

### Overview

### HP ProBook x360 435 G8 Notebook PC



#### Left

1. Internal Microphones
2. Webcam LED
3. Webcam and IR Camera (Optional)
4. HP Privacy Camera
5. IR Camera LED (Optional)
6. Clickpad
7. World-facing Camera (Optional)
8. World-facing Camera LED (Optional)
9. Vents
10. SuperSpeed USB Type-A 5 Gbps signaling rate charging Port
11. Nano Security Lock Slot (Lock Sold Separately)

### Overview



#### Right

- |  |   |
|--|---|
| 1. Power Button  | 5. HDMI 1.4b Port (Cable not included)      |
| 2. Power Connector   | 6. Audio Combo Jack                         |
| 3. SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4) | 7. MicroSD Card reader                      |
| 4. SuperSpeed USB Type-A 5 Gbps signaling rate Port                                    | 8. Touch Fingerprint Sensor (Select models) |

### Overview

#### AT A GLANCE

- Preinstalled with Windows 10 versions or FreeDOS
- A stylish and professional convertible adapts with versatile use modes from traditional laptop to tablet, stand and tent that enables to create, present and collaborate
- Sleek and durable anodized aluminum top cover and keyboard deck
- Choice of AMD Ryzen™ 5000 series mobile processors
- Integrated AMD Radeon™ Graphics
- Display include your choice of 33.8 cm (13.3") diagonal IPS Wide Viewing Angle, FHD, touch screen with Corning® Gorilla® Glass 5
- Commercial-grade security features including HP Sure Start, HP Sure Sense, HP Client Security, HP Sure Click, HP Privacy Camera and optional HP Sure View
- Captures the world around with an optional world facing- camera in the keyboard<sup>1</sup>
- Supports wireless LAN options for connectivity on the go including gigabit data rate Wi-Fi® 6<sup>1</sup>
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Undergoes MIL-STD 810H tests<sup>2</sup>

1. Sold separately or as an optional feature.

2. MIL STD 810H testing is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or formilitary 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.**

### Technical Specifications

#### PRODUCT NAME

HP ProBook x360 435 G8 Notebook PC

#### OPERATING SYSTEM

##### Preinstalled

Windows10 Pro 64 – HP recommends Windows 10 Pro<sup>1</sup>  
Windows10 Pro 64 (National Academic License)<sup>2</sup>  
Windows10 Home 64<sup>1</sup>  
Windows10 Home Single Language 64<sup>1</sup>  
Windows 10 Pro (Windows 10 Enterprise available with a Volume Licensing Agreement)<sup>1</sup>  
Windows10 Enterprise 64 (Web Support)<sup>1</sup>  
FreeDOS

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. 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.

Note: HP tested Windows 10, version 1909 on this platform. For testing information on newer versions of Windows 10, please see <https://support.hp.com/document/c05195282>.

#### PROCESSORS

AMD Ryzen™ 3 5400U (up to 4.0 GHz max boost clock, 10 MB L3 cache, 4 cores)<sup>3,4,5,6</sup>

AMD Ryzen™ 5 5600U with Radeon™ Graphics (2.3 GHz base clock, up to 4.2 GHz max boost clock, 16 MB L3 cache, 6 cores)<sup>3,4,5,6</sup>

AMD Ryzen™ 7 5800U with Radeon™ Graphics (1.9 GHz base clock, up to 4.4 GHz max boost clock, 16 MB L3 cache, 8 cores)<sup>3,4,5,6</sup>

##### Processor Family

AMD Ryzen™ 3 processor<sup>6</sup>

AMD Ryzen™ 5 processor<sup>6</sup>

AMD Ryzen™ 7 processor<sup>6</sup>

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

4. 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. AMD's numbering is not a measurement of clock speed.

5. AMD Max Burst frequency performance varies depending on hardware, software and overall system configuration.

6. 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>.

#### CHIPSET

Chipset is integrated with processor.

### Technical Specifications

#### GRAPHICS

##### Integrated

AMD Radeon™ Graphics

##### Supports

Support HD decode, DX12, HDMI1.4b<sup>7</sup>, via HDMI up to 4K 30Hz

7. HDMI cable sold separately.

#### DISPLAY

##### Touch

33.8 cm (13.3") diagonal FHD UWVA eDP BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, 250 nits, 45% NTSC with HD camera (1920 x 1080) <sup>8,9,10</sup>

33.8 cm (13.3") diagonal FHD UWVA eDP BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, 250 nits, 45% NTSC with HD + IR camera (1920 x 1080) <sup>8,9,10</sup>

33.8 cm (13.3") diagonal FHD UWVA eDP + PSR BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, Low Power, 400 nits, 72% NTSC with HD camera (1920 x 1080) <sup>8,9,10</sup>

33.8 cm (13.3") diagonal FHD UWVA eDP + PSR BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, Low Power, 400 nits, 72% NTSC with HD + IR camera (1920 x 1080) <sup>8,9,10</sup>

HP Sure View Integrated Privacy Screen 33.8 cm (13.3") diagonal FHD UWVA eDP + PSR BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, 1000 nits, 72% NTSC with HD camera (1920 x 1080) <sup>8,9,10,11</sup>

HP Sure View Integrated Privacy Screen 33.8 cm (13.3") diagonal FHD UWVA eDP + PSR BrightView WLED-backlit touch screen with Corning® Gorilla® Glass 5, 1000 nits, 72% NTSC with HD + IR camera (1920 x 1080) <sup>8,9,10,11</sup>

8. FHD/HD content required to view FHD/HD images.

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

10. Actual brightness will be lower with touchscreen or Sure View.

11. HP Sure View integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

### Technical Specifications

#### STORAGE AND DRIVES

##### Primary M.2 Storage

- 128 GB PCIe® Gen3x4 NVMe™ TLC Solid State Drive <sup>12</sup>
- 256 GB PCIe® NVMe™ Value Solid State Drive <sup>12</sup>
- 512 GB PCIe® NVMe™ Value Solid State Drive <sup>12</sup>
- 512 GB PCIe® Gen3x4 NVMe™ TLC Solid State Drive <sup>12</sup>
- 1 TB PCIe® Gen3x4 NVMe™ TLC Solid State Drive <sup>12</sup>

12. 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

##### Maximum Memory

32 GB DDR4-3200 SDRAM <sup>13</sup>

##### Memory

- 32 GB DDR4 -3200 SDRAM (2 x 16GB) <sup>13</sup>
- 16 GB DDR4-3200 SDRAM (1 x 16 GB) <sup>13</sup>
- 16 GB DDR4-3200 SDRAM (2 x 8 GB) <sup>13</sup>
- 8 GB DDR4-3200 SDRAM (1 x 8 GB) <sup>13</sup>
- 8 GB DDR4-3200 SDRAM (2 x 4 GB) <sup>13</sup>
- 4 GB DDR4-3200 SDRAM (1 x 4 GB) <sup>13</sup>

##### Memory Slots

2 SODIMM

Both slots are customer accessible / upgradeable by IT or self-maintainers only.

DDR4 PC4 SODIMMS, system runs at 3200

Supports Dual Channel Memory

13. 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

##### WLAN

Realtek RTL8822CE 802.11ac (2x2) and Bluetooth® 5 Combo <sup>14</sup>

Intel® Dual Band Wireless-AC 9260 802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 5 Combo, non-vPro® <sup>14</sup>

Intel® AX200 Wi-Fi 6 (2x2) and Bluetooth® 5 Combo, non-vPro® <sup>15</sup>

##### Miracast

Native Miracast Support <sup>16</sup>

14. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.

15. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 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 802.11 ax WLAN devices. Only available in countries where 802.11ax is supported.

16. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming.

### Technical Specifications

#### AUDIO/MULTIMEDIA

**Audio**

Integrated microphone (Dual Array)  
2 Integrated stereo speakers

**Speaker Power**

2W/4ohm Per speaker

**Camera**

User-facing 720p HD camera <sup>17,18</sup>  
User-facing 720p HD + IR camera <sup>17,18</sup>  
World-facing 5MP auto-focus secondary camera <sup>18</sup>

**Sensors**

Combo Chip (Accelerometer + Gyro)  
Magnetometer  
Hall Sensor

17. FHD/HD content required to view FHD/HD images.

18. Sold separately or as an optional feature.

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#### KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

**Keyboard**

HP Premium Keyboard, spill resistant with DuraKeys and optional backlit <sup>19</sup>

**Pointing Device**

Clickpad with multi-touch gesture support

**Function Keys**

F1 - Display Switching  
F2 - Blank or Privacy (with LED)  
F3 - Brightness Down  
F4 - Brightness Up  
F5 - Audio Mute  
F6 - Volume Down  
F7 - Volume Up  
F8 - Mic Mute  
F9 - Blank or Keyboard Backlit Toggle  
F10 - Insert  
F11 - Airplane Mode  
F12 - HP Programmable Key  
Power Button

**Hidden Function Keys**

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

19. Backlit keyboard is an optional feature.

### Technical Specifications

#### SOFTWARE AND SECURITY

##### Preinstalled Software

###### BIOS

HP BIOSphere Gen6<sup>20</sup>

BIOS Update via Network

HP Secure Erase<sup>21</sup>

Absolute Persistence Module<sup>22</sup>

HP Wake on WLAN

###### Software

HP Connection Optimizer<sup>23</sup>

HP Hotkey Support

HP Support Assistant<sup>24</sup>

HP Noise Cancellation Software

Buy Office (Sold separately)

Microsoft Defender<sup>25</sup>

###### Manageability Features

HP Driver Packs (download)<sup>26</sup>

HP Client Catalog (download)

HP Manageability Integration Kit Gen4(download)<sup>27</sup>

HP Image Assistant (download)

###### Security Management

TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)

USB enable/disable (via BIOS)

Setup password (via BIOS)

Support for chassis padlocks and cable lock devices

HP Sure Click<sup>28</sup>

HP Sure Sense<sup>29</sup>

HP Sure Start Gen6<sup>30</sup>

HP Sure View Gen3<sup>31</sup>

HP Sure Admin<sup>32</sup>

HP Pro Security Edition (Select models)<sup>33</sup>

HP Fingerprint Sensor (Select models)<sup>34</sup>

20. HP BIOSphere Gen6 is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations.

21. HP Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

22. Absolute firmware module is shipped turned off and can only be activated with the purchase a license subscription and full activation of the software agent. License subscriptions can be purchased for terms ranging multiple years. Service is



### Technical Specifications

limited, check with Absolute for availability outside the U.S. Certain conditions apply. For full details visit:  
<https://www.absolute.com/about/legal/agreements/absolute/>

23. HP Connection Optimizer requires Windows 10.

24. HP Support Assistant requires Windows and Internet access.

25. Windows Defender Opt in and internet connection required for updates.

26. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.

27. HP Manageability Integration Kit can be downloaded from  
<http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.

28. HP Sure Click requires Windows 10 Pro or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

29. HP Sure Sense is available on select HP PCs and is not available with Windows 10 Home.

30. HP Sure Start Gen6 is available on select HP PCs and requires Windows 10.

31. HP Sure View Gen3 integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

32. HP Sure Admin requires Windows 10, HP BIOS, HP Manageability Integration Kit from <http://www.hp.com/go/clientmanagement> and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.

33. HP Pro Security Edition is available preloaded on select HP PCs and includes HP Sure Click Pro and HP Sure Sense Pro. 3-year license required. The HP Pro Security Edition software is licensed under the license terms of the HP End User License Agreement (EULA) that can be found at:

[https://h30670.www3.hp.com/ecommerce/common/disclaimer.do#EN\\_US](https://h30670.www3.hp.com/ecommerce/common/disclaimer.do#EN_US) as modified by the following:

“7. Term.

Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Pro Security Edition (HP Sure Sense Pro and HP Sure Click Pro) is effective upon activation and will continue for thirty-six (36) months thereafter (“Initial Term”). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Pro Security Edition from HP.com, HP Sales or an HP Channel Partner, or (b) continue using the standard versions of HP Sure Click and HP Sure Sense at no additional cost with no future software updates or HP Support.”

HP Pro Security Edition is optimized for the SMB environment and ships pre-configured - manageability is optional. The HP Pro Security Edition supports a limited tool set that can be used by the HP Manageability Integration Kit which can be downloaded from <http://www.hp.com/go/clientmanagement>.

34. HP Fingerprint sensor is an optional feature that must be configured at purchase.

### Technical Specifications

#### POWER

##### Power Supply

HP Smart 65 W External AC power adapter <sup>35</sup>  
HP Smart 65 W EM External AC power adapter <sup>35</sup>  
HP Smart 65 W USB Type-C adapter <sup>35</sup>  
HP Smart 45 W External AC power adapter <sup>35</sup>  
HP Smart 45 W USB Type-C adapter <sup>35</sup>

##### Power Cord

3-wire plug - 1m <sup>35</sup>  
2-wire plug - 1m <sup>35</sup>

##### Primary Battery

HP Long Life 3-cell, 45 Wh Li-ion polymer <sup>36,37</sup>  
Support HP Fast Charge (Up to 50% in 30 minutes with 65W AC Adapter)<sup>38</sup>

##### Battery life

Up to 17 hours <sup>39</sup>

35. Availability may vary by country.

36. Battery is internal and not replaceable by customer. Serviceable by warranty.

37. Actual battery Watt-hours (Wh) will vary from design capacity. Battery capacity will naturally decrease with shelf life, time, usage, environment, temperature, system configuration, loaded apps, features, power management settings and other factors.

38. Supports HP Fast Charge with 65W AC Adapter. Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

39. Windows 10 MM18 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](http://www.bapco.com) for additional details.

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#### WEIGHTS & DIMENSIONS

##### Weight

Starting at 3.19 lb (1.45 kg)<sup>40</sup>

##### Dimensions (w x d x h)

12.15 x 8.78 x 0.71 in  
30.85 x 22.295 x 1.795 cm

40. Weight will vary by configuration.

### Technical Specifications

#### PORTS/SLOTS

##### Ports

- 1 SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)
- 2 SuperSpeed USB Type-A 5 Gbps signaling rate (1 charging port)
- 1 HDMI 1.4b<sup>41</sup>
- 1 Headphone/microphone combo jack
- 1 AC power

##### Expansion Slots

- 1 microSD
- Supports SD, SDHC, SDXC

41. HDMI cable sold separately.

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#### SERVICE AND SUPPORT

1-year and 3-year limited warranties and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for HP Long Life batteries which will follow the one or three year warranty of the platform. Refer to <http://www.hp.com/support/batterywarranty/> for additional battery information. 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>.<sup>42</sup>

42. 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](http://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

<b>Stand-Alone Power Requirements (AC Power)</b>	<b>Nominal Operating Voltage</b>	19 V
	<b>Average Operating Power</b>	5.71 w
	<b>Integrated Graphics</b>	AMD
	<b>Max Operating Power</b>	UMA < 45W
<b>Temperature</b>	<b>Operating</b>	41° to 95° F (5° to 35° C)
	<b>Non-operating</b>	-4° to 140° F (-20° to 60° C)
<b>Relative Humidity</b>	<b>Operating</b>	10% to 90%, non-condensing
	<b>Non-operating</b>	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
<b>Shock</b>	<b>Operating</b>	40 G, 2 ms, half-sine
	<b>Non-operating</b>	200 G, 2 ms, half-sine
<b>Random Vibration</b>	<b>Operating</b>	0.75 grms
	<b>Non-operating</b>	1.50 grms
<b>Altitude (unpressurized)</b>	<b>Operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
	<b>Non-operating</b>	-50 to 10,000 ft (-15.24 to 3,048 m)
<b>Planned Industry Standard Certifications</b>	<b>UL</b>	Yes
	<b>CSA</b>	Yes
	<b>FCC Compliance</b>	Yes
	<b>ENERGY STAR®</b>	Yes, Select models <sup>43</sup>
	<b>EPEAT®</b>	Yes, Gold in U.S. <sup>44</sup>
	<b>ICES</b>	Yes
	<b>Australia</b>	Yes
	<b>NZ A-Tick Compliance</b>	Yes
	<b>CCC</b>	Yes
	<b>Japan VCCI Compliance</b>	Yes
	<b>KC</b>	Yes
	<b>BSMI</b>	Yes
	<b>CE Marking Compliance</b>	Yes
	<b>BNCI or BELUS</b>	Yes
	<b>CIT</b>	Yes
	<b>EAC</b>	Yes
	<b>Saudi Arabian Compliance (ICCP)</b>	Yes
	<b>SABS</b>	Yes
	<b>UKRSERTCOMPUTER</b>	Yes

43. Configurations of the HP ProBook x360 435 G7 G8 that are ENERGY STAR® qualified are identified as HP ProBook x360 435 G8 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

44. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit [www.epeat.net](http://www.epeat.net) for more information.

### Technical Specifications

#### DISPLAYS

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

1. Actual brightness will be lower with touchscreen or Sure View.

<b>Panel LCD 13.3 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45% NTSC 250 nits eDP 1.2 w/o PSR slim</b>	<b>Outline Dimensions (W x H x D)</b>	300.56 x 187.77 mm (max) (w/ PCB & w/o bracket)
	<b>Active Area</b>	293.76 x 165.24 mm (typ.)
	<b>Weight</b>	260 g (max)
	<b>Diagonal Size</b>	13.3 inch
	<b>Thickness</b>	3.0 mm (max)
	<b>Interface</b>	eDP 1.2 (2 lane)
	<b>Surface Treatment</b>	BrightView Glass
	<b>Touch Enabled</b>	Yes
	<b>Contrast Ratio</b>	600:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness<sup>1</sup></b>	250nits (typ.)
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format of LCD Pixel Arrangement</b>	RGB
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	45% NTSC
<b>Color Depth</b>	6 bits	
<b>Viewing Angle</b>	UWVA 85/85/85/85	

### Technical Specifications

<b>Panel LCD 13.3 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 72% NTSC 400 nits eDP 1.4+PSR2 ultraslim</b>	<b>Outline Dimensions (W x H x D)</b>	299.06 x 185.54 mm (max)
	<b>Active Area</b>	293.76 x 165.24 mm (typ.)
	<b>Weight</b>	170 g (max)
	<b>Diagonal Size</b>	13 inch
	<b>Thickness</b>	2.0 mm (max)
	<b>Interface</b>	eDP 1.4 + PSR2 (2 lane)
	<b>Surface Treatment</b>	BrightView Glass
	<b>Touch Enabled</b>	Yes
	<b>Contrast Ratio</b>	1200:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness<sup>1</sup></b>	400 nits
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format of LCD Pixel Arrangement</b>	RGB
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	72% NTSC
	<b>Color Depth</b>	8 bits
<b>Viewing Angle</b>	UWVA 85/85/85/85	

### Technical Specifications

<b>Panel LCD 13.3 inch diagonal FHD (1920 x 1080) BrightView WLED UWVA 72% NTSC 1000 nits eDP 1.4+PSR2 flat Privacy NWBZ</b>	<b>Outline Dimensions (W x H x D)</b>	298.76 x 186.04 mm (typ.)
	<b>Active Area</b>	293.76 x 165.24 mm (typ.)
	<b>Weight</b>	255 g (max)
	<b>Diagonal Size</b>	13.3 inch
	<b>Thickness</b>	3.0 mm (max)
	<b>Interface</b>	eDP 1.4 + PSR2
	<b>Surface Treatment</b>	BrightView Glass
	<b>Touch Enabled</b>	Yes
	<b>Contrast Ratio</b>	2000:1 (typ.)
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness<sup>1</sup></b>	1000 nits
	<b>Pixel Resolution</b>	1920 x 1080(FHD)
	<b>Format of LCD Pixel Arrangement</b>	RGB
	<b>Backlight</b>	LED
	<b>Color Gamut Coverage</b>	72% NTSC
	<b>Color Depth</b>	8 bit
	<b>Viewing Angle</b>	UWVA 85/85/85/85

### Technical Specifications

#### STORAGE

Note: 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.

<b>128 GB 2280 M2 PCIe NVMe TLC Solid State Drive</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	128 GB
	<b>NAND Type</b>	TLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe
	<b>Maximum Sequential Read</b>	1300~2047MB/s
	<b>Maximum Sequential Write</b>	800~1200MB/s
	<b>Logical Blocks</b>	250,069,680
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	ATA Security; DIPM; TRIM; DEVSLP

<b>256 GB 2280 PCIe NVMe Value Solid State Drive</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	256 GB
	<b>NAND Type</b>	TLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe
	<b>Maximum Sequential Read</b>	Around 1500 ~ 1700 MB/s
	<b>Maximum Sequential Write</b>	Around 780 ~ 1300 MB/s
	<b>Logical Blocks</b>	500118192
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	ATA Security; TRIM; L1.2



### Technical Specifications

<b>SSD 512 GB 2280 M2 PCIe-3x4 SS NVMe TLC</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	512 GB
	<b>NAND Type</b>	TLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe Gen3X4
	<b>Maximum Sequential Read</b>	Around 2700 ~ 3400 MB/s
	<b>Maximum Sequential Write</b>	Around 1390 ~ 2956 MB/s
	<b>Logical Blocks</b>	1000215215
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	ATA Security; TRIM; L1.2

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<b>SSD 512 GB 2280 PCIe NVMe Value</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	512 GB
	<b>NAND Type</b>	TLC/QLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe
	<b>Maximum Sequential Read</b>	Around 1500 ~ 1700 MB/s
	<b>Maximum Sequential Write</b>	Around 860 ~ 1500 MB/s
	<b>Logical Blocks</b>	1000215215
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	ATA Security; TRIM; L1.2

### Technical Specifications

<b>SSD 1TB 2280 PCIe-3x4 NVMe Three Layer Cell single-sided</b>	<b>Form Factor</b>	M.2 2280
	<b>Capacity</b>	1 TB
	<b>NAND Type</b>	TLC
	<b>Height</b>	0.09 in (2.3 mm)
	<b>Width</b>	0.87 in (22 mm)
	<b>Weight</b>	0.02 lb (10 g)
	<b>Interface</b>	PCIe NVMe Gen3X4
	<b>Maximum Sequential Read</b>	3100 ~ 3500 MB/s
	<b>Maximum Sequential Write</b>	2770 ~ 3037 MB/s
	<b>Logical Blocks</b>	2000409264
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	ATA Security; TRIM; L1.2

### Technical Specifications

#### NETWORKING/COMMUNICATIONS

<b>Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® and Bluetooth® 5.0<sup>1</sup></b>	<b>Wireless LAN Standards</b>	<ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> <li>IEEE 802.11d</li> <li>IEEE 802.11e</li> <li>IEEE 802.11h</li> <li>IEEE 802.11i</li> <li>IEEE 802.11k</li> <li>IEEE 802.11r</li> <li>IEEE 802.11v</li> </ul>
	<b>Interoperability</b>	Wi-Fi certified
	<b>Frequency Band</b>	<ul style="list-style-type: none"> <li>•802.11b/g/n 2.402 – 2.482 GHz</li> <li>•802.11a/n/ac 4.9 – 4.95 GHz (Japan)</li> <li>5.15 – 5.25 GHz</li> <li>5.25 – 5.35 GHz</li> <li>5.47 – 5.725 GHz</li> <li>5.825 – 5.850 GHz</li> </ul>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>•802.11b: 1, 2, 5.5, 11 Mbps</li> <li>•802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>•802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz &amp; 80MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>•IEEE 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>•AES-CCMP: 128 bit in hardware</li> <li>•802.1x authentication</li> <li>•WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>•WPA2 certification</li> <li>•WPA3 certification</li> <li>•IEEE 802.11i</li> <li>•WAPI</li> </ul>
	<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz): +11.5dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode: 2.0 W</li> <li>• Receive mode: 1.6 W</li> <li>• Idle mode (PSP)180 mW (WLAN Associated)</li> <li>• Idle mode: 50 mW (WLAN unassociated)</li> <li>• Connected Standby/Modern Standby: 10mW</li> <li>• Radio disabled: 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	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
<b>Antenna type</b>	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
<b>Form Factor</b>	PCI-Express M.2 MiniCard with CNVi Interface
<b>Dimensions</b>	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230: 2.8 g 2. Type 126: 1.3 g
<b>Operating Voltage</b>	3.3 v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (-10° to 70° C) <b>Non-operating</b> -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b> 10% to 90% (non-condensing) <b>Non-operating</b> 5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b> 0 to 10,000 ft (3,048 m) <b>Non-operating</b> 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON

#### HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology

<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)

### Technical Specifications

<b>Signaling Data Rate</b>	Legacy: 3 Mbps signaling data rate <sup>1</sup> 2.17 Mbps BLE: 1 Mbps signaling data rate <sup>1</sup> 0.2 Mbps <a href="#">1. Actual throughput may vary.</a> 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)
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	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) <sup>2</sup> Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.
2. 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.
3. Check latest software/driver release for updates on supported security features.
4. 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

<p><b>Intel® Wi-Fi 6 AX200 and Bluetooth® 5.0 (802.11ax 2 x 2, supporting gigabit data rate) non-vPro<sup>1,5</sup></b></p>	<p><b>Wireless LAN Standards</b></p> <ul style="list-style-type: none"> <li>IEEE 802.11a</li> <li>IEEE 802.11b</li> <li>IEEE 802.11g</li> <li>IEEE 802.11n</li> <li>IEEE 802.11ac</li> <li>IEEE 802.11ax</li> <li>IEEE 802.11d</li> <li>IEEE 802.11e</li> <li>IEEE 802.11h</li> <li>IEEE 802.11i</li> <li>IEEE 802.11k</li> <li>IEEE 802.11r</li> <li>IEEE 802.11v</li> </ul>
<p><b>Interoperability</b></p>	<p>Wi-Fi certified</p>
<p><b>Frequency Band</b></p>	<ul style="list-style-type: none"> <li>•802.11b/g/n/ax 2.402 – 2.482 GHz</li> <li>•802.11a/n/ac/ax 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</li> </ul>
<p><b>Data Rates</b></p>	<ul style="list-style-type: none"> <li>•802.11b: 1, 2, 5.5, 11 Mbps</li> <li>•802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>•802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>•802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz &amp; 160MHz)</li> <li>• 802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, 80MHz &amp; 160MHz)</li> </ul>
<p><b>Modulation</b></p>	<p>Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM</p>
<p><b>Security<sup>3</sup></b></p>	<ul style="list-style-type: none"> <li>•IEEE 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>•AES-CCMP: 128 bit in hardware</li> <li>•802.1x authentication</li> <li>•WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>•WPA2 certification</li> <li>•IEEE 802.11i</li> <li>•WAPI</li> </ul>
<p><b>Network Architecture Models</b></p>	<p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p>
<p><b>Roaming</b></p>	<p>IEEE 802.11 compliant roaming between access points</p>
<p><b>Output Power<sup>2</sup></b></p>	<ul style="list-style-type: none"> <li>• 802.11b: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> </ul>

### Technical Specifications

	<ul style="list-style-type: none"> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz): +11.5dBm minimum</li> <li>• 802.11ax HT40(2.4GHz): +10dBm minimum</li> <li>• 802.11ax VHT160(5GHz): +10dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode: 2.0 W</li> <li>• Receive mode: 1.6 W</li> <li>• Idle mode (PSP)180 mW (WLAN Associated)</li> <li>• Idle mode: 50 mW (WLAN unassociated)</li> <li>• Connected Standby/Modern Standby: 10mW</li> <li>• Radio disabled: 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	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 802.11ax, MCS11(HT40): -59dBm maximum 802.11ax, MCS11(VHT160): -58.5dBm maximum
<b>Antenna type</b>	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
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230: 2.8 g 2. Type 126: 1.3 g
<b>Operating Voltage</b>	3.3 v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (-10° to 70° C) <b>Non-operating</b> -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating</b> 10% to 90% (non-condensing) <b>Non-operating</b> 5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b> 0 to 10,000 ft (3,048 m) <b>Non-operating</b> 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON

### Technical Specifications

#### HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology

<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0/5.1 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps signaling data rate <sup>1</sup> 2.17 Mbps BLE: 1 Mbps signaling data rate <sup>1</sup> 0.2 Mbps <a href="#">1. Actual throughput may vary.</a>
<b>Transmit Power</b>	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) The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Power Management Certifications</b>	Microsoft Windows ACPI, and USB Bus Support FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	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)



### Technical Specifications

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 (802.11ax) are draft 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 802.11ax devices. Only available in countries where 802.11ax is supported.
2. 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.
3. Check latest software/driver release for updates on supported security features.
4. 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).
5. Wi-Fi 5 or 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

#### Intel® 9260

#### 802.11a/b/g/n/ac (2 x 2) Wireless LAN Standards Wi-Fi® and Bluetooth® 5 Combo<sup>1</sup> (Non-vPro)

IEEE 802.11a  
IEEE 802.11b  
IEEE 802.11g  
IEEE 802.11n  
IEEE 802.11ac  
IEEE 802.11d  
IEEE 802.11e  
IEEE 802.11h  
IEEE 802.11i  
IEEE 802.11k  
IEEE 802.11r  
IEEE 802.11v

#### Interoperability

Wi-Fi certified

#### Frequency Band

- 802.11b/g/n  
2.402 – 2.482 GHz
- 802.11a/n/ac  
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

- 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, 80MHz & 160MHz)

#### Modulation

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

#### Security<sup>3</sup>

- IEEE 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication

### Technical Specifications

	<ul style="list-style-type: none"> <li>•WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>•WPA2 certification</li> <li>•WPA3 certification</li> <li>•IEEE 802.11i</li> <li>•WAPI</li> </ul>
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>• 802.11b: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ac VHT160(5GHz): +11.5dBm minimum</li> </ul>
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>•Transmit mode: 2.0 W</li> <li>•Receive mode: 1.6 W</li> <li>•Idle mode (PSP)180 mW (WLAN Associated)</li> <li>•Idle mode: 50 mW (WLAN unassociated)</li> <li>•Connected Standby/Modern Standby: 10mW</li> <li>•Radio disabled: 8 mW</li> </ul>
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
<b>Receiver Sensitivity<sup>4</sup></b>	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
<b>Antenna type</b>	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
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
<b>Weight</b>	1. Type 2230: 2.8 g 2. Type 126: 1.3 g
<b>Operating Voltage</b>	3.3 v +/- 9%
<b>Temperature</b>	<b>Operating</b> 14° to 158° F (–10° to 70° C) <b>Non-operating</b> –40° to 176° F (–40° to 80° C)

### Technical Specifications

<b>Humidity</b>	<b>Operating</b>	10% to 90% (non-condensing)
	<b>Non-operating</b>	5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating</b>	0 to 10,000 ft (3,048 m)
	<b>Non-operating</b>	0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF LED OFF – Radio ON	

### HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology

<b>Bluetooth Specification</b>	4.0/4.1/4.2/5.0 Compliant
<b>Frequency Band</b>	2402 to 2480 MHz
<b>Number of Available Channels</b>	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
<b>Signaling Data Rate</b>	Legacy: 3 Mbps signaling data rate <sup>1</sup> 2.17 Mbps BLE: 1 Mbps signaling data rate <sup>1</sup> 0.2 Mbps <a href="#">1. Actual throughput may vary.</a>
<b>Transmit Power</b>	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) The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management Certifications</b>	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	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

### Technical Specifications

FAX Profile (FAX)  
 Basic Imaging Profile (BIP)2  
 Headset Profile (HSP)  
 Hands Free Profile (HFP)  
 Advanced Audio Distribution Profile (A2DP)

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.
2. 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.
3. Check latest software/driver release for updates on supported security features.
4. 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).

### POWER

#### HP 45 W USB type C Straight 1.8 m AC Adapter

<b>Dimensions</b>	94.0 mm x 40.0 mm x 26.5 mm
<b>Weight</b>	192.5 g +/- 10 g (Not including power cord. Power cord varies by country)
<b>Input</b>	<b>Input Efficiency</b> Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec: 5V: 81.5% 9V: 86.7% 12V: 87.41% 15V: 87.8%  <b>Input frequency range</b> 47 ~ 63 Hz <b>Input AC current</b> Max. 1.4 A at 90 VAC
<b>Output</b>	<b>Output power</b> 5V/15W 9V/27W 12V/36W 15V/45W  <b>DC output</b> 5V / 9V / 12V / 15V <b>Hold-up time</b> 5ms at 115 Vac input <b>Output current limit</b> < 5.0A
<b>Connector</b>	USB Type-C™
<b>Environmental Design</b>	<b>Operating temperature</b> 32° to 95° F (0° to 35° C) <b>Non-operating (storage) temperature</b> -4° to 185° F (-20° to 85° C) <b>Altitude</b> 0 to 16,400 ft (0 to 5000m) <b>Humidity</b> 20% to 95% <b>Storage Humidity</b> 10% to 95%
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.

### Technical Specifications

<b>HP 45 W Smart AC adapter</b>	<b>Dimensions</b>	3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)	
	<b>Weight</b>	0.386 lb (175g) max (Not including power cord. Power cord varies by country)	
	<b>Input</b>	90 to 265 VAC	
	<b>Output</b>	<b>Input Efficiency</b>	87.74% at 115Vac and 88.4% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
		<b>Input AC current</b>	1.4 A at 90 VAC
		<b>Output power</b>	45 W
		<b>DC output</b>	19.5 V
	<b>Connector</b>	<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<8.0A
		4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
<b>Altitude</b>		0 to 16,400 ft (0 to 5000m)	
<b>Humidity</b>		20% to 95%	
<b>Storage Humidity</b>		10% to 95%	
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.		

<b>AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5 mm Right Angle 1.8 m 2prong</b>	<b>Dimensions</b>	95.0 x 40.0 x 26.5 mm	
	<b>Weight</b>	200 g +/- 10 g (Not including power cord. Power cord varies by country)	
	<b>Input</b>	90 to 265 VAC	
	<b>Output</b>	<b>Input Efficiency</b>	87.74% at 115Vac and 88.4% at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
		<b>Input AC current</b>	1.4 A at 90 VAC
		<b>Output power</b>	45 W
		<b>DC output</b>	19.5 V
	<b>Connector</b>	<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<8.0A
		C6	
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
<b>Altitude</b>		0 to 16,400 ft (0 to 5000m)	
<b>Humidity</b>		20% to 95%	
<b>Storage Humidity</b>		10% to 95%	
<b>EMI and Safety Certifications</b>	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.		

### Technical Specifications

<b>AC Adapter 65 Watt nPFC Standard USB Type-C Straight 1.8 m</b>	<b>Dimensions</b>	90.0 x 51 x 28.5 mm		
	<b>Weight</b>	250 g +/- 10 g (Not including power cord. Power cord varies by country)		
	<b>Input</b>	<b>Input Efficiency</b>	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A	
		<b>Input frequency range</b>	47 ~ 63 Hz	
		<b>Input AC current</b>	1.6 A at 90 VAC and maximum load	
		<b>Output</b>	<b>Output power</b>	65 W
			<b>DC output</b>	5V/9V/12V/15V/20V
	<b>Hold-up time</b>		5ms at 115 Vac input	
	<b>Connector</b>	<b>Output current limit</b>	<8.0A MAXIMUM	
	<b>Environmental Design</b>	USB Type-C™		
		<b>Operating temperature</b>	32° to 95° F (0° to 35° C)	
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)	
		<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)	
<b>Humidity</b>		20% to 95%		
<b>EMI and Safety Certifications</b>	<b>Storage Humidity</b>	10% to 95%		
	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards -IEC60950, EN60950, UL60950, UL62368, 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.			

### Technical Specifications

<b>AC Adapter 65 Watt Smart nPFC EM Barrel 4.5 mm New EM</b>	<b>Dimensions</b>	102 x 55 x 30 mm	
	<b>Weight</b>	250 g +/- 10 g (Not including power cord. Power cord varies by country)	
	<b>Input</b>	<b>Input Efficiency</b>	88.0 % at 115 Vac and 89.0 % at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
		<b>Input AC current</b>	1.7 A at 90 Vac
	<b>Output</b>	<b>Output power</b>	65 W
		<b>DC output</b>	19.5 V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<11.0 A
		<b>Connector</b>	C6
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
		<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)
		<b>Humidity</b>	20% to 95%
<b>EMI and Safety Certifications</b>	<b>Storage Humidity</b>	10% to 95%	
	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, UL62368, 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.		

<b>AC Adapter 65 Watt Smart nPFC Standard Barrel 4.5 mm Right Angle 1.8 m</b>	<b>Dimensions</b>	90.0 x 51 x 28.5 mm	
	<b>Weight</b>	230 g +/- 10 g (Not including power cord. Power cord varies by country)	
	<b>Input</b>	<b>Input Efficiency</b>	88.0 % at 115 Vac and 89.0 % at 230Vac
		<b>Input frequency range</b>	47 ~ 63 Hz
		<b>Input AC current</b>	1.7 A at 90 Vac
	<b>Output</b>	<b>Output power</b>	65 W
		<b>DC output</b>	19.5 V
		<b>Hold-up time</b>	5ms at 115 Vac input
		<b>Output current limit</b>	<11.0 A
		<b>Connector</b>	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords
	<b>Environmental Design</b>	<b>Operating temperature</b>	32° to 95° F (0° to 35° C)
		<b>Non-operating (storage) temperature</b>	-4° to 185° F (-20° to 85° C)
		<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)
		<b>Humidity</b>	20% to 95%
<b>EMI and Safety Certifications</b>	<b>Storage Humidity</b>	10% to 95%	
	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.		

### Technical Specifications

<b>Battery SX 3 Cell 45 Wh Long Life -PL Fast Charge</b>	<b>Dimensions (H x W x L)</b>	184.62 x 85.25 x 6.15 mm	
	<b>Weight</b>	0.195 kg Max	
	<b>Cells/Type</b>	3cell Lithium-Ion Polymer cell	
	<b>Energy</b>	<b>Voltage</b>	13.2V / 11.55V (13.2V / 11.4V)
		<b>Amp-hour capacity</b>	3.9 Ah / 3.75 Ah (3.95 Ah / 3.79 Ah)
	<b>Temperature</b>	<b>Watt-hour capacity</b>	45 Wh
		<b>Operating (Charging)</b>	32° to 113° F (0° to 45° C)
		<b>Operating (Discharging)</b>	14° to 122° F (-10° to 60° C)
	<b>Optional Travel Battery Available</b>	No	
	<b>Warranty</b>	Based on system offering	



### Technical Specifications

#### **COUNTRY OF ORIGIN**

China

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

Type	Description	Part #
<b>Cases</b>	HP Essential Top Load Case	H2W17AA
	HP Essential Backpack (up to 15.6")	H1D24AA
<b>Docking</b>	HP USB-C Mini Dock	1PM64AA
	HP Thunderbolt Dock 120W G2	2UK37AA
	HP TB Dock G2 w/ Combo Cable	3TR87AA
	HP TB Dock 120W G2 w/Audio	3YE87AA
	HP TB Dock 120W G2 cable	3XB94AA
	HP TB Dock G2 combo cable	3XB96AA
	HP TB Dock 120W G2 Cable	3XB94AA
	HP TB Dock G2 Combo Cable	3XB96AA
	HP TB Dock G2 Audio Module	3AQ21AA
	HP USB-C/A Universal Dock G2	5TW13AA
	HP USB-C Dock G5	5TW10AA
<b>Input/Output</b>	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP USB-C to RJ45 Adapter	V7W66AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP USB Fingerprint Mouse	4TS44AA
	HP USB-C to DP	N9K78AA
	HP USB-C to USB-A Hub	Z6A00AA
	HP Elite USB-C Multi Port Hub	4WX89AA
	HP Pro Pen	8JU62AA
<b>Power</b>	HP 45W Smart AC Adapter 4.5mm	H6Y88AA
	HP 65W Smart AC Adapter 4.5mm	H6Y89AA
	HP 45W LC USB-C Power Adapter	1MZ01AA
	HP 65W LC USB-C Power Adapter	TBD
	USB-C NB Power Bank	1TZ86AA
	HP Essential Power Bank	3TB55AA
<b>Storage</b>	HP External USB Optical Drive	F2B56AA
<b>Security</b>	HP Sure Key Cable Lock	6UW42AA
	HP Nano Keyed Cable Lock	1AJ39AA

Date of change:	Version History:	Description of change:
	V1 to V2	

### Summary of Changes

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