 |
| | <ol style="list-style-type: none"> 1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). |

HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology

| | |
|-------------------------------------|--|
| Bluetooth Specification | 4.0/4.1/4.2 Compliant |
| Frequency Band | 2402 to 2480 MHz |
| Number of Available Channels | Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| Transmit Power | The Bluetooth component shall operate as a Class II Bluetooth device with |

Not all configuration components are available in all regions/countries.
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Technical Specifications

a maximum transmit power of + 4 dBm for BR and EDR.

| | |
|-------------------------------------|--|
| Power Consumption | Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW |
| Electrical Interface | USB 2.0 compliant |
| Bluetooth Software Supported | Microsoft Windows Bluetooth Software |
| Link Topology | |
| Power Management | Microsoft Windows ACPI, and USB Bus Support |
| Certifications | FCC (47 CFR) Part 15C, Section 15.247 & 15.249 |
| Power Management | ETS 300 328, ETS 300 826 |
| Certifications | Low Voltage Directive IEC950 |
| Bluetooth Profiles Supported | UL, CSA, and CE Mark BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) |

**Realtek
802.11a/b/g/n/ac (1x1)
WiFi and Bluetooth® 4.2
Combo**¹

| | |
|-------------------------------|---|
| 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 <ul style="list-style-type: none"> • 2.402– 2.482 GHz 802.11a/n <ul style="list-style-type: none"> • 5.15 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz |



Technical Specifications

| | |
|---|---|
| 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, |
| Security¹ | <ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI |
| Network Architecture Models | Ad-hoc (Peer to Peer) Infrastructure (Access Point Required) |
| Roaming | IEEE 802.11 compliant roaming between access points |
| Output Power² | <ul style="list-style-type: none"> • 802.11b : +14dBm minimum • 802.11g : +12dBm minimum • 802.11a : +12dBm minimum • 802.11n HT20(2.4GHz) : +12dBm minimum • 802.11n HT40(2.4GHz) : +12dBm minimum • 802.11n HT20(5GHz) : +10dBm minimum • 802.11n HT40(5GHz) : +10dBm minimum • 802.11ac VHT80(5GHz) : +10dBm minimum |
| Power Consumption | Transmit mode 2.0 W Receive mode 1.6 W Idle mode (PSP) 180 mW (WLAN Associated) Idle mode 50 mW (WLAN unassociated) Connected Standby 10mW Radio disabled 8 mW |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
| Receiver Sensitivity³ | 802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum |
| Antenna type | High efficiency antenna with spatial diversity, mounted in the display enclosure |



Technical Specifications

| | | |
|--------------------------|---|--------------------------------|
| | 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 | |
| Weight | Type 2230 : 2.8g | |
| 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 | |
| | <ol style="list-style-type: none"> 1. Check latest software/driver release for updates on supported security features. 2. Maximum output power may vary by country according to local regulations. 3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation). | |

HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology

| | |
|---|--|
| Bluetooth Specification | 4.0/4.1/4.2 Compliant |
| Frequency Band | 2402 to 2480 MHz |
| Number of Available Channels | Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| 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. |
| Power Consumption | Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW |
| Electrical Interface | USB 2.0 compliant |
| Bluetooth Software Supported Link Topology | Microsoft Windows Bluetooth Software |
| Power Management | Microsoft Windows ACPI, and USB Bus Support |
| Certifications | FCC (47 CFR) Part 15C, Section 15.247 & 15.249 |
| Power Management | ETS 300 328, ETS 300 826 |



Technical Specifications

| | |
|-------------------------------------|--|
| Certifications | Low Voltage Directive IEC950 |
| Bluetooth Profiles Supported | <ul style="list-style-type: none"> UL, CSA, and CE Mark BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) |

POWER

| | | |
|--|--|---|
| HP 65W AC Adapter, nPFC 3Pin RC 4.5mm | Dimensions | 4.25 x 1.85 x 1.47 in (10.8 x 4.7 x 3.74 cm) |
| | Weight | 1.81 lb (250g) max |
| | Input | 100 to 240 VAC |
| | Input Efficiency | 88% min at 115 VAC and 89% min at 230 VAC |
| | Input frequency range | 47 to 63 Hz |
| | Input AC current | 1.7 A at 90 VAC |
| | Output | |
| | Output power | 65W |
| | DC output | 19.5V |
| | Hold-up time | 5 msec at 115 VAC input |
| | Output current limit | <11A, Over voltage protection- 29V max automatic shutdown |
| | Connector | 4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords |
| | Environmental Design | |
| | Operating temperature | 32° to 104° F (0° to 40° C) |
| | Non-operating (storage) temperature | -4° to 149° F (-20° to 65° C) |
| | Altitude | 0 to 10,000 ft (0 to 3,048 m) |
| | Humidity | 20% to 80% |
| | Storage Humidity | 10% to 90% |
| | | *CE Mark - full compliance with LVD and EMC directives |



Technical Specifications

EMI and Safety Certifications

* 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.

| | | | | |
|--|---|--|---|--|
| 65W 3-prong AC Adapter (EM Model) | Dimensions | 102x55x30mm | | |
| | Weight | 270g +/- 10g | | |
| | Input | Input Efficiency | 87% min at 115V/230V | |
| | | Input frequency range | 47 to 63 Hz | |
| | | Input AC current | 1.7 A at 90 VAC and maximum load | |
| | Output | DC output | 65W(19.5V/3.33A) | |
| | | Hold-up time | 5 msec at 115 VAC input | |
| | | Output current limit | <11A, Over voltage protection- 29V max automatic shutdown | |
| | | Connector | 4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords | |
| | Environmental Design | Operating temperature | 0° to 35° C | |
| | | Non-operating (storage) temperature | -20° to 85° C | |
| | | Altitude | 0 to 5,000 m | |
| | | Humidity | 0% to 95% | |
| Storage Humidity | | 0% to 95% | | |
| Safety Certifications | CE Mark - EMC directives; Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation. | | | |

| | | | | |
|---|-------------------------------|---|-------------------------------|--|
| HP 3-cell, Long Life 48 WHr Li-ion | Dimensions (H x W x L) | 7.0. x180.48x88.95 mm (0.273 x 7.09 x 3.49 inch) | | |
| | Weight | 0.22 kg (0.48lb) | | |
| | Cells/Type | 3cell Lithium-Ion | | |
| | Energy | Voltage | 11.4V/ 10.95V | |
| | | Amp-hour capacity | 4.212Ah /4.385Ah | |
| | | Watt-hour capacity | 48Wh | |
| | 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 | |



Technical Specifications

| | |
|--|---------|
| Fuel Gauge LED | No |
| Warranty | 1-year* |
| Optional Travel Battery Available | No |

*Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform.

Country of Origin

China



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

| Type | Description | Part Number |
|-----------------------------|--|----------------------------|
| Docking | HP USB-C Dock G4 | 3FF69AA |
| | HP 3005pr USB3 Port Replicator | Y4H06AA |
| | HP Thunderbolt Dock 120W G2 | 2UK37AA |
| | HP USB-C Travel Dock | TOK29AA |
| | HP USB Travel Dock | TOK30AA |
| | HP Elite USB-C Dock G3 | 2DW60AA |
| | HP USB-C Mini Dock | 1PM64AA |
| | HP USB-C Universal Dock | 1MK33AA |
| Input/Output | HP Slim USB Keyboard and Mouse | T6T83AA |
| | HP Slim Wireless Keyboard and Mouse | T6L04AA |
| | 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 HDMI to DVI Adapter | F5A28AA |
| | HP USB-C to DP | N9K78AA |
| | HP USB-C to USB-A Hub | Z6A00AA |
| | HP Stereo 3.5mm Headset | T1A66AA |
| | HP Stereo USB Headset | T1A67AA |
| | Memory | HP 4GB 2400MHz DDR4 Memory |
| HP 8GB 2400MHz DDR4 Memory | | Z4Y85AA |
| HP 16GB 2400MHz DDR4 Memory | | Z4Y86AA |
| Power | HP 45W Smart AC Adapter 4.5mm | H6Y88AA |
| | HP 65W Smart AC Adapter | H6Y89AA |
| | HP 65W Slim AC Adapter | H6Y82AA |
| | HP 45W USB-C Power Adapter | 1HE07AA |
| | HP 65W USB-C Power Adapter | 1HE08AA |
| | HP Notebook Power Bank | N9F71AA |
| | HP USB-C Notebook Power Bank | 1TZ86AA |
| Storage | HP External USB Optical Drive | F2B56AA |
| | HP 500GB 7200rpm HDD | F3B97AA |
| | HP External Portable USB3.0 HDD | K6A93AA |
| | HP 256GB Value 2280 M.2 SATA-3 SSD | 1DE47AA |
| | HP 512GB TLC PCI-e 3x4 NVME 2280 M.2 SSD | 1FU88AA |
| Security | HP Essential Combination Lock | TOY16AA |
| | HP Combination Lock | TOY15AA |
| | HP Keyed Cable lock | TOY14AA |
| | HP Keyed Cable Lock 10mm | T1A62AA |
| UCC | HP Conferencing Keyboard | K8P74AA |
| | HP USB Collaboration Keyboard | Z9N38AA |
| | HP Wireless Collaboration Keyboard | Z9N39AA |



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

| | | |
|-----------------|---|---------|
| | HP UC Wireless Mono Headset | W3K08AA |
| | HP UC Wireless Duo Headset | W3K09AA |
| | HP UC Speaker Phone | K7V16AA |
| | HP UC Wired Headset | K7V17AA |
| Displays | HP EliteDisplay S140u USB Portable Monitor | G8R65AA |
| | HP ProDisplay P240VA 23.8-inch Monitor | N3H14AA |
| | HP ProDisplay P232 23-inch Monitor | K7X31AA |
| | HP ProDisplay P223 21.5-inch Monitor | X7R61AA |
| | HP EliteDisplay E230t 23-inch Touch Monitor | W2Z50AA |
| | HP EliteDisplay E240c 23.8-inch Collaboration Monitor | M1P00A8 |



Summary of Changes

| Date of change: | Version History: | | Description of change: |
|------------------------|-------------------------|---------|---|
| August 22, 2017 | From V1 to V2 | Update | Change battery life information TBD |
| September 7, 2017 | From V2 to V3 | Update | Change battery life information to current |
| October 6, 2017 | From V3 to V4 | Update | TPM 2.0 added to Client Security Software |
| December 20, 2017 | From V4 to V5 | Update | SKU Z9R42AA removed |
| December 21, 2017 | From V5 to V6 | Update | Backlit keyboard available as an option removed |
| February 23, 2018 | From V6 to V7 | Update | HP Elite USB-C Docking Station (X7W54AA) removed from options section |
| April 5, 2018 | From V7 to V8 | Update | Processors added to Processors and processors family Dockings updated in options section |
| April 18, 2018 | From V8 to V9 | Update | At a glance section part 13 |
| May 7, 2018 | From V9 to V10 | Added | Environmental tab |
| June 4, 2018 | From V10 to V11 | Update | Processors section |
| July 6, 2018 | From V11 to V12 | Update | Energy star |
| August 13, 2018 | From V12 to V13 | Remove | Software Velocity |
| September 5, 2018 | From V13 to V14 | Update | Processors and Docking section |
| October 2, 2018 | From V14 to V15 | Removed | Certification tab |

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