

Overview

HP EliteBook 850 G8 Notebook PC



Left

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|-------------------------------------|--|
| 1. Ambient Lights Sensor (Optional) | 7. Glass Clickpad |
| 2. Internal Microphones (2) | 8. Smartcard Reader (Optional) |
| 3. Webcam LED (Optional) | 9. Audio Combo Jack |
| 4. Camera Shutter | 10. SuperSpeed USB Type-A 5Gbps signaling rate |
| 5. HD and IR Camera (Optional) | 11. Nano Security Lock Slot (Lock sold separately) |
| 6. IR Camera LEDs (Optional) | |

Overview



Right

1. Power Connector
2. USB 3.1 Gen 1 Port
3. HDMI Port 2.0b (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. SIM Card Slot (Optional)
7. Touch Fingerprint Sensor (Select models)

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

Overview

AT A GLANCE

- Premium ultraslim design with precision-crafted machined aluminum (CNC) chassis for a premium look and feel
- 11th Generation Intel® Core™ i5, i7 Processors up to four-core
- Preinstalled with Windows 10 versions or FreeDOS
- Designed to support all HP docking options including the HP Universal Dock G5
- Featuring redesigned quiet HP Keyboard with the HP Programmable key and backlit options
- Innovative world-facing third mic improves inbound ambient noise cancellation while 360 degree mic pick-up allows everyone to clearly hear and be heard
- Optional ultrabright displays with ambient light sensor
- Choice of displays:
 - 39.6 cm (15.6") diagonal FHD IPS Anti-Glare LED-backlit, 250 nits, 45% NTSC
 - 39.6 cm (15.6") diagonal FHD IPS Anti-Glare LED-backlit non-touch 400 nits, 72% NTSC
 - 39.6cm (15.6") diagonal UHD IPS Anti-Glare LED-backlit non-touch, 400 nits, 72% NTSC
 - 39.6cm (15.6") diagonal FHD IPS Anti-Glare On-Cell LED-backlit touch, 250 nits, 45% NTSC
 - 39.6cm (15.6") diagonal FHD IPS Anti-Glare LED-backlit non-touch, 1000 nits, 100% sRGB with HP Sure View Reflect
- Enterprise grade security with HP Sure Sense, HP Sure Start Gen6, HP Privacy Camera, HP Sure View Reflect, HP Sure Run Gen4, HP Sure Recover Gen4 with Embedded Reimaging, HP Sure Click, SmartCard Reader and Touch Fingerprint reader
- Connectivity with optional CAT20 5G/ WWAN, and Thunderbolt™ Docking (Dock sold separately)
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Choice of solid state drives up to 2 TB and DDR4 memory up to 64 GB
- Undergoes MIL-STD 810H tests¹
- Choose from MX 450 N18S-G5 or Intel® Iris® Xe Graphics

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 EliteBook 850 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 Windows 10 Enterprise 64 (Web Support) ¹ FreeDOS
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1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com/>.

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

PROCESSORS

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

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

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

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

Processor Family

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

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

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

11th Generation Intel® Core™ i5 processor (i5-1145G7)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.

Technical Specifications

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>.

GRAPHICS

Integrated

Intel® Iris® Xe Graphics⁷

Discrete

NVIDIA® GeForce® MX450 (2 GB GDDR6 video memory)⁵⁵

Supports

HD decode, DX12, HDMI 2.0b, HDCP 2.3⁸

7. Intel® Iris® Xe Graphics capabilities require system to be configured with Intel® Core™ i5 or i7 processors and dual channel memory. Intel® Iris® Xe Graphics with Intel® Core™ i5 or i7 processors and single channel memory will only function as UHD graphics.

8. HDMI cable sold separately.

55. Integrated graphics depends on processor. NVIDIA® Optimus™ technology requires an Intel processor, plus an NVIDIA® GeForce® discrete graphics configuration and is available on Windows 10 Pro OS. With NVIDIA® Optimus™ technology, full enablement of all discrete graphics video and display features may not be supported on all systems (e.g. OpenGL applications will run on the integrated GPU or the APU as the case may be).

DISPLAY

Non-Touch

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD camera (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD + IR camera (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for WWAN (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD camera for WWAN (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD + IR camera for WWAN (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 400 nits, 100% SRGB, Low Power Ambient Light Sensor for HD+IR Camera (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 400 nits, 100% SRGB, Low Power Ambient Light Sensor for HD+IR Camera for WWAN (1920x1080)^{9,10}

39.6 cm (15.6") diagonal UHD Bent, anti-glare UWVA eDP+PSR 400 nits, 100% SRGB, Low Power Ambient Light Sensor for HD+IR Camera (1920x1080)^{9,10}

39.6 cm (15.6") diagonal UHD Bent, anti-glare UWVA eDP+PSR 400 nits, 100% SRGB, Low Power Ambient Light Sensor for

Technical Specifications

HD+IR Camera for WWAN (1920x1080)^{9,10}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor for HD camera (1920x1080)^{9,10,11,12}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor for HD + IR camera (1920x1080)^{9,10,11,12}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor for HD camera for WWAN (1920x1080)^{9,10,11,12}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP+PSR, 1000 nits, 100% sRGB with HP Sure View Reflect integrated privacy screen, Ambient Light Sensor for HD + IR camera for WWAN (1920x1080)^{9,10,11,12}

Touch

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD+IR camera Touch on Panel (1920x1080)^{9,10,11,12}

39.6 cm (15.6") diagonal FHD Bent, anti-glare UWVA eDP, 250 nits, 45% NTSC for HD+IR camera for WWAN Touch on Panel (1920x1080)^{9,10,11,12}

HDMI 2.0¹³

Support resolution up to 4K @60 Hz

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.

13. HDMI cable sold separately.

Docking station model (Sold separately)	Total number of supported displays (incl. the notebook display)	Max resolutions supported for DP 1.4 hosts with DSC	Dock Connectors	Technical limitations / additional information For more details refer to HP Dock QuickSpecs http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c04168358 All information below applies to platforms running DP 1.4 with DSC
HP Thunderbolt Dock G2	Max number of displays = 4	Dual 8K@ 60Hz in high res mode	2xDP, 1xVGA, 1xTB, 1xUSB-C alt-mode	Max displays = 4 with max resolution of 5K@ 30Hz running Thunderbolt host Max resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in High Resolution mode The highest resolution for dual displays running a non-Thunderbolt host in Multi-function mode is one 5K dual cable (using both DP ports) + one 4K on USB-C DP port

Technical Specifications

HP USB-C Dock G5	3	Dual 5K@ 30Hz + 1 4K UHD (multi-function mode)	1xHDMI, 2xDP	Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode The highest resolution for running a non-Thunderbolt host in Multi-function mode is a single 5K dual cable (using both DP ports) + one 4K on HDMI port
HP USB-C/A Universal Dock G2	3	Triple 4K UHD@ 60Hz	1xHDMI, 2xDP	In High Resolution, mode the max available is one display. This dock's best use case is triple display. The best resolution for dual display is two 4K UHD@ 60Hz Highest triple displays resolution available is three 4KUHD @60Hz using both DP and 1 HDMI port. Best single display is with High Resolution mode using HDMI port.
HP USB-C Travel Dock G2	1	Single 4K@ 30 Hz 4960 x 2160 (via HDMI) or 1920 x 1200@ 60Hz via VGA	1xHDMI, 1xVGA	Single external display using either HDMI or VGA

Technical Specifications

STORAGE AND DRIVES

Primary M.2 Storage

128 GB PCIe® Gen3x2 NVMe™ M.2 SSD TLC¹⁴

256 GB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹⁴

512 GB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹⁴

1 TB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹⁴

2 TB PCIe® Gen3x4 NVMe™ M.2 SSD TLC¹⁴

256 GB PCIe® NVMe™ Value M.2 SSD¹⁴

512 GB PCIe® NVMe™ Value M.2 SSD¹⁴

512 GB PCIe® Gen 3x4 NVMe™ M.2 SED TLC OPAL2¹⁴

256 GB PCIe® Gen3x4 NVMe™ M.2 SED TLC OPAL2¹⁴

512 Intel® PCIe® NVMe™ QLC M.2 SSD with 32 GB Intel® Optane™ memory H10^{14,15}

14. 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.

15. 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

64 GB DDR4-3200 SDRAM

Memory

64 GB DDR4-3200 SDRAM (2 x 32 GB)¹⁶

32 GB DDR4-3200 SDRAM (2 x 16 GB)¹⁶

16 GB DDR4-3200 SDRAM (2 x 8 GB)¹⁶

16 GB DDR4-3200 SDRAM (1 x 16 GB)¹⁶

8 GB DDR4-3200 SDRAM (1 x 8 GB)¹⁶

8 GB DDR4-3200 SDRAM (2 x 4 GB)¹⁶

4 GB DDR4-3200 SDRAM (1 x 4 GB)¹⁶

Memory Slots

2 SODIMM

DDR4 SODIMMS, system runs at 3200

Supports Dual Channel Memory

16. 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

Intel® Dual Band Wi-Fi® 6 AX201 802.11 a/b/g/n/ac/ax (2x2) WLAN and Bluetooth® 5 Combo, non-vPro®¹⁷

Intel® Dual Band Wi-Fi® 6 AX201 802.11 a/b/g/n/ac/ax (2x2) WLAN and Bluetooth® 5 Combo, vPro®^{17,18}

WWAN

Intel® XMM™ 7360 LTE-Advanced Cat 9¹⁹

Qualcomm® Snapdragon™ X55 5G Cat 20²⁰

Near Field Communications (NFC) Module²²

HP Module with NXP NFC Controller NPC300 12C NCI

Miracast

Native Miracast Support²¹

17. 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 (802.11 ax) 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. For full Intel® vPro™ functionality, Windows, a vPro supported processor, vPro enabled chipset, vPro enabled WLAN card and discrete TPM 2.0 are required. See <https://www.intel.com/content/www/us/en/architecture-and-technology/vpro/vpro-platform-general.html>

19. 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.

20. 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.

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

22. Sold separately or as an optional feature.

Technical Specifications

AUDIO/MULTIMEDIA

Audio

Audio by Bang & Olufsen

2 Integrated stereo speakers

Integrated microphone (3-Mic Array)

World- Facing microphone

Speaker Power

2W/4ohm Per speaker

Camera

720p HD camera^{9,22}

720p HD+IR camera^{9,22}

Sensors

Ambient light sensor

Hall Sensor

HP Tamper Lock ⁵³

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

22. Sold separately or as an optional feature.

53. HP Tamper Lock must be enabled by the customer or your administrator.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard – spill-resistant, backlit keyboard²³

Pointing Device

Clickpad with multi-touch gesture support, taps enabled as default Microsoft Precision Touchpad Default Gestures Support

Function Keys

F1 - Display Switching

F2 - Blank or Privacy (with LED)

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

Technical Specifications

F12 - HP Programmable Key
Print Screen
Power Button (with LED)

Hidden Function Keys

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

23. Keyboards are made from up to 65% post-consumer recycled plastic.

SOFTWARE AND SECURITY

Preinstalled Software

BIOS

HP BIOSphere Gen6²⁴
HP Drive Lock & Automatic Drive Lock
BIOS Update via Network
HP Secure Erase²⁵
Absolute Persistence Module²⁶
HP LAN-Wireless Protection

Software

HP Connection Optimizer²⁷
HP Hotkey Support
myHP
HP Support Assistant²⁸
HP QuickDrop
HP Noise Cancellation Software
Touchpoint Customizer for Commercial
HP Notifications
HP Privacy Settings
HP Wireless Button Driver
HP Power Manager
Tile App²⁹
HP PC Hardware Diagnostics Windows
Buy Microsoft Office (Sold separately)
Microsoft Defender³³
HP Smart Support⁵⁶

Manageability Features

HP Driver Packs (download)³⁰

Technical Specifications

HP Manageability Integration Kit Gen4 (download)³¹

HP System Software Manager (SSM) (download)

HP Client Catalog (download)

HP Client Management Script Library (download)

HP Image Assistant (download)

Client Security Software

HP Client Security Manager Gen7³²

Security Management

Setup password (via BIOS)

HP Fingerprint Sensor³⁴

Support for chassis padlocks and cable lock devices

HP Wolf Pro Security Edition⁵⁴

HP Sure Click³⁵

HP Sure Sense⁴⁹

HP Sure Start Gen6³⁶

HP Sure Run Gen4³⁷

HP Sure Admin⁵⁰

HP Sure Recover Gen4³⁸

TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)³⁹

Is the BIOS on this notebook ISO/IEC 19678:2015 (formerly NIST 800-147) compliant?: Yes

UEFI version: 2.7

Class: Class 3

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

25. 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™.

26. 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/>

27. HP Connection Optimizer requires Windows 10.

28. HP Support Assistant requires Windows and Internet access.

29. 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.

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

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

Technical Specifications

32. HP Client Security Manager Gen7 requires Windows and is available on the select HP Elite and Pro PCs.
33. Windows Defender Opt in and internet connection required for updates.
34. HP Fingerprint sensor is an optional feature that must be configured at purchase.
35. HP Sure Click requires Windows 10 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details
36. HP Sure Start Gen6 is available on select HP PCs.
37. HP Sure Run Gen4 is available on select Windows 10 based HP Pro, Elite and Workstation PCs with select Intel® or AMD processors.
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. Firmware TPM is version 2.0.
49. HP Sure Sense is available on select HP PCs and is not available with Windows10 Home.
50. 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.
54. HP Wolf Pro Security Edition (including HP Sure Click Pro and HP Sure Sense Pro) is available preloaded on select SKUs and, depending on the HP product purchased, includes a paid 1-year or 3-year license. The HP Wolf Pro Security Edition software is licensed under the license terms of the HP Wolf Security Software - End-User license Agreement (EULA) that can be found at: https://support.hp.com/us-en/document/ish_3875769-3873014-16 as that EULA is modified by the following:
“7. Term. Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Wolf Pro Security Edition (HP Sure Sense Pro and HP Sure Click Pro) is effective upon activation and will continue for either a twelve (12) month or thirty-six (36) month license term (“Initial Term”). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Wolf 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.
56. 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.

Technical Specifications

SMART CARD READER

Smart Card Reader (Optional)	Smart card standard	PC/SC 2.0 for Windows smart card standard
	Dimensions (L x W x H)	0.41 x 0.08 x 0.32 in (10.5 x 2 x 8.2 mm)
	Smart Card support	ISO 7816 Class A and AB smart cards
	Smart Card Interface	Smart Card Interface with T = 0 and T = 1 support Support I2C memory card, SLE4418, SLE4428, SLE4432, SLE4442, SLE4436, SLE5536, SLE6636, AT88SC1608, AT45D041 card and AT45DB041 card via external EEPROM
	Model number	Alcor AU9560
	FIPS 201 Compliant	Yes

POWER

Power Supply

- HP Smart 65 W External AC power adapter⁴⁰
- HP Smart 65 W USB Type-C[®] adapter⁴⁰
- HP Smart 65 W EM External AC power adapter⁴⁰
- HP Smart 45 W External AC power adapter⁴⁰
- HP Smart 45 W External AC power adapter, 2-prong (Japan only)⁴⁰

Power Cord

- 2-wire plug - 1.0m
- 3-wire plug - 1.0m

Primary Battery

- HP Long Life 3-cell, 56 Wh Polymer^{41,51}
- Supports HP Fast Charge (Up to 50% in 30 minutes)⁴²

Battery Life

- Up to 14 hours and 45 minutes⁴³

Battery Weight

- 0.47 lb
- 0.215 kg

40. Availability may vary by country.

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

42. Supports HP Fast Charge with 65W AC Adapter. Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode. Power adapter with a minimum capacity of 65 watts is required. After charging has reached 50% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

43. 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

51. 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.

WEIGHTS & DIMENSIONS

Product Weight

Non-Touch

Starting at 3.73 lb (1.69 kg)⁴⁴

Touch

Starting at 3.84 lb (1.74 kg)⁴⁴

Product Dimensions (W x D x H)

14.1 x 9.2 x 0.75 in

35.9 x 23.38 x 1.92 cm

44. 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 (1 Charging)
- 1 HDMI 2.0b⁸
- 1 Headphone/microphone combo
- 1 4.5 mm AC power
- 1 nano SIM card slot⁴⁵
- 1 Smartcard reader (Optional)
- 1 Nano Security Lock Slot (Lock sold separately)

8. HDMI cable sold separately.

All units have a SIM card slot and icon but units that do not support WWAN are shipped with a non-removable SIM slot plug.

45. All units have a SIM card slot and icon but units that do not support WWAN are shipped with a non-removable SIM slot plug.

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>.⁴⁶

46. 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

Nominal Operating Voltage	19.5V
Average Operating Power	2.67W
Integrated graphics	Yes
Discrete Graphics	15.3W
Max Operating Power	Discrete < 65W UMA < 45W
Temperature	
Operating	32° to 95° F (0° to 35° C)
Non-operating	41° to 95° F (5° to 35° C) (writing optical)
Relative Humidity	
Operating	10% to 90%, non-condensing
Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
Shock	
Operating	40 G, 2 ms, half-sine
Non-operating	200 G, 2 ms, half-sine
Random Vibration	
Operating	0.75 grms
Non-operating	1.50 grms
Altitude (unpressurized)	
Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
Planned Industry Standard Certifications	
UL	Yes
CSA	Yes
FCC Compliance	Yes
ENERGY STAR®	Select models ⁴⁷
EPEAT®	EPEAT 2019 Gold in United States ⁴⁸
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

47. Configurations of the HP EliteBook 850 G8 Notebook PC that are ENERGY STAR® certified are identified as HP EliteBook 850 G8 Notebook PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

Technical Specifications

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

DISPLAYS

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 15.6 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)	350.96 x 205.54 mm (max)
Active Area	344.16 x 193.59 mm (typ.)
Weight	370 g (max)
Diagonal Size	15.6 inch
Thickness	3.0 mm/ 5.0 mm (w/PCB) (max)
Interface	eDP 1.2 (2 lane)
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

Panel LCD 15.6 inch FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent Touch on Panel NWBZ

Outline Dimensions (W x H x D)	350.96 x 205.74 mm (max)
Active Area	344.16 x 193.59 mm
Weight	380 g (max)
Diagonal Size	15.6 inch
Thickness	3.2mm/ 5.2mm (PCB) (max)
Interface	eDP 1.2
Surface Treatment	Anti-Glare On-cell
Touch Enabled	Yes
Contrast Ratio	600:1
Refresh Rate	60 Hz
Brightness	250 nits ¹
Pixel Resolution	1920 x 1080 (FHD)
Format	RGB Stripe
Backlight	LED

Technical Specifications

Color Gamut Coverage	NTSC 45%
Color Depth	6 bits
Viewing Angle	UWVA 85/85/85/85

Panel LCD 15.6 inch FHD (1920x1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 bent LP NWBZ

Outline Dimensions (W x H x D)	349.52 x 205.42 mm (max)
Active Area	344.22 x 193.62 mm
Weight	325g (max)
Diagonal Size	15.6 inch
Thickness	2.6mm / 4.6mm (PCB) (max)
Interface	eDP 1.4
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	1200:1
Refresh Rate	60 Hz
Brightness	400 nits
Pixel Resolution	1920 x 1080 (FHD)
Format	RGB Stripe
Backlight	LED
Color Gamut Coverage	sRGB 100% only for UHD LP
Color Depth	8 bits
Viewing Angle	UWVA 85/85/85/85

Panel LCD 15.6 inch UHD (3840x2160) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 bent LP NB2Y

Outline Dimensions (W x H x D)	349.52 x 205.42 mm (max)
Active Area	344.22 x 193.62 mm
Weight	320 g (max)
Diagonal Size	15.6 inch
Thickness	2.6mm / 4.6mm (PCB) (max)
Interface	eDP 1.4
Surface Treatment	Anti-Glare
Touch Enabled	No
Contrast Ratio	1200:1
Refresh Rate	60 Hz
Brightness	400 nits
Pixel Resolution	3840 x 2160 (UHD)
Format	RGB Stripe
Backlight	LED
Color Gamut Coverage	sRGB 100% only for UHD LP
Color Depth	8 bits
Viewing Angle	UWVA 85/85/85/85

Technical Specifications

**Panel LCD 15.6-in FHD
(1920x1080) Anti-Glare WLED
UWVA 100% sRGB 1000nits eDP
1.4+PSR HP Sure View Reflect
NB2Y bent**

Outline Dimensions (W x H x D)	349.52 x 205.39 max.
Active Area	344.16 x 193.59
Weight	370g max
Diagonal Size	15.6 inch
Thickness	2.6mm / 4.5mm max. (PCB)
Interface	eDP
Surface Treatment	Anti-Glare (AG)
Touch Enabled	No
Contrast Ratio	1500:1
Refresh Rate	60 Hz
Brightness	1000 nits ¹
Pixel Resolution	1920 x 1080 (FHD)
Format	RGB
Backlight	LED
Color Gamut Coverage	100% sRGB
Color Depth	8 bits
Viewing Angle	UWVA 85/85/85/85

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 Gen3X2

Maximum Sequential Read Up to 1400 ~ 2100 MB/s

Maximum Sequential Write Logical Blocks Up to 800 ~ 1200 MB/s
250,069,680

Operating Temperature Features 32° to 158°F (0° to 70°C) [ambient temp]
ATA Security (Option); TRIM; L1.2
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 Gen3X2

Maximum Sequential Read Up to 3100 ~ 3500 MB/s

Maximum Sequential Write Logical Blocks Up to 2700 ~ 3037 MB/s
2,000,409,264

Operating Temperature Features 32° to 158°F (0° to 70°C) [ambient temp]
ATA Security; TRIM; L1.2

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	Up to 2800 ~ 3500 MB/s
	Maximum Sequential Write	Up to 1600 ~ 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

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 Gen3X2
	Maximum Sequential Read	Up to 2100 ~ 2400 MB/s
	Maximum Sequential Write	Up to 950 ~ 1400 MB/s
	Logical Blocks	500,118,192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security (Option); TRIM; L1.2

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	Up to 2800 ~ 3500 MB/s
Maximum Sequential Write Logical Blocks	Up to 1663 ~ 2200 MB/s 500,118,192
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security (Option); TCG Opal 2.0; TRIM; L1.2

**SSD 2TB 2280 PCIe-3x4 NVMe
Three Layer Cell single-sided**

Form Factor	M.2 2280
Capacity	2 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	Up to 3100 ~ 3500 MB/s
Maximum Sequential Write Logical Blocks	Up to 2800 ~ 3000 MB/s 3,907,029,168
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security; TRIM; L1.2

Technical Specifications

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	Up to 3100 ~ 3500 MB/s
Maximum Sequential Write Logical Blocks	Up to 2400 ~ 2956 MB/s 1,000,215,215
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security; TRIM; L1.2

SSD 512GB 2280 PCIe NVMe Value

Form Factor	M.2 2280
Capacity	512 GB
NAND Type	Value
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen3X2
Maximum Sequential Read	Up to 1500 ~ 2400 MB/s
Maximum Sequential Write Logical Blocks	Up to 1000 ~ 1750 MB/s 1,000,215,215
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security (Option); TRIM; L1.2

Technical Specifications

**SSD 512GB 2280 PCIe-3x2x2
NVMe+SSD 32GB 3D Xpoint**

Form Factor	M.2 2280
Capacity	512 GB
NAND Type	QLC+3D XPoint
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	PCIe NVMe Gen3X2X2
Maximum Sequential Read	Up to 2400 MB/s
Maximum Sequential Write Logical Blocks	Up to 1300 MB/s 1,000,215,215
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security; TRIM; L1.2

**SSD 512GB 2280 PCIe-3x4 NVMe
Self Encrypted OPAL2 Three
Layer Cell**

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	Up to 3100 ~ 3500 MB/s
Maximum Sequential Write Logical Blocks	Up to 2400 ~ 2956 MB/s 1,000,215,215
Operating Temperature Features	32° to 158°F (0° to 70°C) [ambient temp] ATA Security (Option); TCG Opal 2.0; TRIM; L1.2

Technical Specifications

NETWORKING

Intel® Wi-Fi® 6¹ AX201 and Bluetooth® 5.0 802.11ax (2x2) supporting gigabit data rate⁵, 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	<ul style="list-style-type: none"> •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	<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	<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 •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 Power²	<ul style="list-style-type: none"> • 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum

Technical Specifications

	<ul style="list-style-type: none"> • 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/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: 2.8 g 2. Type 126: 1.3 g 				
Operating Voltage	3.3v +/- 9%				
Temperature	<table> <tbody> <tr> <td>Operating</td> <td>14° to 158° F (-10° to 70° C)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 176° F (-40° to 80° C)</td> </tr> </tbody> </table>	Operating	14° to 158° F (-10° to 70° C)	Non-operating	-40° to 176° F (-40° to 80° C)
Operating	14° to 158° F (-10° to 70° C)				
Non-operating	-40° to 176° F (-40° to 80° C)				
Humidity	<table> <tbody> <tr> <td>Operating</td> <td>10% to 90% (non-condensing)</td> </tr> <tr> <td>Non-operating</td> <td>5% to 95% (non-condensing)</td> </tr> </tbody> </table>	Operating	10% to 90% (non-condensing)	Non-operating	5% to 95% (non-condensing)
Operating	10% to 90% (non-condensing)				
Non-operating	5% to 95% (non-condensing)				
Altitude	<table> <tbody> <tr> <td>Operating</td> <td>0 to 10,000 ft (3,048 m)</td> </tr> <tr> <td>Non-operating</td> <td>0 to 50,000 ft (15,240 m)</td> </tr> </tbody> </table>	Operating	0 to 10,000 ft (3,048 m)	Non-operating	0 to 50,000 ft (15,240 m)
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				

Technical Specifications

HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology

Bluetooth Specification	4.0/4.1/4.2/5.0/5.1 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps signaling data rate ¹ 2.17 Mbps BLE: 1 Mbps signaling data rate ¹ 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.

<p>Intel® Wi-Fi® 6¹ AX201 and Bluetooth® 5.0 802.11ax (2x2), supporting gigabit data rate⁵ non-vPro®</p>	<p>Wireless LAN Standards</p>	<p>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</p>
	<p>Interoperability</p>	<p>Features Wi-Fi 6 technology</p>
	<p>Frequency Band</p>	<ul style="list-style-type: none"> •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
	<p>Data Rates</p>	<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)
	<p>Modulation</p>	<p>Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM</p>

Technical Specifications

Security³	<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 •WPA3 certification
Network Architecture Models	<ul style="list-style-type: none"> •IEEE 802.11i •WAPI
Roaming	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Output Power²	IEEE 802.11 compliant roaming between access points
Power Consumption	<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 Management	<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
Receiver Sensitivity⁴	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Antenna type	<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
	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

Technical Specifications

	support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard 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: 2.8 g 2. Type 126: 1.3 g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (–10° to 70° C) Non-operating –40° to 176° F (–40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF LED Off – Radio ON
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology	
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps signaling data rate ¹ 2.17 Mbps BLE: 1 Mbps signaling data rate ¹ 0.2 Mbps 1. Actual throughput may vary.
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	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 Software Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode

Technical Specifications

- LE Link Layer
- LE Low Duty Cycle Directed Advertising
- LE L2CAP Connection Oriented Channels
- Train Nudging & Interlaced Scan
- BT4.2 ESR08 Compliance
- LE Secure Connection- Basic/Full
- LE Privacy 1.2 –Link Layer Privacy
- LE Privacy 1.2 –Extended Scanner Filter Policies
- LE Data Packet Length Extension
- FAX Profile (FAX)
- Basic Imaging Profile (BIP)2
- Headset Profile (HSP)
- Hands Free Profile (HFP)
- Advanced Audio Distribution Profile (A2DP)

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

**Qualcomm®
Snapdragon™ X55
5G Cat 20¹**

**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)

Technical Specifications

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)
5GNR 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)
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)

Technical Specifications

Wireless protocol standards	5G NR Air Interface 1 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 mm × 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.

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
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Technical Specifications

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. 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.

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) Mode¹	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) Mode¹	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

Technical Specifications

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.

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.
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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 (0oto 35oC)
Non-operating (storage) temperature	-4oF to 185oF (-20oto 85oC)
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.

**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

Technical Specifications

Connector	
Connector	4.5mm Barrel Type
Environmental Design	
Operating temperature	32oF to 95oF (0oto 35oC)
Non-operating (storage) temperature	-4oF to 185oF (-20oto 85oC)
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.

AC Adapter 65 Watt nPFC Slim USB type C Straight 1.8m

Dimensions	88x53.5x21mm
Weight	unit: 220g +/- 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
Connector	
Connector	USB Type C
Environmental Design	
Operating temperature	32oFto 95oF (0oto 35oC)
Non-operating (storage) temperature	-4oFto 185oF (-20oto 85oC)

Technical Specifications

Non-operating (storage) temperature

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 1.8m

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

Connector

USB TYPE C

Environmental Design

Operating temperature 32°F to 95°F (0°to 35°C)

Non-operating (storage) temperature -4°F to 185°F (-20°to 85°C)

Non-operating (storage) temperature

Altitude 0 to 16,400 ft (0 to 5000m)

Humidity 20% to 95%

Storage Humidity 10% to 95%

Technical Specifications

EMI and Safety Certifications

- 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.

AC Adapter 65 Watt Smart nPFC EM Barrel 4.5mm New EM

Dimensions

102x55x30mm

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

Connector

4.5mm Barrel Type

Environmental Design

Operating temperature

32oF to 95oF (0to 35oC)

Non-operating (storage) temperature

-4oF to 185oF (-20oto 85oC)

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 65 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	Dimensions	90x51x28.5mm
	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	
	Connector	4.5mm Barrel Type
	Environmental Design	
	Operating temperature	32oF to 95oF (0to 35oC)
	Non-operating (storage) temperature	-4oF to 185oF (-20oto 85oC)
	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.	

Battery CC 3 Cell 56 Wh Long Life -PL Fast Charge	Dimensions (H x W x L)	7.0 x 66.5 x 276.3 (0.275 x 2.618 x 10.877 inch)
	Weight	0.215 kg (0.47 lb)
	Cells/Type	3cell Lithium-Ion Polymer cell / 615383
	Energy	
	Voltage	11.55V
	Amp-hour capacity	4.85Ah
	Watt-hour capacity¹	56 Wh
	Temperature	32° to 113° F (0° to 45° C)
	Operating (Charging)	32° to 122° F (0° to 50° C)
	Operating (Discharging)	14° to 140° F (-10° to 60° C)
Fuel Gauge LED	N/A	

Technical Specifications

Warranty	Depends on system offering
Optional Travel Battery Available	No

1. 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.

Fingerprint Reader	Model Synaptics Validity VFS7552 touch sensor
	Mobile Voltage Operation 3.0V to 3.6V
	Operating Temperature 14° – 167°F (-10°-75°C)
	Current Consumption Image 36mA peak
	Low Latency Wait For Finger 950 uA
	Capture Rate 30 cm/sec
	ESD Resistance IEC 61000-4-2 4B (+15KV)
	Detection Matrix 200*1 (Plus another secondary line) / 508 dpi / 10mm sensor area
	FRR (False Reject Rate) / FAR (False Acceptance Rate) FRR ~ 1% @ 1:50K FAR

Technical Specifications

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations	<p>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:</p> <ul style="list-style-type: none"> • 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 Certified • China Energy Conservation Program (CECP) • China State Environmental Protection Administration (SEPA) • Taiwan Green Mark • Korea Eco-label • Japan PC Green label* 		
Sustainable Impact Specifications	<ul style="list-style-type: none"> • Ocean-bound plastic in Speaker Box • 35% 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 • Bulk packaging available 		
System Configuration	<p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.</p>		
Energy Consumption (in accordance with US ENERGY STAR® test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Sort idle)	7.69 W	7.52 W	7.69 W
Normal Operation (Long idle)	1.53 W	1.38 W	1.37 W
Sleep	1.53 W	1.38 W	1.37 W
Off	0.38 W	0.41 W	0.3 W
	<p>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.</p>		

Technical Specifications

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	24.1 BTU/hr	23.6 BTU/hr	24.1 BTU/hr
Normal Operation (Long idle)	4.8 BTU/hr	4.3 BTU/hr	4.3 BTU/hr
Sleep	4.8 BTU/hr	4.3 BTU/hr	4.3 BTU/hr
Off	1.2 BTU/hr	1.3 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	2.5		23.6
Fixed Disk – Random writes	3.5		27.5
Optical Drive – Sequential reads	4.1		31.8
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.		
Additional Information	<ul style="list-style-type: none"> 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 http://www.epeat.net Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. 		
Packaging Materials	External:	PAPER/Corrugated	345 g
	Internal:	PLASTIC/Polypropylene-PP	4 g
		PLASTIC/Polyethylene low density	15 g
		PAPER/Molded pulp	189 g
	The plastic packaging material contains at least 0% recycled content.		
	The corrugated paper packaging materials contains at least 59.1% recycled content.		
RoHS Compliance	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		

Technical Specifications

	<p>products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.</p> <p>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.</p> <p>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.</p> <p>To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.</p>
<p>Material Usage</p>	<p>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):</p> <ul style="list-style-type: none"> • 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 • 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)

Technical Specifications

Packaging Usage	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the HP web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>
HP, Inc. Corporate Environmental Information	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</p> <p>ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</p>
footnotes	<ul style="list-style-type: none"> • 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.

Technical Specifications

COUNTRY OF ORIGIN

China

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

Category	Description	Part Number
Cases	HP Prelude Pro Top Load	1X645AA
	HP Prelude Pro Backpack	1X644AA
	HP Business Backpack (17.3")	25C67AA
	HP Business Case (15.6")	25C66AA
Docking	HP Thunderbolt Dock 120W G2	2UK37AA
	HP Thunderbolt Dock 120W G2 TAA	2UK37AA
	HP TB Dock w/ Combo Cable (230W)	3TR87AA
	HP TB Dock Audio Module	3AQ21AA
	HP TB Dock 120W G2 cable	3XB94AA
	HP TB Dock G2 combo cable	3XB96AA
	HP TB Dock 230W G2 Cable	3XB95AA
	HP USB-C Mini Dock	1PM64AA
	HP USB-C Dock G5	5TW10AA
HP USB-C/A Universal Dock G2	5TW13AA	
Input/Output	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP Wireless Premium Keyboard	Z9N41AA
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Wireless Collaboration Keyboard	Z9N39AA
	HP 935 Creator Wireless Mouse	1D0K8AA
	HP 635 Multi-Device Wireless Mouse	1D0K2AA
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP X4000b Bluetooth Mouse	H3T50AA
	HP Wired Desktop 320M Mouse	9VA80AA
	HP USB Travel Mouse	G1K28AA
	HP Bluetooth Travel Mouse	6SP30AA
	HP Wireless Premium Mouse	1JR31AA
	HP USB Premium Mouse	1JR32AA
	HP Elite Presenter Mouse	2CE30AA
	HP Stereo 3.5mm Headset	T1A66AA
	HP Stereo USB Headset	T1A67AA
	HP UC Wireless Mono Headset	W3K08AA
	HP UC Wireless Duo Headset	W3K09AA
	HP USB-C to USB-A Hub	Z6A00AA
	HP USB-C to DP	N9K78AA
	HP USB-C to VGA	N9K76AA
	HP USB to Gig RJ45 Adapter	N7P47AA
	HP HDMI to VGA	H4F02AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to RJ45 Adapter	V7W66AA

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

	HP USB-C Travel Hub G2	7PJ38AA
	HP Elite USB-C Hub	4WX89AA
Power	HP 65W Slim AC Adapter	H6Y82AA
	HP 45W Smart AC Adapter	H6Y88AA
	HP 65W Smart AC Adapter	H6Y89AA
	HP 45W 2-prong 4.5 mm DC jack AC Adapter	L6F60AA#ABJ
	HP 45W USB-C Power Adapter	1HE07AA
	HP 65W USB-C Power Adapter	1HE08AA
	65W USB-C Slim Power Adapter	3PN48AA
	HP Notebook Power Bank	N9F71AA
	HP USB-C Essential Power Bank	3TB55AA
Storage	HP USB External DVDRW Drive	F2B56AA
	HP 256GB PCI-e 3x4 NVMe M.2 SSD	1D0H6AA
	HP 512GB PCI-e 3x4 NVMe M.2 SSD	1D0H7AA
Memory	HP 4GB DDR4 3200 Memory	286H5AA
	HP 8GB DDR4 3200 Memory	286H8AA
	HP 16GB DDR4 3200 Memory	286J1AA
Security	HP Nano Keyed Cable Lock	1AJ39AA
	HP Sure Key Cable Lock	6UW42AA

Summary of Changes

Date of change:	Version History:		Description of change:
December 11, 2021	V1 to V2	Updated	Ports, Battery Life
January 27, 2021	V2 to V3	Updated	USB ports to new industry standards.
February 4, 2021	V3 to V4	Added	Processors, WPA3 certification
February 8, 2021	V4 to V5	Updated	Smart Card Reader
February 10, 2021	V5 to V6	Updated	Environmental Data
February 17, 2021	V6 to V7	Update	Processor section
March 9, 2021	V7 to V8	Update	Audio and Multimedia section
April 16, 2021	V8 to V9	Update	Graphics Disclaimer/Options and Accessories
April 23, 2021	V9 to V10	Added	BIOS information in Software section
April 27, 2021	V10 to V11	Update	Graphics section/TPM 2.0 update
May 6, 2021	V11 to V12	Removed	Processors base frequency/Added HP Smart Support
May 27, 2021	V12 to V13	Update	HP Pro Security Edition to HP Wolf Pro Security Edition
June 22, 2021	V13 to V14	Removed	HP Thunderbolt Dock 230W G2 and HP WorkWell from Software section/Added Environmental Data

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