

Overview

HP ProBook 640 G5 Notebook PC



Left

- | | |
|-------------------------------|--|
| 1. Webcam (Select models) | 6. Smart Card Reader (Select models) |
| 2. Internal Microphones (2) | 7. Audio Combo Jack |
| 3. Camera Privacy Shutter | 8. USB 3.1 Gen 1 Port |
| 4. Webcam LED (Select models) | 9. Security Lock Slot (Lock sold separately) |
| 5. Clickpad | 10. Power Button |

Overview



Right

1. Micro SD Card Slot
2. Power Connector
3. Docking Connector
4. VGA Port
5. Ethernet Port
6. HDMI Port (Cable not included)
7. USB 3.1 Gen 1 port
8. USB 3.1 Gen 1 Charging Port
9. USB Type-C™ Charging Port (PD+DP 1.2, Gen1)
10. HDD LED Indicator
11. Fingerprint Reader (Select models)

Overview

AT A GLANCE

- Windows 10 versions and FreeDOS
- Precision-crafted slim design with fingerprint resistant modern, fresh and comfortable natural silver finish
- Choice of 8th Generation Intel® Core™ processors, with integrated graphics or optional AMD Radeon™ 540X 64 bit Discrete Graphics
- HP Advanced keyboard, spill resistant with optional backlit design
- Large Clickpad with gestures support
- Enhanced security features including TPM2.0, HP Privacy Camera, Optional HP Sure View Gen3, optional Smart Card Reader, optional Touch FingerPrint Reader³ (select models), HP Sure Sense² and HP Sure Start Gen5.
- LED-backlit display 35.56 cm (14") diagonal HD, FHD, Touch FHD or FHD with HP Sure View Gen3.
- Optional WWAN
- HDMI port for connecting to high-resolution displays
- Optional HD webcam with dual-microphone array for video conferencing
- Three USB 3.1 Gen1 ports (1 charging) and one USB-C™ port (PD+DP 1.2, Gen1)
- Flexible wireless connectivity options, including 802.11 AX WLAN module and CAT9 WWAN module
- Battery hours up to 15 hours and 30 minutes with fast charging technology
- Dual storage combines SSD fast boot up and app access with cost effective HDD mass storage
- Passed MIL-STD 810G test¹
- Compliance with FCC (Class B)

1. MIL-STD 810G 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. HP Sure Sense requires Windows 10. See product specifications for availability.

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

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

Technical Specifications

PRODUCT NAME

HP ProBook 640 G5 Notebook PC

OPERATING SYSTEM

Preinstalled	Windows 10 Pro 64 ¹ Windows 10 Pro 64 (National Academic only) ² Windows 10 Home 64 ¹ Windows 10 Home Single Language 64 ¹ Windows 10 Pro (Windows 10 Enterprise available with a Volume Licensing Agreement) 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™ i7-8665U vPro™ with Intel® UHD graphics 620 (1.9 GHz base frequency, up to 4.8 GHz with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores)^{3,4,5}

Intel® Core™ i7-8565U with Intel® UHD graphics 620 (1.8 GHz base frequency, up to 4.6 GHz with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores)^{3,4,5}

Intel® Core™ i5-8365U vPro™ with Intel® UHD Graphics 620 (1.6 GHz base frequency, up to 4.1 GHz with Intel® Turbo Boost Technology, 6 MB L3 cache, 4 cores)^{3,4,5}

Intel® Core™ i5-8265U with Intel® UHD Graphics 620 (1.6 GHz base frequency, up to 3.9 GHz with Intel® Turbo Boost Technology, 6 MB L3 cache, 4 cores)^{3,4,5}

Intel® Core™ i3-8145U with Intel® UHD Graphics 620 (2.1 GHz base frequency, up to 3.9 GHz with Intel® Turbo Boost Technology, 4 MB cache, 2 cores)^{3,4,5}

Processor Family

8th Generation Intel® Core™ i7 processor (i7-8665U, i7-8565U models)⁵

8th Generation Intel® Core™ i5 processor (i5-8365U, i5-8265U models)⁵

8th Generation Intel® Core™ i3 processor (i3-8145U model)⁵

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. 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® UHD graphics 620⁷

Discrete

AMD Radeon™ 540X (2 GB GDDR5 dedicated)⁶

Supports

Support HD decode, DX12, HDMI 1.4b

7. HD content required to view HD images.

6. AMD Dynamic Switchable Graphics technology requires an Intel processor, plus an AMD Radeon™ discrete graphics configuration and is not available on FreeDOS and Linux OS. With AMD Dynamic Switchable Graphics 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 HD

35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC (1366 x 768)^{7,8}

35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, for HD camera (1366 x 768)^{7,8}

35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, for WWAN (1366 x 768)^{7,8}

35.56 cm (14") diagonal HD SVA eDP anti-glare LED-backlit, 220 cd/m², 45% NTSC, for HD camera and WWAN (1366 x 768)^{7,8}

Non-Touch FHD

35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 250 cd/m², 45% NTSC (1920 x 1080)^{7,8}

35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 250 cd/m², 45% NTSC, for HD camera (1920 x 1080)^{7,8}

35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 250 cd/m², 45% NTSC, for WWAN (1920 x 1080)^{7,8}

35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 250 cd/m², 45% NTSC, for HD camera and WWAN (1920 x 1080)^{7,8}

Touch FHD

35.56 cm (14") diagonal FHD IPS eDP LED-backlit touch screen, 250 cd/m², 45% NTSC, for HD camera and WWAN (1920 x 1080)^{7,8}

Non-Touch FHD Privacy Panel

HP Sure View Gen3 Integrated Privacy Screen 35.56 cm (14") diagonal FHD IPS eDP anti-glare LED-backlit, 1000 cd/m², 72% NTSC, for HD camera and WWAN(1920 x 1080)*

7. HD content required to view HD images.

8. Resolutions are dependent upon monitor capability, and resolution and color depth settings.

*Touch-enabled display and Sure View privacy panel will lower actual brightness

Technical Specifications

Docking station model	Total number of supported displays (incl. the notebook display)	Max. resolutions supported	Dock Connectors	Technical limitations
HP UltraSlim Docking Station	3	Dual 2.5K @ 60Hz	2xDP, 1xVGA	Dual 2.5k only with both displays into DP
HP Thunderbolt Dock G2	3	Single 4K@60Hz (3840 x 2160)	2xDP, 1xVGA, 1xTB, 1xUSB-C alt-mode	System will perform at USB 3.0 Gen1 speeds when connected to the dock (5Gbits) Thunderbolt port will function as a USB 2.0 port with data and power out (15W) only.
HP USB-C Dock G4	3	Dual 2K @ 60Hz Single 4K @ 60Hz (3840 x 1440)	1xHDMI, 2xDP	
HP USB-C Universal Dock	3	Dual 4K @ 60Hz Single 5K @ 60Hz	2xDP	
HP USB-C Travel Dock	2	Single 2K @ 60Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time
HP USB-C Mini Dock	2	Single 4K @ 30Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time

Technical Specifications

STORAGE AND DRIVES

Primary Storage

500 GB 7200 rpm SATA⁹

500 GB 7200 rpm SATA FIPS 140-2 SED⁹

1 TB 7200 rpm SATA⁹

Primary M.2 Storage

128 GB SATA-3 SS TLC⁹

256 GB PCIe[®] NVMe™ SS Value⁹

256 GB PCIe[®] Gen3x4 NVMe™ SS TLC⁹

256 GB SATA-3 TLC FIPS⁹

256 GB SATA-3 SS TLC (Opal 2)⁹

256 GB Intel[®] PCIe[®] NVMe™ QLC M.2 SSD with 16 GB Intel[®] Optane™ memory H10 (Available Q4 2019)^{9,10,11}

512 GB PCIe[®] NVMe™ Value⁹

512 GB PCIe[®] Gen3x4 NVMe™ SS TLC⁹

512 GB PCIe[®] Gen3x4 NVMe™ SS TLC (Opal 2)⁹

512 GB SATA-3 SS TLC (FIPS)⁹

512 GB Intel[®] PCIe[®] NVMe™ QLC M.2 SSD with 32 GB Intel[®] Optane™ memory H10^{9,10,11}

1 TB PCIe[®] Gen3x4 NVMe™ SS TLC⁹

256GB SATA-3 SS TLC (for Brazil only)

Cache Memory

16 GB PCIe[®] NVMe™ Intel[®] Optane™ Memory for storage acceleration⁹

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

10. Intel[®] Optane™ 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.

11. Intel[®] Optane™ memory H10 only for Intel[®] PCIe[®] NVMe™ QLC M.2 SSD.

MEMORY

Maximum Memory

64 GB DDR4-2400 SDRAM¹²

Memory

4 GB Total System Memory (4 GB x 1)

8 GB Total System Memory (4 GB x 2)

8 GB Total System Memory (8 GB x 1)

12 GB Total System Memory (8 GB + 4 GB)

16 GB Total System Memory (16 GB x 1)

16 GB Total System Memory (8 GB x 2)

32 GB Total System Memory (16 GB x2)

48 GB Total System Memory (32 GB + 16 GB) (available Q4 2019)

64 GB Total System Memory (32 GB x2) (available Q4 2019)

Memory Slots

2 SODIMM

Both slots are customer accessible / upgradeable

DDR4 SODIMMS, System runs at: 2400

Supports Dual Channel Memory

Technical Specifications

12. 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® Wireless-AC 9560 802.11 ac (2x2) Wi-Fi® and Bluetooth® 5, vPro™¹³

Intel® Wireless-AC 9560 802.11 ac (2x2) Wi-Fi® and Bluetooth® 5, non-vPro™¹³

Intel® Wi-Fi 6** AX200 + Bluetooth® 5 (802.11ax 2x2, vPro, supporting gigabit file transfer speeds)

Intel® Wi-Fi 6** AX200 + Bluetooth® 5 (802.11ax 2x2, non-vPro, supporting gigabit file transfer speeds)

WWAN

LTE CAT6: Intel® XMM™ 7262 LTE-Advanced, Fibocom LTE/HSPA+ w/GPS¹⁴

LTE CAT9: Intel® XMM™ 7360 LTE-Advanced, Fibocom LTE/HSPA+ w/GPS¹⁴

NFC

NXP NPC300 Near Field Communication Module¹⁵

WPAN Bluetooth

BT 5.0 supported via all supported WLAN modules

Ethernet

Intel® Ethernet Connection I219-LM 10/100/1000 vPro™¹⁶

Intel® Ethernet Connection I219-V 10/100/1000 Non-vPro™¹⁶

13. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.

14. WWAN module 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. 4G LTE not available on all products, in all regions.

15. Sold separately or as an optional feature.

16. The term "10/100/1000" or "Gigabit" Ethernet indicates compatibility with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/s. For high-speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

**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.

AUDIO/MULTIMEDIA

Audio

2 Integrated stereo speakers

Integrated dual array microphone

Webcam

720p HD HP Privacy Camera^{7,15,17}

7. HD content required to view HD images.

15. Sold separately or as an optional feature.

17. Internet access required.

Technical Specifications

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Advanced Keyboard

Pointing Device

ClickPad, Spill-resistant with drain¹⁵

ClickPad, Spill-resistant with drain, DuraKeys & Backlit¹⁵

Dual Point, Spill-resistant with drain, DuraKeys & Backlit¹⁵

Dual Point, Spill-resistant with drain, DuraKeys & Backlit Privacy¹⁵

Function Keys

ESC: system information

F1 - Display Switching

F2 - Blank or Privacy

F3 - Brightness Down

F4 - Brightness Up

F5 - Speaker Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

F9 - Backlight Toggle (for backlit keyboard) or Blank

F10 - NumLock

F11 - Wi-fi[®] Toggle

F12 - Sleep

Clickpad requirements:

On/off control by driver

Taps enabled as default

Gestures:

Win 10:

Disabled by default:

3 Finger Flick

2 Finger Rotate

Momentum Motion

1 Finger Vertical Scroll

Win 10:

Support PTP with Miniport driver

Settings enabled by default by MSFT:

2 Finger Scrolling

2 Finger Zoom (Pinch)

OSD (enable/disable)

3 finger tap - Cortana

3 finger flick - App switch

4 finger tap - Action Center

[15. Sold separately or as an optional feature.](#)

Technical Specifications

SOFTWARE AND SECURITY

Preinstalled Software

BIOS

HP BIOSphere Gen5¹⁸
HP Drive Lock & Automatic Drive Lock¹⁹
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Secure Erase²⁰
Absolute Persistence Module²¹
Pre-boot Authentication

Software

HP Native Miracast Support²²
HP Connection Optimizer
HP Image Assistant
HP Hotkey Support
HP JumpStart
HP Support Assistant²³
HP Noise Cancellation Software
Buy Office (sold separately)

Manageability Features

HP Driver Packs²⁴
HP System Software Manager (SSM)
HP BIOS Config Utility (BCU)
HP Client Catalog
HP Manageability Integration Kit Gen3²⁵
HP Cloud Recovery²⁶

Client Security Software

HP Client Security Suite Gen5²⁷
Power On Authentication
HP Fingerprint Sensor²⁸ (select models)
HP Power On Authentication
Windows Defender²⁹

Security Management

Pre-boot Authentication
TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)³⁰
Serial, USB enable/disable (via BIOS)
Power-on password (via BIOS)
Setup password (via BIOS)

Technical Specifications

Support for chassis padlocks and cable lock devices

HP Sure Click³¹

HP Sure Start Gen5³²

HP Sure Sense³³

Security

TPM

Model: Infineon SLB9670

Version: 7.85

Revision: TPM 2.0

FIPS 140-2 Compliant: Yes

Smartcard Reader

Model number: Alcor AU9560

FIPS 201 Compliant: Yes

IPv6 Compliance

Yes

MD5 Hash: Please follow the instructions below to access MD5 Hash.

Log-on to <http://hp.com/support>, enter your product name, select software and drivers, select OS, select driver. After selecting the driver, click on “Associated files” and then click on “Download”. When opening the file, under “Purpose” you should see the appropriate “SOFTPAQ MD5:” Field

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

Yes

UEFI version: 2.6

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

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

20. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 “Clear” sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.

21. Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription.

Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: <http://www.absolute.com/company/legal/agreements/> computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.

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

23. HP Support Assistant requires Windows and Internet access.

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

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

26. HP Cloud Recovery is available for HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, wired network connection. Note: You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: <https://support.hp.com/us-en/document/c05115630>

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

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

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

Technical Specifications

- 30. Firmware TPM is version 2.0. Hardware TPM is v1.2, which is a subset of the TPM 2.0 specification version v0.89 as implemented by Intel Platform Trust Technology (PTT).
- 31. HP Sure Click is available on most HP PCs and supports Microsoft® Internet Explorer and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.
- 32. HP Sure Start Gen5 is available on select HP PCs with Intel processors. See product specifications for availability.
- 33. HP Sure Sense requires Windows 10. See product specifications for availability.

POWER

Power Supply

- HP Smart 45 W External AC power adapter³⁴
- HP Smart 45 W External AC power adapter - Argentina³⁴
- HP Smart 45 W 2-prong External AC power adapter³⁴
- HP Smart 45 W USB Type-C™ adapter³⁴
- HP Smart 65 W External AC power adapter^{34,35}
- HP Smart 65 W EM External AC power adapter^{34,35}
- HP Smart 65 W USB Type-C™ adapter^{34,35}

Primary Battery

- HP Long Life 3-cell, 48 Wh Li-ion^{36,37}
- HP Fast Charge Technology - 90% in 90minutes^{35,38}

Battery Life

Up to 15 hours and 30 minutes

Power Cord

- 2-wire plug, 1.0m, Conventional³⁴
- 3-wire plug, 1.0m, Conventional³⁴
- 3-wire plug, 1.8m, Conventional³⁴
- Duckhead power cord, 1.0m, Premium³⁴
- Duckhead power cord, 1.8m, Premium³⁴

- 34. Availability may vary by country.
- 35. Supports HP Fast Charging.
- 36. Battery is internal and not replaceable by customer. Serviceable by warranty.
- 37. Windows 10 MM14 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See <http://www.bapco.com> for additional details.
- 38. Recharges the battery up to 90% within 90 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 90% capacity, charging will return to normal. Charging time may vary +/-10% due to System tolerance.

Technical Specifications

WEIGHTS & DIMENSIONS

Weight

Starting at 3.8 lb (non-touch); Starting at 4.3 lb (touch)³⁹
Starting at 1.73 kg (non-touch); Starting at 1.95 kg (touch)³⁹

Dimensions (w x d x h)

13.4 x 9.5 x 0.83 in (non-touch); 13.4 x 9.5 x 0.87 in (touch)
34 x 24 x 2.09 cm (non-touch); 34 x 24 x 2.19 cm (touch)

[39. Weight will vary by configuration.](#)

PORTS/SLOTS

Ports

1 USB 3.1 Type-C™ Gen 1 (Power delivery, DisplayPort™ 1.2)
3 USB 3.1 Gen 1 (1 charging)
1 HDMI 1.4⁴⁰
1 RJ-45
1 VGA
1 headphone/microphone combo
1 AC power

Expansion Slots

1 docking connector
1 microSD (multi-format digital media reader)

[40. HDMI cable sold separately.](#)

SERVICE AND SUPPORT

HP Services offers 3-year and 1-year limited warranties and 90 day software support options depending on country and the SKU selected by the customer. Batteries have a default one year limited warranty except for Long Life batteries which will have same 1-year or 3-year limited warranty as the platform. On-site service and extended coverage is also available with HP Care Pack Services, 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>.⁴¹

[41. 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.](#)

CERTIFICATION AND COMPLIANCE

ENERGY STAR® certified
EPEAT® 2019 Silver⁴²
Low halogen⁴³

Technical Specifications

TCO 5.0 Certified

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

43. 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	19.5 V
	Average Operating Power	Win 10
	Integrated Graphics	10 W
	Discrete Graphics	15 W
	Max Operating Power	Discrete < 65W UMA < 45W
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	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 ⁴⁴
	EPEAT® 2019	Yes, Silver in U.S. ⁴⁵
	ICES	Yes
	Australia / NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCI or BELUS	Yes
	CIT	Yes
	GOST	Yes
	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes

Technical Specifications

44. Configurations of the HP ProBook 640 G5 that are ENERGY STAR® qualified are identified as HP ProBook 640 G5 ENERGY STAR on HP websites and on <http://www.energystar.gov>.

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

ENVIRONMENTAL & INDUSTRY

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® 2019 Silver registered in the United States. Based on EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. See http://www.epeat.net for registration status in your country. • TCO Certified Edge • China Energy Conservation Program (CECP) • China State Environmental Protection Administration (SEPA) • Taiwan Green Mark • Korea Eco-label • Japan PC Green label* 		
	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, 60Hz
	Normal Operation (Sort idle)	4.9	5.4	5.1
	Normal Operation (Long idle)	2.5	3	2.7
	Sleep	0.7	0.8	0.8
	Off	0.3	0.3	0.3
		<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</p>		

Technical Specifications

	compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.		
Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	17	18	17
Normal Operation (Long idle)	9	10	9
Sleep	2	3	3
Off	1	1	1
	*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	14	
Fixed Disk – Random writes	3	23	
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:		
	<ul style="list-style-type: none"> • 3 USB ports • 1 PC card slot (type I/II) • 1 ExpressCard/54 slot • 1 IEEE 1394 Port • 2 SODIMM memory slots • Optional expansion base docking station • 1 multi-bay II storage port • Interchangeable HDD <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>		

Technical Specifications

	Batteries	<p>This battery(s) in this product comply with EU Directive 2006/66/EC</p> <p>Batteries used in the product do not contain: Mercury greater the 1ppm by weight Cadmium greater than 20ppm by weight</p> <p>Battery description: CR2032 (coin cell) / SS03050 Battery type: Lithium / Li-Ion/Li-Ion Polymer Battery description: 6-cell high capacity Lithium-Ion battery (optional 8 cell available) Battery type:</p>	
	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 1680.1 (EPEAT) standard at the Silver level, see http://www.epeat.net • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product contains 5.69% post-consumer recycled plastic (by wt.) according to IEEE 1680.1-2018 standard, criterion 4.2.1.1. • This product is 96.4% recycle-able when properly disposed of at end of life. 	
	Packaging Materials	External:	PAPER/Corrugated 261
		Internal:	PLASTIC/EPE (Expanded Polyethylene) 62
			PLASTIC/Polyethylene low density - LDPE 14
			PLASTIC/Polypropylene - PP 4
	Material Usage	<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 	

Technical Specifications

		<ul style="list-style-type: none"> • 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)
	<p>Packaging Usage</p>	<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.
	<p>End-of-life Management and Recycling</p>	<p>Hewlett-Packard 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 Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>

Technical Specifications

	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</p> <p>and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</p>
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DISPLAYS

Panel LCD 14 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 72 percent cg 1000 nits eDP 1.4+PSR2 flat Privacy NWBZ	Outline Dimensions (W x H)	315.01 x 194.99 mm (typ.)
	Active Area	309.31 x 173.98 mm (typ.)
	Weight	265 g (max)
	Diagonal Size	14 inch
	Thickness	3.0 mm (max)
	Interface	eDP 1.4
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	2000:1 (typ.)
	Refresh Rate	60 Hz
	Brightness*	1000 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format of LCD Pixel Arrangement	RGB
	Backlight	LED
	Color Gamut Coverage	72% of NTSC
	Color Depth	8 bit
	Viewing Angle	UWVA 85/85/85/85

*Touch-enabled display and Sure View privacy panel will lower actual brightness

Technical Specifications

Panel LCD 14 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45 percent cg 250 nits eDP slim NB	Outline Dimensions (W x H)	316.17 x 197.98 mm (max)
	Active Area	309.37 x 174.02 mm (typ.)
	Weight	285 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 mm (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 of LCD Pixel Arrangement	RGB
	Backlight	LED
	Color Gamut Coverage	45% of NTSC
	Color Depth	6 bits
Viewing Angle	UWVA 85/85/85/85	

Panel LCD 14 inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45 percent cg 250 nits eDP slim Touch on Panel NWBZ	Outline Dimensions (W x H)	316.112 x 197.98 mm (max)
	Active Area	309.37 x 174.02 mm (typ.)
	Weight	290 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 mm (panel side) / 3.2 mm (PCBA Side) (max)
	Interface	eDP 1.2
	Surface Treatment	Anti-Glare On-cell
	Touch Enabled	Yes
	Contrast Ratio	600:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	250 nits
	Pixel Resolution	1920 x 1080 (FHD)

Technical Specifications

Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits
Viewing Angle	UWVA 85/85/85/85

14" diagonal HD SVA anti-glare LED-backlit non-touch; 220 cd/m²; 45% percent cg (1366 x 768)

Outline Dimensions (W x H)	320.9 x 205.6 (mm) max
Active Area	309.40 x 173.95 (mm)
Weight	290 g max
Diagonal Size	14 (inch)
Thickness	3.0 (mm) max
Interface	eDP 1.2
Surface Treatment	Anti-Glare (AG)
Touch Enabled	None
Contrast Ratio	300:1 (typical)
Refresh Rate	60 Hz
Brightness	220 nits
Pixel Resolution	1366 x 768 (HD)
Format of LCD Pixel Arrangement	RGB
Backlight	LED
Color Gamut Coverage	45% of NTSC
Color Depth	6 bits + Hi FRC
Viewing Angle	SVA 40/40/15/30

NOTE: All specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

Technical Specifications

STORAGE

HDD 500 GB 7200 RPM 7 mm SATA	Drive Weight	0.21 lbs (95 g)
	Rotation speed	7200RPM
	Cache Buffer	Up to 32MB
	Height	0.28 in (7 mm)
	Width	2.75 in (69.85 mm)
	Interface	ATA-8, SATA 3.0
	Transfer Rate	600 MB/s
	Seek Time	Single Track: 2 ~ 1.5 ms Average: 11 ~ 13 ms Maximum: 18 ~ 22 ms
	Logical Blocks	976773168
	Operating Temperature	32° to 140°F (0° to 60°C) [ambient temp]
	Security Features	ATA Security
	Features	S.M.A.R.T., NCQ, Ultra DMA

HDD 500 GB 7200 RPM 7 mm FIPS SATA Opal2	Drive Weight	0.21 lbs (95 g)
	Rotation speed	7200 rpm
	Cache Buffer	Up to 32MB
	Width	0.28 in (7 mm)
	Interface	2.75 in (69.85 mm)
	Transfer Rate	ATA-8, SATA 3.0
	Seek Time	Single Track: 2 ~ 1.5 ms Average: 11 ~ 13 ms Maximum: 18 ~ 22 ms
	Logical Blocks	976,773,168
	Operating Temperature	32° to 140°F (0° to 60°C) [ambient temp]
	Security Features	ATA Security; TCG Opal 2.x, FIPS
	Features	S.M.A.R.T., NCQ, Ultra DMA

Technical Specifications

HDD 1 TB 7200 RPM 7 mm SATA 2.5 in	Drive Weight	90 g
	Rotation speed	7200 rpm
	Cache Buffer	128 MB
	Height	7.2 mm Max.
	Width	69.85 mm
	Interface	ATA-8, SATA 3.0
	Transfer Rate	600 MB/s
	Seek Time	Single Track: 1.5 ms Average: 13 ms Maximum: 32 ms
	Logical Blocks	1,953,525,168
	Operating Temperature	0~60°C
	Security Features	ATA Security
	Features	S.M.A.R.T., NCQ, Ultra DMA, TRIM

SSD 128 GB 2280 M2 SATA-3 TLC	Form Factor	0.02 lb (10 g)
	Capacity	128 GB
	NAND Type	TLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	ATA-8, SATA 3.0
	Maximum Sequential Read	Up To 520 MB/s
	Maximum Sequential Write	Up To 450 MB/s
	Logical Blocks	250,069,680
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	DIPM; TRIM; DEVSLP

256 GB 2280 PCIe NVMe Value Solid State Drive	Form Factor	0.02 lb (10 g)
	Capacity	256 GB
	NAND Type	MLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3X4
	Maximum Sequential Read	Up To 1700 MB/s
	Maximum Sequential Write	Up To 600 MB/s

Technical Specifications

Logical Blocks	703,282,608
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2

SSD 256 GB 2280 M2 PCIe-3x4 SS NVMe TLC

Form Factor	0.02 lb (10 g)
Capacity	256 GB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Interface	PCIe NVMe Gen3X4
Maximum Sequential Read	Up To 2600 MB/s
Maximum Sequential Write	Up To 900 MB/s
Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2

SSD 256 GB 2280 M2 SATA-3 Three Layer Cell Federal Information Processing Standard

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	ATA-8, SATA 3.0
Maximum Sequential Read	Up To 530 MB/s
Maximum Sequential Write	Up To 550 MB/s
Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	DIPM; TRIM; DEVSLP

SSD 256 GB 2280 M2 SATA-3 Self Encrypted OPAL2 Three Layer Cell

Form Factor	M.2 2280
Capacity	256 GB
NAND Type	TLC

Technical Specifications

Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Weight	0.02 lb (10 g)
Interface	ATA-8, SATA 3.0
Maximum Sequential Read	Around 530 ~ 560 MB/s
Maximum Sequential Write	Around 500 ~ 530 MB/s
Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	ATA Security; TCG OPAL 2.0; DIPM; TRIM; DEVSLP

256 GB 2280 PCIe-3x2x2 NVMe+SSD 16 GB 3D Xpoint

Form Factor	M.2 2280
Capacity	256 GB
NAND Type	QLC
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 1450 MB/s
Maximum Sequential Write	Up To 650 MB/s
Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2, Optane Storage acceleration

SSD 512 GB 2280 PCIe NVMe Value

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	Around 1500 ~ 1700 MB/s
Maximum Sequential Write	Around 860 ~ 1500 MB/s
Logical Blocks	1,000,215,215
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]

Technical Specifications

Features ATA Security; TRIM; L1.2

**SSD 512 GB 2280 M2
PCIe-3x4 SS NVMe TLC**

Form Factor 0.02 lb (10 g)
Capacity 512 GB
NAND Type TLC
Height 0.09 in (2.3 mm)
Width 0.87 in (22 mm)
Interface PCIe NVMe Gen3X4
Maximum Sequential Read Up To 2600 MB/s
Maximum Sequential Write Up To 1400 MB/s
Logical Blocks 1,000,215,216
Operating Temperature 32° to 158°F (0° to 70°C) [ambient temp]
Features TRIM; L1.2

**SSD 512 GB 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)
Interface PCIe NVMe Gen3X4
Maximum Sequential Read Around 3000 ~ 3400 MB/s
Maximum Sequential Write Around 1800 ~ 2500 MB/s
Logical Blocks 1,000,215,216
Operating Temperature 32° to 158°F (0° to 70°C) [ambient temp]
Features ATA Security; TCG Opal 2.0; FIPS; DIPM; TRIM; DEVSLP

**SSD 512 GB 2280 M2 SATA-3
TLC FIPS**

Form Factor 0.02 lb (10 g)
Capacity 512 GB
NAND Type TLC
Height 0.09 in (2.3 mm)
Width 0.87 in (22 mm)

Technical Specifications

Interface	ACS-3, SATA 3.2
Maximum Sequential Read	Up To 530 MB/s
Maximum Sequential Write	Up To 400 MB/s
Logical Blocks	1,000,215,216
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	DIPM; TRIM; DEVSLP

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

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 2400 MB/s
Maximum Sequential Write	Up To 1300 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

SSD 1 TB 2280 PCIe-3x4 NVMe TLC SS

Form Factor	0.02 lb (10 g)
Capacity	1TB
NAND Type	TLC
Height	0.09 in (2.3 mm)
Width	0.87 in (22 mm)
Interface	PCIe NVMe Gen3X4
Maximum Sequential Read	2900
Maximum Sequential Write	2000
Logical Blocks	2000409263
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	TRIM; L1.2

Technical Specifications

SSD 16 GB 2280 PCIe-3x2 NVMe 3D Xpoint	Form Factor	M.2 2280
	Capacity	16 GB
	NAND Type	Xpoint
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3X2
	Maximum Sequential Read	1400
	Maximum Sequential Write	300
	Logical Blocks	28,181,188
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
Features	L1.2	

SSD 256 GB 2280 M2 SATA-3 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	ATA-8, SATA 3.0
	Maximum Sequential Read	Up To 550 MB/s
	Maximum Sequential Write	Up To 450 MB/s
	Logical Blocks	500,118,192
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	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.

NETWORKING/COMMUNICATIONS

Intel® Wi-Fi 6** AX200 + BT5 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

Technical Specifications

	IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
Interoperability	Wi-Fi® certified
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 and Wi-Fi compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •IEEE 802.11i •Cisco Certified Extensions, all versions through CCX4 and CCX Lite •WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output 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)

Technical Specifications

	<ul style="list-style-type: none"> • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10 mW • Radio disabled 8 mW 				
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode				
Receiver Sensitivity⁴	<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				
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	<table> <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> </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> <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> </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> <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> </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)				

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

Technical Specifications

	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
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

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

Technical Specifications

Intel® Wi-Fi 6** AX200 + BT5 non-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	Wi-Fi® certified
	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 and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES •WPA2 certification •IEEE 802.11i •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

Technical Specifications

	<ul style="list-style-type: none"> • 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 10 mW • 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				
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	<table border="0"> <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> </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 border="0"> <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> </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 border="0"> <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> </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)				

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)

Technical Specifications

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
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)

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

**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.

Technical Specifications

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.

<p>Intel® 9560 802.11a/b/g/n/ac (2 x 2) Wi-Fi® and Bluetooth® 5.0 Combo¹ vPro</p>	<p>Wireless LAN Standards</p> <ul style="list-style-type: none"> IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v <p>Interoperability</p> <p>Wi-Fi® certified</p> <p>Frequency Band</p> <ul style="list-style-type: none"> •802.11b/g/n 2.402 – 2.482 GHz •802.11a/n/ac 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz <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) <p>Modulation</p> <p>Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p> <p>Security³</p> <ul style="list-style-type: none"> •IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES •WPA2 certification •IEEE 802.11i •WAPI <p>Network Architecture Models</p> <p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p> <p>Roaming</p> <p>IEEE 802.11 compliant roaming between access points</p> <p>Output Power²</p> <ul style="list-style-type: none"> • 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum
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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
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 10 mW • Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity⁴	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum
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	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	1. Type 2230: 2.8g 2. Type 126: 1.3g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF LED White – Radio ON

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

Bluetooth Specification	4.0/4.1/4.2/5.0 Compliant
Frequency Band	2402 to 2480 MHz

Technical Specifications

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.
Transmit Power	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Bluetooth Software Supported	Microsoft Windows Bluetooth Software
Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
Security & Manageability	Intel® vPro™ support with appropriate Intel® chipset components

1. Wireless access point and Internet service is required. Availability of public wireless access point is limited.
2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
3. Check latest software/driver release for updates on supported security features.

Technical Specifications

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).

<p>Intel® 9560 802.11a/b/g/n/ac (2 x 2) Wi-Fi® and Bluetooth® 5.0 Combo¹ non-vPro</p>	<p>Wireless LAN Standards</p> <ul style="list-style-type: none"> IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v <p>Interoperability</p> <p>Wi-Fi® certified</p> <p>Frequency Band</p> <ul style="list-style-type: none"> •802.11b/g/n 2.402 – 2.482 GHz •802.11a/n/ac 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz <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) <p>Modulation</p> <p>Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p> <p>Security³</p> <ul style="list-style-type: none"> •IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES •WPA2 certification •IEEE 802.11i •WAPI <p>Network Architecture Models</p> <p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p> <p>Roaming</p> <p>IEEE 802.11 compliant roaming between access points</p> <p>Output Power²</p> <ul style="list-style-type: none"> • 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum
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Technical Specifications

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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	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure
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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 Wireless Technology

Bluetooth Specification	4.0/4.1/4.2/5.0 Compliant
Frequency Band	2402 to 2480 MHz

Technical Specifications

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	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
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1. Wireless access point and Internet service is required. Availability of public wireless access point is limited.
2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.
3. Check latest software/driver release for updates on supported security features.
4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Technical Specifications

Intel® XMM™ 7360 LTE-Advanced CAT9¹	Technology/Operating bands	FDD LTE: 2100 (Band 1), 1900 (Band 2), 1800 (Band 3), 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 1400 (Band 11), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1400 (Band 21), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66). TDD LTE: 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41). HSPA+: 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz
	Wireless protocol standards	3GPP Release 11 LTE Specification CAT.9, DL 60MHz BW throughput up to 450Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
	GPS	Standalone, A-GPS (MS-A, MS-B)
	GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
	Maximum data rates	LTE: 450 Mbps (Download), 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	5.8 g
	Dimensions	42 x 30 x 2.3 mm

1. Mobile Broadband is an optional feature and requires configuration at time of purchase. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

Intel® XMM™ 7262 LTE- Advanced DL CAT6	Technology/Operating bands	FDD LTE: 2100 (Band 1), 1800 (Band 3), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 800 (Band 20), 700 (Band 28), HSPA+: 2100 (Band 1), 850 (Band 5), 900 (Band 8)
	Wireless protocol standards	3GPP Release 11 LTE Specification CAT.6, DL 40MHz BW throughput up to 300Mbps; UL 20MHz throughput up to 50Mbps WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
	GPS	Standalone, A-GPS (MS-A, MS-B and XTRA)
	GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz
	Maximum data rates	LTE: 300 Mbps (Download), 50 Mbps (Upload) DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload) HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)

Technical Specifications

Maximum output power	LTE: 23 dBm HSPA+: 23.5 dBm
Maximum power consumption	LTE: 1,200 mA (peak); 830 mA (average) HSPA+: 1,100 mA (peak); 680 mA (average)
Form Factor	M.2, 3042-S3 Key B
Weight	6 g
Dimensions	42 x 30 x 2.3 mm

1. Mobile Broadband is an optional feature and requires configuration at time of purchase. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.

Near Field Communications Controller (optional)	Dimensions (L x W x H)	Module 25 mm by 10 mm by 2.0 mm
	Chipset	NPC100
	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	0°C to 70°C
	Storage temperature	-20°C to 125°C
	Humidity	10-90% operating 5-95% non-operating
	Supply Operating voltage	4.35 to 5.25 Volts
I/O Voltage	1.8V or 3.3V	

Technical Specifications

Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)	Mode	Power Consumption, Typical
	Polling	7.3 mA
	Detected Test Tag Type 1	Total 283.8 mA Net Module 236.8 mA
	Detected Test Tag Type 2	Total 288.8 mA Net Module 241.8 mA
	Detected Test Tag Type 3	Total 287.7 mA Net Module 240.7 mA
	Detected Test Tag Type 4	Total 282.3 mA Net Module 235.3 mA
	Antenna	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.

Intel® i219LM 10/100/1000 Integrated NIC	Connector	RJ-45
	System Interface	PCI (Intel proprietary) + SMBus
	Data rates supported	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
	IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
	Performance	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
	Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
	Power Management	ACPI compliant – multiple power modes

Technical Specifications

	Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Management Interface	Auto MDI/MDIX Crossover cable detection
IT Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
Security & Manageability	Intel® vPro™ support with appropriate Intel® chipset components

Intel® i219v 10/100/1000 Integrated NIC

Connector	RJ-45
System Interface	PCI (Intel proprietary) + SMBus
Data rates supported	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
Performance	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000Mw WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Management Interface	Auto MDI/MDIX Crossover cable detection

Technical Specifications

IT Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
Security & Manageability	Intel® vPro™ support with appropriate Intel® chipset components

POWER

**AC Adapter 45 Watt nPFC
Wall Mount USB type C™
Straight 1.8m C6NS**

Dimensions
Weight
Input

62.0 x 62.0 x 28.5 mm
unit: 220 g +/- 10 g

Input Efficiency

Average Efficiency of 25%, 50%, 75%, 100%
load condition with 115Vac/230Vac Spec:

5V: 81.5%
9V: 86.7%
10V: 87.5%
12V: 87.8%
15V: 87.8%
20V: 87.8%

Technical Specifications

Output	Input frequency range	47 ~ 63 Hz
	Input AC current	1.4 A at 90 VAC
	Output power	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec
	DC output	5V: 81.5%
Connector	Hold-up time	9V: 86.7%
	Output current limit	10V: 87.5%
		Non-Standard C6
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	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**

Dimensions	95.0 x 40.0 x 26.5 mm	
Weight	unit: 200 g +/- 10 g	
Input	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
	Input frequency range	47 ~ 63 Hz
Output	Input AC current	Max. 1.4 A at 90 Vac
	Output power	45W
	DC output	19.5V
	Hold-up time	5ms at 115 Vac input
	Output current limit	<8.0A
Connector	C6	
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%
Safety Certifications	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.	

Dimensions 95.0 x 40.0 x 26.5 mm

Technical Specifications

AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m Argentina	Weight	unit: 200 g +/- 10 g	
	Input	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
		Input frequency range	47 ~ 63 Hz
	Output	Input AC current	Max. 1.4 A at 90 Vac
		Output power	45W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<8.0A
	Connector	C6	
	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%	
Safety Certifications	Storage Humidity	10% to 95%	
	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.		
	MTBF - over 200,000 hours at 25°C ambient condition.		

AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m 2prong	Dimensions	95.0 x 40.0 x 26.5 mm	
	Weight	unit: 200 g +/- 10 g	
	Input	Input Efficiency	87.74% at 115Vac and 88.4% at 230Vac
		Input frequency range	47 to 63 Hz
	Output	Input AC current	Max. 1.4 A at 90 Vac
		Output power	45W
		DC output	19.5V
		Hold-up time	5ms at 115 VAC input
		Output current limit	<8.0A
	Connector	C6	
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%	
Safety Certifications	Storage Humidity	10% to 95%	
	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.		
	MTBF - over 200,000 hours at 25°C ambient condition.		

Technical Specifications

AC Adapter 65 Watt nPFC USB type C Straight 1.8m C6NS	Dimensions	74 x 74x28.5mm
	Weight	unit: 245 g +/- 10 g
	Input	Input Efficiency
		81.5% min at 115 Vac/ 230Vac @ 5V/3A
		86.7% min at 115 Vac/ 230Vac @ 9V/3A
		88% min at 115 Vac/ 230Vac @ 10V/5A
		88% min at 115 Vac/ 230Vac @ 12V/5A
		89% min at 115 Vac/ 230Vac @ 15V/4.33A
		89% min at 115 Vac/ 230Vac @ 20V/3.25A
		Input frequency range
Output	Input AC current	1.7 A at 90 VAC and maximum load
	Output power	65W
	DC output	5V/9V/10V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input
	Output current limit	<8.0A
Connector	Non-Standard C6	
Environmental Design	Operating temperature	32° to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	5% to 95%
	Storage Humidity	5% to 95%
Safety Certifications	CE Mark - full compliance with LVD and EMC directives Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 100,000 hours at 25°C ambient condition.	

AC Adapter 65 Watt Smart nPFC EM Barrel 4.5 mm New EM	Dimensions	102 x 55 x 30 mm
	Weight	unit: 250 g +/- 10 g
	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	C6	
Environmental Design	Operating temperature	32° to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
Safety Certifications	CE Mark - full compliance with LVD and EMC directives	

Technical Specifications

Worldwide safety standards - IEC60950, EN60950, UL60950, Class 1, 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 Standard Barrel 4.5 mm Right Angle 1.8 m	Dimensions	90.0 x 51 x 28.5 mm	
	Weight	unit: 230 g +/- 10 g	
	Input	Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	Max. 1.7 A at 90 Vac
	Output	Output power	65W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input
		Output current limit	<11.0A
	Connector	4.5mm Barrel Type C6	
	Environmental Design	Operating temperature	32° to 95° F (0° to 35° C)
		Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
		Altitude	0 to 16,400 ft (0 to 5000m)
		Humidity	20% to 95%
Safety Certifications	Storage Humidity	10% to 95%	
	CE Mark - full compliance with LVD and EMC directives		
	Worldwide safety standards - IEC60950, EN60950, UL60950, Class 1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE. MTBF - over 200,000 hours at 25°C ambient condition.		

HP 3-cell Long Life Li-Ion (48 WHr)	Dimensions (H x W x L)	8.05 x 185.15 x 95 mm	
	Weight	0.26 kg	
	Cells/Type	3cell Lithium-Ion Polymer cell / 606072	
	Energy	Voltage	11.4V
		Amp-hour capacity	4.212Ah /4.0Ah
		Watt-hour capacity	48Wh
		Temperature	Operating (Charging) 32° to 113° F (0° to 45° C)
		Operating (Discharging) 14° to 122° F (-10° to 60° C)	
	Optional Travel Battery Available	No	

COUNTRY OF ORIGIN

China

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

Type	Description	Part #
Cases	HP Essential Top Load Case	H2W17AA#xxx
	HP Essential Backpack (up to 15.6")	H1D24AA
	HP Essential Messenger Case (up to 17.3")	H1D25AA
Docking	HP UltraSlim Docking Station	D9Y32AA#xxx
	HP UltraSlim Docking Station TAA US	E5C22AV#ABA
	HP Thunderbolt Dock 120W G2	2UK37AA
	HP Thunderbolt Dock 120W G2 TAA	2UK37AA
	HP TB Dock G2 w/ Combo Cable	3TR87AA
	HP TB Dock 120W G2 w/ Audio	3YE87AA#xxx
	HP USB-C Universal Dock	1MK33AA#xxx
	HP USB-C/A Universal Dock G2	5TW13AA#XXX
	HP USB-C Universal Dock w/4.5mm Adapter	2UF95AA
	HP USB-C Universal Dock NF	3DV65AA
	HP USB-C Dock G4	3FF69AA#xxx
	HP USB-C Dock G5	5TW10AA#XXX
	HP USB-C Mini Dock	1PM64AA#xxx
	HP USB-C Travel Dock	T0K29AA#xxx
	HP USB Travel Dock	T0K30AA#xxx
	HP TB Dock Audio Module	3AQ21AA
	HP TB Dock 120W G2 cable	3XB94AA
	HP TB Dock G2 combo cable	3XB96AA
	HP Adjustable Dual Display Stand	AW664AA#xxx
	HP Display and Notebook Stand II	E8G00AA#xxx
HP USB-C Mini Dock	1PM64AA#xxx	
Input/Output	HP Slim USB Keyboard and Mouse	T6T83AA#xxx
	HP Slim Wireless Keyboard and Mouse	T6L04AA#xxx
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Ultra Mobile Wireless Mouse	H6F25AA#xxx
	HP Comfort Grip Wireless Mouse	H2L63AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP Slim Bluetooth Mouse	F3J92AA#xxx
	HP Essential USB Mouse	2TX37AA#xxx
	HP Elite Presenter Mouse	2CE30AA#xxx
	HP HDMI to DVI Adapter	F5A28AA
	HP USB-C to DP	N9K78AA
	HP USB-C to HDMI 2.0	1WC36AA#xxx
	HP USB-C to USB-A Hub	Z6A00AA
	HP UC Wireless Mono Headset	W3K08AA
	HP UC Wireless Duo Headset	W3K09AA
	HP Stereo 3.5mm Headset	T1A66AA

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

	HP Stereo USB Headset	T1A67AA
	HP TB Dock Audio Module	3AQ21AA
	HP Thunderbolt 120W 1m cable	3AQ23AA
	HP Thunderbolt 1m combo cable	3AQ25AA
Power	HP 45W Smart AC Adapter 4.5mm	H6Y88AA#xxx
	HP 65W Smart AC Adapter	H6Y89AA#xxx
	HP 65W Slim AC Adapter	H6Y82AA#xxx
	HP 45W USB-C Power Adapter	1HE07AA#xxx
	HP 65W USB-C Power Adapter	1HE08AA#xxx
	3-cell Prismatic Battery	TBD
	HP Notebook Power Bank	N9F71AA#xxx
	HP USB-C Notebook Power Bank	2NA10AA
	HP 65W USB-C Slim Power Adapter	3PN48AA#xxx
Storage	HP External USB Optical Drive	F2B56AA
	HP 256GB TLC PCIe 3x4 NVMe M.2 SSD	1FU87AA
	HP 512GB TLC PCIe 3x4 NVMe M.2 SSD	1FU88AA
	HP 500GB 7200rpm HDD	F3B97AA
Security	HP Essential Combination Loc	TOY16AA
	HP Combination Lock	TOY15AA
	HP Keyed Cable lock	TOY14AA
	HP 14.0" Notebook Privacy Filter	J6E65AA
	HP Docking Station Cable Lock	AU656AA#XXX
	HP Keyed Cable Lock 10mm	T1A62AA
UCC	HP Conferencing Keyboard	K8P74AA#xxx
	HP Speaker Phone	K7V16AA
	HP Wired Headset	K7V17AA

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

Memory	HP 4GB DDR4 Memory	Z4Y84AA
	HP 8GB DDR4 Memory	Z4Y85AA
	HP 16GB DDR4 Memory	Z4Y86AA
Displays	HP ProDisplay P223 21.5-inch Monitor	X7R61AA
	HP ProDisplay P240va 23.8-inch Monitor	N3H14AA
	HP EliteDisplay E243 23.8-inch Monitor	1FH47AA

Summary of Changes

Date of change:	Version History:	Update	Description of change:
June 10, 2019	V1 to V2	Added	HP Cloud Recovery
June 21, 2019	V2 to V3	Added	Environmental Tab
June 24, 2019	V3 to V4	Updated	Display Section
June 27, 2019	V4 to V5	Updated	Display Section
September 9, 2019	V5 to V6	Updated	Intel® Optane™ and disclaimer for 1000 nit Sure View panel
September 11, 2019	V6 to V7	Updated	Ports and Slots section
March 30, 2020	V7 to V8	Updated	Images section, USB-C port

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