Overview

HP 245 G7 Notebook PC

Left

1. Webcam LED
2. Webcam
3. Internal microphone
4. Touchpad
5. Touchpad button
6. Power indicator LED
7. Hard drive indicator LED
8. SD Card slot
9. USB 2.0 port
10. Security lock slot (Lock sold separately)
11. Power button

Overview

		Right	
1.	AC Smart Pin adapter plug	4.	USB 3.1 Gen 1 port
2.	RJ-45/Ethernet port	5.	USB 3.1 Gen 1 port
3.	HDMI port (Cable not included)	6.	Audio combo jack

At A Glance

QuickSpecs

Overview

- Preinstall with Windows 10 versions, FreeDOS or Ubuntu
- Choice of AMD Ryzen™ and 7th Generation AMD APU processors
- 14" (35.56 cm) diagonal HD Anti-Glare Display
- Choice of Integrated AMD Radeon Vega or Radeon Graphics
- Dark Ash Silver color with texture pattern
- Up to 1 TB Hard Drive or 256 GB M.2 SATA3 Solid State Drive
- Weight starting at 1.52 Kg (3.4lbs)
- Security features including FW TPM 2.0 and security lock slot (Lock not included)
- Keyboard - Full size textured island-style keyboard
- Touchpad with gestures support
- HP webcam with single digital microphone and HD (supporting WDR- Wide Dynamic Range) or VGA camera
- Two USB 3.1 (Gen 1) ports and One USB 2.0 port
- Wireless LAN (WLAN) up to 802.11ac to keep you connected

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

Technical Specifications

PRODUCT NAME

HP 245 G7 Notebook PC

OPERATING SYSTEM

Preinstalled OS   Windows 10 Pro 64[1]
Windows 10 Home 64[1]
Windows 10 Home Single Language 64[1]
Windows 10 Pro 64 (National Academic only)[2]
FreeDOS
Ubuntu

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 en 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. Fe vary; see https://aka.ms/ProEducation for Windows 10 Pro Education feature information.

PROCESSOR

AMD Ryzen™ 5 2500U APU with Radeon™ Vega Graphics
(2 GHz base frequency, up to 3.6 GHz burst frequency, 6 MB cache, 4 cores)[3,4,5]
AMD Ryzen™ 3 2200U APU with Radeon™ Vega Graphics
(2.5 GHz base frequency, up to 3.4 GHz burst frequency, 5 MB cache, 2 cores) [3,4,5]
AMD A6-9225 APU with Radeon™ R4 Graphics
(2.6 GHz base frequency, up to 3 GHz burst frequency, 1 MB cache, 2 cores)[3,4,5]
AMD A4-9125 APU with Radeon™ R3 Graphics
(2.3 GHz base frequency, up to 2.6 GHz burst frequency, 1 MB cache, 2 cores)[3,4,5]
AMD Ryzen™ 3 2300U APU with Radeon™ Vega Graphics
(2 GHz base frequency, up to 3.4 GHz burst frequency, 4 MB cache, 4 cores)[3,4,5]
Processor Family
AMD Ryzen™ 5 Mobile Processors[5]
AMD Ryzen™ 3 Mobile Processors[5]
7th Generation AMD A6 APU processor (A6-9225) [5]
7th Generation AMD A4 APU processor (A4-9125)[5]

3. Multi core is designed to improve performance of certain software products. Not all customers or software applications will necessa benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware 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. In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products co with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on http://www.support.h

Technical Specifications

CHIPSET

Chipset is integrated with processor

GRAPHICS

Integrated
AMD Radeon Vega 8 Mobile Graphics
AMD Radeon Vega 3 Mobile Graphics
AMD Radeon™ R4 Graphics
AMD Radeon™ R3 Graphics

Supports
Support HD decode, DX12, HDMI 1.4b[6]

6. HDMI cable sold separately.

DISPLAY

Non-Touch
35.56 cm (14") diagonal HD SVA eDP anti-glare WLED-backlit slim-flat, 220 cd/m², 45% NTSC (1366 x 768)[7,8]

HDMI
Port supports resolutions up to 1920 x 1200 external resolution @60 Hz

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

STORAGE AND DRIVES

Technical Specifications

Primary Storage
1 TB 5400 rpm SATA[9]
500 GB 7200 rpm SATA[9]
500 GB 5400 rpm SATA[9]

Primary M.2 Storage
128 GB SATA-3 TLC Solid State Drive[9]
256 GB SATA-3 TLC Solid State Drive[9]

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

MEMORY

Maximum Memory
16 GB DDR4-2400 SDRAM[10]
8 GB DDR4-1866 SDRAM[10]

Memory
16 GB DDR4-2400 SDRAM (2 X 8 GB) [10]
8 GB DDR4-2400 SDRAM (1 x 8 GB)
8 GB DDR4-2400 SDRAM (2 x 4 GB) [10]
4 GB DDR4-2400 SDRAM (1 x 4 GB)
8 GB DDR4-1866 SDRAM (1 x 8 GB)
4 GB DDR4-1866 SDRAM (1 x 4 GB)

Memory Slots
2 SODIMM (AMD Ryzen™ Mobile Processors)
DDR4 PC4 SODIMMS, system runs at 2400 (AMD Ryzen™ Mobile Processors)
1 SODIMM (7th Generation AMD APU processor)
Supports Dual Channel Memory
DDR4 PC4 SODIMMS, system runs at 1866 (7th Generation AMD APU processor)
All slots are customer non-accessible / non-upgradeable

NOTE: All slots are customer non-accessible / non-upgradeable.

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

Technical Specifications

WLAN
Realtek 802.11ac (2x2) WLAN and Bluetooth® 4.2 Combo (MU-MIMO supported)[11]
Realtek 802.11ac (1x1) WLAN and Bluetooth® 4.2 Combo[11]
Realtek 802.11b/g/n (1x1) WLAN and Bluetooth® 4.2 Combo[11]

Miracast
Compatible with Miracast-certified devices[12]

Ethernet
Integrated 10/100/1000 GbE NIC

11. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.
12. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming.

AUDIO/MULTIMEDIA

Audio
2 Integrated stereo speakers

Camera
HP TrueVision HD Camera [7,13]

Webcam
VGA webcam[13,14]

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

KEYBOARDS/TOUCHPAD

Technical Specifications

Keyboard
Full Size Island-style Keyboard

Pointing Device
Touchpad with multi-touch gesture support

Function Keys
F1 - Open " How to get help in Windows 10" webpage
F2 - Brightness Down
F3 - Brightness Up
F4 - Display Switching
F5 - Blank
F6 - Mute
F7 - Volume Down
F8 -Volume Up
F9 - Previous
F10 - Play/Pause
F11 - Next
F12 - Airplane mode

SOFTWARE AND SECURITY

Preinstalled Software

HP JumpStart
HP Documentation
HP Setup Integrated OOBE
HP SSRM
HP Audio Switch
HP SUPPORT ASSISTANT
McAfee LiveSafe[TM]
HP Support Assistant[15]

Security Management
TPM 2.0[16]
Security lock slot (Lock sold separately)

15. HP Support Assistant requires Windows and Internet access.
16. 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).re 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).

POWER

Technical Specifications

Power Supply

65 W EM Smart AC adapter[17,19]
45 W Smart AC adapter[17]

Primary Battery

HP Long Life 3-cell, 41 Wh Li-ion Battery[18]
Support battery fast charge - Approximately 90% in 90 minutes[19]

Battery Life

Up to 10 hours and 45 minutes[20]

Power Cord

1M (3.28 feet) length power cord[17]

17. Availability may vary by country.
18. Battery is internal and not replaceable by customer. Serviceable by warranty.
19. Recharges the battery up to 90% within 90 minutes when the system is off or in standby mode. Power adapter with a minimum ca
65 watts is required. After charging has reached 90% capacity, charging will return to normal. Charging time may vary +/-10% due to
tolerance.
20. 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 w
time and usage. See http://www.bapco.com for additional details.

WEIGHTS & DIMENSIONS

Product Weight

Starting at 3.3 lb[21]
Starting at 1.52 kg[21]

Product Dimensions (w x d x h)

13.19 x 9.21 x 0.78 in
33.5 x 23.4 x 1.99 cm

21. Weight will vary by configuration.

PORTS/SLOTS

Technical Specifications

Ports/Connectors

2 USB 3.1 Gen 1
1 USB 2.0
1 HDMI v1.4b[6]
1 RJ-45
1 AC power
1 Headphone/microphone combo jack

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

6. HDMI cable sold separately.

SERVICE AND SUPPORT

HP Services offers 1-year limited warranties and 90 day software limited warranty options depending on country. Batteries have 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. [22]

22. 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.

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	19.5 V
Average Operating Power	Win 10
Integrated graphics	8.98W
Max Operating Power	Discrete < 65W
	UMA < 45W

Temperature

Operating	32° to 95° F (0° to 35° C) (not writing optical)
	41° to 95° F (5° to 35° C) (writing optical)
Non-operating	-4° to 140° F (-20° to 60° C)

Technical Specifications

Relative Humidity

Operating	10% to 90%, non-condensing
Non-operating	5% to 95%

Shock

Operating	40 G, 2 ms duration, half-sine
Non-operating	240 G, 2 ms duration, half-sine

Random Vibration

Operating	1.043 grms
Non-operating	3.5 grms

Planned Industry Standard Certifications

UL	Yes
CSA	No
FCC Compliance	Yes
ENERGY STAR®	Yes[23]
EPEAT® 2019	Yes, Silver in U.S.[24]
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
SABS	Yes

23. Configurations of the HP ProBook 430 G6 that are ENERGY STAR® certified[2] are identified as HP ProBook 430 G6 ENERGY STAR on HP websites and on http://www.energystar.gov.

24. 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 eithe or lower.

Technical Specifications

14" HD WLED Anti-Glare diagonal (1366 x 768) slim-flat (3.0mm), SVA, eDP

Outline Dimensions (W x H x D)	320.9 x 250.6 x 3.0
Active Area	309.5 x 174.05
Weight	270g max
Diagonal Size	14.0 (inch)
Thickness	3.0 (mm) max
Interface	eDP 1.2
Surface Treatment	AG
Touch Enabled	No
Contrast Ratio	600:1 (typ. AG)
Refresh Rate	60Hz
Brightness	220nits typical
Pixel Resolution	1366 x 768 (HD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits
Viewing Angle	45/45/20/40

STORAGE AND DRIVES

500 GB 5400 rpm SATA Dard Drive

Drive Weight	92g(0.20lb)
Rotation speed	5400 rpm
Cache Buffer	Up to 128MB
Height	7.0 +/- 0.2 mm (0.28 +/-.008 in)
Width	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
Interface	ATA-8, SATA 3.0
Transfer Rate	600 MB/s
Seek Time	Single Track: 2 ~ 1.5 ms Average: 11 ~ 16 ms Maximum: 18 ~ 22 ms
Logical Blocks	976,773,168
Operating Temperature	0° to 60°C
Security Features	ATA Security
Features	S.M.A.R.T., NCQ, Ultra DMA

Technical Specifications

500 GB 7200 rpm SATA Hard Drive	**Drive Weight**	92g(0.20lb)
	Rotation speed	7200 rpm
	Cache Buffer	Up to 128MB
	Height	7.0 +/- 0.2 mm (0.28 +/-.008 in)
	Width	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
	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	0° to 60℃
	Security Features	ATA Security
	Features	S.M.A.R.T., NCQ, Ultra DMA

1 TB 5400 rpm SATA Hard Drive	**Drive Weight**	90g(0.198lb)
	Rotation speed	5400 rpm
	Cache Buffer	Up to 128MB
	Height	<7.2mm
	Width	69.85 +/- 0.25 mm (2.750 +/- 0.010 in)
	Interface	ATA-8, SATA 3.0
	Transfer Rate	600 MB/s
	Seek Time	Single Track: 2 ~ 1.5 ms Average: 11 ~ 16 ms Maximum: 18 ~ 22 ms
	Logical Blocks	976,773,168
	Operating Temperature	0° to 60℃
	Security Features	ATA Security
	Features	S.M.A.R.T., NCQ, Ultra DMA

Technical Specifications

128 GB 2280 M2 SATA-3 TLC Solid State Drive		
Drive Weight	0.02 lb (10 g)	
NAND Type/Size	TLC/128GB	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
Interface	ATA-8, SATA 3.0	
Transfer Rate	550MB/s	
Logical Blocks	250,069,680	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Security Features	ATA Security	
Features	DIPM; TRIM; DEVSLP	

256 GB 2280 M2 SATA-3 TLC Solid State Drive		
Drive Weight	0.02 lb (10 g)	
Height	0.09 in (2.3 mm)	
Width	0.87 in (22 mm)	
Interface	ATA-8, SATA 3.0	
Transfer Rate	550MB/s	
Logical Blocks	500,118,192	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Security Features	ATA Security	
Features	DIPM; TRIM; DEVSLP	

NETWORKING/COMMUNICATIONS
WLAN

Realtek RTL8822BE 802.11 ac 2x2 WLAN and Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
Interoperability	Wi-Fi® certified
Frequency Band	802.11b/g/n

- 2.402 - 2.482 GHz

802.11a/n

- 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

Technical Specifications

	- 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) - 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security[3]	- IEEE and WiFi® compliant 64 / 128 bit WEP encryption for a/b/g mode only - AES-CCMP: 128 bit in hardware - 802.1x authentication - WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. - WPA2 certification - IEEE 802.11i - Cisco Certified Extensions, all versions through CCX4 and CCX Lite - WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	- 802.11b: +14dBm minimum - 802.11g: +12dBm minimum - 802.11a: +12dBm minimum - 802.11n HT20(2.4GHz): +12dBm minimum - 802.11n HT40(2.4GHz): +12dBm minimum - 802.11n HT20(5GHz): +10dBm minimum - 802.11n HT40(5GHz): +10dBm minimum - 802.11ac VHT80(5GHz): +10dBm minimum
Power Consumption	Transmit mode: 2.0 W Receive mode: 1.6 W Idle mode (PSP)180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connected Standby/Modern Standby: 10mW Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	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 enclos Two embedded dual band 2.4/5 GHz antennas are provided to the card to su WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm
Weight	Type 2230: 2.8g

QuickSpecs

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)
LED Activity	LED Amber - Radio OFF; LED White - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet er
rate of 10% for 802.11a/g (OFDM modulation).

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

Bluetooth® Specification	4.0/4.1/4.2 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps Signaling data rate[1] BLE: 1 Mbps Signaling data rate[1]

1. Actual throughput may vary.

Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice chann

Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymm
(3-DH5) or 864 kbps symmetric (3-EV5)

Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

Realtek RTL8821CE 802.11 ac 1x1 WLAN and Bluetooth® 4.2 Combo Adapter (MU-MIMO supported)	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi® certified
	Frequency Band	802.11b/g/n

- 2.402 - 2.482 GHz

802.11a/n

- 4.9 - 4.95 GHz (Japan)
- 5.15 - 5.25 GHz

Technical Specifications

- 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 and 80MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security[3]	- IEEE and WiFi® compliant 64 / 128 bit WEP encryption for a/b/g mode only - AES-CCMP: 128 bit in hardware 802.1x authentication - WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. - WPA2 certification - IEEE 802.11i - Cisco Certified Extensions, all versions through CCX4 and CCX Lite - WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	802.11b: +14dBm minimum 802.11g: +12dBm minimum 802.11a: +12dBm minimum 802.11n HT20(2.4GHz): +12dBm minimum 802.11n HT40(2.4GHz): +12dBm minimum 802.11n HT20(5GHz): +10dBm minimum 802.11n HT40(5GHz): +10dBm minimum 802.11ac VHT80(5GHz): +10dBm minimum
Power Consumption	- Transmit mode 2.0 W - Receive mode 1.6 W - Idle mode (PSP) 180 mW (WLAN Associated) - Idle mode 50 mW (WLAN unassociated) - Connected Standby 10mW - Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[3]	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

Technical Specifications

Antenna type	High efficiency antenna.	
	One embedded dual band 2.4/5 GHz antenna is provided to the card to suppo WLAN communications and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230: 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; LED White - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet er rate of 10% for 802.11a/g (OFDM modulation).

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Bluetooth® Specification	4.0/4.1/4.2 Compliant
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Signaling Data Rate	Legacy: 3 Mbps Signaling data rate[1] BLE: 1 Mbps Signaling data rate[1]

1. Actual throughput may vary.

Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice chann

Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymm (3-DH5) or 864 kbps symmetric (3-EV5)"

Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

Realtek RTL8723DE 802.11 bgn 1x1 WLAN and Bluetooth® 4.2 Combo Adapter	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	Interoperability	Wi-Fi® certified

Technical Specifications

Frequency Band	802.11b/g/n

- 2.402 - 2.482 GHz

802.11a/n

- 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
- 802.11n: MCS 0 ~ MCS 7, (20MHz, and 40MHz)

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

Security[3]
- IEEE and WiFi® compliant 64 / 128 bit WEP encryption for a/b/g mode only
- AES-CCMP: 128 bit in hardware
- 802.1x authentication
- WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.
- WPA2 certification
- IEEE 802.11i
- Cisco Certified Extensions, all versions through CCX4 and CCX Lite
- WAPI

Network Architecture Models Ad-hoc (Peer to Peer)
Infrastructure (Access Point Required)

Roaming IEEE 802.11 compliant roaming between access points

Output Power[2]
- 802.11b: +14dBm minimum
- 802.11g: +12dBm minimum
- 802.11n HT20(2.4GHz): +12dBm minimum
- 802.11n HT40(2.4GHz): +12dBm 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 Sensitivity[3] 802.11b, 1Mbps: -93.5dBm maximum
802.11b, 11Mbps: -84dBm maximum
802.11g, 6Mbps: -86dBm maximum
802.11g, 54Mbps: -72dBm maximum
802.11n, MCS07: -67dBm maximum

Technical Specifications

Antenna type	High efficiency antenna.	
	One embedded dual band 2.4/5 GHz antenna is provided to the card to suppo WLAN communications and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230: 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Amber - Radio OFF; LED White - Radio ON	

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet er rate of 10% for 802.11a/g (OFDM modulation).

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

Bluetooth® Specification	4.0/4.1/4.2 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps Signaling data rate up to 2.17 Mbps[1] BLE: 1 Mbps Signaling data rate up to 0.2 Mbps[1]

1. Actual throughput may vary.

Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice chann

Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymm (3-DH5) or 864 kbps symmetric (3-EV5)"

Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

Realtek Ethernet (10/100/1000)	**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/ IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable)

Technical Specifications

	IEEE 802.3az EEE (Energy Efficient Ethernet)	
	Jumbo Frame 9K	
	Auto MDI/MDIX Crossover cable detection	
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	
Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wak 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, clau 30)	
	Comprehensive diagnostic and configuration software suite	
	Virtual Cable Doctor for Ethernet cable status	
Interface	PCI Express 1.1 to support ASPM L1	
NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller	

POWER

HP 45 W AC adapter	**Dimensions** (H x W x D)	95 x 40 x 26.5mm	
	Weight	200 g	
	Input	100 to 240 VAC	
		Input Efficiency	87.8 % at 115 VAC and 88.5 % at 230VAC
		Input frequency range	50~ 60 Hz
		Input AC current	Max. 1.4 A at 90 VAC
	Output	**Output power**	45W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	The power supply shall limit the maximum steady state output current to an average current of 8 Amperes.
	Connector	4.5mm Barrel Type	
	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	The power supply can be operated at 5,000 m above sea level
		Humidity	The power supply shall withstand without degradation with 95% relative humidity, non-condensing, both operating and non-operating.

QuickSpecs

Technical Specifications

	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 (EM)	**Dimensions** (H x W x D)	102 x 55 x 30mm	
	Weight	270 g	
	Input	100 to 240 VAC	
		Input Efficiency	88.0 % at 115 VAC and 89.0 % at 230VAC
		Input frequency range	50~ 60 Hz
		Input AC current	Max. 1.7 A at 90 VAC
	Output	**Output power**	65W
		DC output	19.5V
		Hold-up time	5ms at 115 VAC input
		Output current limit	The power supply shall limit the maximum steady state output current to an average current of 11 Amperes.
	Connector	4.5mm Barrel Type	
	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	The power supply can be operated at 5,000 m above sea level
		Humidity	The power supply shall withstand without degradation with 95% relative humidity, non-condensing, both operating and non-operating.
	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 3-cell Li-Ion Long Life - Fast Charge (41 WHr)	**Dimensions**	6.0 x 186.85 x 90.2 mm (0.236 x 7.35 x 3.55 inch)	
	Weight	0.18 kg (0.39 lb)	
	Cells/Type	3cell Lithium-Ion Polymer cell / 515974	
	Voltage	11.4V	
	Amp-hour capacity	3.6Ah	
	Watt-hour capacity	41Wh	
	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	
HP 3-cell Li-Ion Long Life - Fast Charge (41 WHr)	**Dimensions**	6.0 x 186.85 x 90.2 mm (0.236 x 7.35 x 3.55 inch)	
	Weight	0.19 kg (0.41 lb)	
	Cells/Type	3cell Lithium-Ion Prismatic cell / 496080	
	Voltage	11.55V	

Technical Specifications

Amp-hour capacity	3.615Ah/3.63Ah
Watt-hour capacity	41Wh
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

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

Category	Description	Part Number
Cases	HP Essential Top Load Case	H2W17AA#xxx
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Messenger Case (up to 17.3")	H1D25AA
Docking	HP 3005PR USB3 Port Replicator	Y4H06AA
	HP USB Travel Dock	T0K30AA
	HP Monitor Stand	M9X76AA
Input / Output	HP Slim USB Keyboard and Mouse	T6T83AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP HDMI to DVI Adapter	F5A28AA
	HP Stereo USB Headset	T1A67AA
	HP Stereo 3.5mm Headset	T1A66AA
Power	HP 45W Smart AC Adapter 4.5mm	H6Y88AA#XXX
	HP 65W Smart AC Adapter	H6Y89AA#xxx
	HP 65W Slim AC Adapter	H6Y82AA#xxx
Memory	HP 4GB 2666Mhz DDR4	4VN05AA
	HP 8GB 2666Mhz DDR4	4VN06AA
Storage	HP External USB Optical Drive	F2B56AA
	HP External USB Optical Drive	F2B56AA
Displays	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

Summary of Changes

Date of change:	Version History:		Description of change:
March 1, 2019	From v1 to v2	Removed	USB-C Travel Dock
March 4, 2019	From v2 to v3	Removed	Battery Life
March 25, 2019	From v3 to v4	Added	Battery Life
June 13, 2019	From v4 to v5	Updated	EPEAT
July 5, 2019	From v5 to v6	Updated	Color Gamut
July 12, 2019	From v6 to v7	Added	Processors