

Technical Specifications

HP ProBook 455 G7 Notebook PC



Left

- | | |
|---|--|
| 1. Internal Microphones (2) | 7. SD Card Reader |
| 2. Webcam | 8. Thermal Vent |
| 3. Privacy Shutter (Only available with webcam) | 9. USB 2.0 Port |
| 4. Webcam LED | 10. Standard Security Lock Slot (Lock sold separately) |
| 5. Clickpad | 11. Power Button |
| 6. Hard Drive LED | |

Technical Specifications



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 (select models) |

Technical Specifications

At a Glance

- Preinstalled Windows 10 versions or FreeDOS
- Choice of AMD Ryzen™ 4000 series mobile processors, R7, R5 and R3
- Display include your choice of 39.62 cm (15.6") diagonal HD, Ultra Wide Viewing Angle FHD, And Privacy Panel option
- Enhanced security features including TPM2.0, HP Sure Sense, HP Sure Start, HP BIOSphere, Hardware enforced Firmware Protection, optional Fingerprint sensor (select models)⁴, optional IR camera, and optional Privacy Panel
- Designed to pass 19 MIL-STD 810H testing¹
- Weight starting at 4.41 lb (2.0kg) (Weight will vary by configuration)
- HP Long-Life Rechargeable battery, with HP Fast Charge Technology recharges 50% in 30 minutes²
- 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 keyboard³, and Clickpad with multi-touch gestures enabled, taps enabled as default

1. MIL-STD-810H 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 that must be configured at purchase

4. HP Fingerprint Sensor is an optional feature and requires configuration at purchase.

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



Technical Specifications**PRODUCT NAME**HP ProBook 455 G7 Notebook PC

OPERATING SYSTEMS

Preinstalled	Windows 10 Pro 64 ¹ Windows 10 Pro 64 (National Academic only) ² Windows 10 Home 64 ¹ Windows 10 Home Single Language 64 ¹ Windows® 10 Enterprise 64 (Web Support) ¹ FreeDOS
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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.

NOTE: Your product does not support Windows 8 or Windows 7. 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>. A full list of HP products and the Windows 10 versions tested is available on the HP support website. <https://support.hp.com/us-en/document/c05195282>

PROCESSORS

AMD Ryzen™ 3 4300U APU with Renoir™ Vega 6 Graphics (2.7 GHz base clock, up to 3.7 GHz max boost clock, 4 MB L3 cache, four-cores)^{3,4,5,6}

AMD Ryzen™ 5 4500U APU with Renoir™ Vega 8 Graphics (2.3 GHz base clock, up to 4.0 GHz max boost clock, 4 MB L3 cache, six-cores)^{3,4,5,6}

AMD Ryzen™ 7 4700U APU with Renoir™ Vega 10 Graphics (2.0 GHz base clock, up to 4.1 GHz max boost clock, 4 MB L3 cache, eight-cores)^{3,4,5,6}

Processors Family

AMD Ryzen™ 4000 Series Mobile processors⁶

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>.



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CHIPSET

Chipset is integrated with processor

GRAPHICS

Integrated

AMD Radeon™ Graphics⁷

Note: View processor section for details.

Supports

Support HD decode, DX12, HDMI 1.4

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

DISPLAY

Internal

Non-Touch

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED backlit slim, 220 cd/m², 45% NTSC (1366 x 768)^{7,8}

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED backlit slim, 220 cd/m², 45% NTSC for HD camera (1366 x 768)^{7,8}

39.6 cm (15.6") diagonal HD SVA eDP anti-glare LED backlit slim, 220 cd/m², 45% NTSC for HD + IR camera (1366 x 768)^{7,8}

39.6 cm (15.6") diagonal FHD IPS eDP anti-glare LED-backlit slim, 250 cd/m², 45% NTSC (1920 x 1080)^{7,8}

39.6 cm (15.6") diagonal FHD IPS eDP anti-glare LED-backlit slim, 250 cd/m², 45% NTSC for HD camera (1920 x 1080)^{7,8}

39.6 cm (15.6") diagonal FHD IPS eDP anti-glare LED-backlit slim, 250 cd/m², 45% NTSC for HD + IR camera (1920 x 1080)^{7,8}

39.6 cm (15.6") diagonal FHD eDP+PSR anti-glare LED-backlit flat, 1000 cd/m², 72% NTSC for HD Webcam Privacy (1920x1080)^{7,8}

Supports narrow bezel

HDMI

HDMI1.4b, 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.](#)



Technical Specifications

STORAGE AND DRIVES

Primary Storage

500 GB 7200 rpm SATA⁹

1 TB 5400 rpm SATA⁹

Primary M.2 Storage

128 GB SATA TLC Solid State Drive⁹

256 GB PCIe® NVMe™ Value Solid State Drive⁹

512 GB PCIe® NVMe™ TLC Solid State Drive⁹

512 GB PCIe® NVMe™ Value Solid State Drive⁹

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 DDR4-3200 SDRAM¹⁰

Memory

16 GB DDR4-3200 SDRAM (1 x 16 GB)

12 GB DDR4-3200 SDRAM (1 x 4 GB and 1 x 8 GB)¹⁰

8 GB DDR4-3200 SDRAM (1 x 8 GB)

8 GB DDR4-3200 SDRAM (2 x 4 GB)¹⁰

4 GB DDR4-3200 SDRAM (1 x 4 GB)

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

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 RTL8822CE 802.11 a/b/g/n/ac (2x2) Wi-Fi® + Bluetooth® 5 Combo¹¹

Intel® Dual Band Wi-Fi® 6 AX200 802.11ax (2x2) and Bluetooth® 5 Combo, non-vPro™¹¹

Intel® Dual Band Wireless-AC 9260 802.11 a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 5 Combo, non-vPro™¹¹

Ethernet

Realtek RTL8111EP 10/100/1000 NIC¹²

11. 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



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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.

AUDIO/MULTIMEDIA

Audio

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

Camera

720p HD camera⁷
720p HD + IR camera^{7,13}

7. HD content required to view HD images.

13. IR camera is an optional feature that must be configured at purchase.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard, spill resistant with numeric keypad and optional backlit¹⁴

Pointing Device

Clickpad with multi-touch gesture support

Function Keys

F1 - Display Switching
F2 - Blank or SureView On/Off
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 that must be configured at purchase.

SOFTWARE AND SECURITY

BIOS

HP BIOSphere Gen5¹⁵
HP Drive Lock & Automatic Drive Lock¹⁶
BIOS Update via Network



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Master Boot Record Security
Power On Authentication
Secure Erase¹⁷
Absolute Persistence Module¹⁸
Pre-boot Authentication

Software

HP Connection Optimizer
HP Image Assistant
HP Hotkey Support
HP JumpStarts
HP Support Assistant¹⁹
HP Noise Cancellation Software
Buy Office (sold separately)

Manageability Features

HP Driver Packs²⁰
HP System Software Manager (SSM)
HP BIOS Config Utility (BCU)
HP Client Catalog
HP Manageability Integration Kit Gen3²¹

Client Security Software

HP Client Security Manager Gen5²²
Windows Defender²³
HP Fingerprint Sensor²⁴

Security Management

Pre-boot Authentication
TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)²⁵
USB enable/disable (via BIOS)
Power-on password (via BIOS)
Setup password (via BIOS)
Support for chassis padlocks and cable lock devices
HP Fingerprint Sensor²⁴
HP Sure Sense²⁶
HP Sure Click²⁷
HP Sure Start Gen5²⁸

15. HP BIOSphere Gen5 is available on select HP Pro and Elite PCs. See product specifications for details. Features may vary depending on the platform and configurations.

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

17. 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™.

18. 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 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/>.

19. HP Support Assistant requires Windows and Internet access.

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

21. HP Manageability Integration Kit can be downloaded from <http://www.hp.com/go/clientmanagement>.

22. HP Client Security Manager Gen5 requires Windows and is available on the select HP Pro and Elite PCs. See product specifications for details.

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



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- 24. HP Fingerprint Sensor is an optional feature and requires configuration at purchase.
- 25. Firmware TPM is version 2.0.
- 26. HP Sure Sense requires Windows 10. See product specifications for availability. On HP Elite x2 G4 units with WWAN shipping to China, HP Sure Sense is only available via Softpaq download.
- 27. HP Sure Click is available on select HP platforms and supports Microsoft Internet Explorer, Google Chrome™, 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.
- 28. HP Sure Start Gen5 is available on select HP PCs with Intel processors. See product specifications for availability.

POWER

Power Supply

- HP Smart 65 W External AC power adapter²⁹
- HP Smart 65 W EM External AC power adapter²⁹
- HP Smart 65 W USB Type-C® adapter²⁹
- HP Smart 45 W External AC power adapter²⁹
- HP Smart 45 W USB Type-C® adapter²⁹

Power Cord

- 3-wire plug - 1.8 m²⁹
- 3-wire plug - 1.0 m²⁹
- 2-wire plug - 1.0 m²⁹
- Duckhead power cord - 1.0 m²⁹
- Duckhead power cord - 1.8 m²⁹

Primary Battery

- HP Long Life 3-cell, 45 Wh Li-ion polymer³⁰

Battery Life

- 14 hours³¹

Battery Weight

- 0.22 kg
- 0.49 lb

- 29. Availability may vary by country.
- 30. Battery is internal and not replaceable by customer. Serviceable by warranty.
- 31. 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 <http://www.bapco.com> for additional details..



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WEIGHTS & DIMENSIONS

Weight

Starting at 4.41 lb³²

Starting at 2.0 kg³²

Dimensions (w x d x h)

14.37 x 10.11 x 0.75 in

36.49 x 25.69 x 1.89 cm

32. Weight will vary by configuration. Does not include power adapter.

PORTS/SLOTS

Ports

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

2 USB 3.1 Gen 1

1 USB 2.0 (powered port)

1 HDMI 1.4³³

1 RJ-45

1 AC power

1 stereo headphone/microphone combo jack

Expansion Slots

1 SD

Supports SD, SDHC, SDXC

33. HDMI cable sold separately.



Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	19V
Average Operating Power	8.1 W
Integrated graphics	Yes (AMD Radeon™ Graphics)
Max Operating Power	Discrete < 65 W UMA < 45 W

Temperature

Operating	32° to 95° F (0° to 35° C) (Not writing optical)
Non-operating	-4° to 140° F (-20° to 60° C) (Writing optical)

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 ³⁵
EPEAT® 2019	Yes, Gold in U.S. ³⁶
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



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Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes

35. Configurations of the HP ProBook 455 G7 that are ENERGY STAR® qualified are identified as HP ProBook 455 G7 ENERGY STAR® on HP websites and on <http://www.energystar.gov>.

36. 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.

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

Panel LCD 15.6 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45% NTSC 250 nits eDP 1.2 w/o PSR slim NWBZ	Outline Dimensions (W x H x D)	350.96 x 216.65 mm (max)
	Active Area	344.16 x 193.59 mm (typ.)
	Weight	370 g (max)
	Diagonal Size	15.6 inch
	Thickness	3.2 mm (max)
	Interface	eDP 1.2 (2 lane)
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	600:1 (typ.)
	Refresh Rate	60 Hz



Technical Specifications

Brightness	250 nits
Pixel Resolution	1920 x 1080 (FHD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits
Viewing Angle	UWVA 85/85/85/85

**Panel LCD 15.6 inch
diagonal FHD (1920 x 1080)
Anti-Glare WLED UWVA 72%
NTSC 1000 nits eDP
1.4+PSR2 flat Privacy**

Outline Dimensions (W x H x D)	349.52 x 204.79 mm (max)
Active Area	344.16 x 193.59 mm (typ.)
Weight	350 g (max)
Diagonal Size	15.6 inch
Thickness	2.6 mm (max)
Interface	eDP 1.4 + PSR2 (4 lane)
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	2000:1 (typ.)
Refresh Rate	60 Hz
Brightness	1000 nits
Pixel Resolution	1920 x 1080 (FHD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	72% of NTSC
Color Depth	8 bits
Viewing Angle	UWVA 85/85/85/85



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STORAGE AND DRIVES

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

500 GB 7200 rpm SATA Hard Drive

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

1 TB 5400 rpm SATA Hard Drive

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



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SSD 128 GB 2280 M2 SATA-3 TLC

Form Factor	M.2 2280
Capacity	128 GB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	ATA-8, SATA 3.0
Maximum Sequential Read	Up To 520 MB/s
Maximum Sequential Write	Up To 450 MB/s
Logical Blocks	250,069,680
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	DIPM; TRIM; DEVSLP

256 GB 2280 PCIe NVMe Value Solid State Drive

Form Factor	M.2 2280
Capacity	256 GB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Interface	PCIe NVMe Gen3
Maximum Sequential Read	Up To 1700 MB/s
Maximum Sequential Write	Up To 1300 MB/s
Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2

512 GB 2280 M2 PCIe NVMe TLC Solid State Drive

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



Technical Specifications

512 GB 2280 PCIe NVMe Value Solid State Drive	Form Factor	M.2 2280
	Capacity	512 GB
	NAND Type	Value
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Weight	0.02 lb (10 g)
	Interface	PCIe NVMe Gen3X4
	Maximum Sequential Read	Up To 1500 ~ 1700 MB/s
	Maximum Sequential Write	Up To 860 ~ 1500 MB/s
	Logical Blocks	1,000,215,216
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security, TRIM; L1.2



Technical Specifications

NETWORKING/COMMUNICATIONS

Intel® Wi-Fi 6¹ AX200 and Bluetooth® 5.0 802.11ax (2x2), non-vPro, supporting gigabit file transfer speeds non-vPro

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

Interoperability
Frequency Band

Wi-Fi CERTIFIED™
•802.11b/g/n/ax
2.402 – 2.482 GHz
•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

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)
•802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)

Modulation

Direct Sequence Spread Spectrum
OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM

Security³

• IEEE compliant 64 / 128 bit WEP encryption for a/b/g mode only
• AES-CCMP: 128 bit in hardware
• 802.1x authentication
• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
• WPA2 certification
• IEEE 802.11i
• WAPI

Network Architecture Models

Ad-hoc (Peer to Peer)
Infrastructure (Access Point Required)

Roaming

IEEE 802.11 compliant roaming between access points

Output Power²

• 802.11b: +18.5dBm minimum
• 802.11g: +17.5dBm minimum
• 802.11a: +18.5dBm minimum
• 802.11n HT20(2.4GHz): +15.5dBm minimum
• 802.11n HT40(2.4GHz): +14.5dBm minimum
• 802.11n HT20(5GHz): +15.5dBm minimum



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	• 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ac VHT160(5GHz): +11.5dBm minimum • 802.11ax HT40(2.4GHz): +10dBm minimum • 802.11ax VHT160(5GHz): +10dBm minimum
Power Consumption	• Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10 mW • Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	• 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
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure
	Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	1. Type 2230 : 2.8 g 2. Type 126: 1.3 g
Operating Voltage	3.3v +/- 9%
Temperature	Operating Operating: 14° to 158° F (–10° to 70° C) Non-operating Non-operating: –40° to 176° F (–40° to 80° C)
Humidity	Operating Operating: 10% to 90% (non-condensing) Non-operating Non-operating: 5% to 95% (non-condensing)
Altitude	Operating Operating: 0 to 10,000 ft (3,048 m) Non-operating Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF LED OFF – Radio ON
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology	
Bluetooth® Specification	4.0/4.1/4.2/5.0/5.1 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate⁴	Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps



Technical Specifications

	BLE: 1 Mbps Signaling Data Rate 0.2 Mbps 1. Actual throughput may vary.
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	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)

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).



Technical Specifications

Intel® 802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 5.0 Combo¹ 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
Security³	•IEEE compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •IEEE 802.11i •WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power²	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ac VHT160(5GHz): +11.5dBm minimum
Power Consumption	•Transmit mode 2.0 W •Receive mode 1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode 50 mW (WLAN unassociated) •Connected Standby/Modern Standby: 10mW •Radio disabled 8 mW



Technical Specifications

Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna. One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	Type 2230: 2.8 g Type 126: 1.3 g
Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (-10° to 70° C) Non-operating: -40° to 176° F (-40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF LED OFF – Radio ON
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology	
Bluetooth Specification	4.0/4.1/4.2/5.0 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps Signaling Data Rate 2.17 Mbps BLE: 1 Mbps Signaling Data Rate 0.2 Mbps 1. Actual throughput may vary.
Transmit Power	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.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	



Technical Specifications

Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management	ETS 300 328, ETS 300 826
Certifications	Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	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)

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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).

802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 5.0	Wireless LAN Standards	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



Technical Specifications

	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)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security³	•IEEE compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •IEEE 802.11i •WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
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Output Power²	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ac VHT160(5GHz): +11.5dBm minimum
Power Consumption	•Transmit mode: 2.0 W •Receive mode: 1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode: 50 mW (WLAN unassociated) •Connected Standby/Modern Standby: 10mW •Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard with CNVi Interface
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	Type 2230: 2.8 g Type 126: 1.3 g



Technical Specifications

Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (–10° to 70° C) Non-operating: –40° to 176° F (–40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
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HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology

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Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support FCC (47 CFR) Part 15C, Section 15.247 & 15.249
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Technical Specifications

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.
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).

Realtek RTK8111HSH 10/100/1000 Integrated NIC	Connector	RJ-45
	System Interface	PCIe + SMBus
	Ethernet Features	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
	Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
	Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Management Interface	Auto MDI/MDIX Crossover cable detection



Technical Specifications

POWER

HP 45 W Smart AC adapter

Dimensions (H x W x D)

3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)

Weight

0.386 lb (175 g) max

[Not including power cord. Power cord varies by country](#)

Input

90 to 265 VAC

Input Efficiency

87.74% at 115 VAC and 88.4% at 230 VAC

Input frequency range

47 to 63 Hz

Input AC current

1.4 A at 90 VAC

Output

Output power

45 W

DC output

19.5 V

Hold-up time

5 msec at 115 VAC input

Output current limit

<8.0 A

Connector

4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords

Environmental Design

Operating temperature

32° to 95° F (0° to 35° C)

Non-operating (storage) temperature

-4° to 185° F (-20° to 85° C)

Altitude

0 to 16,400 ft (0 to 5,000 m)

Humidity

20% to 95%

Storage Humidity

10% to 95%

EMI and Safety Certifications

*CE Mark - full compliance with LVD and EMC directives

* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.

* MTBF - over 200,000 hours at 25°C ambient condition.

HP 65 W Smart AC adapter

Dimensions

90 x 51 x 28.5 mm

Weight

220 g +/- 10 g

[Not including power cord. Power cord varies by country](#)

Input

Input Efficiency

88% min at 115 VAC and 89.0% at 230 VAC

Input frequency range

47 to 63 Hz

Input AC current

Max. 1.7 A at 90 VAC

Output

Output power

65 W

DC output

19.5 V

Hold-up time

5 msec at 115 VAC input

Output current limit

<11.0 A

Connector

4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords

Environmental Design

Operating temperature

32°F to 95°F (0° to 35°C)

Non-operating (storage) temperature

-4°F to 185°F (-20° to 85°C)



Technical Specifications

EMI and Safety Certifications	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	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.	

HP 65 W EM Smart AC adapter	Dimensions	102 x 55 x 30 mm	
	Weight	270g +/- 10g Not including power cord. Power cord varies by country	
	Input Efficiency	87% min at 115V/230V	
	Input frequency range	47 to 63 Hz	
	Input AC current	1.7 A at 90 Vac and maximum load	
	DC output	65 W (19.5V/3.33A)	
	Hold-up time	5 msec at 115 VAC input	
	Output current limit	<11 A, Over voltage protection- 29V max automatic shutdown	
	Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	Environmental Design	Operating temperature	32°F to 95°F (0° to 35°C)
		Non-operating (storage) temperature	-4°F to 185°F (-20° to 85°C)
		Altitude	0 to 5,000 m
		Humidity	0% to 95%
		Storage Humidity	0% to 95%
	EMI and Safety Certifications	*CE Mark - EMC directives	
		* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE; Reliability - failure rate of less than 0.1% annually within the first three years of operation.	
		*MTBF - over 200,000 hours at 25°C ambient condition.	

AC Adapter 65 Watt nPFC USB Type-C®	Dimensions	74 x 74 x 28.5 mm	
	Weight	245 g +/- 10 g Not including power cord. Power cord varies by country	
	Input	Input Efficiency	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		



Technical Specifications

	Input frequency range	47 to 63 Hz
	Input AC current	1.7 A at 90 VAC and maximum load
	Output power	65 W
	DC output	5V/9V/10V/12V/15V/20V
	Hold-up time	5ms at 115 VAC input
	Output current limit	<8.0A
Connector	USB Type-C®	
Environmental Design	Operating temperature	32° F to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° F to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	5% to 95%
	Storage Humidity	5% to 95%
EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.	

AC Adapter 45 Watt nPFC USB Type-C®	Dimensions	94.0mm x 40.0mm x 26.5mm
	Weight	192.5g +/-10% Not including power cord. Power cord varies by country
	Input	Input Efficiency 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%
		Input frequency range 47 to 63 Hz
		Input AC current Max. 1.4 A at 90 VAC
		Output power 5V/15W 9V/27W 12V/36W 15V/45W
		DC output 5V/9V/12V/15V
		Hold-up time 5ms at 115 VAC input
		Output current limit <5.0 A
Connector	USB Type-C®	
Environmental Design	Operating temperature	32°F to 95°F (0°to 35°C)
	Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)



Technical Specifications

EMI and Safety Certifications	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	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.	

3 Cell WHr 45 Long Life - Polymer HP Fast Charge Technology¹	Dimensions (H x W x L)	6.0 x 184.7 x 88.9 mm
	Weight	0.22 kg (0.48 lb)
	Cells/Type	3cell Lithium-Ion
	Voltage	11.55 V
	Amp-hour capacity	3.900 Ah
	Watt-hour capacity	45 Wh
	Operating (Charging)	32° to 113° F (0° to 45° C)
	Operating (Discharging)	14° to 122° F (-10° to 60° C)
	Optional Travel Battery Available	No

1. 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.



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

Type	Description	Part Number
Cases	HP Essential Top Load Case	H2W17AA
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP 17.3 Business Backpack	2SC67AA
Docking	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 G2 Audio Module	3AQ21AA
	HP USB-C/A Universal Dock G2	5TW13AA
	HP USB-C Dock G5	5TW10AA
Input / Output	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Bluetooth Travel Mouse	6SP30AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP HDMI to DVI Adapter	F5A28AA
	HP Elite USB-C Hub	4WX89AA
	HP USB-C Travel Hub G2	7PJ38AA
Power	HP 45W Smart AC Adapter 4.5mm	H6Y88AA
	65W Smart Power Adapter (w/ 4.5mm to 7.5mm DC dongle)	H6Y89AA
	HP 65W Slim AC Adapter	H6Y82AA
	HP 65W USB-C Slim Power Adapter	3PN48AA
	HP 65W USB-C Power Adapter	1HE08AA
	HP 45W USB-C Power Adapter	1HE07AA
	HP Power Bank	N9F71AA
	HP USB-C Power Bank	2NA10AA
Storage	HP External USB Optical Drive	F2B56AA
Security	HP Keyed Cable Lock 10mm	T1A62AA
	HP Sure Key Cable Lock	6UW42AA



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

Displays	HP E223d Docking Monitor (Santino)	5VT82A8/5VT82AA
	HP E243d Docking Monitor (Sonny)	1TJ76AA
	HP E273d Docking Monitor (Vito)	5WN63A8/5WN63AA
	HP EliteDisplay E244d Monitor (Sand Dollar)	6PA50A8/6PA50AA
	HP EliteDisplay E274d Monitor (Glomar)	6PA56A8/6PA56AA



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