

Overview

HP EliteBook x360 1040 G8 Notebook PC



1. Internal Microphones
2. IR Camera LEDs
3. Webcam and IR Camera
4. Webcam LED
5. Glass Clickpad

Left

6. Nano Security lock slot (Lock sold separately)
7. WWAN SIM (Nano)
8. Audio Combo Jack
9. SuperSpeed USB Type-A 5Gbps signaling rate (Charging port)

Overview



Right

1. Power button
2. SuperSpeed USB Type-A 5Gbps signaling rate (Charging port)
3. HDMI 2.0 port (Cable not included)
4. Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)¹
5. Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)¹
6. Battery LED

1. SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

Overview

AT A GLANCE

- An all metal CNC Aluminum chassis that is .6 inches (1.66 cm) thin (at front) and with a starting weight of 2.9 lbs. (1.31 Kg)
 - A 360° convertible notebook with 4 usage modes: Laptop mode, Tablet mode, Tent mode, and Media mode
 - Choice of 11th Generation Intel® Core™ i5, i7 Processors with integrated Intel® Iris® Xe Graphics supporting dual channel LP DDR4X memory up to 32 GB and solid state storage up to 2 TB
 - Intel® EVO configurations available
 - Touch display choices include 35.56 cm (14.0") diagonal IPS FHD displays and stunning UHD HDR-400 display. Optional Anti-glare screen available on FHD panels. Get added protection in open or public places with the optional HP Sure View Reflect integrated privacy screen
 - Ultimate connectivity with dual Thunderbolt™ 4² with USB4 support ports, dual USB 3.1 Gen1 charging ports, and HDMI 2.0. Stay connected where you need to with additional choices of 5G or 4G/LTE WWAN, WLAN and optional Thunderbolt™ Docking (Sold separately)
 - Featuring HP Quiet Keyboard with the HP Programmable key. The power button, HP Sure Shutter and the fingerprint sensor are also located on the keyboard
 - An optional HP Rechargeable Active Pen 31 with Magnetic Attach and 4096 Levels of pressure
 - Never forget your password with your choice of simple authentication methods, including the IR camera for face recognition and Touch Fingerprint Sensor for Windows Hello
 - Enterprise grade security with HP Sure Sense, HP Sure Start, HP Sure Shutter, HP Sure View Reflect (optional), HP Sure Run, HP Sure Recover with Embedded Reimaging, HP Sure Click, HP Tamper Lock and Touch Fingerprint sensor
 - HP Sure Shutter - industry's 1st camera with an electric shutter. The on/off button for this shutter is located on the function row of the keyboard.
 - Two choices for the system battery: a 54.5 Wh battery for lighter configurations and a 78.5 Wh battery for the longest battery life. Battery Life Up to TBD hours (MobileMark2018)
 - AI based HP Context Aware to maximize performance when working at a table, comfort when working from your lap, and responsiveness when working on the go.
 - HP Presence Aware automatically locks your system when you leave and seamlessly authenticates with Window's Hello
 - HP Dynamic Audio, a new AI-based audio experience, tunes output to speech, music, and movies all while suppressing background noise. (Planned to be available March 2021)
 - HP Sound Calibration to uniquely tune end user headphone audio. (Planned to be available March 2021)
 - Passed 19 MIL-STD 810H tests¹
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.
 2. SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

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

Technical Specifications

PRODUCT NAME

HP EliteBook x360 1040 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) ^{1,2}
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
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 1809 on this platform. For testing information on newer versions of Windows 10, please see <https://support.hp.com/document/c05195282>.

PROCESSORS

Intel® Core™ i7-1185G7 (3.0 GHz base frequency, up to 4.8 GHz frequency with Intel® Turbo Boost Technology, 12 MB L3 cache, 4 cores) supports Intel® vPro® Technology ^{3,4 5,6}.

Intel® Core™ i7-1165G7 (2.8 GHz base frequency, up to 4.7 GHz with Intel® Turbo Boost Technology, 12 MB L3 cache, 4 cores) ^{3,4 5,6}.

Intel® Core™ i5-1145G7 (2.6 GHz base frequency, up to 4.4 GHz frequency with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores) supports Intel® vPro® Technology ^{3,4 5,6}.

Intel® Core™ i5-1135G7 (2.4 GHz base frequency, up to 4.2 GHz with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores) ^{3,4 5,6}.

Processor Family

11th Generation Intel® Core™ i7 processor (i7-1185G7 and 1165G7) ⁶

11th Generation Intel® Core™ i5 processor (i5-1145G7 and 1135G7) ⁶

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

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

5. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See <http://www.intel.com/technology/turboboost> for more information.

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>.

Technical Specifications

CHIPSET

Chipset is integrated with processor

GRAPHICS

Integrated

Intel® Iris® X^e Graphics

Supports

Support HD decode DX12 HDMI 2.0 ⁷

7. HDMI cable sold separately.

DISPLAY

Touch

35.6 cm (14") diagonal FHD IPS Ultraslim 2.0mm eDP + PSR2 BrightView touch screen with 0.4mm Gorilla® Glass 5, 400 nits, 72% NTSC (1920 x 1080) ^{9,10,11}

35.6 cm (14") diagonal FHD IPS Ultraslim 2.0mm eDP + PSR2 Anti-Glare touch screen with 0.4mm Gorilla® Glass 5, 400 nits, 72% NTSC (1920 x 1080) ^{9,10,11}

35.6 cm (14") diagonal UHD HDR400 IPS Ultraslim 2.0mm eDP + PSR BrightView touch screen with 0.4mm Gorilla® Glass 5, 550 nits, 72% NTSC (3840 x 2160) ^{9,10,11}

HP Sure View Reflect Integrated Privacy Screen 35.6 cm (14") diagonal FHD IPS Ultraslim 2.0mm eDP + PSR BrightView touch screen with 0.4mm Gorilla® Glass 5, 1000 nits, 72% NTSC (1920 x 1080) ^{9,10,11,12}

HP Sure View Reflect Integrated Privacy Screen 35.6 cm (14") diagonal FHD IPS Ultraslim 2.0mm eDP + PSR Anti-Glare touch screen with 0.4mm Gorilla® Glass 5, 1000 nits, 72% NTSC (1920 x 1080) ^{9,10,11,12}

HDMI 2.0⁸

Supports resolutions up to 4K@60Hz

8. HDMI cable sold separately.

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.

Technical Specifications

STORAGE AND DRIVES

Primary M.2 Storage

128 GB PCIe® Gen3x2 NVMe™ M.2 SSD TLC¹³

256 GB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹³

512 GB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹³

1 TB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹³

2 TB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹³

256 GB PCIe® NVMe™ Value M.2 SSD¹³

512 GB PCIe® NVMe™ Value M.2 SSD¹³

256 GB PCIe® Gen3x4 NVMe™ M.2 SED SS TLC OPAL 2¹³

512 GB PCIe® Gen 3x4 NVMe™ M.2 SED TLC OPAL2¹³

512 Intel® PCIe® NVMe™ QLC M.2 SSD with 32 GB Intel® Optane™ memory H10^{13,14}

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.

14. Intel® Optane™ H10 memory system acceleration does not replace or increase the DRAM in your system. Requires 8th Gen or higher Intel® Core™ processor, BIOS version with Intel® Optane™ supported, Windows 10 64-bit, and an Intel® Rapid Storage Technology (Intel® RST) driver.

MEMORY

Maximum Memory

32 GB LPDDR4X-4266 SDRAM

Memory

32 GB LPDDR4X-4266 SDRAM¹⁵

16 GB LPDDR4X-4266 SDRAM¹⁵

8 GB LPDDR4X-4266 SDRAM¹⁵

Memory Slots

Memory soldered down

LPDDR4X, System runs at: 4266

Supports Dual Channel Memory

15. All slots are non-accessible / non-upgradeable.

Technical Specifications

NETWORKING/COMMUNICATIONS

WLAN

Intel® Dual Band Wireless-AX201 802.11a/b/g/n/ac/ax (2x2) Wi-Fi® 6 and Bluetooth® 5 Combo, vPro® 16
Intel® Dual Band Wireless-AX201 802.11a/b/g/n/ac/ax (2x2) Wi-Fi® 6 and Bluetooth® 5 Combo, non-vPro® 16

WWAN

Intel® XMM™ 7360 LTE-Advanced Cat 9 18
Qualcomm® Snapdragon™ X55 5G Modem (5G + LTE CAT 20)19

NFC

NPC300 Near Field Communication Module 20

Miracast

Native Miracast Support 21

16. 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 802.11 ax devices.

18. WWAN module is an optional feature, requires factory configuration and requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. LTE not available on all products, in all regions.

19. 5G module is an optional feature that must be configured at purchase. AT&T and T-Mobile networks supported in the U.S. Module designed for 5G networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP, requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 5G not available on all products, in all regions. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select countries, where carrier supported.

20. Sold separately or as an optional feature.

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

AUDIO/MULTIMEDIA

Audio

Audio by Bang & Olufsen
4 Premium stereo speakers
Microphones (Multi Array including two user facing and two world-facing microphones)

Camera

Hybrid 720p HD camera with integrated electronic privacy shutter, HP Sure Shutter 22
Note: The on/off button for this shutter is located on the function row of the keyboard.

Sensors

Accelerometer
Magnetometer
Gyroscope
Ambient light sensor
Hall sensor

22. HD content required to view HD images.

Technical Specifications

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Quiet Keyboard, spill resistant, Backlit keyboard and Durakeys

HP Quiet Keyboard, spill resistant, Backlit keyboard and Durakeys, privacy

Pointing Device

Glass ClickPad with multi-touch gesture support

Function Keys

F1 - Display Switching

F2 - Blank or Sure View

F3 - Brightness Down

F4 - Brightness up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

F9 - Keyboard Backlight

F10 - Insert

F11 - Airplane Mode

F12 - Programmable Key

Non-Function Keys

HP Sure Shutter

Power Key

Delete Key

Hidden Function Keys

Fn+R = Break

Fn+S = Sys Rq

Fn+C = Scroll Lock

Fn+E = Insert

Fn+W = Pause

Technical Specifications

SOFTWARE AND SECURITY

Preinstalled Software

BIOS

HP BIOSphere Gen6 ²³
HP Drive Lock & Automatic Drive Lock
BIOS Update via Network
HP Secure Erase ²⁴
Absolute Persistence Module ²⁵
HP LAN-Wireless Protection
USB enable/disable (via BIOS)

Software

HP Connection Optimizer ²⁶
HP Hotkey Support
myHP
HP Support Assistant ²⁷
HP QuickDrop ¹⁷
HP Noise Cancellation Software
Touchpoint Customizer for Commercial
HP Notifications
HP Privacy Settings
HP Wireless Button Driver
HP Power Manager
HP WorkWell
HP PC Hardware Diagnostics Windows
Buy Microsoft Office (sold separately)
Microsoft Defender ³¹
Tile App ³²

Manageability Features

HP Driver Packs (download) ²⁸
HP Manageability Integration Kit Gen4 (download) ²⁹
HP Client Catalog (download)
HP Client Management Script Library (download)
HP Image Assistant (download)

Security Management

HP Client Security Manager Gen7 ³⁰
HP Fingerprint Sensor
HP Pro Security Edition (Select models)³³
HP Sure Click ³⁴
HP Sure Sense ³⁵
HP Sure Start Gen6 ³⁶
HP Sure Admin ³⁷
HP Sure Recover Gen4 ³⁸
HP Sure Run Gen4 ³⁹
TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified)(FIPS 140-2 Level 2 Certified) ⁴⁰

17. 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.

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

24. HP Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-

Technical Specifications

- 88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.
25. 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/>
26. HP Connection Optimizer requires Windows 10.
27. HP Support Assistant requires Windows and Internet access.
28. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
29. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>.
30. HP Client Security Manager Gen7 requires Windows and is available on the select HP Elite and Pro PCs.
31. Windows Defender Opt in and internet connection required for updates.
32. Some features require optional subscription to Tile Premium. Tile application for Windows 10 available for download from the Windows Store. Mobile phone app available for download from App Store and Google Play. Requires iOS 11 and greater or Android 6.0 and greater see <https://support.thetileapp.com/hc/en-us/articles/200424778> for more information. HP Tile will function as long as the PC has battery power.
33. HP Pro Security Edition is available preloaded on skus of 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>.
34. HP Sure Click requires Windows 10 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.
35. HP Sure Sense is available on select HP PCs and is not available with Windows10 Home.
36. HP Sure Start Gen6 is available on select HP PCs.
37. 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.
38. HP Sure Recover Gen4 is available on select HP PCs and requires an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data.
39. HP Sure Run Gen4 is available on select Windows 10 based HP Pro, Elite and Workstation PCs with select Intel® or AMD processors.
40. Firmware TPM is version 2.0.
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Technical Specifications

POWER

Power Supply

HP Smart 65 W USB Type-C® adapter ⁴¹

HP Smart 65 W Slim USB Type-C® adapter ⁴¹

Primary Battery

HP Long Life 4-cell, 54 Wh Li-ion polymer ^{42,43}

HP Long Life 4-cell, 78.5 Wh Li-ion polymer ^{42,43}

Power Cord

Premium 1m C5 power cord

Conventional 1m C5 power cord

Battery life

Up to TBD hours (MobileMark2018) and TBD minutes⁴⁴

41. Availability may vary by country.

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

43. 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.

44. 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.

WEIGHTS & DIMENSIONS

Product Weight

Starting at 2.9 lb (1.31 kg) ⁴⁵

Product Dimensions (w x d x h)

12.57 x 7.98 x 0.65 in

31.93 x 20.26 x 1.66 cm

45. Weight will vary by configuration.

Technical Specifications

PORTS/SLOTS

Ports

- 2 Thunderbolt™ 4 with USB4™ Type-C® 40Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)⁵²
- 2 SuperSpeed USB Type-A 5Gbps signaling rate (Charging ports)
- 1 HDMI 2.0⁴⁶
- 1 External Nano SIM Slot for WWAN ⁴⁷
- 1 Headphone/Microphone Combo

46. HDMI cable sold separately.

47. SIM slot is not user accessible without WWAN configuration.

52. SuperSpeed USB 20Gbps is not available with Thunderbolt™ 4.

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>.⁴⁸

48. HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit www.hp.com/go/cpc. 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

CERTIFICATION AND COMPLIANCE

ENERGY STAR® 49
 EPEAT® 2019 Gold in the U.S. 50
 Low halogen 51
 TCO 8.0 Certified

49. Configurations of the HP EliteBook x360 1040 G8 Notebook PC that are ENERGY STAR® qualified are identified as HP EliteBook x360 1040 G8 Notebook PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

50. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit www.epeat.net for more information.

51. External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	AC 15V
	Average Operating Power	
	Integrated Graphics	Yes
	Discrete Graphics	N/A
	Max Operating Power	UMA<65W
Temperature	Operating	32° to 95° F (0° to 35° C) (not writing optical)
	Non-operating	41° to 95° F (5° to 35° C) (writing optical)
Relative Humidity	Operating	32° to 95° F (0° to 35° C) (not writing optical)
	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	1.043 grms
	Non-operating	3.5 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®	Yes
	EPEAT	Yes
	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

Technical Specifications

Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

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 (1920.x.1080) Anti-Glare WLED UWVA sRGB 100% cg 400nits eDP 1.4+PSR2 bent LP	Outline Dimensions (W x H x D)	313.67 X 184.17 mm (max)
	Active Area	309.37 X 174.02 mm (typ.)
	Weight	200 g (max)
	Diagonal Size	14.0 inch
	Thickness	2.0 mm/3.8 mm (w/PCB) (max)
	Interface	eDP 1.4
	Surface Treatment	Anti-Glare
	Touch Enabled	Yes
	Contrast Ratio	1200:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	400 nits ¹
	Pixel Resolution	1920 x 1080 (FHD)
	Format	RGB Stripe
	Backlight	LED
Color Gamut Coverage	sRGB 100% (NTSC 72%)	
Color Depth	8 bits	
Viewing Angle	UWVA 85/85/85/85	

Panel LCD 14 inch FHD (1920 x 1080) BrightView WLED UWVA sRGB 100% cg 400nits eDP 1.4+PSR2 bent LP	Outline Dimensions (W x H x D)	313.67 X 184.17 mm (max)
	Active Area	309.37 X 174.02 mm (typ.)
	Weight	200 g (max)
	Diagonal Size	14.0 inch
	Thickness	2.0 mm/3.8 mm (w/PCB) (max)
	Interface	eDP 1.4
	Surface Treatment	BrightView
	Touch Enabled	Yes
	Contrast Ratio	1200:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	400 nits ¹
	Pixel Resolution	1920 x 1080 (FHD)
	Format of LCD Pixel Arrangement	RGB Stripe

Technical Specifications

Backlight	LED
Color Gamut Coverage	sRGB 100% (NTSC 72%)
Color Depth	8 bits
Viewing Angle	UWVA 85/85/85/85

Panel LCD 14 inch UHD (3840 x 2160) BrightView WLED UWVA HDR-400 sRGB 95% cg 550nits eDP 1.4+PSR2 bent	Outline Dimensions (W x H x D)	313.61 X 184.74 mm (max)
	Active Area	309.31 X 173.98 mm (typ.)
	Weight	200 g (max)
	Diagonal Size	14.0 inch
	Thickness	2.0 mm/3.8 mm (w/PCB) (max)
	Interface	eDP 1.4
	Surface Treatment	BrightView
	Touch Enabled	Yes
	Contrast Ratio	1400:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	550 nits ¹
	Pixel Resolution	3840 x 2160 (UHD)
	Format	RGB Stripe
	Backlight	LED
	Color Gamut Coverage	sRGB 95%
	Color Depth	8 bits+2FRC
	Viewing Angle	UWVA 85/85/85/85

Panel LCD 14-in FHD (1920 x 1080) Anti-Glare WLED UWVA 72% cg 1000nits eDP 1.4+PSR PrivacyG4 NB2Y	Outline Dimensions (W x H x D)	314.612 x 185.33 mm (max.)
	Active Area	309.312 x 173.99 mm
	Weight	230 g (max.)
	Diagonal Size	14.0"
	Thickness	3.9 mm (max.)
	Interface	eDP
	Surface Treatment	Anti-glare
	Touch Enabled	Yes
	Contrast Ratio	1500:1 (typ.)

Technical Specifications

Refresh Rate	60 Hz
Brightness	1000 nits ¹
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

Panel LCD 14-in FHD (1920 x 1080) BrightView WLED UWVA 72% cg 1000nits eDP 1.4+PSR PrivacyG4 NB2Y	Outline Dimensions (W x H x D)	314.612 x 185.33 mm (max.)
	Active Area	309.312 x 173.99 mm
	Weight	230 g (max.)
	Diagonal Size	14.0"
	Thickness	3.9 mm (max.)
	Interface	eDP
	Surface Treatment	BrightView
	Touch Enabled	Yes
	Contrast Ratio	1500:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	1000 nits ¹
	Pixel Resolution	1920 x 1080 (FHD)
	Format	RGB
	Backlight	LED
	Color Gamut Coverage	72%
	Color Depth	8 bits
	Viewing Angle	UWVA 85/85/85/85

Technical Specifications

STORAGE

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 Gen3X2
	Maximum Sequential Read	1300 ~ 2047 MB/s
	Maximum Sequential Write	630 ~ 800 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

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.

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

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.

Technical Specifications

SSD 256GB 2280 M2 PCIe-3x4 SS NVMe TLC	Form Factor	M.2 2280
	Capacity	256 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 Gen3x4
	Maximum Sequential Read	2800 ~ 3500 MB/s
	Maximum Sequential Write	1400 ~ 2200 MB/s
	Logical Blocks	500,118,192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; TRIM; L1.2

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.

SSD 256GB 2280 PCIe NVMe Value	Form Factor	M.2 2280
	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

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.

Technical Specifications

SSD 256GB 2280 PCIe-3x4 NVMe Self Encrypted OPAL2 Three Layer Cell	Form Factor	M.2 2280
	Capacity	256 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 Gen3X4
	Maximum Sequential Read	2800 ~ 3500 MB/s
	Maximum Sequential Write	1663 ~ 2200 MB/s
	Logical Blocks	500,118,192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security (Option); TCG Opal 2.0; TRIM; L1.2

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.

SSD 512GB 2280 M2 PCIe-3x4 SS NVMe TLC	Form Factor	M.2 2280
	Capacity	512 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 Gen3X4
	Maximum Sequential Read	3100 ~ 3500 MB/s
	Maximum Sequential Write	2400 ~ 2956 MB/s
	Logical Blocks	1,000,215,215
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; TRIM; L1.2

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.

Technical Specifications

SSD 512GB 2280 PCIe NVMe Value	Form Factor	M.2 2280
	Capacity	512GB
	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

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.

SSD 512GB 2280 PCIe-3x4 NVMe Self Encrypted OPAL2 Three Layer	Form Factor	M.2 2280
	Capacity	512 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 Gen3X4
	Maximum Sequential Read	3100 ~ 3500 MB/s
	Maximum Sequential Write	2400 ~ 2956 MB/s
	Logical Blocks	1,000,215,215
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security (Option); TCG Opal 2.0; TRIM; L1.2

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.

Technical Specifications

NETWORKING/COMMUNICATIONS

Intel Wi-Fi¹ 6 AX201 + BT5 (802.11ax 2x2, supporting gigabit file transfer speeds⁵) (vPro[®])	Wireless LAN Standards	<ul style="list-style-type: none"> 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	Features Wi-Fi 6 technology
	Frequency Band	802.11b/g/n/ax <ul style="list-style-type: none"> • 2.402 – 2.482 GHz 802.11a/n/ac/ax <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	LTE: 23 dBm HSPA+: 23.5 dBm
	Maximum power consumption	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum

Technical Specifications

	<ul style="list-style-type: none"> • 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 • 802.11ax HT40(2.4GHz): +10dBm minimum • 802.11ax VHT160(5GHz): +10dBm minimum"
Power Consumption	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 with CNVi Interface
Dimensions	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 White – 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
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Technical Specifications

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 ¹ ; throughput up to 2.17 Mbps BLE: 1 Mbps data rate ¹ ; throughput up to 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	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	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)
Security & Manageability	Intel® vPro™ support with appropriate Intel® chipset components

Technical Specifications

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

Intel Wi-Fi¹ 6 AX201 + BT5 (802.11ax 2x2, supporting gigabit file transfer speeds⁵) (non-vPro[®])	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	Features Wi-Fi 6 technology
	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
	Security³	•IEEE compliant 64 /128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication

Technical Specifications

	<ul style="list-style-type: none"> •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	<ul style="list-style-type: none"> • 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 • 802.11ax HT40(2.4GHz) : +10dBm minimum • 802.11ax VHT160(5GHz) : +10dBm minimum
Power Consumption	<ul style="list-style-type: none"> •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 Sensitivity⁴	<ul style="list-style-type: none"> •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 Mini Card with CNVi Interface
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)

Technical Specifications

Humidity	Non-operating: -40° to 176° F (-40° to 80° C) 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 4.0/4.1/4.2/5.0/5.1 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 ¹ ; throughput up to 2.17 Mbps BLE: 1 Mbps data rate ¹ ; throughput up to 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 + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	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

Technical Specifications

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).
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® XMM™ 7360 LTE-Advanced¹	Technology/Operating bands	FDD LTE: LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3) , 1700 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8) , 1400 (Band 11), 700 (Band 12), 700 (Band 13) 700 (Band 17) , 850 (Band 18) , 850 (Band 19), 800 (Band 20), 1450 (Band 21) , 850 (Band 26) 700 (Band 28) MHz, 700 (Band 29) , 2300 (Band 30) , 2100 (Band 66) MHz TDD LTE: 2600 (Band 38) , 1900 (Band 39) , 2300 (Band 40) , 2500 (Band 41) MHz HSPA+: 2100 (Band 1), 1900 (Band 2), 1700 (Band 4), 850 (Band 5), 900 (Band 8) MHz
	Wireless protocol standards	3GPP Release 11 LTE Specification CAT.9, MAX 60MHz aggregation BW WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
	GPS	Standalone, A-GPS (MS-B and LTO)
	GPS bands	GPS 1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 ± 2.046 MHz
	Maximum data rates	LTE: 450 Mbps (DL 3CA), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)
	Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm
	Maximum power consumption	LTE: 1,200 mA (peak); 900 mA (average) HSPA+: 1,100 mA (peak); 800 mA (average)
	Form Factor	M.2, 3042-S3 Key B
	Weight	6 g
	Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm

1. WWAN module is an optional feature, requires factory configuration and requires separately purchased service contract.

Technical Specifications

Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. LTE not available on all products, in all regions.

Qualcomm® Snapdragon™ X55 5G Modem (5G + LTE CAT 20) ¹

Technology/Operating bands

WCDMA/HSDPA/HSUPA/HSPA+ operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)

Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

Band 6: 830 to 840 MHz (UL), 875 to 885 MHz (DL)

Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

Band 9: 1750 to 1785 MHz (UL), 1845 to 1880 MHz (DL)

Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)

LTE FDD/TDD operating bands:

Band 1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

Band 2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

Band 3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)

Band 4: 1710 to 1755 MHz (UL), 2110 to 2155 MHz (DL)

Band 5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

Band 7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)

Band 8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

Band 12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)

Band 13: 777 to 787 MHz (UL), 746 to 756 MHz (DL)

Band 14: 788 to 798 MHz (UL), 758 to 768 MHz (DL)

Band 17: 704 to 716 MHz (UL), 734 to 746 MHz (DL)

Band 18: 815 to 830 MHz (UL), 860 to 875 MHz (DL)

Band 19: 830 to 845 MHz (UL), 875 to 890 MHz (DL)

Band 20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)

Band 25: 1850 to 1915 MHz (UL), 1930 to 1995 MHz (DL)

Band 26: 814 to 849 MHz (UL), 859 to 894 MHz (DL)

Band 28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)

Band 29: 717 to 728 MHz (DL)

Band 30: 2305 to 2315 MHz (UL) 2350 to 2360 MHz (DL)

Band 32: 1452 to 1496 MHz (DL)

Band 34: 2010 to 2025 MHz (UL/DL)

Band 38: 2570 to 2620 MHz (UL/DL)

Band 39: 1880 to 1920 MHz (UL/DL)

Band 40: 2300 to 2400 MHz (UL/DL)

Band 41: 2496 to 2690 MHz (UL/DL)

Band 42: 3400 to 3600 MHz (UL/DL)

Band 46: 5150 to 5925 MHz (DL)

Band 48: 3550 to 3700 MHz (UL/DL)

Band 66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)

Band 71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)

5G NR Sub 6GHz

n1: 1920 to 1980 MHz (UL), 2110 to 2170 MHz (DL)

n2: 1850 to 1910 MHz (UL), 1930 to 1990 MHz (DL)

n3: 1710 to 1785 MHz (UL), 1805 to 1880 MHz (DL)

n5: 824 to 849 MHz (UL), 869 to 894 MHz (DL)

n7: 2500 to 2570 MHz (UL), 2620 to 2690 MHz (DL)

n8: 880 to 915 MHz (UL), 925 to 960 MHz (DL)

n12: 699 to 716 MHz (UL), 729 to 746 MHz (DL)

Technical Specifications

n20: 832 to 862 MHz (UL), 791 to 821 MHz (DL)
 n28: 703 to 748 MHz (UL), 758 to 803 MHz (DL)
 n41: 2496 to 2690 MHz (UL/DL)
 n66: 1710 to 1800 MHz (UL), 2110 to 2200 MHz (DL)
 n71: 663 to 698 MHz (UL), 617 to 652 MHz (DL)
 n77: 3300 to 4200 MHz (UL/DL)
 n78: 3300 to 3800 MHz (UL/DL)
 n79: 4400 to 5000 MHz (UL/DL)

Wireless protocol standards

5G NR Air Interface
 l 3GPP Rel15 5G NR sub-6
 LTE Rel14
 20 layers and 2 Gbps downlink (DL) throughput – 4 × 4 MIMO across 5x CA
 200 Mbps uplink (UL) throughput – 40 MHz ULCA and 256 QAM
 WCDMA
 R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification

GPS

Standalone, A-GPS (MS-A, MS-B)

GPS bands

GPS: L1 (1575.42MHz); L5 (1176MHz)
 GLONASS: L1 (1602MHz)
 BeidouB1(1561.098MHz)
 Galileo E1 (1575.42); E5a (1176MHz)

Maximum data rates

5G sub 6G : 3.8 Gbps
 LTE: ue-CategoryDL 20, (DL : 2 Gbps)
 ue-CategoryUL 13 , (UL: 150Mbps)
 DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload)
 HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)

Maximum output power

LTE: 23 dBm in all band except B41
 LTE B41 HPUE = 26dBm
 HSPA+: 23.5 dBm

Maximum power consumption

5G Sub 6 : 2500 mA
 LTE: 1,300 mA (peak); 1100 mA (average)
 HSPA+: 1,100 mA (peak); 800 mA (average)

Form Factor

M.2, 3042-S3 Key B

Weight

8 g

Dimensions (Length x Width x Thickness)

42 m × 30 mm × 2.6 mm

1. 5G module is an optional feature that must be configured at purchase. AT&T and T-Mobile networks supported in the U.S. Module designed for 5G networks as carriers deploy Evolved-Universal Terrestrial Radio Access New Radio Dual Connectivity (ENDC) with both 100Mhz of 5G NR and LTE channel bandwidth, using 256QAM 4x4 as defined by 3GPP, requires activation and separately purchased service contract. Check with service provider for coverage and availability in your area. Connection, upload and download speeds will vary due to network, location, environment, network conditions, and other factors. 5G not available on all products, in all regions. Backwards compatible to 4G LTE and 3G HSPA technologies. 5G module planned to be available in select countries, where carrier supported.

Technical Specifications

NXP NPC300 Near Field Communication Module

Dimensions (L x W x H)	Module 17 mm by 10 mm by 2.0 mm
Chipset	NPC300
System interface	I2C
NFC RF standards	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
NFC Forum Support	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2
Reader (PCD-VCD) Mode(1)	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards
Card Emulation (PICC-VICC) Mode(1)	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
Frequency	13.56 MHz
NFC Modes Supported	Reader/Writer, Peer-to-Peer
Raw RF Data Rates	106, 212, 424, 848 kbps
Operating temperature	-25°C to 80°C
Storage temperature	-25°C to 125°C
Humidity	10-90% operating 5-95% non-operating
Supply Operating voltage	2.7 to 5.5 Volts
I/O Voltage	1.8V or 3.3V

Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)

Mode	Power Consumption, Typical (2)
Polling	710.93 mW
Detected Test Tag Type 1	152.09 mW
Detected Test Tag Type 2	341.26 mW
Detected Test Tag Type 3	383.76 mW
Detected Test Tag Type 4	312.26 mW
Antenna	Antenna connector, 0.3mm pitch, 7 connector FPC. Antenna matching is external to module.

Technical Specifications

1. With application or UICC support
2. Actual Power Consumption is dependent on NFC antenna and matching circuit and on the particular polling sequence and period configured.

POWER

AC Adapter 65 Watt nPFC Slim USB type C Straight 1.0 m	Dimensions	88x53.5x21 mm
	Weight	unit: 220g +/- 10g
Output	Input	100 to 240 VAC
	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 power	65W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input
	Output current limit	< 8.0A
	Connector	USB Type C
	Environmental Design	Operating temperature 32oFto 95oF (0oto 35oC) Non-operating (storage) temperature -4oFto 185oF (-20oto 85oC) Altitude 0 to 16,400 ft (0 to 5000m) Humidity 5% to 95% Storage Humidity 5% 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 100,000 hours at 25°C ambient condition.	

AC Adapter 65 Watt nPFC Standard USB type C Straight 1.0 m	Dimensions	90.0x51x28.5mm
	Weight	unit: 250g +/- 10g
Output	Input	100 to 240 VAC
	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 power	65W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input

Technical Specifications

Connector	Output current limit	8.0A Max.
	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	20% to 95%
	Storage Humidity	10% to 95%
EMI and Safety Certifications	<ul style="list-style-type: none"> - CE Mark - full compliance with LVD and EMC directives - Worldwide safety standards - IEC60950, EN60950, UL60950, UL62368, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. - MTBF - over 200,000 hours at 25°C ambient condition. 	

Battery HK 4 Cell Wh 54 Long Life -PL	Dimensions (H x W x L)	5.85mm*89.7mm*268.2mm	
	Weight	221g±10g	
	Cells/Type	4-cell; Polymer	
	Energy	Voltage	7.7V
		Amp-hour capacity	7.013Ah
		Watt-hour capacity	54Wh
		Operating (Charging)	0~45°C
		Operating (Discharging)	-10°C~60°C
	Temperature		
	Fuel Gauge LED	No	
Optional Travel Battery Available	N/a		

Battery HK 4 Cell WH 78 Long Life -PL	Dimensions (H x W x L)	6.49mm*94.6mm*281.6mm	
	Weight	295g±10g	
	Cells/Type	4-cell; Polymer	
	Energy	Voltage	7.72V
		Amp-hour capacity	10.18Ah
		Watt-hour capacity	78.5Wh
		Operating (Charging)	0~45°C
		Operating (Discharging)	-10°C~60°C
	Temperature		
	Fuel Gauge LED	No	
Optional Travel Battery Available	N/A		

Technical Specifications

FINGERPRINT READER

Model:
Synaptics Validity VFS7604 touch sensor
Mobile Voltage Operation:
3.0V to 3.6V
Operating Temperature:
0~60°C
Current Consumption Image:
100mA Max
Low Latency Wait For Finger:
260 uA
Capture Rate:
Image transmitter output frequency 9.6MHz
ESD Resistance:
IEC 61000-4-2 4B (+/-15KV)
Detection Matrix:
363 dpi / 7.4x6mm sensor area
FRR (False Reject Rate) / FAR (False Acceptance Rate):
FRR <1% @ 1:50K FAR

COUNTRY OF ORIGIN

China

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

Type	Description	Part #
Cases	HP Business Slim 14.1 Top Load	2SC65AA,2SC65UT,2SC65ET
	HP Executive 15.6 Backpack	6KD07AA,6KD07UT,6KD07ET
	HP Executive Slim 14.1 Top Load	6KD04AA,6KD04UT,6KD04ET
Docking	HP Thunderbolt 120W Dock G2	6HP48AA,2UK37AA,2UK37ET
	HP Thunderbolt 120W Dock w/Audio G2	3YE87AA,2UK37UT,3YE87ET
	HP Thunderbolt 230W Dock w/Combo Cable G2	3TR87AA,3TR87UT,3TR87ET
	HP USB-C 120W G5 Dock	26D32AA,5TW10AA,5TW10UT, 5TW10ET
	HP USB-C Mini Dock	2SR85AA,1PM64AA,1PM64UT,1 PM64ET
	HP USB-C/A 120W Universal Dock G2	5TW13AA,5TW13UT,5TW13ET
Input/Output	HP HDMI to VGA Adapter	H4F02AA,H4F02UT,H4F02ET
	HP TB Dock 120W G2 Cable	3XB94AA,3XB94UT,3XB94ET
	HP TB Dock 230W G2 Combo Cable	3XB96AA,3XB96UT,3XB96ET
	HP USB-C to DisplayPort Adapter	N9K78AA,N9K78UT
	HP USB-C to HDMI 2.0 Adapter	2PC54AA,1WC36UT,1WC36AA
	HP USB-C to RJ45 Adapter	V8Y76AA,V7W66AA,V7W66UT
	HP USB-C to USB-A Hub	Z8W90AA,Z6A00AA,Z6A00UT,Z 6A00ET
	HP USB Collaboration Keyboard	Z9N38AA,Z9N38UT
	HP Wireless USB Premium Keyboard	Z9N41AA,Z9N41AT
	HP WL BT Collaboration Keyboard	Z9N39AA,Z9N39UT
	HP WL USB Keyboard	T6U20AA,T6U20UT
	HP Slim Wireless Keyboard and Mouse	T6L04AA,T6L04UT
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA,9SR36UT,9SR36ET
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP 235 WL Mouse and Keyboard Combo	1Y4D0AA
	HP 125 Wired Keyboard	266C9AA
	HP 320M Wired Mouse	9VA80AA,9VA80UT,9VA80ET
	HP Comfort Grip Wireless USB Mouse	H2L63AA,H2L63UT
	HP Presenter Bluetooth Mouse	2CE30AA,2CE30UT,2CE30ET
	HP Travel Bluetooth Mouse	6SP30AA,6SP30UT,6SP30ET
	HP Travel USB Mouse	G1K28AA,G1K28ET
	HP UltraMobile Wireless Mouse	H6F25AA,H6F25UT
	HP Active RECHBL Pen G3	6SG43AA,6SG43UT
Power	HP 65W USB-C AC Power Adapter	1HE08AA,1HE08UT

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

HP 65W USB-C LC AC Power Adapter	1P3K6AA,1P3K6UT
HP 65W USB-C Slim Travel AC Power Adapter	X7W50AA,3PN48AA,3PN48UT
HP USB Power Bank	N9F71AA,N9F71UT
HP USB-C Essential Power Bank	3TB55AA,3TB55UT

Storage

HP USB DVD-Writer EXT ODD	Y3T76AA,F2B56AA,F2B56UT,F2B56ET
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Security

HP Dual Head Nano Cable Lock	1AJ41AA,1AJ41UT
HP Nano Cable Lock	1AJ39AA,1AJ39UT
HP SureKey Standard/Nano/Wedge Cable Lock	6UW42AA,6UW42UT

UCC

HP BT UC WL Duo Headset	W3K09AA#ABB,W3K09AA#UUF
HP Wired Thunderbolt Audio Module	3AQ21AA,3AQ21UT,3AQ21ET
HP Wired USB-A Stereo Headset	T1A67AA
HP Wireless BT UC WL Mono Headset	W3K08AA#ABB,W3K08AA#UUF

Summary of Changes

Date of change:	Version History:		Description of change:
January 27, 2021	V1 to V2	Update	USB ports to new industry standards.

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