

### Overview

#### HP ProBook 455 G6 Notebook PC



#### Left

- |                             |  |
|-----------------------------|--|
| 1. Internal Microphones (2) | 6. SD Card Reader                            |
| 2. Webcam                   | 7. Thermal Vent                              |
| 3. Webcam LED               | 8. USB 2.0 Port                              |
| 4. Clickpad                 | 9. Security Lock Slot (Lock sold separately) |
| 5. Hard Drive LED           | 10. Power Button                             |

### Overview



#### Right

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| 1. Power Connector                | 5. USB 3.1 Gen 1 Port                |
| 2. USB Type-C™ 3.1 Gen 1 Port     | 6. USB 3.1 Gen 1 Port                |
| 3. Ethernet Port (RJ-45)          | 7. Headphone / Microphone Combo Jack |
| 4. HDMI Port (Cable not included) | 8. Fingerprint Sensor                |

### Overview

#### At a Glance

- Preinstall Windows 10 versions or FreeDOS 3.0
- Choice of AMD Ryzen™ processors
- Display include your choice of 39.62 cm (15.6") diagonal HD, Ultra Wide Viewing Angle FHD
- Integrated AMD Radeon™ Vega UMA Graphics
- Enhanced security features including TPM2.0, HP BIOSphere, Hardware enforced Firmware Protection, optional Fingerprint sensor, and optional IR camera
- Passed 19 items MIL-STD 810G testing plus an additional 120,000 hours of reliability testing through HP's Total Test Process<sup>1</sup>
- Weight starting at 4.41 lbs (2 kgs)
- HP Long-Life Rechargeable batteries, with HP Fast Charge Technology recharges 50% in 30 minutes<sup>2</sup>
- Battery life up to 11 hours
- Supports wireless LAN for connectivity on the go
- Up to 512 GB Solid State Drives and 1 TB Hard Drive
- Up to 16 GB total system memory
- 720p HD webcam, IR camera for face authentication with Windows Hello
- Spill-resistant and optional backlit Keyboard, and Clickpad with multi-touch gestures enabled, taps enabled as default<sup>3</sup>
- Certified for Skype for business to enhance conferencing experience

1. 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.

2. Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode when used with the power adapter provided with the notebook. After charging has reached 50% capacity, charging speed will return to normal. Charging time may vary +/-10% due to System tolerance.

3. Backlit keyboard is an optional feature.

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



### Technical Specifications

#### PRODUCT NAME

HP ProBook 455 G6 Notebook PC

#### OPERATING SYSTEMS

<b>Preinstalled</b>	Windows 10 Pro 64 <sup>1</sup> Windows 10 Pro 64 (National Academic only) <sup>2</sup> Windows 10 Home 64 <sup>1</sup> Windows 10 Home Single Language 64 <sup>1</sup> FreeDOS 3.0
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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..

#### PROCESSORS

AMD Ryzen™ 7 PRO 2700U APU with Radeon™ RX Vega 10 Graphics (2.2 GHz base clock, up to 3.8 GHz max boost clock, 4 MB L3 cache, 4 cores)<sup>3,4,5,6</sup>

AMD Ryzen™ 5 2500U APU with Radeon™ Vega 8 Graphics (2 GHz base clock, up to 3.6 GHz max boost clock, 4 MB L3 cache, 4 cores)<sup>3,4,5,6</sup>

AMD Ryzen™ 3 2200U APU with Radeon™ Vega 3 Graphics (2.5 GHz base clock, up to 3.4 GHz max boost clock, 4 MB L3 cache, 2 cores)<sup>3,4,5,6</sup>

##### Processors Family

AMD Ryzen™ APU processor<sup>6</sup>

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

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

5. Max Boost clock 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**

Radeon™ Vega Graphics<sup>7</sup>

**Supports**

Support HD decode, DX12, HDMI 1.4b

[7. HD content required to view HD images.](#)

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#### DISPLAY

**Internal****Non-Touch**

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB, two WLAN antennas (1366 x 768)<sup>7,8</sup>

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD camera, one WLAN antenna (1366 x 768)<sup>7,8</sup>

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD camera, two WLAN antennas (1366 x 768)<sup>7,8</sup>

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD + IR camera, two WLAN antennas (1366 x 768)<sup>7,8</sup>

39.6 cm (15.6") diagonal FHD UWVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB, two WLAN antennas (1920 x 1080)<sup>7,8</sup>

39.6 cm (15.6") diagonal FHD UWVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD camera, one WLAN antenna (1920 x 1080)<sup>7,8</sup>

39.6 cm (15.6") diagonal FHD UWVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD camera, two WLAN antennas (1920 x 1080)<sup>7,8</sup>

39.6 cm (15.6") diagonal FHD UWVA eDP anti-glare LED-backlit slim, 220 cd/m<sup>2</sup>, 67% sRGB for HD + IR camera, two WLAN antennas (1920 x 1080)<sup>7,8</sup>

Supports narrow bezel

**HDMI**

HDMI 1.4b, up to 4K 30Hz

[7. HD content required to view HD images.](#)

[8. Resolutions are dependent upon monitor capability, and resolution and color depth settings.](#)

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### Technical Specifications

#### STORAGE AND DRIVES

**Primary Storage**

1 TB 5400 rpm SATA<sup>9</sup>  
500 GB 7200 rpm SATA<sup>9</sup>

**Primary M.2 Storage**

128 GB SATA TLC Solid State Drive<sup>9</sup>  
256 GB PCIe<sup>®</sup> NVMe<sup>™</sup> Value Solid State Drive<sup>9</sup>  
512 GB PCIe<sup>®</sup> NVMe<sup>™</sup> TLC Solid State Drive<sup>9</sup>

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

**Maximum Memory**

16 GB DDR4-2400 SDRAM<sup>10</sup>

**Memory**

16 GB DDR4-2400 SDRAM (2 x 8 GB)<sup>10</sup>  
12 GB DDR4-2400 SDRAM (1 x 4 GB and 1 x 8 GB)<sup>10</sup>  
8 GB DDR4-2400 SDRAM (1 x 8 GB)  
8 GB DDR4-2400 SDRAM (2 x 4 GB)<sup>10</sup>  
4 GB DDR4-2400 SDRAM (1 x 4 GB)

**Memory Slots**

2 SODIMM  
Both slots are customer accessible / upgradeable  
DDR4 PC4 SODIMMS, system 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

**WLAN**

Realtek RTL8822BE 802.11ac (2x2) WLAN and Bluetooth<sup>®</sup> 4.2 Combo<sup>11</sup>  
Realtek RTL8821CE 802.11ac (1x1) WLAN and Bluetooth<sup>®</sup> 4.2 Combo<sup>11</sup>

**Ethernet**

Realtek RTL8111HSH-CG 10/100/1000 GbE NIC<sup>12</sup>

11. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.

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



### Technical Specifications

#### AUDIO/MULTIMEDIA

##### Audio

Integrated microphone (Mono or Dual Array)  
2 Integrated stereo speakers

##### Camera

720p HD camera<sup>7</sup>  
720p HD camera+IR Camera<sup>7,13</sup>

7. HD content required to view HD images.  
13. Sold separately or as an optional feature.

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

##### Keyboard

HP Premium Keyboard, spill resistant with numeric keypad and optional backlit<sup>14</sup>

##### Pointing Device

Clickpad with multi-touch gesture support

##### Function Keys

F1 - Display Switching  
F2 - Blank  
F3 - Brightness Down  
F4 - Brightness Up  
F5 - Audio Mute  
F6 - Volume Down  
F7 - Volume Up  
F8 - Mic Mute  
F9 - Blank or Backlit Toggle  
F10 - Blank  
F11 - Wireless  
F12 - Sleep

##### Hidden Functions

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

14. Backlit keyboard is an optional feature.

#### SOFTWARE AND SECURITY

##### BIOS

HP BIOSphere Gen4<sup>15</sup>  
HP DriveLock & Automatic DriveLock<sup>16</sup>  
BIOS Update via Network  
Secure Erase<sup>17</sup>  
Absolute Persistence Module<sup>18</sup>  
Pre-boot Authentication  
HP Wireless Wakeup



## Technical Specifications

### Software

HP Native Miracast Support<sup>19</sup>  
HP LAN-Wireless Protection  
HP Connection Optimizer  
HP 3D DriveGuard  
HP Support Assistant<sup>20</sup>  
HP Noise Cancellation Software  
HP Host Based MAC Address Manager  
Buy Office (Sold separately)

### Manageability Features

HP Driver Packs<sup>21</sup>  
HP System Software Manager (SSM)  
HP BIOS Config Utility (BCU)  
HP Client Catalog  
HP Manageability Integration Kit Gen3<sup>22</sup>  
HP Cloud Recovery<sup>23</sup>

### Client Security Software

HP Client Security Suite Gen4<sup>24</sup> including:  
HP Security Manager<sup>25</sup> (Including Credential Manager, HP Password Manager, HP Spare Key)  
HP Fingerprint Sensor<sup>26</sup>  
HP Power On Authentication  
Microsoft Defender<sup>27</sup>

### Security Management

Secure Erase<sup>17</sup>  
TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)<sup>28</sup>  
SATA 0,1 port disablement (viaBIOS)  
Serial, USB enable/disable (viaBIOS)  
Power-on password (viaBIOS)  
Setup password (viaBIOS)  
Support for chassis padlocks and cable lock devices  
Integrated hood sensor  
HP Sure Click<sup>29</sup>

15. HP BIOSphere Gen4 requires Intel® or AMD 8th Gen processors. Features may vary depending on the platform and configurations.

16. HP Drive Lock & Automatic Drive Lock is not supported on NVMe drives.

17. HP Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method.

18. 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.

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

20. HP Support Assistant requires Windows and Internet access.

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

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





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## Technical Specifications

23. HP Cloud Recovery is available for HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, wired network connection. Note: You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: <https://support.hp.com/us-en/document/c05115630>
24. HP Client Security Suite Gen 4 requires Windows and Intel® or AMD 7th or 8th generation processors.
25. 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.
26. HP Fingerprint Sensor sold separately or as an optional feature.
27. Microsoft Defender Opt in and internet connection required for updates.
28. Firmware TPM is version 2.0. Hardware TPM is v1.2, which is a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT). TPM is version 2.0. Hardware TPM is v1.2, which is a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT).
29. HP Sure Click is available on most HP PCs and supports Microsoft® Internet Explorer and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.
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## POWER

### Power Supply

- HP Smart 65 W External AC Adapter<sup>30</sup>
- HP Smart 65 W EM External AC Adapter<sup>30</sup>
- HP Smart 65 W USB Type-C™ Adapter<sup>30</sup>
- HP Smart 45 W External AC power Adapter<sup>30</sup>
- HP Smart 45 W USB Type-C™ Adapter<sup>30</sup>

### Power Cord

- 3-wire plug - 1.8 m<sup>30</sup>
- 3-wire plug - 1 m<sup>30</sup>
- 2-wire plug - 1 m<sup>30</sup>
- Duckhead power cord - 1.0 m<sup>30</sup>
- Duckhead power cord - 1.8 m<sup>30</sup>

### Primary Battery

- HP Long Life 3-cell, 45 Wh Li-ion Polymer<sup>31</sup>

### Battery Life

- Up to 11 hours<sup>32</sup>

### Battery Weight

- 0.48 lb
- 0.22 kg

30. Availability may vary by country.

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

32. 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](http://www.bapco.com) for additional details..

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## Technical Specifications

### WEIGHTS & DIMENSIONS

**Weight**Starting at 4.41 lbs<sup>33</sup>Starting at 2 kgs<sup>33</sup>**Dimensions (w x d x h)**

14.37 x 10.11 x 0.75 in

36.49 x 25.69 x 1.9 cm

33. Weight will vary by configuration.

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### PORTS/SLOTS

**Ports**

1 USB 3.1 Type-C™ Gen 1 (Power delivery, DisplayPort™)

2 USB 3.1 Gen 1

1 USB 2.0 (Charging)

1 HDMI 1.4b<sup>34</sup>

1 RJ-45

1 AC power

1 Headphone/microphone combo jack

**Expansion Slots**

1 SD

Supports SD, SDHC, SDXC

34. HDMI cable sold separately.

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### SERVICE AND SUPPORT

HP Services offers 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. 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>35</sup>

35. 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 <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

#### Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	19V
Average Operating Power	Win 10
Integrated graphics	Data is not available (APU 15W)
Max Operating Power	UMA < 45W

#### 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®	Selected models <sup>36</sup>
EPEAT® 2019	Yes, Silver in U.S. <sup>37</sup>
ICES	Yes
Australia	Yes
NZ A-Tick Compliance	Yes
CCC	Yes
Japan VCCI Compliance	Yes
KC	Yes
BSMI	Yes
CE Marking Compliance	Yes
BNCI or BELUS	Yes
CIT	Yes
GOST	Yes
Saudi Arabian Compliance (ICCP)	Yes



### Technical Specifications

SABS	Yes
UKRSERTCOMPUTER	Yes

36. Configurations of the HP ProBook 455 G6 that are ENERGY STAR® qualified are identified as HP ProBook 455 G6 ENERGY STAR® on HP websites and on <http://www.energystar.gov>.

37. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit <http://www.epeat.net> for more information.

### DISPLAYS

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

<b>Panel LCD 15.6 inch diagonal FHD (1920x1080) Anti-Glare WLED UWVA 45% cg 220nits eDP slim NB</b>	<b>Outline Dimensions (W x H x D)</b>	350.96 x 216.75 (max.)
	<b>Active Area</b>	344.16 x 193.59 (typ.)
	<b>Weight</b>	<370 g max.
	<b>Diagonal Size</b>	15.6"
	<b>Thickness</b>	3.2 mm max.
	<b>Interface</b>	eDP 1.2
	<b>Surface Treatment</b>	Anti-glare
	<b>Touch Enabled</b>	No
	<b>Contrast Ratio</b>	600:1 (typ) - AG
	<b>Refresh Rate</b>	60 Hz
	<b>Brightness</b>	220 nits typical (Panel Only)
	<b>Pixel Resolution</b>	1920 x 1080 (FHD)
	<b>Format</b>	RGB
	<b>Backlight</b>	LED
<b>Color Gamut Coverage</b>	45%	
<b>Color Depth</b>	6 bits + Hi FRC	
<b>Viewing Angle</b>	UWVA 85/85/85/85	



### Technical Specifications

**Panel LCD 15.6 inch  
diagonal HD (1366x768)  
Anti-Glare WLED SVA 45%  
cg 220nits eDP 1.2 w/o PSR  
slim NB**

<b>Outline Dimensions (W x H x D)</b>	350.96 x 216.75 (max.)
<b>Active Area</b>	344.16 x 193.59 (typ.)
<b>Weight</b>	<370 g max.
<b>Diagonal Size</b>	15.6"
<b>Thickness</b>	3.2 mm max.
<b>Interface</b>	eDP 1.2
<b>Surface Treatment</b>	Anti-glare
<b>Touch Enabled</b>	No
<b>Contrast Ratio</b>	300:1 (typ)
<b>Refresh Rate</b>	60 Hz
<b>Brightness</b>	220 nits typical (Panel Only)
<b>Pixel Resolution</b>	1366 x 768 (HD)
<b>Format</b>	RGB
<b>Backlight</b>	LED
<b>Color Gamut Coverage</b>	45%
<b>Color Depth</b>	6 bits + Hi FRC
<b>Viewing Angle</b>	SVA 40/40/15/30



### Technical Specifications

#### STORAGE AND DRIVES

##### HARD DRIVES

<b>500 GB 7200 rpm SATA Hard Drive</b>	<b>Drive Weight</b>	0.20 lb (92 g) ~ 0.21 lb (95 g)
	<b>Rotation speed</b>	7200 rpm
	<b>Cache Buffer</b>	Up to 32 MB
	<b>Height</b>	0.28 in (7 mm)
	<b>Width</b>	2.75 in (69.85 mm)
	<b>Interface</b>	ATA-8, SATA 3.0
	<b>Transfer Rate</b>	600 MB/s
	<b>Seek Time</b>	Single Track: 2 ~ 1.5 ms Average: 11 ~ 13 ms Maximum: 18 ~ 22 ms
	<b>Logical Blocks</b>	976,773,168
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C) [top cover temp]
	<b>Security Features</b>	ATA Security
	<b>Features</b>	S.M.A.R.T., NCQ, Ultra DMA
	<b>1 TB 5400 rpm SATA Hard Drive</b>	<b>Drive Weight</b>
<b>Rotation speed</b>		5400 rpm
<b>Cache Buffer</b>		Up to 32 MB
<b>Height</b>		0.28 in (7.2 mm)
<b>Width</b>		2.75 in (69.85 mm)
<b>Interface</b>		ATA-8, SATA 3.0
<b>Transfer Rate</b>		600 MB/s
<b>Seek Time</b>		Single Track 2 ms Average 12 ~ 13 ms Maximum 18 ~ 22 ms
<b>Logical Blocks</b>		1,953,525,168
<b>Operating Temperature</b>		32° to 140° F (0° to 60° C) [top cover temp]
<b>Security Features</b>		ATA Security
<b>Features</b>		S.M.A.R.T., NCQ, Ultra DMA



### Technical Specifications

<b>SSD 128 GB 2280 M2 SATA-3 TLC</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>	ATA-8, SATA 3.0
	<b>Maximum Sequential Read</b>	Up To 520 MB/s
	<b>Maximum Sequential Write</b>	Up To 450 MB/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>	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>Interface</b>	PCIe NVMe Gen3
	<b>Maximum Sequential Read</b>	Up To 1700 MB/s
	<b>Maximum Sequential Write</b>	Up To 1300 MB/s
	<b>Logical Blocks</b>	500,118,192
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C) [ambient temp]
	<b>Features</b>	TRIM; L1.2
	<b>512 GB 2280 M2 PCIe NVMe TLC Solid State Drive</b>	<b>Form Factor</b>
<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>Interface</b>		PCIe NVMe Gen3X4
<b>Maximum Sequential Read</b>		Up To 2600 MB/s
<b>Maximum Sequential Write</b>		Up To 1400 MB/s
<b>Logical Blocks</b>		1,000,215,216
<b>Operating Temperature</b>		32° to 158°F (0° to 70°C) [ambient temp]
<b>Features</b>		TRIM; L1.2



## Technical Specifications

### NETWORKING/COMMUNICATIONS

<b>Realtek 802.11a/b/g/n/ac (2x2) WLAN and Bluetooth® 4.2 Combo<sup>1</sup></b>	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	<b>Interoperability</b>	Wi-Fi® certified
	<b>Frequency Band</b>	802.11b/g/n <ul style="list-style-type: none"> <li>• 2.402 – 2.482 GHz</li> </ul> 802.11a/n <ul style="list-style-type: none"> <li>• 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, and 80MHz)</li> </ul>
	<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	<b>Security</b>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 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>
	<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 : +14dBm minimum</li> <li>• 802.11g : +12dBm minimum</li> <li>• 802.11a : +12dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT20(5GHz) : +10dBm minimum</li> <li>• 802.11n HT40(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT80(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 10 mW</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>3</sup></b>	802.11b, 1Mbps : -93.5dBm maximum



### Technical Specifications

	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>	Type 2230: 2.3 x 22.0 x 30.0 mm
<b>Weight</b>	Type 2230: 2.8g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating            Operating: 14° to 158° F (-10° to 70° C) Non-operating    Non-operating: -40° to 176° F (-40° to 80° C)
<b>Humidity</b>	Operating            Operating: 10% to 90% (non-condensing) Non-operating    Non-operating: 5% to 95% (non-condensing)
<b>Altitude</b>	Operating            Operating: 0 to 10,000 ft (3,048 m) Non-operating    Non-operating: 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED White – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology</b>	
<b>Bluetooth® Specification</b>	4.0/4.1/4.2 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<sup>4</sup></b>	Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps BLE: 1 Mbps Signaling Data Rate 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>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<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



## Technical Specifications

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

<b>Realtek 802.11a/b/g/n/ac (1x1) WLAN and Bluetooth® 4.2 Combo<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> </ul>
	<b>Interoperability Frequency Band</b>	<ul style="list-style-type: none"> <li>Wi-Fi® certified</li> <li>802.11b/g/n                             <ul style="list-style-type: none"> <li>• 2.402 – 2.482 GHz</li> </ul> </li> <li>802.11a/n                             <ul style="list-style-type: none"> <li>• 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> </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, and 80MHz)</li> </ul>
	<b>Modulation</b>	<ul style="list-style-type: none"> <li>Direct Sequence Spread Spectrum</li> <li>BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</li> </ul>
	<b>Security</b>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 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> </ul>



### Technical Specifications

	<ul style="list-style-type: none"> <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 : +14dBm minimum</li> <li>• 802.11g : +12dBm minimum</li> <li>• 802.11a : +12dBm minimum</li> <li>• 802.11n HT20(2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT40(2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT20(5GHz) : +10dBm minimum</li> <li>• 802.11n HT40(5GHz) : +10dBm minimum</li> <li>• 802.11ac VHT80(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 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>3</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. One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN communications and Bluetooth communications
<b>Form Factor</b>	PCI-Express M.2 MiniCard
<b>Dimensions</b>	Type 2230 : 2.3 x 22.0 x 30.0 mm
<b>Weight</b>	Type 2230 : 2.8g
<b>Operating Voltage</b>	3.3v +/- 9%
<b>Temperature</b>	Operating            Operating: 14° to 158° F (–10° to 70° C) Non-operating       Non-operating: –40° to 176° F (–40° to 80° C)
<b>Humidity</b>	Operating            Operating: 10% to 90% (non-condensing) Non-operating       Non-operating: 5% to 95% (non-condensing)
<b>Altitude</b>	Operating            Operating: 0 to 10,000 ft (3,048 m) Non-operating       Non-operating: 0 to 50,000 ft (15,240 m)
<b>LED Activity</b>	LED Amber – Radio OFF; LED White – Radio ON
<b>HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology</b>	
<b>Bluetooth Specification</b>	4.0/4.1/4.2 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<sup>4</sup></b>	<p>Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps BLE: 1 Mbps Signaling Data Rate 0.2 Mbps <a href="#">1. Actual throughput may vary.</a></p> <p>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)</p>
<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>	<p>Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW</p>
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth Software Supported</b>	Microsoft Windows Bluetooth Software
<b>Link Topology</b>	
<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>	<p>ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark</p>
<b>Bluetooth Profiles Supported</b>	<p>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 &amp; 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)</p>

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).
4. Actual throughput may vary.



### Technical Specifications

#### POWER

##### HP 45 W Smart AC adapter

<b>Dimensions (H x W x D)</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 (175 g) max
<b>Input</b>	90 to 265 VAC
	<b>Input Efficiency</b> 87.74% at 115Vac and 88.4% at 230Vac
	<b>Input frequency range</b> 47 to 63 Hz
	<b>Input AC current</b> 1.4 A at 90 VAC
<b>Output</b>	<b>Output power</b> 45W
	<b>DC output</b> 19.5V
	<b>Hold-up time</b> 5 msec at 115 VAC input
	<b>Output current limit</b> <8.0A
<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 5,000 m)
	<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.

##### HP 65 W Smart AC adapter

<b>Dimensions</b>	90 x 51 x 28.5 mm
<b>Weight</b>	unit: 220 g +/- 10 g
<b>Input</b>	<b>Input Efficiency</b> 88% min at 115 VAC and 89% min at 230 VAC
	<b>Input frequency range</b> 47 to 63 Hz
	<b>Input AC current</b> Max. 1.7 A at 90 VAC
<b>Output</b>	<b>Output power</b> 65W
	<b>DC output</b> 19.5V
	<b>Hold-up time</b> 5 msec at 115 VAC input
	<b>Output current limit</b> <11.0A
<b>Connector</b>	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords
<b>Environmental Design</b>	<b>Operating temperature</b> 32°F to 95°F (0° to 35°C)
	<b>Non-operating (storage) temperature</b> -4°F to 185°F (-20° to 85°C)
	<b>Altitude</b> 0 to 16,400 ft (0 to 5000m)
	<b>Humidity</b> 20% to 95%



### Technical Specifications

<b>EMI and Safety Certifications</b>	<p><b>Storage Humidity</b> 10% to 95%</p> <p>*CE Mark - full compliance with LVD and EMC directives</p> <p>* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.</p> <p>* MTBF - over 200,000 hours at 25°C ambient condition.</p>
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<b>HP 65 W EM Smart AC adapter</b>	<b>Dimensions</b>	102 x 55 x 30 mm	
	<b>Weight</b>	270g +/- 10g	
	<b>Input Efficiency</b>	87% min at 115V/230V	
	<b>Input frequency range</b>	47 to 63 Hz	
	<b>Input AC current</b>	1.7 A at 90 VAC and maximum load	
	<b>DC output</b>	65W(19.5V/3.33A)	
	<b>Hold-up time</b>	5 msec at 115 VAC input	
	<b>Output current limit</b>	<11A, Over voltage protection- 29V max automatic shutdown	
	<b>Connector</b>	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	<b>Environmental Design</b>	<b>Operating temperature</b>	0° to 35° C
		<b>Non-operating (storage) temperature</b>	-20° to 85° C
		<b>Altitude</b>	0 to 5,000 m
		<b>Humidity</b>	0% to 95%
<b>Storage Humidity</b>		0% to 95%	
<b>EMI and Safety Certifications</b>	<p>*CE Mark - full compliance with LVD and EMC directives</p> <p>* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.</p> <p>* Reliability - failure rate of less than 0.1% annually within the first three years of operation</p>		

<b>AC Adapter 65 Watt nPFC USB type C</b>	<b>Dimensions</b>	74 x 74 x 28.5 mm	
	<b>Weight</b>	unit: 245 g +/- 10 g	
	<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 @ 10V/5A 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 to 63 Hz
		<b>Input AC current</b>	1.7 A at 90 VAC and maximum load
		<b>Output power</b>	65W



### Technical Specifications

	<b>DC output</b>	5V/9V/10V/12V/15V/20V
	<b>Hold-up time</b>	5ms at 115 Vac input
	<b>Output current limit</b>	<8.0A
<b>Connector</b>	Type C	
<b>Environmental Design</b>	<b>Operating temperature</b>	32° F to 95° F (0° to 35° C)
	<b>Non-operating (storage) temperature</b>	-4° F to 185° F (-20° to 85° C)
	<b>Altitude</b>	0 to 16,400 ft (0 to 5000m)
	<b>Humidity</b>	5% to 95%
	<b>Storage Humidity</b>	5% to 95%
<b>EMI and Safety Certifications</b>	<p>*CE Mark - full compliance with LVD and EMC directives</p> <p>* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.</p> <p>* MTBF - over 200,000 hours at 25°C ambient condition.</p>	

<b>AC Adapter 45 Watt nPFC USB type C</b>	<b>Dimensions</b>	62.0 x 62.0 x 28.5 mm
	<b>Weight</b>	unit: 220 g +/- 10 g
	<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%10V: 87.5%12V : 87.8%15V: 87.8%20V: 87.8%
		<b>Input frequency range</b> 47 to 63 Hz
		<b>Input AC current</b> Max. 1.4 A at 90 Vac
		<b>Output power</b> 5V/15W 9V/27W 10V/37.5W 12V/45W 15V/45W 20V/45W
	<b>DC output</b>	5V/9V/10V/12V/15V/20V
	<b>Hold-up time</b>	5ms at 115 Vac input
	<b>Output current limit</b>	<5.0A
<b>Connector</b>	Type C	
<b>Environmental Design</b>	<b>Operating temperature</b>	32°F to 95°F (0°to 35°C)
	<b>Non-operating (storage) temperature</b>	-4°F 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%
	*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.

#### 3 Cell WHr 45 Long Life - Polymer HP Fast Charge Technology

<b>Dimensions (H x W x L)</b>	6.0. x184.7x88.9 mm
<b>Weight</b>	0.22 kg (0.48 lb)
<b>Cells/Type</b>	3cell Lithium-Ion
<b>Voltage</b>	11.55V
<b>Amp-hour capacity</b>	3.900Ah
<b>Watt-hour capacity</b>	45Wh
<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

### ENVIRONMENTAL DATA

#### Eco-Label Certifications & declarations

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

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

#### System Configuration

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

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

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	7.4	7.59	7.42
Normal Operation (Long idle)	4.8	4.95	5
Sleep	0.5	0.57	0.5
Off	0.3	0.34	0.3

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.





### Technical Specifications

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	25	26	25
Normal Operation (Long idle)	16	17	17
Sleep	2	2	2
Off	1	1	1

NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)
Typically Configured – Idle	3	27
Fixed Disk – Random writes	3	27

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

**Batteries**  
Batteries used in the product do not contain:  
Mercury greater than 1ppm by weight  
Cadmium greater than 20ppm by weight

Battery size: CR2032 (coin cell)  
Battery type: Lithium

- Additional Information**
- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
  - This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
  - This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
  - This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the <Silver> level, see <http://www.epeat.net>
  - Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
  - This product contains 0% post-consumer recycled plastic (by wt.)
  - This product is 96.5% recycle-able when properly disposed of at end of life.

Packaging Materials	External:	PAPER/Corrugated	295 g
	Internal:	PLASTIC/EPE (Expanded Polyethylene)	68 g
		PLASTIC/Polyethylene low density - LDPE	10 g

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

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes



## Technical Specifications

- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

### Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

### End-of-life Management and Recycling

HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <http://www.hp.com/go/reuse-recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the HP web site at: <http://www.hp.com/go/recyclers>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

For more information about HP's commitment to the environment:

### HP Inc. Corporate Environmental Information

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

[http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC\\_GBU\\_Product\\_Design\\_ISO\\_14K\\_Certificate.pdf](http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf)

and

<http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf>



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

Type	Description	Part Number
<b>Cases</b>	HP Essential Top Load Case	H2W17AA#xxx
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Messenger Case (up to 17.3")	H1D25AA
<b>Docking</b>	HP USB-C Mini Dock	1PM64AA#xxx
	HP USB-C Universal Dock	1MK33AA#xxx
	HP USB-C Dock G4	3FF69AA#xxx
	HP TB Dock 120W w/Audio	3YE87AA#xxx
	HP Thunderbolt Dock 120W G2	2UK37AA#xxx
	HP TB Dock G2 w/ Combo Cable	3TR87AA#xxx
	HP TB Dock 120W G2 Cable	3XB94AA
	HP TB Dock G2 Combo Cable	3XB96AA
	HP TB Dock G2 Audio Module	3AQ21AA
	HP USB Travel Dock	T0K30AA#xxx
	DIB HP 400G6 HDD Bracket Kit	5LV47AV
<b>Input / Output</b>	HDMI to VGA Adapter	H4F02AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to VGA Adapter	N9K76AA
	HP Stereo 3.5 mm Headset	T1A66AA
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP USB Collaboration Keyboard	Z9N38AA#xxx
	HP UC Speaker Phone	K7V16AA
<b>Power</b>	HP Power Bank	N9F71AA#xxx
	HP 45W LC USB-C Power Adapter	1MZ01AA#ABA
	HP 45W Smart AC Adapter 4.5mm	H6Y88AA#xxx
	HP 65W Slim AC Adapter	H6Y82AA#xxx
	HP 65W USB-C Power Adapter	3PN48AA
	HP 45W USB-C Power Adapter	1HE07AA#xxx
	HP 65W USB-C Power Adapter	1HE08AA#xxx
	HP USB-C Power Bank	2NA10AA#xxx
<b>Storage</b>	HP External USB Optical Drive	F2B56AA
	HP 500GB 7200rpm HDD	F3B97AA
	HP 512GB TLC PCI-e 3x4 NVMe SSD (2280)	1FU88AA
	4GB 2666MHz DDR4	4VN05AA
	8GB 2666MHz DDR4	4VN06AA



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

	16GB 2666 MHz DDR4	4VN07AA
<b>Security</b>	HP Essential Keyed Cable lock 12.3mm	T0Y14AA
	HP Keyed Cable Lock 10mm	T1A62AA
	HP Combination Lock	T0Y15AA
<b>Displays</b>	HP ProDisplay P240va 23.8 inch Monitor	N3H14AA
	HP ProDisplay P232 23 inch Monitor	K7X31AA
	HP EliteDisplay E223 21.5 inch Monitor	1FH45AA
	HP EliteDisplay E243 23.8-inch Monitor	1FH47AA
	HP EliteDisplay S14 14-inch Portable Display	3HX46AA



### Summary of Changes

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
March 11, 2019	V1 to V2	Updated	Networking section
April 9, 2019	V2 to V3	Updated	Environmental data table added
April 10, 2019	V3 to V4	Updated	Items MIL-STD 810G testing corrected
April 17, 2019	V4 to V5	Updated	MIL-STD
June 10, 2019	V5 to V6	Added	HP Cloud Recovery

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