Overview

HP ProBook 445 G8 Notebook PC

Left

1. Internal Microphones (2)
2. Webcam LED (Optional)
3. HD and IR Camera (Optional)
4. Camera Shutter (Only available with webcam)
5. IR Camera LED (Optional)
6. Clickpad
7. SuperSpeed USB Type-A 5 Gbps signaling rate Power Port
8. Ethernet Port (RJ-45)
9. Nano Security Lock Slot (Lock sold separately)

Overview

Right

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

Overview

AT A GLANCE

- A new compact design with lift-anywhere edge and configurable all metal chassis
- Choice of AMD Cezanne™ 5000 series mobile processors, R7, R5 and R3
- Preinstalled with Windows 10 versions or FreeDOS
- Integrated AMD Radeon™ Vega graphics
- Fast and upgradeable dual channel DDR4 SODIMM memory up to 32 GB
- Choice of 35.56 cm (14.0") diagonal HD, Ultra Wide Viewing Angle FHD, Touch or Non-Touch screen, and Privacy Panel option
- Features redesigned quiet and responsive HP Keyboard with the HP Programmable key and backlit options
- Choice of Solid State Drives up to 1 TB
- Multi-layered security with HP SureStart Gen6, HP Privacy Camera, HP Sure View Gen3, HP Sure Sense, HP Sure Click, and optional Touch Fingerprint sensor
- Supports wireless options for connectivity on the go including gigabit-speed Wi-Fi® 6
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Designed to support optional HP docking options including the HP Universal Dock G5
- Undergoes MIL-STD 810H tests [1]
- Battery Life up to 15 hours and 45 minutes

1. MIL-STD 810H is not intended to demonstrate fitness of U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Accidental damage requires an optional HP Accidental Damage Protection Care Pack.

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

Technical Specifications

PRODUCT NAME

HP ProBook 445 G8 Notebook PC

OPERATING SYSTEM

Preinstalled

Windows 10 Pro 64 – HP recommends Windows 10 Pro for business [1]
Windows 10 Pro 64 (National Academic License) [2]
Windows 10 Home 64 [1]
Windows 10 Home Single Language 64 [1]
Windows 10 Pro (Windows 10 Enterprise available with a Volume Licensing Agreement) [1]
Windows 10 Enterprise 64[1] (Web support)
FreeDOS

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com/.

2. Some devices for academic use will automatically be updated to Windows 10 Pro Education with the Windows 10 Anniversary Update. Features vary; see https://aka.ms/ProEducation for Windows 10 Pro Education feature information.

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

PROCESSORS

AMD Ryzen™ 3 5400U APU with AMD Radeon™ Graphics (2.6 GHz base clock, up to 4.0 GHz max boost clock, 8 MB L3 cache, 4 cores)[3,4,5,6]
AMD Ryzen™ 5 5600U APU with AMD Radeon™ Graphics (2.3 GHz base clock, up to 4.2 GHz max boost clock, 16MB L3 cache, 6 cores)[3,4,5,6]
AMD Ryzen™ 7 5800U APU with AMD Radeon™ Graphics (1.9 GHz base clock, up to 4.4 GHz max boost clock, 16 MB L3 cache, 8 cores)[3,4,5,6]
AMD Ryzen™ 5 PRO 5650U APU with Radeon™ Graphics (2.3 GHz base clock, up to 4.2 GHz max boost clock, 16 MB L3 cache, 6cores) [3,4,5,6]
AMD Ryzen™ 7 PRO 5850U APU with Radeon™ Graphics (1.9 GHz base clock, up to 4.4 GHz max boost clock, 16 MB L3 cache, 8cores) [3,4,5,6]

Processor Family
AMD Cezanne™ 5000 Series Mobile Processors [6]

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

Technical Specifications

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.

GRAPHICS

Integrated

AMD Radeon™ Graphics

Supports

Support HD decode, DX12, HDMI 1.4 [7]

7. HDMI cable sold separately.

DISPLAY

Non-Touch

35.6 cm (14") diagonal HD SVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC (1366 x 768) [9,10]

35.6 cm (14") diagonal HD SVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD camera (1366 x 768) [9,10]

35.6 cm (14") diagonal HD SVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD+IR camera (1366 x 768) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP+PSR anti-glare, low power narrow bezel bent, 400 nits, 100% sRGB for HD camera (1920 x 1080) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP+PSR anti-glare, low power narrow bezel bent, 400 nits, 100% sRGB for HD+IR camera (1920 x 1080) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC (1920 x 1080) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD camera (1920 x 1080) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD + IR camera (1920 x 1080) [9,10]

35.6 cm (14") diagonal FHD UWVA eDP+PSR anti-glare, narrow bezel bent with HP Sure View Gen3 Integrated Privacy Screen, 1000 nits, 100% sRGB for HD camera (1920 x 1080) [9,10,11,12]

35.6 cm (14") diagonal FHD UWVA eDP+PSR anti-glare, narrow bezel bent with HP Sure View Gen3 Integrated Privacy Screen, 1000 nits, 100% sRGB for HD+IR camera (1920 x 1080) [9,10,11,12]

HDMI[8]

Supports resolution up to 4K 30Hz

8. HDMI cable not included.
9. FHD/HD content required to view FHD/HD images.
10. Resolutions are dependent upon monitor capability, and resolution and color depth settings.
11. Actual brightness will be lower with touchscreen or Sure View.
12. HP Sure View integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.

STORAGE AND DRIVES

Primary M.2 Storage

128 GB PCIe® NVMe™ M.2 TLC Solid State Drive [13]
256 GB PCIe® NVMe™ M.2 Value Solid State Drive [13]
512 GB PCIe® NVMe™ M.2 Value Solid State Drive [13]
1 TB PCIe® NVMe™ M.2 TLC Solid State Drive [13]

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

MEMORY

Maximum Memory

32 GB DDR4-3200 SDRAM [14]

Memory

32 GB DDR4-3200 SDRAM (2 x 16 GB) [14]
16 GB DDR4-3200 SDRAM (1 x 16 GB) [14]
12 GB DDR4- 3200 SDRAM (1 x 4 GB + 1 x 8 GB) [14]
8 GB DDR4-3200 SDRAM (1 x 8 GB) [14]
8 GB DDR4-3200 SDRAM (2 x 4 GB) [14]
4 GB DDR4-3200 SDRAM (1 x 4 GB) [14]

Memory Slots

2 SODIMM
Both slots are accessible/upgradeable by IT or self-maintainers only
DDR4 PC4 SODIMMS, system runs at 3200
Supports Dual Channel Memory

14. 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.

Technical Specifications

NETWORKING/COMMUNICATIONS

WLAN

Realtek RTL8822CE 802.11ac (2x2) and Bluetooth® 5 Combo [15]

Intel® Dual Band Wireless-AC 9260 802.11a/b/g/n/ac (2x2) Wi-Fi ®and Bluetooth® 5 Combo, non-vPro® [15]

Intel® AX200 Wi-Fi 6 (2x2) and Bluetooth® 5 Combo, non-vPro®[17]

Ethernet

Realtek 10/100/1000 GbE NIC [16]

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

16. 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.

17. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax WLAN devices. Only available in countries where 802.11ax is supported.

AUDIO/MULTIMEDIA

Audio

2 Integrated stereo speakers

Integrated microphone (Dual Array)

Speaker Power

2W/4ohm per speaker

Camera

720p HD camera [9]

720p HD camera+IR Camera [9,18]

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

18. Sold separately or as an optional feature.

Technical Specifications

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard, spill resistant and optional Durakeys and backlit

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 - Insert
F11 - Airplane Mode
F12 - Programmable key
Print Screen
Power Button (with LED)

Hidden Function Keys

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

Technical Specifications

SOFTWARE AND SECURITY

BIOS

HP BIOSphere Gen6 [19]
HP Drive Lock & Automatic Drive Lock
BIOS Update via Network
HP Secure Erase [20]
Absolute Persistence Module [21]
HP LAN-Wireless Protection
USB enable/disable (via BIOS)

Software

HP Connection Optimizer [22]
HP Hotkey Support
myHP
HP Support Assistant[23]
HP QuickDrop[24]
HP PC Hardware Diagnostics Windows
HP Noise Cancellation Software
Touchpoint Customizer for Commercial
HP Notifications
HP Privacy Settings
HP Wireless Button Driver
HP Power Manager
Buy Microsoft Office (Sold separately)
Microsoft Defender [25]
Xerox® DocuShare® 30 day free trial offer[43]
HP Smart Support [44]

Manageability Features

HP Driver Packs (download) [26]
HP Manageability Integration Kit Gen4 (download) [27]
HP Client Catalog (download)
HP Client Management Script Library (download)
HP Image Assistant (download)
Ivanti Management Suite (download)

Security Management

HP Pro Security Edition (Select models)[28]
HP Fingerprint Sensor (Select models) [29]
HP Sure Click [30]
HP Sure Sense [31]
HP Sure Admin [32]
Secured-core PC Enable[33]

Technical Specifications

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

19. HP BIOSphere Gen6 requires Windows 10 and is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations
20. HP Secure Erase For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.
21. 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/
22. HP Connection Optimizer requires Windows 10.
23. HP Support Assistant requires Windows and Internet access.
24. HP Quick Drop requires Internet access and Windows 10 PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.
25. Microsoft Defender Opt in and internet connection required for updates.
26. HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.
27. HP Manageability Integration Kit can be downloaded from http://www.hp.com/go/clientmanagement.
28. HP Pro Security Edition is available preloaded on select HP PCs and includes HP Sure Click Pro and HP Sure Sense Pro. 3-year license required. The HP Pro Security Edition software is licensed under the license terms of the HP End User License Agreement (EULA) that can be found at: https://h30670.www3.hp.com/ecommerce/common/disclaimer.do#EN_US as modified by the following: "7. Term. Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Pro Security Edition (HP Sure Sense Pro and HP Sure Click Pro) is effective upon activation and will continue for thirty-six (36) months thereafter ("Initial Term"). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Pro Security Edition from HP.com, HP Sales or an HP Channel Partner, or (b) continue using the standard versions of HP Sure Click and HP Sure Sense at no additional cost with no future software updates or HP Support." HP Pro Security Edition is optimized for the SMB environment and ships pre-configured - manageability is optional. The HP Pro Security Edition supports a limited tool set that can be used by the HP Manageability Integration Kit which can be downloaded from http://www.hp.com/go/clientmanagement.
29. HP Fingerprint sensor is an optional feature that must be configured at purchase.
30. HP Sure Click requires Windows 10 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.
31. HP Sure Sense is available on select HP PCs and is not available with Windows10 Home.
32. HP Sure Admin requires Windows 10, HP BIOS, HP Manageability Integration Kit from http://www.hp.com/go/clientmanagement and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.
33. Requires an Intel® vPro® , AMD Ryzen™ Pro processor or Qualcomm® processor with SD850 or higher and requires 8 GB or more system memory. Secured-core PC functionality can be enabled from the factory.
43. Simply sign up and start using Xerox® DocuShare® Go. No credit card. No obligation. Data will become

unavailable unless a subscription is entered before the end of the 30 day free trial period. See visit http://www.xerox.com/docusharego for details.

44. HP Smart Support is available to commercial customers through your HP Service Representative and HP Factory Configuration Services; or it can be downloaded at: http://www.hp.com/smart-support. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights.

POWER

Power Supply

HP Smart 65 W External AC power adapter [34]

HP Smart 65 W EM External AC power adapter [34]

HP Smart 65 W USB Type-C adapter [34]

HP Smart 45 W External AC power adapter [34]

HP Smart 45 W USB Type-C adapter [34]

Power Cord

3-wire plug - 1m [34]

2-wire plug - 1m [34]

Primary Battery

HP Long Life 3-cell, 45 Wh Polymer [35,36]

Battery Life

Up to 15 hours and 45 minutes [37]

Battery Weight

0.42 lb

190 g

34. Availability may vary by country.

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

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

37. Windows 10 MM18 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See www.bapco.com for additional details.

Technical Specifications

WEIGHTS & DIMENSIONS

Product Weight

Starting at 3.03 lb [38]

Starting at 1.38 kg [38]

Product Dimensions (w x d x h)

32.19 x 21.39 x 1.99 cm

12.67 x 8.42 x 0.78 in

38. Weight will vary by configuration.

PORTS/SLOTS

1 SuperSpeed USB Type-C® 10 Gbps signaling rate port (Power delivery, DisplayPort™1.4)

3 SuperSpeed USB Type-A 5 Gbps signaling rate port (1 charging, 1 powered port)

1 HDMI 1.4b [39]

1 RJ-45

1 Headphone/microphone combo jack

1 AC power

Expansion Slots

1 micro SD

Supports SD, SDHC, SDXC

39. HDMI cable sold separately.

Technical Specifications

SERVICE AND SUPPORT

1-year or 3-year limited warranty and 90-day software limited warranty options depending on country.
Batteries have a default one-year limited warranty except for HP Long Life batteries which will follow the one or three year warranty of the platform. Refer to http://www.hp.com/support/batterywarranty/ for additional battery information. On-site service and extended coverage is also available. HP Care Pack Services are optional extended service contracts that go beyond the standard limited warranties. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/cpc. [40]

40. 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.

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	
Nominal Operating Voltage	19V
Average Operating Power	7.52W (Idle)
Integrated graphics	Yes (AMD Radeon™ Graphics)
Discrete Graphics	N/A
	Discrete < 65W
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®	Select models[41]
EPEAT®	EPEAT® Gold in United States [42]
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

Technical Specifications

41. Configurations of the HP ProBook 445 G8 that are ENERGY STAR® qualified are identified as HP ProBook 445 G8 ENERGY STAR on HP websites and on http://www.energystar.gov.
42. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit http://www.epeat.net for more information

DISPLAYS

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

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

Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent NWBZ	**Outline Dimensions (W x H x D)**	316.17 x 186.4 mm (max) (w/ PCB)
	Active Area	309.37 x 174.02 mm (typ.)
	Weight	300 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 mm/ 5.0 mm (PCB) (max)
	Interface	eDP 1.2
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	600:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	250 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format	RGB Stripe
	Backlight	LED
	Color Gamut Coverage	NTSC 45%
	Color Depth	6 bits (Hi FRC supportive w/ condition to enable)
	Viewing Angle	UWVA 85/85/85/85

Technical Specifications

Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA 72percent cg 1000nits eDP 1.4+PSR2 bent Privacy NB2X Gen3	**Outline Dimensions (W x H x D)**	322.82 x 201.25mm (max.)
	Active Area	309.31 x 173.99
	Weight	280g max.
	Diagonal Size	14 (inch)
	Thickness	3mm max.
	Interface	eDP 1.3 + PSR (supportive @ 8bit)
	Surface Treatment	Anti-Glare (AG)
	Touch Enabled	No
	Contrast Ratio	1050:1 (typ.)
	Refresh Rate	60Hz
	Brightness	350nits[1]
	Pixel Resolution	3840 x 2160 (UHD)
	Format	RGB
	Backlight	LED
	Color Gamut Coverage	sRGB 100%
	Color Depth	8bits
	Viewing Angle	UWVA 85/85/85/85

Panel LCD 14 inch FHD (1920x1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 bent LP NB2X	**Outline Dimensions (W x H x D)**	315.07 x 186.6 mm (max)
	Active Area	309.37 X 174.02 mm (typ.)
	Weight	200 g (max)
	Diagonal Size	14.0 inch
	Thickness	2.0 mm/4.0 mm (w/PCB) (max)
	Interface	eDP 1.4
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	1200:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	400 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format	RGB Stripe
	Backlight	LED
	Color Gamut Coverage	sRGB 100% (NTSC 72%)
	Color Depth	6 bits
	Viewing Angle	UWVA 85/85/85/85

Technical Specifications

Panel LCD 14-in HD (1366x768) Anti-Glare WLED SVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ bent

Outline Dimensions (W x H x D)	316.1 x 186.37 (mm) max
Active Area	309.4 x 173.95 (mm)
Weight	300g Max
Diagonal Size	14”
Thickness	3.0t (panel) / 5.0t (panel+PCB) max.
Interface	eDP 1.2 (1 lane)
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	300:1 (typ)
Refresh Rate	60 Hz
Brightness	250nits
Pixel Resolution	1366 x 768 (HD)
Format	RGB Stripe
Backlight	LED
Color Gamut Coverage	NTSC 45%
Color Depth	6 bits
Viewing Angle	SVA 45/45/15/35

Technical Specifications

STORAGE

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.

SSD 128GB 2280 PCIe-3x2 Three Layer Cell	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	PCIe NVMe
	Maximum Sequential Read	1400 ~ 2100 MB/s
	Maximum Sequential Write	800 ~ 1200 MB/s
	Logical Blocks	250,069,680
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; DIPM; TRIM; DEVSLP

SSD 1TB 2280 PCIe-3x4 NVMe Three Layer Cell single-sided	Form Factor	M.2 2280
	Capacity	1 TB
	NAND Type	TLC
	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	3100 ~ 3500 MB/s
	Maximum Sequential Write	2770 ~ 3037 MB/s
	Logical Blocks	2,000,409,264
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; TRIM; L1.2

Technical Specifications

SSD 256GB 2280 PCIe NVMe Value	Capacity	256 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 Gen3
	Maximum Sequential Read	2100 ~ 2200 MB/s
	Maximum Sequential Write	900 ~ 1400 MB/s
	Logical Blocks	500,118,192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security (optional); TRIM; L1.2

SSD 512GB 2280 PCIe NVMe Value	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 Gen3
	Maximum Sequential Read	2200 ~ 2300 MB/s
	Maximum Sequential Write	1000 ~ 1600 MB/s
	Logical Blocks	1,000,215,215
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security (optional); TRIM; L1.2

Technical Specifications

NETWORKING

Intel® Wi-Fi 6 AX200 + Bluetooth® 5 (802.11ax 2x2, supporting gigabit data rate) (non-vPro)[1,5]	**Wireless LAN Standards**	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	Wifi certified
	Frequency Band	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
	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 • WPA3 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

Technical Specifications

Output Power[2]	• 802.11b: +17dBm minimum • 802.11g: +16dBm minimum • 802.11a: +17dBm minimum • 802.11n HT20(2.4GHz): +14dBm minimum • 802.11n HT40(2.4GHz): +13dBm minimum • 802.11n HT20(5GHz): +14dBm minimum • 802.11n HT40(5GHz): +13dBm minimum • 802.11ac VHT80(5GHz): +10dBm minimum • 802.11ac VHT160(5GHz): +10dBm minimum • 802.11ax HE40(2.4GHz): +12dBm minimum • 802.11ax HE80(5GHz): +10dBm minimum • 802.11ax HE160(5GHz): +10dBm minimum
Power Consumption	•Transmit mode: 2.0 W •Receive mode 1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode50 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[4]	• 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(VHT80): -84dBm maximum • 802.11ac, MCS9(VHT80): -59dBm maximum • 802.11ac, MCS9(VHT160): -58.5dBm maximum • 802.11ax, MCS11(HE40): -57dBm maximum • 802.11ax, MCS11(HE80): -54dBm maximum • 802.11ax, MCS11(HE160): -53.5dBm 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: 2.8g 2. Type 126: 1.3g
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)

Technical Specifications

	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 4.0/4.1/4.2/5.0/5.1 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)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 is backwards compatible with prior 802.11 specs. The specifications for Wi-Fi 6 (802.11ax) are draft and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax devices. Only available in countries where 802.11ax is supported.
2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
3. Check latest software/driver release for updates on supported security features.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
5. Wi-Fi 5 or 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

Intel® Thunder Peak 9260 802.11a/b/g/n/ac (2x2) WiFi® and Bluetooth® 5.0 Combo[1] (Non-vPro)	**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

Technical Specifications

	IEEE 802.11r IEEE 802.11v
Interoperability	Wi-Fi certified
Frequency Band	802.11b/g/n •2.402 – 2.482 GHz 802.11a/n/ac •4.9 – 4.95 GHz (Japan) •5.15 – 5.25 GHz •5.25 – 5.35 GHz •5.47 – 5.725 GHz •5.825 – 5.850 GHz
Data Rates	•802.11b: 1, 2, 5.5, 11 Mbps •802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) •802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security[3]	•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 •WPA3 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 Power[2]	• 802.11b: +17dBm minimum • 802.11g: +16dBm minimum • 802.11a: +17dBm minimum • 802.11n HT20(2.4GHz): +14dBm minimum • 802.11n HT40(2.4GHz): +13dBm minimum • 802.11n HT20(5GHz): +14dBm minimum • 802.11n HT40(5GHz): +13dBm minimum • 802.11ac VHT80(5GHz): +10dBm minimum • 802.11ac VHT160(5GHz): +10dBm minimum
Power Consumption	•Transmit mode: 2.0 W •Receive mode 1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode50 mW (WLAN unassociated)

Technical Specifications

	•Connected Standby 10mW •Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[4]	• 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(VHT80): -84dBm maximum • 802.11ac, MCS9(VHT80): -59dBm maximum • 802.11ac, MCS9(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: 2.8g 2. Type 126: 1.3g
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)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

Technical Specifications

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.
2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
3. Check latest software/driver release for updates on supported security features.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® + Bluetooth® 5[1]	**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 modules
	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)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	Security[3]	•IEEE and Wi-Fi certified 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

Technical Specifications

	•WPA3 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 Power[2]	• 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
Power Consumption	•Transmit mode: 2.0 W •Receive mode 1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode50 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[4]	•802.11b, 1Mbps: -93.5dBm maximum •802.11b, 11Mbps: -84dBm maximum •802.11a/g, 6Mbps: -86dBm maximum •802.11a/g, 54Mbps: -72dBm maximum •802.11n, MCS07: -67dBm maximum •802.11n, MCS15: -64dBm maximum •802.11ac, MCS0: -84dBm maximum •802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	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: 2.8g 2. Type 126: 1.3g
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)

Technical Specifications

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)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

1. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.
2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
3. Check latest software/driver release for updates on supported security features.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Technical Specifications

Realtek RTK8111HSH 10/100/1000 Integrated NIC

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 modern standby or sleep state (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
Interface	Auto MDI/MDIX Crossover cable detection
NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller

Technical Specifications

POWER

AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	**Dimensions**	95x45x26.8mm
	Weight	unit: 200g +/- 10g
	Input	
	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
	Input frequency range	47 ~ 63 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	<8.0A
	Connector	
	Connector	4.5mm Barrel Type
	Environmental Design	
	Operating temperature	32oF to 95oF (0° to 35°C)
	Non-operating (storage) temperature	-4oF to 185oF (-20° to 85°C)
	Non-operating (storage) temperature	
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 45 Watt nPFC Standard USB type C Straight 1.8m	**Dimensions**	94.0mm * 40.0mm * 26.5mm
	Weight	192.5g +/-10%
	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 ~ 63Hz
	Input AC current	Max. 1.4 A at 90 Vac
	Output	
	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	
	Connector	USB Type-C™
	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	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m 2prong	**Dimensions**	95x45x26.8mm
	Weight	unit: 200g +/- 10g
	Input	
	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
	Input frequency range	47 ~ 63 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	<8.0A
	Connector	4.5mm Barrel Type
	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	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 65 Watt nPFC Standard USB type C©Straight 1.8m	**Dimensions**	90.0x51x28.5mm
	Weight	unit: 250g +/- 10g
	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 @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A
	Input frequency range	47 ~ 63 Hz
	Input AC current	1.6 A at 90 VAC and maximum load
	Output	
	Output power	65W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input
	Output current limit	8.0A Max.
	Connector	USB Type C™
	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	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 65 Watt Smart nPFC EM Barrel 4.5mm New EM	**Dimensions**	102 x 55 x 30mm
	Weight	unit: 250g +/- 10g
	Input	
	Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230Vac
	Input frequency range	47 ~ 63 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	<11.0A
	Connector	4.5mm Barrel Type
	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	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *CE Mark - full compliance with LVD and EMC directives * Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. * MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 65 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	**Dimensions**	90 x 51 x 28.5mm
	Weight	unit: 230g +/- 10g
	Input	
	Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230Vac
	Input frequency range	47 ~ 63 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	<11.0A
	Connector	4.5mm Barrel Type
	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	20% to 95%
	Storage Humidity	10% to 95%
	EMI and Safety Certifications	Eg: *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.
Battery RH 3 Cell 45Wh Long Life -PL Fast Charge	**Dimensions (H x W x L)**	6.2 x 68.7 x 249.6mm
	Weight	190g
	Cells/Type	3cell Lithium-Ion Polymer cell/ 545974
	Energy	
	Voltage	11.4V
	Amp-hour capacity	3.950Ah
	Watt-hour capacity	45Wh
	Temperature	
	Operating (Charging)	32˚ to 113˚ F (0˚ to 45˚ C)
	Operating (Discharging)	14˚ to 122˚ F (-10˚ to 60˚ C)
	Fuel Gauge LED	NA
	Warranty	Based on system offering
	Optional Travel Battery Available	No

Technical Specifications

FINGERPRINT READER

Model: Elan efsa80ST (module P1515B)
Mobile Voltage Operation: 2.7V to 3.6V
Operating Temperature: -4°F – 175°F (-20° ~ +80°C)
Current Consumption Image: 50mA peak
Low Latency Wait For Finger: 900uA
Capture Rate: 30 frame/sec
ESD Resistance: +15KV
Detection Matrix: 80*80 pixels/ 508 dpi / 4*4mm sensor area
FRR (False Reject Rate) / FAR (False Acceptance Rate): FRR: <3% , FAR: 1/100K

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® • US Federal Energy Management Program (FEMP) • EPEAT Gold registered in the United States. See http://www.epeat.net for registration status in your country. • TCO 8.0 • China Energy Conservation Program (CECP) • China State Environmental Protection Administration (SEPA) • Taiwan Green Mark • Korea Eco-label • Japan PC Green label*		
Sustainable Impact Specifications	• Ocean-bound plastic in (part(s)) • 12.98% post-consumer recycled plastic • External Power Supply 90% Efficiency • Low halogen • Outside Box and corrugated cushions are 100% sustainably sourced and recyclable • Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable • Recycled Plastic cushions • Bulk packaging available		
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, 50Hz**

Technical Specifications

Normal Operation (Sort idle)	4.32 W	4.52 W	4.42 W
Normal Operation (Long idle)	0.60 W	0.63 W	0.60 W
Sleep	0.60 W	0.63 W	0.60 W
Off	0.28 W	0.31 W	0.28 W
	Note: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.		
Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 50Hz**
Normal Operation (Short idle)	14 BTU/hr	14 BTU/hr	14 BTU/hr
Normal Operation (Long idle)	2 BTU/hr	2 BTU/hr	2 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr
	*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	2.6	14.3
Fixed Disk – Random writes	2.7	14.3
Optical Drive – Sequential reads	2.9	24.3
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the spare parts are available throughout the warranty period and or for up to “5” years after the end of production.	

Technical Specifications

<table>
<tr><td>Additional Information</td><td colspan="3">This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net
Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
This product is 12.98% recycle-able when properly disposed of at end of life.</td></tr>
<tr><td>Packaging Materials</td><td>External:</td><td>PAPER/Corrugated</td><td>230 g</td></tr>
<tr><td rowspan="5"></td><td rowspan="3">Internal:</td><td>PLASTIC/EPE (Expanded Polyethylene)</td><td>148 g</td></tr>
<tr><td>PLASTIC/Polyethylene low density</td><td>9 g</td></tr>
<tr><td>PAPER/paperboard</td><td>168 g</td></tr>
<tr><td colspan="3">The plastic packaging material contains at least 0% recycled content.</td></tr>
<tr><td colspan="3">The corrugated paper packaging materials contains at least 57.8% recycled content.</td></tr>
<tr><td>RoHS Compliance</td><td colspan="3">HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.
We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products.
We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.
To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.</td></tr>
<tr><td>Material Usage</td><td colspan="3">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/supplychain/gen_specifications.html):
Asbestos
Certain Azo Colorants
Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
Cadmium
Chlorinated Hydrocarbons
Chlorinated Paraffins
Bis(2-Ethylhexyl) phthalate (DEHP)
Benzyl butyl phthalate (BBP)
Dibutyl phthalate (DBP)
Diisobutyl phthalate (DIBP)
Formaldehyde</td></tr>
</table>

Technical Specifications

	• Halogenated Diphenyl Methanes • Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) – except for wires and cables, 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 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 Hewlett Packard 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.
HP, Inc. Corporate Environmental Information	For more information about HP's commitment to the environment: 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://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

Technical Specifications

footnotes	• Percentage of ocean-bound plastic contained in each component varies by product • Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard. • External power supplies, WWAN modules, power cords, cables and peripherals excluded. • 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers. • Fiber cushions made from 100% recycled wood fiber and organic materials. • Plastic cushions are made from >90% recycled plastic.

COUNTRY OF ORIGIN

China

Summary of Changes

Category	Description	Part Number
Cases	HP Prelude Pro Recycle Backpack	1X644AA
	HP Prelude Pro Recycle Top Load	1X645AA
Docking	HP Thunderbolt 120W Dock G2	2UK37AA
	HP Thunderbolt 120W Dock w/Audio G2	3YE87AA
	HP Thunderbolt 230W Dock w/Combo Cable G2	3TR87AA
	HP USB-C 120W G5 Dock	5TW10AA
	HP USB-C Mini Dock	1PM64AA
	HP USB-C/A 120W Universal Dock G2	5TW13AA
	HP USB-C Travel Dock G2 - New AMO	7PJ38AA
	HP Wired Thunderbolt Audio Module	3AQ21AA
	HP USB-C Travel Dock	4WX89AA
Input/Output	HP USB-C to HDMI 2.0 Adapter	2PC54AA#ABB
	HP USB-C to RJ45 Adapter	V8Y76AA#ABB, V7W66AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP 320M Wired Mouse - New AMO	9VA80AA
	HP Travel Bluetooth Mouse - New AMO	6SP30AA
	HP Travel USB Mouse - New AMO	G1K28AA
	HP Wireless (Link-5) Keyboard	T6U20AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Wireless USB Premium Keyboard	Z9N41AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP 235 WL Mouse and Keyboard Combo	1Y4D0AA
	HP 125 Wired Keyboard	266C9AA
	HP 225 Wired Mouse and Keyboard Combo	286J4AA
Power	HP 45W 4.5 mm LC Smart Japan Only AC Power Adapter - New AMO	L6F60AA#ABJ
	HP 45W 4.5 mm Smart AC Power Adapter - New AMO	H6Y88AA#ABA
	HP 45W USB-C LC AC Power Adapter - New AMO	1MZ01AA#ABA
	HP 65W 4.5 mm Smart AC Power Adapter - New AMO	H6Y89AA#ABA
	HP 65W 4.5 mm wDongle 7.4 mm Slim AC Power Adapter - New AMO	H6Y82AA#ABA
	HP 65W USB-C LC AC Power Adapter - New AMO	1P3K6AA#ABA
	HP 65W USB-C Slim Travel AC Power Adapter - New AMO	X7W50AA#ABA
Storage	HP USB DVD-Writer EXT ODD - New AMO	Y3T76AA
Memory	HP 4GB DDR4 3200 Memory	286H5AA
	HP 8GB DDR4 3200 Memory	286H8AA
	HP 16GB DDR4 3200 Memory	286J1AA
Security	HP Nano Cable Lock	1AJ39AA
	HP SureKey Standard/Nano/Wedge Cable Lock	6UW42AA
UCC	HP Stereo 3.5mm Headsett (Mindy)	T1A66AA
	HP Wired USB-A Stereo Headset	T1A67AA

Summary of Changes

Date of change:	Version History:	Updated	Description of change:
February 2, 2021	V1 to V2	Update	Battery Life
February 9, 2021	V2 to V3	Add	Environmental Data
February 16, 2021	V3 to V4	Update	Wireless Section
February 18, 2021	V4 to V5	Update	Networking and Environmental Section
February 25, 2021	V5 to V6	Update	Xerox DocuShare offer value
April 20, 2021	V6 to V7	Updated	Memory Section and Input/ Output Section Updated
May 6, 2021	V7 to V8	Add	HP Smart Support
May 14, 2021	V8 to V9	Add	AMDR5 Pro/R7 Pro Processors
May 25, 2021	V9 to V10	Update	Micro SD Card Reader
June 11, 2021	V10 to V11	Remove	HP WorkWell from Software and Security section

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