Overview

HP 348 G7 Notebook PC

Left

1. **Internal Microphones (2)**
2. **Webcam LED**
3. **Webcam**
4. **Touchpad**
5. **Touchpad Button**
6. **Power Indicator LED**
7. **Hard Drive Indicator LED**
8. **SD Card Slot**
9. **USB Type-C™ 3.1 Gen Port**
10. **USB 3.1 Gen 1 Port**
11. **Security Lock Slot (Lock sold separately)**
12. **Power Button**

Overview

Right

1. **Power Connector**
2. **RJ-45/Ethernet Port**
3. **HDMI Port (Cable not included.)**
4. **USB 3.1 Gen 1 Port**
5. **USB 3.1 Gen 1 Port**
6. **Audio Combo Jack**

Overview

At A Glance

- **Preinstall with Windows 10 or FreeDOS**
- **Choice of 10th Generation Intel® Core™ i7, i5 and i3 processors**
- **Display include your choice of 35.56 cm (14") diagonal narrow bezel, AntiGlare, ultra-wide or standard view angle, HD or FHD**
- **Graphics include your choice of integrated Intel® graphics or switchable discrete graphics AMD Radeon™ 530**
- **Enhanced security features including Hardware TPM, Fingerprint Sensor[2] (select models), and security lock slot**
- **Passed 120,000 hours of reliability testing through HP's Total Test Process**
- **Integrated with 2 stereo speakers and dual array microphone for better audio experience**
- **Support dual storage, Solid State Drives up to 512 GB, and/or HDDs up to 1 TB**
- **Up to 32 GB total system memory**
- **Offers 720p HD webcam or no webcam edition for your options**
- **Full-size island-style, spill resistant keyboard and Touchpad with multi-touch gestures enabled, taps enabled as default**
- **Passed 13 MIL-STD 810G tests[1]**

1. **MIL-STD-810G testing is not intended to demonstrate fitness of U.S. Department of Defense (DoD) 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 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 348 G7 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[1]

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.

PROCESSOR

Intel® Celeron® processors

Intel® Core™ i7-10510U processor with Intel® UHD Graphics (1.8 GHz base frequency, up to 4.9 GHz with Intel® Turbo Boost Technology, 8 MB L3 cache, 4 cores)[3,4,5,6]
Intel® Core™ i5-10210U processor with Intel® UHD Graphics (1.6 GHz base frequency, up to 4.2 GHz with Intel® Turbo Boost Technology, 6 MB L3 cache, 4 cores) [3,4,5,6]
Intel® Core™ i3-10110U processor with Intel® UHD Graphics (2.1 GHz base frequency, up to 4.1 GHz with Intel® Turbo Boost Technology, 4 MB L3 cache, 2 cores) [3,4,5,6]
Intel® Core™ i3-8130U with Intel® UHD Graphics 620 (2.2 GHz base frequency, up to 3.4 GHz with Intel® Turbo Boost Technology, 4 MB L3 cache, 2 cores) [3,4,5,6]
Intel® Core™ i3-7020U with Intel® HD Graphics 620 (2.3 GHz, 3 MB L3 cache, 2 cores)[3,4,6]

Processor Family

10th Generation Intel® Core™ i7 processor (i7-10510U)[7]
10th Generation Intel® Core™ i5 processor (i5-10210U) [7]
10th Generation Intel® Core™ i3 processor (i3-10110U) [7]
8th Generation Intel® Core™ i3 processor (i3-8130U) [7]
7th Generation Intel® Core™ i3 processor (i3-7020U) [7]

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.
4. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
5. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information.
6. In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on

products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on http://www.support.hp.com.

7. 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.

CHIPSET

Chipset is integrated with processor

GRAPHICS

Integrated
Intel® UHD Graphics (i7-10510U, i5-10210U, and i3-10110U)[8]
Intel® UHD Graphics 620 (i3-8130U)[8]
Intel® HD Graphics 620 (i3-7020U)[8]
NOTE: See processor section for details.

Discrete
AMD Radeon™ 530 (2 GB GDDR5 dedicated)[9]

Supports
Support HD decode, DX12, HDMI 1.4

8. HD content required to view HD images.
9. 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
35.56 cm (14") diagonal HD SVA eDP anti-glare WLED-backlit slim-flat, 220 nits, 45% NTSC, one WLAN antenna (1366 x 768)[8,10]
35.56 cm (14") diagonal HD SVA eDP anti-glare WLED-backlit slim-flat, 220 nits, 45% NTSC, two WLAN antennas (1366 x 768) [8,10]
35.56 cm (14") diagonal FHD, UWVA IPS eDP anti-glare WLED-backlit slim-flat, 250 nits, 45% NTSC, one WLAN antenna (1920 x 1080) [8,10]
35.56 cm (14") diagonal FHD UWVA IPS eDP anti-glare WLED-backlit slim-flat, 250 nits, 45% NTSC, two WLAN antennas (1920 x 1080) [8,10]

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

STORAGE AND DRIVES

Primary Storage
500 GB 7200 rpm SATA[11]
1 TB 5400 rpm SATA[11]

Primary M.2 Storage
128 GB SATA TLC Solid State Drive[11]
256 GB PCIe® NVMe™ Value Solid State Drive[11]
256 GB PCIe® NVMe™ TLC Solid State Drive[11]
512 GB PCIe® NVMe™ Value Solid State Drive[11]

Cache Memory
Intel® Optane™ 16 GB Cache[12]
Only available with HDD

11. 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.
12. Intel® Optane™ memory is sold separately. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z240 Tower/SFF, Z2 Mini, ZBook Studio, 15 and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel® Core™ processor or Intel® Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel® Optane™ supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMe™ Spec 1.1, and an Intel® Rapid Storage Technology (Intel® RST) 15.5 driver.

MEMORY

Maximum Memory
32 GB DDR4-2666 SDRAM (only available for 10th Generation Intel® processors)
32 GB DDR4-2133 SDRAM[13]

Memory
32 GB DDR4-2666 SDRAM (2 X 16 GB) (Only available for 10th Generation Intel® processors)[13]
16 GB DDR4-2666 SDRAM (1 X 16 GB) (Only available for 10th Generation Intel® processors)[13]
8 GB DDR4-2666 SDRAM (1 x 8 GB) (Only available for 10th Generation Intel® processors)[13]
4 GB DDR4-2666 SDRAM (1 x 4 GB) (Only available for 10th Generation Intel® processors)[13]
32 GB DDR4-2133 SDRAM (2 X 16 GB)[13]
16 GB DDR4-2133 SDRAM (1 X 16 GB)[13]
8 GB DDR4-2133 SDRAM (1 x 8 GB)[13]
4 GB DDR4-2133 SDRAM (1 x 4 GB)[13]

Memory Slots
2 SODIMM
Both slots are customer accessible / upgradeable
DDR4 PC4 SODIMMS runs at 2666 on 10th Gen Intel® (CML) processors and runs at 2133 on 8th/7th Gen Intel (KBL and KBL-R) processors
Supports Dual Channel Memory

13. Due to the non-industry standard nature of some third-party memory modules, we recommend HP branded memory to ensure compatibility. If you mix memory speeds, the system will perform at the lower memory speed.

NETWORKING/COMMUNICATIONS

WLAN
Realtek 802.11a/b/g/n/ac (1x1) and Bluetooth® 4.2 Combo[14]
Realtek 802.11a/b/g/n/ac (2x2) and Bluetooth® 5 Combo[14]
Intel® Dual Band Wireless-AC 9560 802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® 5 Combo, non-vPro™[14,15]
Intel® Dual Band Wi-Fi 6 AX201 802.11a/b/g/n/ac/ax (2x2) WLAN and Bluetooth® 5 Combo, non-vPro™[15*]

Miracast
Support for Miracast[16]

Ethernet
Integrated 10/100/1000 GbE
Realtek RTL8111HSH-CG 10/100/1000 GbE NIC[17]

14. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.
15. Only available for 10th Generation Intel® processors
16. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming.
17. 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

Camera
HP TrueVision HD Camera[8,18]

8. HD content required to view HD images.
18. Sold separately or as an optional feature.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
Full size island-style spill-resistant keyboard

Pointing Device

Technical Specifications

Touchpad with multi-touch gesture support

Function Keys
ESC: System Information
F1: Windows Help
F2: Brightness Down
F3: Brightness Up
F4: Display Switching
F5: Blank
F6: Speaker Mute
F7: Volume Down
F8: Volume Up
F9: Previous track/section
F10: Starts, Pauses, or resumes playback
F11: Next track/section
F12: Airplane mode (Wireless feature on or off).

SOFTWARE AND SECURITY

Software
HP Support Assistant[19]
Native Miracast Support[20]

Security Management
Security Lock
HP Drivelock[21]
Hardware TPM and Firmware TPM 2.0
Fingerprint Sensor (select models)[22]

19. HP Support Assistant requires Windows and Internet access.
20. Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming.
21. Supports primary storage only
22. HP Fingerprint Sensor is an optional feature and requires configuration at purchase.

POWER

Power Supply
HP Smart 65 W EM External AC power adapter[23]
HP Smart 65 W External AC power adapter[23]
HP Smart 45 W External AC power adapter[23]

Primary Battery
HP Long Life 3-cell, 41 Wh Li-ion[24]
Support HP fast charge technology[25]

Power Cord
3-wire plug – 1 m[23]
3-wire plug - 1.8 m[23]

Technical Specifications

Battery Life
Up to 13 hours (UMA, CML-U processor, HD display, 4 GB*1 memory, SSD)[26]

Battery Weight
0.19 lb
0.41 kg

23. Availability may vary by country.
24. Battery is internal and not replaceable by customer. Serviceable by warranty.
25. Recharges the battery up to 90% within 90 minutes or up to 50% within 45 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.
26. 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.

WEIGHTS & DIMENSIONS

Product Weight
Starting at 3.3 lbs[27]
Starting at 1.5 kg[27]
Does not include power adapter.

Product Dimensions (W x D x H)
8.89 x 12.76 x 0.783 in
22.59 x 32.4 x 1.99 cm

27. Weight will vary by configuration.

PORTS/SLOTS

Ports
1 USB type C (support USB3.1 gen1 /data-transfer only)
2 USB 3.1 gen 1
1 USB 3.1 gen 1 (support charging/power delivery)
1 HDMI 1.4[28]
1 RJ-45
1 AC power
1 Headphone/microphone combo jack

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

28. HDMI cable sold separately.

SERVICE AND SUPPORT

HP Services offers 1-year limited warranties and 90 day software limited warranty options depending on country. 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.[29]

29. HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit http://www.hp.com/go/cpc. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	*Nominal Operating Voltage*	**19.5 V**
	Average Operating Power	**Win 10**
	Integrated Graphics	**5.28 W**
	Max Operating Power	**Discrete < 65W** **UMA < 45W**
Temperature	*Operating*	**32° to 95° F (0° to 35° C) (not writing optical)** **41° to 95° F (5° to 35° C) (writing optical)**
	Non-operating	**-4° to 140° F (-20° to 60° C)**
Relative Humidity	*Operating*	**10% to 90%, non-condensing**
	Non-operating	**5% to 95%**
Shock	*Operating*	**40 G, 2 ms duration, half-sine**
	Non-operating	**240 G, 2 ms duration, half-sine**
Random Vibration	*Operating*	**1.043 grms**
	Non-operating	**3.5 grms**
Altitude (unpressurized)	*Operating*	**-15 m to 3048 m (-50 ft to 10000 ft)**
	Non-operating	**-15 m to 12192 m (-50 ft to 40000 ft)**
Planned Industry Standard Certifications	*UL*	**Yes**
	CSA	**No**
	FCC Compliance	**Yes**
	ENERGY STAR®	**No, but compliant with ENERGY STAR[30]**
	EPEAT®	**EPEAT® 2019 Silver in U.S.[31]**
	ICES	**Yes**
	Australia	**No**
	NZ A-Tick Compliance	**No**
	CCC	**Yes**
	Japan VCCI Compliance	**No**

Technical Specifications

KC	**No**
BSMI	**Yes**
CE Marking Compliance	**Yes**
BNCI or BELUS	**No**
CIT	**No**
GOST	**No**
Saudi Arabian Compliance (ICCP)	**No**
SABS	**No**
UKRSERTCOMPUTER	**No**

30. Configurations of the HP 348 Notebook PC that are ENERGY STAR® certified are identified as HP 348 Notebook PC ENERGY STAR® on HP websites and on http://www.energystar.gov.

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

DISPLAYS

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

14 inch diagonal FHD WLED Anti-Glare (1920 x 1080) slim-flat (3.0 mm), UWVA, eDP, Narrow Bezel	*Outline Dimensions* **(W x H x D)**	**320.9 x 205.6 (max)**
	Active Area	**309.31 x 173.99**
	Weight	**290g (max)**
	Diagonal Size	**14 inch**
	Thickness	**3.0 mm max.**
	Interface	**eDP 1.2 (2 Lane)**
	Surface Treatment	**Anti-Glare (AG)**
	Touch Enabled	**No**
	Contrast Ratio	**600:1 (typ)**
	Refresh Rate	**60 Hz**
	Brightness	**250 nit typ**
	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**

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14 inch diagonal HD SVALED-backlight; 220	*Outline Dimensions* **(W x H x D)**	**316.2 x 198 (mm) max (with PCB Board)**
	Active Area	**309.4 x 173.95 (mm)**

Technical Specifications

cd/m2; 45% sRGB (1366 x 768)	*Weight*	**280 g max.**
	Diagonal Size	**14.0 (inch)**
	Thickness	**3.0 (mm) max**
	Interface	**eDP 1.2**
	Surface Treatment	**Anti-glare (AG)**
	Touch Enabled	**None**
	Contrast Ratio	**500:1 (typical)**
	Refresh Rate	**60 Hz**
	Brightness	**220 nit typical**
	Pixel Resolution	**1366 x 768 (HD)**
	Format of LCD Pixel Arrangement	**RGB**
	Backlight	**LED**
	Color Gamut Coverage	**45% of NTSC**
	Color Depth	**6 bits**
	Viewing Angle	**45/45/20/45**

STORAGE AND DRIVES

500 GB 7200 rpm SATA Hard Drive	*Drive Weight*	**0.21 lbs (95 g)**
	Rotation speed	**7200 rpm**
	Cache Buffer	**Up to 128MB**
	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	**976,773,168**
	Operating Temperature	**32° to 140° F (0° to 60° C) [case temp]**
	Security Features	**ATA Security**
	Features	**S.M.A.R.T., NCQ, Ultra DMA**

1 TB 5400 rpm SATA Hard Drive	*Drive Weight*	**0.21 lbs (94 g)- 0.21 lbs (95 g)**
	Rotation speed	**5400 rpm**
	Cache Buffer	**Up to 128MB**
	Height	**0.28 in (7 mm)**
	Width	**2.75 in (69.85 mm)**
	Interface	**ATA-8, SATA 3.0**
	Transfer Rate	**600 MB/s**

Technical Specifications

	Seek Time	**Single Track: 2ms; Average: 12 ~ 13 ms; Maximum: 18 ~ 22 ms**
	Logical Blocks	**1,953,525,168**
	Operating Temperature	**32° to 140° F (0° to 60° C) [case temp]**
	Security Features	**ATA Security**
	Features	**S.M.A.R.T., NCQ, Ultra DMA**
128 GB 2280 M2 SATA-3 TLC Solid State Drive	*Drive Weight*	**M.2 2280**
	Rotation speed	**128 GB**
	Cache Buffer	**TLC**
	Height	**0.09 in (2.3 mm)**
	Width	**0.87 in (22 mm)**
	Interface	**0.01 lb (6 g) ~ 0.02 lb (10 g)**
	Transfer Rate	**ATA-8, SATA 3.0**
	Seek Time	**Up To 535 MB/s**
	Logical Blocks	**Up To 515 MB/s**
	Operating Temperature	**250,069,680**
	Security Features	**32° to 158°F (0° to 70°C) [ambient temp]**
	Features	**DIPM; TRIM; DEVSLP**
256 GB 2280 M2 PCIe NVMe Value Solid State Drive	*Form Factor*	**M.2 2280**
	Capacity	**256GB**
	NAND Type	**TLC**
	Height	**0.09 in (2.3 mm)**
	Width	**0.87 in (22 mm)**
	Interface	**PCIe NVMe Gen3x2**
	Maximum Sequential Read	**Up to 1500 MB/s**
	Maximum Sequential Write	**Up to 1000 MB/s**
	Logical Blocks	**500,118,192**
	Operating Temperature	**32° to 158°F (0° to 70°C) [ambient temp]**
	Features	**TRIM, L1.2**
256 GB PCIe NVMe TLC Solid State Drive	*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)**
	Interface	**PCIe NVMe Gen3x4**
	Maximum Sequential Read	**Up to 2500 MB/s**
	Maximum Sequential Write	**Up to 1000 MB/s**
	Logical Blocks	**500,118,192**
	Operating Temperature	**32° to 158°F (0° to 70°C) [ambient temp]**
	Features	**TRIM, L1.2**

512 GB 2280 M2 PCIe NVMe Value Solid State Drive	*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	**0.01 lb (6 g) ~ 0.02 lb (10 g)**
	Interface	**PCIe NVMe Gen3x2**
	Maximum Sequential Read	**Up to 1500 MB/s**
	Maximum Sequential Write	**Up to 1000 MB/s**
	Logical Blocks	**1,000,215,215**
	Operating Temperature	**32° to 158°F (0° to 70°C) [ambient temp]**
	Features	**TRIM, L1.2**

NETWORKING/COMMUNICATIONS

Intel® 9560 802.11a/b/g/n/ac (2 x 2) Wi-Fi® and Bluetooth® 5.0 Combo[1] non-vPro	*Wireless LAN Standards*	**IEEE 802.11a** **IEEE 802.11b** **IEEE 802.11g** **IEEE 802.11n** **IEEE 802.11ac** **IEEE 802.11d** **IEEE 802.11e** **IEEE 802.11h** **IEEE 802.11i** **IEEE 802.11k** **IEEE 802.11r** **IEEE 802.11v**
	Interoperability	**Wi-Fi certified modules**
	Frequency Band	**•802.11b/g/n** **2.402 – 2.482 GHz**

Technical Specifications

	•802.11a/n/ac **4.9 – 4.95 GHz (Japan)** **5.15 – 5.25 GHz** **5.25 – 5.35 GHz** **5.47 – 5.725 GHz** **5.825 – 5.850 GHz**
Data Rates	**• 802.11b: 1, 2, 5.5, 11 Mbps** **• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)** **• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)**
Modulation	**Direct Sequence Spread Spectrum** **BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM**
Security[3]	**• IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only** **• AES-CCMP: 128 bit in hardware** **• 802.1x authentication** **• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.** **• WPA2 certification** **• IEEE 802.11i** **• WAPI**
Network Architecture	**Ad-hoc (Peer to Peer)**
Models	**Infrastructure (Access Point Required)**
Roaming	**IEEE 802.11 compliant roaming between access points**
Output Power[2]	**• 802.11b: +18.5dBm minimum** **• 802.11g: +17.5dBm minimum** **• 802.11a: +18.5dBm minimum** **• 802.11n HT20(2.4GHz): +15.5dBm minimum** **• 802.11n HT40(2.4GHz): +14.5dBm minimum** **• 802.11n HT20(5GHz): +15.5dBm minimum** **• 802.11n HT40(5GHz): +14.5dBm minimum** **• 802.11ac VHT80(5GHz): +11.5dBm minimum** **• 802.11ac VHT160(5GHz): +11.5dBm minimum**
Power Consumption	**• Transmit mode: 2.0 W** **• Receive mode: 1.6 W** **• Idle mode (PSP) 180 mW (WLAN Associated)** **• Idle mode: 50 mW (WLAN unassociated)** **• Connected Standby/Modern Standby: 10mW** **• Radio disabled: 8 mW**
Power Management	**ACPI and PCI Express compliant power management** **802.11 compliant power saving mode**
Receiver Sensitivity [3]	**• 802.11b, 1Mbps: -93.5dBm maximum** **• 802.11b, 11Mbps: -84dBm maximum** **• 802.11a/g, 6Mbps: -86dBm maximum** **• 802.11a/g, 54Mbps: -72dBm maximum**

Technical Specifications

	• 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: 2.8 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 White – Radio ON**

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

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

Bluetooth Specification	**4.0/4.1/4.2/5.0 Compliant**
Frequency Band	**2402 to 2480 MHz**
Number of Available Channels	**Legacy: 0~79 (1 MHz/CH)** **BLE: 0~39 (2 MHz/CH)**
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 + 4 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 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)**
Intel® Wi-Fi 6[4] AX201 + Bluetooth® 5 (802.11 a/b/g/n/ac/ax 2 x 2, non-vPro, supporting gigabit file transfer speeds) non-vPro	*Wireless LAN Standards*	**IEEE 802.11a** **IEEE 802.11b** **IEEE 802.11g** **IEEE 802.11n** **IEEE 802.11ac** **IEEE 802.11ax** **IEEE 802.11d** **IEEE 802.11e** **IEEE 802.11h** **IEEE 802.11i** **IEEE 802.11k** **IEEE 802.11r**

Technical Specifications

	IEEE 802.11v
Interoperability	**Wi-Fi modules**
Frequency Band	**•802.11b/g/n/ax** **2.402 – 2.482 GHz** **•802.11a/n/ac/ax** **4.9 – 4.95 GHz (Japan)** **5.15 – 5.25 GHz** **5.25 – 5.35 GHz** **5.47 – 5.725 GHz** **5.825 – 5.850 GHz**
Data Rates	**• 802.11b: 1, 2, 5.5, 11 Mbps** **• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)** **• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)** **• 802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)**
Modulation	**Direct Sequence Spread Spectrum** **OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM**
Security[3]	**• IEEE and WiFi 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	**Ad-hoc (Peer to Peer)**
Models	**Infrastructure (Access Point Required)**
Roaming	**IEEE 802.11 compliant roaming between access points**
Output Power[2]	**• 802.11b: +18.5dBm minimum** **• 802.11g: +17.5dBm minimum** **• 802.11a: +18.5dBm minimum** **• 802.11n HT20(2.4GHz): +15.5dBm minimum** **• 802.11n HT40(2.4GHz): +14.5dBm minimum** **• 802.11n HT20(5GHz): +15.5dBm minimum** **• 802.11n HT40(5GHz): +14.5dBm minimum** **• 802.11ac VHT80(5GHz): +11.5dBm minimum** **• 802.11ac VHT160(5GHz): +11.5dBm minimum** **• 802.11ax HT40(2.4GHz): +10dBm minimum** **• 802.11ax VHT160(5GHz): +10dBm minimum**
Power Consumption	**• Transmit mode: 2.0 W** **• Receive mode: 1.6 W** **• Idle mode (PSP) 180 mW (WLAN Associated)** **• Idle mode: 50 mW (WLAN unassociated)**

Technical Specifications

	• Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity [3]	•802.11b, 1Mbps: -93.5dBm maximum •802.11b, 11Mbps: -84dBm maximum • 802.11a/g, 6Mbps: -86dBm maximum • 802.11a/g, 54Mbps: -72dBm maximum • 802.11n, MCS07: -67dBm maximum • 802.11n, MCS15: -64dBm maximum • 802.11ac, MCS0: -84dBm maximum • 802.11ac, MCS9: -59dBm maximum •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	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

1. Check latest software/driver release for updates on supported security features.
2. Maximum output power may vary by country according to local regulations.
3. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).
4. 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

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 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)**

Technical Specifications

802.11a/b/g/n/ac (1 x 1) Wi-Fi® and Bluetooth® 4.2 Combo[1]	*Wireless LAN Standards*	**IEEE 802.11a** **IEEE 802.11b** **IEEE 802.11g** **IEEE 802.11n** **IEEE 802.11ac** **IEEE 802.11d** **IEEE 802.11e** **IEEE 802.11h** **IEEE 802.11i** **IEEE 802.11k** **IEEE 802.11r** **IEEE 802.11v**
	Interoperability	**Wi-Fi CERTIFIED®**
	Frequency Band	**•802.11b/g/n** **2.402 – 2.482 GHz** **•802.11a/n/ac** **4.9 – 4.95 GHz (Japan)** **5.15 – 5.25 GHz** **5.25 – 5.35 GHz** **5.47 – 5.725 GHz** **5.825 – 5.850 GHz**
	Data Rates	**• 802.11b: 1, 2, 5.5, 11 Mbps** **• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)** **• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)**
	Modulation	**Direct Sequence Spread Spectrum** **BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM**
	Security[3]	**• IEEE 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	**Ad-hoc (Peer to Peer)**
	Models	**Infrastructure (Access Point Required)**
	Roaming	**IEEE 802.11 compliant roaming between access points**
	Output Power[2]	**• 802.11b: +14dBm minimum** **• 802.11g: +12dBm minimum** **• 802.11a: +12dBm minimum** **• 802.11n HT20(2.4GHz): +12dBm minimum**

Technical Specifications

	• 802.11n HT40(2.4GHz): +12dBm minimum • 802.11n HT20(5GHz): +10dBm minimum • 802.11n HT40(5GHz): +10dBm minimum • 802.11ac VHT80(5GHz): +10dBm minimum
Power Consumption	• Transmit mode: 2.0 W • Receive mode: 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode: 50 mW (WLAN unassociated) • Connected Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity [3]	• 802.11b, 1Mbps: -93.5dBm maximum • 802.11b, 11Mbps: -84dBm maximum • 802.11a/g, 6Mbps: -86dBm maximum • 802.11a/g, 54Mbps: -72dBm maximum • 802.11n, MCS07: -67dBm maximum • 802.11n, MCS15: -64dBm maximum • 802.11ac, MCS0: -84dBm maximum • 802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna. One embedded dual band 2.4/5 GHz antenna is provided to the card to support WLAN communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm
Weight	Type 2230: 2.8 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

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

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

Technical Specifications

Bluetooth Specification	**4.0/4.1/4.2 Compliant**
Frequency Band	**2402 to 2480 MHz**
Number of Available Channels	**Legacy: 0~79 (1 MHz/CH)** **BLE: 0~39 (2 MHz/CH)**
Signaling Data Rate	**Legacy: 3 Mbps signaling data rate[1] 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 + 4 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 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)**

Technical Specifications

RTL8822CE 802.11a/b/g/n/ac 2 x 2 Wi-Fi® and Bluetooth® 5	*Wireless LAN Standards*	**IEEE 802.11a** **IEEE 802.11b** **IEEE 802.11g** **IEEE 802.11n** **IEEE 802.11ac** **IEEE 802.11d** **IEEE 802.11e** **IEEE 802.11h** **IEEE 802.11i** **IEEE 802.11k** **IEEE 802.11r** **IEEE 802.11v**
	Interoperability	**Wi-Fi CERTIFIED®**
	Frequency Band	**• 802.11b/g/n** **2.402 – 2.482 GHz** **• 802.11a/n/ac** **4.9 – 4.95 GHz (Japan)** **5.15 – 5.25 GHz** **5.25 – 5.35 GHz** **5.47 – 5.725 GHz** **5.825 – 5.850 GHz**
	Data Rates	**• 802.11b: 1, 2, 5.5, 11 Mbps** **• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps** **• 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)** **• 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz & 80MHz)**
	Modulation	**Direct Sequence Spread Spectrum** **BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM**
	Security[3]	**• IEEE 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	**Ad-hoc (Peer to Peer)**
	Models	**Infrastructure (Access Point Required)**
	Roaming	**IEEE 802.11 compliant roaming between access points**
	Output Power[2]	**• 802.11b: +18.5dBm minimum** **• 802.11g: +17.5dBm minimum** **• 802.11a: +18.5dBm minimum** **• 802.11n HT20(2.4GHz): +15.5dBm minimum** **• 802.11n HT40(2.4GHz): +14.5dBm minimum** **• 802.11n HT20(5GHz): +15.5dBm minimum** **• 802.11n HT40(5GHz): +14.5dBm minimum** **• 802.11ac VHT80(5GHz): +11.5dBm minimum**

Technical Specifications

	• 802.11ac VHT160(5GHz): +11.5dBm minimum
Power Consumption	• Transmit mode: 2.0 W • Receive mode: 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode: 50 mW (WLAN unassociated) • Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity [3]	• 802.11b, 1Mbps: -93.5dBm maximum • 802.11b, 11Mbps: -84dBm maximum • 802.11a/g, 6Mbps: -86dBm maximum • 802.11a/g, 54Mbps: -72dBm maximum • 802.11n, MCS07: -67dBm maximum • 802.11n, MCS15: -64dBm maximum • 802.11ac, MCS0: -84dBm maximum • 802.11ac, MCS9: -59dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display 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: 2.8 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

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

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

Technical Specifications

Bluetooth Specification	**4.0/4.1/4.2/5.0 Compliant**
Frequency Band	**2402 to 2480 MHz**
Number of Available Channels	**Legacy: 0~79 (1 MHz/CH)** **BLE: 0~39 (2 MHz/CH)**
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 + 4 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 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)**

Technical Specifications

POWER

HP 45 W Smart AC adapter	*Dimensions* **(H x W x D)**	**95.0 x 40.0 x 26.5 mm**	
	Weight	**200 g +/- 10 g**	
		Not including power cord. Power cord varies by country.	
	Input	**100 to 240 VAC**	
		Input Efficiency	**87.74 % at 115 Vac and 88.4 % at 230Vac**
		Input frequency range	**48 ~ 63 Hz**
		Input AC current	**Max. 1.4 A at 90 Vac**
	Output	*Output power*	**45 W**
		DC output	**19.5 V**
		Hold-up time	**5 ms at 115 Vac input**
		Output current limit	**<8.0A**
	Connector	**C6, 4.5mm barrel type**	
	Environmental Design	*Operating temperature*	**32°F to 95°F (0°C to 35°C)**
		Non-operating (storage) temperature	**-4°F to 185°F (-20°C 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.**	

HP 65 W Smart AC adapter	*Dimensions* **(H x W x D)**	**90.0 x 51 x 28.5 mm**	
	Weight	**230 g +/- 10 g**	
		Not including power cord. Power cord varies by country.	
	Input	**100 to 240 VAC**	
		Input Efficiency	**87.74 % at 115 Vac and 88.4 % at 230Vac**
		Input frequency range	**48 ~ 63 Hz**
		Input AC current	**Max. 1.7 A at 90 Vac**
	Output	*Output power*	**65 W**
		DC output	**19.5 V**
		Hold-up time	**5 ms at 115 Vac input**
		Output current limit	**<11.0 A**
	Connector	**C6, 4.5mm barrel type**	
	Environmental Design	*Operating temperature*	**32°F to 95°F (0°C to 35°C)**
		Non-operating (storage) temperature	**-4°F to 185°F (-20°C to 85°C)**

Technical Specifications

		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.**

HP EM 65 W Smart AC adapter	*Dimensions* **(H x W x D)**		**102 x 55 x 30 mm**
	Weight		**250 g +/- 10 g**
			Not including power cord. Power cord varies by country.
	Input		**100 to 240 VAC**
		Input Efficiency	**87.74 % at 115 Vac and 88.4 % at 230Vac**
		Input frequency range	**48 ~ 63 Hz**
		Input AC current	**Max. 1.7 A at 90 Vac**
	Output	*Output power*	**65 W**
		DC output	**19.5 V**
		Hold-up time	**5 ms at 115 Vac input**
		Output current limit	**<11.0 A**
	Connector		**C6, 4.5mm barrel type**
	Environmental Design	*Operating temperature*	**32°F to 95°F (0°C to 35°C)**
		Non-operating (storage) temperature	**-4°F to 185°F (-20°C 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.**

HP 3-cell Long Life Li-Ion (41 WHr)	*Dimensions* **(H x W x D)**		**6.0 x 186.35 x 90.2 mm (0.236 x 7.33 x 3.55 inch)**
	Weight		**0.19 kg (0.418 lb)**
	Cells/Type		**3cell Lithium-Ion Polymer cell / 515974 Prismatic cell 496080**
	Energy	*Voltage*	**11.55 V/11.4 V/11.34 V**
		Amp-hour capacity	**3.63 Ah/3.6 Ah/3.62 Ah**
		Watt-hour capacity	**41 Wh**
	Temperature	*Operating (Charging)*	**32˚ to 113˚ F (0˚ to 45˚ C)**
		Operating (Discharging)	**14˚ to 122˚ F (-10˚ to 60˚ C)**

Technical Specifications

Optional Travel Battery Available	**No**

FINGERPRINT SENSOR

Model	**Elan eFSA80ST touch sensor**
Mobile Voltage Operation	**2.65 V to 3.6 V**
Operating Temperature	**32° to 95° F (0° to 35° C)**
Current Consumption Image	**50 mA peak**
Low Latency Wait for Finger	**<900 uA**
Capture Rate	**20 cm/sec**
ESD Resistance	**IEC 61000-4-2 (+15KV)**
Detection Matrix	**508 dpi / 4 x 4 mm sensor area**
FRR (False Reject Rate) / FAR (False Acceptance Rate)	**FRR ~ 2% @ 1:50 K FAR**

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

Category	*Description*	*Part Number*
Cases	**HP Essential Top Load Case**	**H2W17AA**
	HP Essential Backpack (up to 15.6")	**H1D24AA**
	HP Essential Messenger Case (up to 17.3")	**H1D25AA**
Docking	**HP 3005pr USB3 Port Replicator**	**Y4H06AA**
	HP USB Travel Dock	**T0K30AA**
	HP USB-C Universal Dock	**1MK33AA**
	HP USB-C Universal Dock NF (non-flash)	**3DV65AA**
	HP USB-C Dock G5	**5TW10AA**
	HP USB-C/A Universal Dock G2	**5TW13AA**
	HP USB-C Mini Dock	**1PM64AA**
Input/Output	**HP USB Essential Keyboard and Mouse**	**H6L29AA**
	HP Ultra Mobile Wireless Mouse	**H6F25AA**
	HP Comfort Grip Wireless Mouse	**H2L63AA**
	HP 3-Button USB Laser Mouse	**H4B81AA**
	HP USB Travel Mouse	**G1K28AA**
	HP HDMI to DVI Adapter	**F5A28AA**
	HP HDMI to VGA Adapter	**H4F02AA**
	HP USB-C to VGA Adapter	**N9K76AA**
	HP USB-C to HDMI 2.0 Adapter	**1WC36AA**
	HP Stereo USB Headset	**T1A67AA**
	HP Stereo 3.5mm Headset	**T1A66AA**
Power	**HP 65W Smart AC Adapter**	**H6Y89AA**
	HP 45W Smart Power Adapter (w/ 4.5mm to 7.5mm DC dongle)	**H6Y88AA**
	HP 45W Smart Power Adapter 2 prong -4.5mm (Japan only)	**L6F60AA**
	HP 65W 4.5mm non-EM AC Adapter (India only)	**3FF84AA**
Storage	**HP Mobile USB DVDRW**	**F2B56AA**
UCC	**HP Conferencing Keyboard**	**K8P74AA**
	HP UC Speaker Phone	**4VW02AA**

Summary of Changes

Date of change:	*Version History:*		*Description of change:*
February 18, 2020	**From v1 to v2**	**Updated**	**Keyboard**
February 27, 2020	**From v2 to v3**	**Updated**	**Copyright and footnote for fingerprint sensor.**
April 12, 2020	**From v3 to v4**	**Updated**	**Weights and Ports sections**
April 22, 2020	**From v4 to v5**	**Updated**	**Networking /Communications section**