

Overview

HP 250 15.6 inch G9 Notebook PC



Left

- | | |
|-------------------------------------|--|
| 1. Internal Dual Digital Microphone | 7. Power Indicator LED |
| 2. Webcam LED | 8. Hard Drive Indicator LED |
| 3. Webcam | 9. SuperSpeed USB Type-C® 5Gbps signaling rate ¹ (Data Transfer Only) |
| 4. Touchpad | 10. HDMI Port (Cable Sold Separately) |
| 5. Touchpad Buttons | 11. RJ-45 / Ethernet Port |
| 6. Audio Combo Jack | 12. Power Button |

1. SuperSpeed USB 20Gbps is not available.

Overview



Right

- | | |
|---|---|
| 1. Power Connector | 4. SD Card slot |
| 2. SuperSpeed USB Type-A 5Gbps signaling rate ¹ port (USB 3.2 Gen 1) | 5. Fingerprint Reader (Selected models) |
| 3. SuperSpeed USB Type-A 5Gbps signaling rate ¹ port (USB 3.2 Gen 1) | |

1. SuperSpeed USB 20Gbps is not available.

Overview

AT A GLANCE

- Preinstalled with Windows 11 Pro, Window Home or FreeDOS
- Choice of 12th generation Intel® Core™, Intel® Pentium®, or Intel® Celeron® processors
- Choice of 39.62 cm (15.6") diagonal HD and Ultra Wide Viewing Angle FHD 300 nit display
- NVIDIA® GeForce® MX550 (2 GB GDDR6 dedicated) (Optional)
- Optimize your video calls with an HD camera and temporal noise reduction that adjusts the lighting to your environment.
- Fast dual channel DDR4 SODIMM memory up to 32 GB
- Enhanced security features including discrete TPM 2.0 (select model) and optional Fingerprint reader
- Weight with basic configurations starting at 3.84 lb / 1.74 kg
- Support wireless options for connectivity on the go including gigabit-speed up to Wi-Fi 6
- Supports fast charging (50% in 45 minutes) with no impact on battery recharge cycles
- MM18 Battery life up to 8hours and 20 minutes
- Full size, optional backlit keyboard and clickpad with Precision Touchpad Supported certified
- Passed 13 MIL-STD test

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

Technical Specifications

PRODUCT NAME

HP 250 15.6 inch G9 Notebook PC

OPERATING SYSTEM

- Preinstalled**
- Windows 11 Pro ¹
 - Windows 11 Pro Education¹
 - Windows 11 Home – HP recommends Windows 11 Pro for business ¹
 - Windows 11 Home Single Language – HP recommends Windows 11 Pro for business ^{1,2}
 - Windows 11 Home Education – HP recommends Windows 11 Pro for business ¹
 - FreeDOS

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

2. This computer is preinstalled with Windows 11 Home Single Language.

PROCESSORS

| Processor ^{3,4,5,6,7} | Cores | Threads | L3 Cache | Max Frequency | | Base Frequency |
|--------------------------------|-------|---------|----------|-------------------------|-------------------------|----------------|
| | | | | 1-core and 2-core burst | 3-core and 4-core burst | |
| Intel® Pentium® Silver N6000 | 4 | 4 | 4MB | 3.3 GHz | 3.1 GHz | 1.1 GHz |
| Intel® Celeron® N4500 | 2 | 2 | 4MB | 2.8 GHz | NA | 1.1 GHz |

| Processor ^{3,4,5,6,7} | Cores | Number of P-cores | Number of E-cores | Threads | L3 Cache | Max Turbo Frequency | | Base Frequency | |
|--------------------------------|-------|-------------------|-------------------|---------|----------|---------------------|---------|----------------|---------|
| | | | | | | P-cores | E-cores | P-cores | E-cores |
| Intel® Core™ i7-1255U | 10 | 2 | 8 | 12 | 12MB | 4.7 GHz | 3.5 GHz | 1.7 GHz | 1.2 GHz |
| Intel® Core™ i7-1260P | 12 | 4 | 8 | 16 | 18MB | 4.7 GHz | 3.4 GHz | 2.1 GHz | 1.5 GHz |
| Intel® Core™ i5-1240P | 12 | 4 | 8 | 16 | 12MB | 4.4 GHz | 3.3 GHz | 1.2 GHz | 1.3 GHz |
| Intel® Core™ i5-1235U | 10 | 2 | 8 | 12 | 12MB | 4.4 GHz | 3.3 GHz | 1.3 GHz | 0.9 GHz |

Technical Specifications

| | | | | | | | | | |
|--------------------------|---|---|---|---|------|---------|---------|---------|---------|
| Intel® Core™ i3-1215U | 6 | 2 | 4 | 8 | 10MB | 4.4 GHz | 3.3 GHz | 1.2 GHz | 0.9 GHz |
|--------------------------|---|---|---|---|------|---------|---------|---------|---------|

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. Max Boost clock frequency performance varies depending on hardware, software and overall system configuration.

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

Intel® Iris® X^e Graphics⁸

Discrete

NVIDIA® GeForce® MX550 (2 GB DDR6 dedicated)⁹

Supports

Support HD decode, DX12, HDMI 1.4b¹⁰

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

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

10. HD content required to view HD images.

Technical Specifications

DISPLAY

Non-Touch

39.6 cm (15.6") diagonal, FHD (1920 x 1080), Low Blue Light, anti-glare, UWVA, micro-edge, 300 nits, sRGB 100% eDP 1.4+PSR2 ^{10.11.12}

39.6 cm (15.6") diagonal, FHD (1920 x 1080), anti-glare, SVA, micro-edge, 250 nits, 45% NTSC eDP 1.2 ^{10.11.12}

39.6 cm (15.6") diagonal, FHD (1920 x 1080), anti-glare, UWVA, micro-edge, 250 nits, 45% NTSC eDP 1.2 ^{10.11.12}

39.6 cm (15.6") diagonal, HD (1366x768), anti-glare, SVA, micro-edge, 250 nits, 45% NTSC eDP 1.2 ^{10.11.12}

HDMI

Port supports resolutions up to 1920 x 1080 external resolution @60 Hz

Display Size

15.6" diagonal

39.6 cm (15.6") diagonal

10. HD content required to view HD images.

11. Sold separately or as an optional feature.

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

STORAGE AND DRIVES

Primary Storage

1 TB 5400 rpm SATA ¹³

500 GB 7200 rpm SATA ¹³

500 GB 5400 rpm SATA ¹³

Primary M.2 Storage

1 TB PCIe® NVMe™ M.2 QLC Solid State Drive ¹³

512 GB PCIe® NVMe™ M.2 TLC M.2 Solid State Drive ¹³

512 GB PCIe® NVMe™ M.2 QLC Solid State Drive ¹³

256 GB PCIe® NVMe™ M.2 QLC Solid State Drive ¹³

128 GB PCIe® NVMe™ M.2 TLC M.2 Solid State Drive ¹³

Dual Storage (select models) ¹⁴

256 GB PCIe® NVMe™ M.2 QLC Solid State Drive + 1TB 5400rpm SATA

128 GB M.2 SATA-3 TLC Solid State Drive + 1TB 5400rpm SATA

13. For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 11) is reserved for system recovery software.

14. JSL don't support dual storage due to design limitation.

Technical Specifications

MEMORY

Maximum Memory

32 GB DDR4-3200 MT/s SDRAM^{15,16}

Memory

8 GB DDR4-2933 MT/s SDRAM (1 x 8 GB)^{15,16}

4 GB DDR4-2933 MT/s SDRAM^{15,16}

32 GB DDR4-3200 MT/s SDRAM (2 x 16 GB)^{15,16}

16 GB DDR4-3200 MT/s SDRAM (1 x 16 GB)^{15,16}

16 GB DDR4-3200 MT/s SDRAM (2 x 8 GB)^{15,16}

12 GB DDR4-3200 MT/s SDRAM (1 x 8 + 1 x 4GB)^{15,16}

8 GB DDR4-3200 MT/s SDRAM (1 x 8 GB)^{15,16}

8 GB DDR4-3200 MT/s SDRAM (2 x 4 GB)^{15,16}

4 GB DDR4-3200 MT/s SDRAM (1 x 4 GB)^{15,16}

Memory Slots

1 SODIMM (Intel Pentium/Celeron speed runs up to 2933 MT/s)^{15,16}

Support Single Channel Memory

2 SODIMM (Intel 12th Generation Intel Core processor) (Core i 3/5/7 speed runs up to 3200 MT/s)^{15,16}

Both slots are customer non-accessible / non-upgradeable

Supports Dual Channel Memory

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

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

NETWORKING/COMMUNICATIONS

WLAN

Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® + Bluetooth® 5.0 Wireless Card¹⁷

Realtek RTL8852BE 802.11ax 2x2 Wi-Fi + Bluetooth® 5.3 Wireless Card¹⁸

Realtek RTL8821CE 802.11a/b/g/n/ac (1x1) Wi-Fi® with Bluetooth® 4.2 Wireless Card¹⁷

Miracast

Compatible with Miracast-certified devices (For Win11)¹⁹

Ethernet

Realtek RTL8111HSH 10/100/1000 Integrated NIC.²⁰

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

18. 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.

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

20. 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.

Technical Specifications

AUDIO/MULTIMEDIA

Audio

2 Integrated stereo speakers
Integrated dual array microphone

Speaker Power

2W/4ohm

Camera

720p HD camera with Temporal Noise Reduction ¹¹

[11. HD content required to view HD images.](#)

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

Full Size Textured island-style Keyboard and optional Backlit ¹²

Pointing Device

Touchpad with multi-touch gesture support (PTP certified)

Function Keys

F1 - Open " How to get help in Windows 11" webpage

F2 - Brightness Down

F3 - Brightness Up

F4 - Display Switching

F5 - Blank

F6 - Mute

F7 - Volume Down

F8 -Volume Up

F9 - Previous

F10 - Play/Pause

F11 - Next

F12 - Airplane mode

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

Technical Specifications

SOFTWARE AND SECURITY

Software

MYOffice

MyHP

HP QuickDrop²¹

HP Privacy Settings

HP SUPPORT ASSISTANT²²

HP Audio Switch

HP Connection Optimizer

HP PC Hardware Diagnostics

HP Smart Health

HP Smart²³

Manageability Features

Touchpoint Customizer for Consumer

NOTE: To enhance brightness, level go to the Intel® Graphics Command Center app, click on System and turn off the Display Power Savings function.

Security Management

McAfee Security (30 days free trial as default)²⁴

Express VPN (30 days free trial)

LastPass password manager

Discrete TPM 2.0 (select model) / Firmware TPM 2.0²⁵

Fingerprint Reader²⁶

21. HP Quick Drop requires Internet access and Windows 10 and higher PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.

22. HP Support Assistant requires Windows and Internet access.

23. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights and is available preinstalled on select products, thru HP Factory Configuration Services; or it can be downloaded. For more information about how to enable HP Smart Support or for download, please visit <http://www.hp.com/smart-support>.

24. 30-day McAfee® LiveSafe™ trial included. Internet access required and not included. Subscription required after expiration. See www.McAfee.com for more details.

25. 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).

26. HP Fingerprint sensor is an optional feature that must be configured at purchase.

Technical Specifications

POWER

Power Supply

HP Smart 65 W External AC power adapter ²⁷

HP Smart 65 W EM External AC power adapter ²⁷

HP Smart 45 W External AC power adapter ²⁷

Battery

HP Long Life 3-cell, 41 Wh Li-ion Polymer ^{28,29}

Compliant with UL 1642 Standard

Power Cord

1M (3.28 feet) length power cord

Battery Life

Up to 8 hours 20 minutes ³⁰

Battery Weight

0.42 lb

0.19 kg

27. Availability may vary by country.

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

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

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

Technical Specifications

WEIGHTS & DIMENSIONS

Product Weight

Starting at 3.84 lb³¹

Starting at 1.74 kg³¹

Product Dimensions (W x D x H)

14.09 x 9.53 x 0.78 in

35.8 x 24.2 x 1.99 cm

31. Weight will vary by configuration. Does not include power adapter.

PORTS/SLOTS

Ports

2 SuperSpeed USB Type-A 5Gbps signaling rate (USB 3.2 Gen 1)

1 SuperSpeed USB Type-C® 5Gbps signaling rate (Supports data transfer only and does not support charging or external monitors)

1 HDMI v1.4b ³²

1 RJ-45

1 AC Power

1 Headphone/microphone combo jack

Expansion Slots

support SD/SDHC/SDXC

1 multi-format digital media reader

32. HDMI cable sold separately.

Technical Specifications

SERVICE AND SUPPORT

HP Services offers 1-year limited warranties and 90 day software limited warranty options depending on country. 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. 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>.³³

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

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)

| | |
|---------------------------|----------------------------------|
| Nominal Operating Voltage | 19.5 V |
| Average Operating Power | 6.3W |
| Integrated graphics | Yes |
| Discrete Graphics | N/A (Switchable graphics design) |

| | |
|---------------------|-----------------------------|
| 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 grams |
| Non-operating | 3.5 grams |

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

| | |
|---------------------------------|--------------------------------------|
| Regulatory Model Number | TPN-C139 |
| UL | Yes |
| CSA | No |
| FCC Compliance | Yes |
| ENERGY STAR® | Yes ³⁴ |
| EPEAT® | Yes, EPEAT® registered ³⁵ |
| ICES | Yes |
| Australia / | Yes |
| NZ A-Tick Compliance | Yes |
| CCC | Yes |
| Japan VCCI Compliance | Yes |
| KC | Yes |
| BSMI | Yes |
| CE Marking Compliance | Yes |
| CU/EAC | Yes |
| CIT | N/A |
| Saudi Arabian Compliance (ICCP) | Yes |
| SABS | Yes |
| UKRSERTCOMPUTER | Yes |

Technical Specifications

34. Configurations of the HP 250 G9 Notebook PC that are ENERGY STAR® qualified are identified as HP 250 G9 Notebook PC ENERGY STAR on HP websites and on <http://www.energystar.gov>.

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

DISPLAYS

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

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

| | | |
|--|---|--|
| <p>15.6 in FHD (1920 x 1080) Anti-Glare UWVA Low Blue Light sRGB NWBZ 300 eDP 1.4+PSR2 100 flat LCD Panel</p> | <p>Outline Dimensions (W x H) Active Area Weight Diagonal Size Thickness Interface Surface Treatment Touch Enabled Contrast Ratio Refresh Rate Brightness Pixel Resolution Format Backlight Color Gamut Coverage Color Depth Viewing Angle Low Blue Light Power Consumption (W, EBL@ 150nits max/ 200nits max)</p> | <p>350.66*215.34(With PCBA) typ +/- 0.5 344.16 x 193.59 typ 310g max 15.6" 2.45 typ /2.6 max eDP1.4 Anti-Glare No 1000:1 typ 60Hz 300nits typ 1920 x 1080 (FHD) WLED RGB sRGB100% typ 8bits UWVA 89/89/89/89 Yes 2.69W max / 3.34W max</p> |
|--|---|--|

| | | |
|---|--|--|
| <p>15.6-in FHD (1920x1080) Anti-Glare WLED SVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ ultraslim</p> | <p>Outline Dimensions (W x H) Active Area Weight Diagonal Size Thickness Interface Surface Treatment Touch Enabled Contrast Ratio Refresh Rate Brightness Pixel Resolution Format</p> | <p>350.96 * 216.65 (max. w/ PCB) 344.16 x 193.59 typ 360g max 15.6" 3.2mm max eDP1.2 Anti-Glare No 300:1 typ 60Hz 250nits typ 1920 x 1080 (FHD) WLED</p> |
|---|--|--|

Technical Specifications

| | |
|---|-----------------------|
| Backlight | RGB |
| Color Gamut Coverage | NTSC45% |
| Color Depth | 6bit |
| Viewing Angle | SVA 45/45/15/35 |
| Low Blue Light | No |
| Power Consumption (W, EBL@ 150nits max/ 200nits max) | 2.67W max / 3.33W max |

15.6-in FHD (1920x1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ slim

| | |
|---|------------------------|
| Outline Dimensions (W x H) | 350.96*216.75(max.) |
| Active Area | 344.16 x 193.59 (typ.) |
| Weight | 370g max. |
| Diagonal Size | 15.6" |
| Thickness | 3.2 max. |
| Interface | eDP1.2 |
| Surface Treatment | Anti-Glare |
| Touch Enabled | No |
| Contrast Ratio | 600:1 typ |
| Refresh Rate | 60Hz |
| Brightness | 250nits typ |
| Pixel Resolution | 1920 x 1080 (FHD) |
| Format | WLED |
| Backlight | RGB |
| Color Gamut Coverage | NTSC45% |
| Color Depth | 6bits |
| Viewing Angle | UWVA 85/85/85/85 |
| Low Blue Light | No |
| Power Consumption (W, EBL@ 150nits max/ 200nits max) | 2.75W max |

15.6-in HD (1366x768) Anti-Glare WLED SVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ ultraslim

| | |
|-----------------------------------|-------------------------------|
| Outline Dimensions (W x H) | 350.96 * 216.65 (max. w/ PCB) |
| Active Area | 344.23 x 193.54 typ |
| Weight | 360g max |
| Diagonal Size | 15.6" |
| Thickness | 3.2mm max |
| Interface | eDP1.2 |
| Surface Treatment | Anti-Glare |
| Touch Enabled | No |
| Contrast Ratio | 300:1 typ |
| Refresh Rate | 60Hz |
| Brightness | 250nits typ |
| Pixel Resolution | 1366 x 768 (HD) |
| Format | WLED |
| Backlight | RGB |

Technical Specifications

| | |
|---|-----------------------|
| Color Gamut Coverage | NTSC45% |
| Color Depth | 6bits |
| Viewing Angle | SVA 45/45/15/35 |
| Low Blue Light | No |
| Power Consumption (W, EBL@ 150nits max/ 200nits max) | 2.42W max / 2.98W max |

Technical Specifications

STORAGE AND DRIVES

For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 11) is reserved for system recovery software.

| | | |
|---------------------------------------|---------------------------------|---|
| HDD 1TB 5400RPM 7mm SATA | Drive Weight | 0.21 lbs (95 g) |
| | Rotation speed | 5400rpm |
| | NAND Type | up to 128MB |
| | Height | 0.28 in (7 mm) |
| | Width | 2.75 in (69.85 mm) |
| | Weight | ATA-8, SATA 3.0 |
| | Interface | 600MB/s (Interface) |
| | Maximum Sequential Read | Single Track: 1.5ms Agerage: 13ms Maximum: 32ms |
| | Maximum Sequential Write | 1,953,525,168 |
| | Logical Blocks | 0° to 60°C [case temp] |
| | Operating Temperature | ATA Security |
| Features | S.M.A.R.T., NCQ, Ultra DMA | |
| HDD 500GB 5400RPM 7mm SATA | Drive Weight | 0.21 lbs (95 g) |
| | Rotation speed | 5400rpm |
| | Cache Buffer | up to 128MB |
| | NAND Type/Size | N/A |
| | Height | 0.28 in (7 mm) |
| | Width | 2.75 in (69.85 mm) |
| | Interface | ATA-8, SATA 3.0 |
| | Transfer Rate | 600MB/s (Interface) |
| | Seek Time | Single Track: 1.5ms Agerage: 13ms Maximum: 32ms |
| | Logical Blocks | 976,773,168 |
| | Operating Temperature | 0° to 60°C [case temp] |
| Security Features | ATA Security | |
| Features | S.M.A.R.T., NCQ, Ultra DMA | |
| HDD 500GB 7200RPM 7mm SATA | Drive Weight | 0.21 lbs (95 g) |
| | Rotation speed | 7200rpm |
| | 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 | 600MB/s (Interface) |
| | Seek Time | Single Track: 1.5ms Agerage: 13ms Maximum: 32ms |

Technical Specifications

| | |
|------------------------------|----------------------------|
| Logical Blocks | 976,773,168 |
| Operating Temperature | 0° to 60°C [case temp] |
| Security Features | ATA Security |
| Features | S.M.A.R.T., NCQ, Ultra DMA |

| | | |
|----------------------|---------------------------------|----------------------------|
| 64GB eMMC 5.x | Form Factor | eMMC |
| | Capacity | 64GB |
| | NAND Type | MLC/TLC |
| | Height | 1.4mm |
| | Width | 11.5x13mm |
| | Weight | 0.2g |
| | Interface | MMC protocol |
| | Maximum Sequential Read | Update to 250MB/s |
| | Maximum Sequential Write | Update to 70MB/s |
| | Logical Blocks | 64GB(62,537,072,640 Bytes) |
| | Operating Temperature | 0 to 70 |
| Features | HS400 | |

| | | |
|---|---------------------------------|--|
| SSD 128GB 2280 PCIe-3x2 Three Layer Cell | Form Factor | M.2 2280 |
| | Capacity | 128GB |
| | NAND Type | TLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (2.2 mm) |
| | Interface | PCIe NVMe Gen3X4 |
| | Maximum Sequential Read | up to 1600MB/s ±20% |
| | Maximum Sequential Write | up to 900MB/s ±20% |
| | Logical Blocks | 250,069,680 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | Pyrite |

| | | |
|---------------------------------------|---------------------------------|--|
| SSD 1TB 2280 PCIe NVMe QLC | Form Factor | M.2 2280 |
| | Capacity | 1TB |
| | NAND Type | QLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (22 mm) |
| | Interface | PCIe NVMe |
| | Maximum Sequential Read | up to 2300MB/s ±20% |
| | Maximum Sequential Write | up to 2000MB/s ±20% |
| | Logical Blocks | 2,000,409,264 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | Pyrite |

Technical Specifications

| | | |
|-------------------------------------|---------------------------------|--|
| SSD 256GB 2280 PCIe NVMe QLC | Form Factor | M.2 2280 |
| | Capacity | 256GB |
| | NAND Type | QLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (2.2 mm) |
| | Weight | 0.02 lb (10 g) |
| | Interface | PCIe NVMe |
| | Maximum Sequential Read | up to 2300MB/s \pm 20% |
| | Maximum Sequential Write | up to 1280MB/s \pm 20% |
| | Logical Blocks | 500,118,192 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| Features | Pyrite | |

| | | |
|-------------------------------------|---------------------------------|--|
| SSD 512GB 2280 PCIe NVMe QLC | Form Factor | M.2 2280 |
| | Capacity | 512GB |
| | NAND Type | QLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (2.2 mm) |
| | Interface | PCIe NVMe |
| | Maximum Sequential Read | up to 2300MB/s \pm 20% |
| | Maximum Sequential Write | up to 1400MB/s \pm 20% |
| | Logical Blocks | 1,000,215,216 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | Pyrite |

| | | |
|---|---------------------------------|--|
| SSD 512GB 2280 M2 PCIe-3x4 SS NVMe TLC | Form Factor | M.2 2280 |
| | Capacity | 512GB |
| | NAND Type | TLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (2.2 mm) |
| | Interface | PCIe NVMe Gen3X4 |
| | Maximum Sequential Read | up to 3100MB/s \pm 20% |
| | Maximum Sequential Write | up to 2400MB/s \pm 20% |
| | Logical Blocks | 1,000,215,216 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | Pyrite |

Technical Specifications

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|--------------------------------|---------------------------------|--|
| SSD 512GB 2280 PCIe-4x4 | Form Factor | M.2 2280 |
| NVMe Three Layer Cell | Capacity | 512GB |
| | NAND Type | TLC |
| | Height | 0.09 in (2.3 mm) |
| | Width | 0.87 in (2.2 mm) |
| | Weight | |
| | Interface | PCIe NVMe Gen4X4 |
| | Maximum Sequential Read | up to 6000MB/s ±20% |
| | Maximum Sequential Write | up to 4000MB/s ±20% |
| | Logical Blocks | 1,000,215,216 |
| | Operating Temperature | 32° to 158°F (0° to 70°C) [ambient temp] |
| | Features | Pyrite |

Technical Specifications

NETWORKING/COMMUNICATIONS

| | |
|---|--|
| <p>Realtek 802.11a/b/g/n/ac (1x1) Wi-Fi® and Bluetooth® 4.2 Wireless Card¹</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>Frequency Band</p> <ul style="list-style-type: none"> Wi-Fi certified modules •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: max 150Mbps • 802.11ac : max 433.3Mbps <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 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 • WPA3 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 : +14dBm minimum • 802.11g : +12dBm minimum • 802.11a : +12dBm minimum • 802.11n HT20(2.4GHz) : +12dBm minimum • 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 <p>Power Consumption</p> <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

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|--|--|
| | <ul style="list-style-type: none"> • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW |
| Power Management | ACPI and PCI Express compliant power management 802.11 compliant power saving mode |
| Receiver Sensitivity⁴ | 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 : 2.8g |
| Operating Voltage | 3.3v +/- 9% |
| Temperature | Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C) |
| Humidity | Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)" |
| Altitude | Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m) |
| LED Activity | LED Amber – Radio OFF; LED OFF – Radio ON |
| HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology | |
| 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) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| Transmit Power | The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR. |

1. Wi-Fi 5 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with prior 802.11 specs.

2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

3. Check latest software/driver release for updates on supported security features.

4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

Technical Specifications

| | | |
|--|---|---|
| <p>Realtek RTL8852BE 802.11ax 2x2 Wi-Fi® + Bluetooth® 5.3 Wireless Card (802.11ax 2x2, supporting gigabit data rate) ¹</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 802.11ax 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 modules</p> |
| | <p>Frequency Band</p> | <ul style="list-style-type: none"> •802.11b/g/n/ax 2.402 – 2.482 GHz •802.11a/n/ac/ax 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz |
| | <p>Data Rates</p> | <ul style="list-style-type: none"> •802.11b: 1, 2, 5.5, 11 Mbps •802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11n: max 300Mbps •802.11ac: max 866.7Mbps • 802.11ax: max 1201Mbps |
| | <p>Modulation</p> | <p>Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM</p> |
| | <p>Security³</p> | <ul style="list-style-type: none"> •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 •WPA3 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 • 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 • 802.11ax HE40(2.4GHz): +10dBm minimum • 802.11ax HE80(5GHz): +10dBm minimum |
| | <p>Power Consumption</p> | <ul style="list-style-type: none"> •Transmit mode:2.5 W |

Technical Specifications

- Receive mode:2 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
- 802.11ax, MCS11(HE40): -57dBm maximum
- 802.11ax, MCS11(HE80): -54dBm maximum

Antenna type

High efficiency antenna with spatial diversity, mounted in the display enclosure
Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications

Form Factor

PCI-Express M.2 MiniCard

Dimensions

1. Type 2230: 2.3 x 22.0 x 30.0 mm
2. Type 1216: 1.67 x 12.0 x 16.0 mm

Weight

1. Type 2230: 2.8g
2. Type 126: 1.3g

Operating Voltage

3.3v +/- 9%

Temperature

- Operating** 14° to 158° F (-10° to 70° C)
- Non-operating** -40° to 176° F (-40° to 80° C)

Humidity

- Operating** 10% to 90% (non-condensing)
- Non-operating** 5% to 95% (non-condensing)

Altitude

- Operating** 0 to 10,000 ft (3,048 m)
- Non-operating** 0 to 50,000 ft (15,240 m)

LED Activity

LED Amber – Radio OFF
LED Off – Radio ON

HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1/5.2/5.3 Wireless Technology

Bluetooth Specification

4.0/4.1/4.2/5.0/5.1/5.2/5.3 Compliant

Frequency Band

2402 to 2480 MHz

Number of Available Channels

Legacy: 0~79 (1 MHz/CH)
BLE: 0~39 (2 MHz/CH)

Data Rates and Throughput

Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps
BLE: 1 Mbps data rate; throughput up to 0.2 Mbps
Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)

Transmit Power

The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

1. Wi-Fi 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with

Technical Specifications

prior 802.11 specs.

2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

3. Check latest software/driver release for updates on supported security features.

4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

| | | |
|--|---|---|
| <p>Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® + Bluetooth® 5</p> | <p>Wireless LAN Standards</p> | <p>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> |
| | <p>Interoperability</p> | <p>Wi-Fi certified modules</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: max 300Mbps • 802.11ac : max 866.7Mbps |
| | <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 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 • WPA3 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 • 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 |

Technical Specifications

| | |
|---|--|
| Power Consumption | <ul style="list-style-type: none"> • 802.11ac VHT80(5GHz) : +11.5dBm minimum • 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 Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications |
| Form Factor | PCI-Express M.2 MiniCard |
| Dimensions | 1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm |
| Weight | 1. Type 2230 : 2.8g 2. Type 126: 1.3g |
| Operating Voltage | 3.3v +/- 9% |
| Temperature | Operating 14° to 158° F (-10° to 70° C) Non-operating -40° to 176° F (-40° to 80° C) |
| Humidity | Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing) |
| Altitude | Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m) |
| LED Activity | LED Amber – Radio OFF LED Off – Radio ON |

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

| | |
|-------------------------------------|--|
| Bluetooth Specification | 4.0/4.1/4.2/5.0 Compliant |
| Frequency Band | 2402 to 2480 MHz |
| Number of Available Channels | Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH) |
| Data Rates and Throughput | Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5) |
| Transmit Power | The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR. |

1. Wi-Fi 5 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels. Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ac) is backwards compatible with

Technical Specifications

prior 802.11 specs.

2. The FCC has declared as of September 1, 2014 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

3. Check latest software/driver release for updates on supported security features.

4. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CKK modulation) and a packet error rate of 10% for 802.11a/g (OFDM modulation).

| | | |
|--|-----------------------------|---|
| Realtek RTK8111HSH 10/100/1000 Integrated NIC | Ethernet Features | 10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s |
| | Power Management | ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption |
| | Performance Features | TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K |
| | Manageability | Wake-on-LAN from modern standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) (MSC is supported on selected model) 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 |

Technical Specifications

POWER

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

| | | | |
|---|---|--|--|
| HP 65W Smart AC adapter | Dimensions (H x W x D) | 90x51x28.5mm | |
| | Weight | 230g +/- 10g (Not including power cord. Power cord varies by country.) | |
| | Input | 100 to 240 VAC | |
| | | Input Efficiency | 88.0 % at 115 VAC and 89.0 % at 230VAC |
| | | Input frequency range | 48 ~ 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 Over voltage protection- 29V max automatic shutdown |
| | Connector | 4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords | |
| | 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 | 1 to 16,400 ft (0 to 5000m) |
| | | Humidity | 20% to 95% |
| EMI and Safety Certifications | Storage Humidity | 10% to 95% | |
| | Eg: | | |
| | *CE Mark - full compliance with LVD and EMC directives | | |
| | * Worldwide safety standards - IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1 , Class1, SELV; | | |
| Agency approvals - C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE. | | | |
| * MTBF - over 200,000 hours at 25°C ambient condition. | | | |

| | | | |
|------------------------|-----------------------------|--|---|
| 45 W AC adapter | Dimensions | 95x40x26.5mm | |
| | Weight | 200g +/- 10g (Not including power cord. Power cord varies by country.) | |
| | Input | 100 to 240 VAC | |
| | | Input Efficiency | 88.0 % at 115 VAC and 89.0 % at 230VAC |
| | | Input frequency range | 48 ~ 63 Hz |
| | | Input AC current | Max. 1.4 A at 90 VA |
| | Output | Output power | 45W |
| | | DC output | 19.5V |
| | | Hold-up time | 5ms at 115 Vac input |
| | | Output current limit | <8.0A Over voltage protection- 29V max automatic shutdown |
| | Connector | 4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords | |
| | 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) |

Technical Specifications

| | | |
|--------------------------------------|---|------------------------------|
| EMI and Safety Certifications | Altitude | 1 to 16,400 ft (0 to 5,000m) |
| | Humidity | 20% to 95% |
| | Storage Humidity | 10% to 95% |
| | Eg: | |
| | *CE Mark - full compliance with LVD and EMC directives | |
| | * Worldwide safety standards - IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1 , Class1, SELV; | |
| | Agency approvals - C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE. | |
| | * MTBF - over 200,000 hours at 25°C ambient condition. | |

| | | | |
|--------------------------------------|---|--|--|
| HP 65W EM Smart AC adapter | Dimensions | 102x55x30mm | |
| | Weight | 250g +/- 10g (Not including power cord. Power cord varies by country.) | |
| | Input | 100 to 240 VAC | |
| | | Input Efficiency | 88.0 % at 115 VAC and 89.0 % at 230VAC |
| | | Input frequency range | 48 ~ 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 Over voltage protection- 29V max automatic shutdown |
| | Connector | 4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords | |
| | Environmental Design | Operating temperature | 32°Fto 95°F (0°to 35°C) |
| | | Non-operating (storage) temperature | -4°Fto 185°F (-20°to 85°C) |
| | Altitude | 1 to 16,400 ft (0 to 5,000m) | |
| | Humidity | 20% to 95 | |
| | Storage Humidity | 10% to 95% | |
| EMI and Safety Certifications | Eg: | | |
| | *CE Mark - full compliance with LVD and EMC directives | | |
| | * Worldwide safety standards - IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1 , Class1, SELV; | | |
| | Agency approvals - C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE. | | |
| | * MTBF - over 200,000 hours at 25°C ambient condition. | | |

Technical Specifications

| | | |
|---|--|--|
| HP 3-cell Long Life Li-Ion (41 Wh¹) | Dimensions (H x W x L) | 6.0 x 186.85 x 90.2 mm (0.23 x 7.29 x 3.52 inch) |
| | Weight | 0.175 Kg (0.385 lb) |
| | Cells/Type | 3cell lithium-Ion Polymer cell 515974 |
| | Energy | |
| | Voltage | 11.34V/11.28V |
| | Amp-hour capacity | 3.62Ah/3.635Ah |
| | Watt-hour capacity | 41Wh |
| | Temperature | |
| | Operating (Charging) | 32° to 113° F (0° to 45° C) |
| | Operating (Discharging) | 14° to 122° F (-10° to 60° C) |
| | Fuel Gauge LED | N/A |
| | Warranty | 1-year |
| | Optional Travel Battery Available | No |

Technical Specifications

AUDIO

| | |
|-----------------------------------|--|
| HD Stereo Codec | Realtek ALC3247 |
| Audio I/O Ports | One Headset Combo-Jack connector support CTIA spec. |
| Internal Speaker Amplifier | 2W class D stereo amplifier for the internal speaker only. External speakers must be powered. |
| Multi-streaming Capable | Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the Combo jack or integrated speaker. |
| Sampling | Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 48 kHz for DAC and ADC. |
| Wavetable Syntheses | Yes - Uses OS soft wavetable |
| Analog Audio | Yes. |
| # of Channels on Line-Out | 0 |
| Internal Speaker | Yes |

FINGERPRINT READER

| | |
|---------------------------------|--|
| Sensor vendor | Elan eFSA80ST touch sensor |
| Sensor type | Capacitive |
| DPI resolution | 508 DPI |
| Scan area | 80 x 80 pixels array |
| False Rejection Rate | FRR (False Reject Rate) / FAR (False Acceptance Rate): FRR ~ 2% @ 1:50K FAR |
| False Acceptance Rate | |
| Mobile Voltage Operation | 2.65V to 3.6V |
| Operating Temperature | 32° to 95° F (0° to 35° C) |
| Current Consumption | |
| Image | 50mA peak |
| Low Latency Wait For | |
| Finger | <900 uA |
| Capture Rate | 20cm/sec |
| ESD Resistance | IEC 61000-4-2 (+15KV) |
| Detection Matrix | 508 dpi / 4x4mm sensor area |

Technical Specifications

ENVIRONMENTAL DATA

| | | | |
|--|---|---------------------|---------------------|
| Eco-Label Certifications & declarations | <p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> IT ECO declaration US ENERGY STAR® US Federal Energy Management Program (FEMP) EPEAT® registered where applicable. EPEAT® registration varies by country. See http://www.epeat.net for registration status by country.* <p>*Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.</p> <ul style="list-style-type: none"> TCO- N/A China Energy Conservation Program (CECP) China State Environmental Protection Administration (SEPA) Taiwan Green Mark Korea Eco-label Japan PC Green label* | | |
| Sustainable Specifications | Impact <ul style="list-style-type: none"> 5% post-consumer recycled plastic Low halogen Outside Box and corrugated cushions are 100% sustainably sourced and recyclable Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable Bulk packaging available | | |
| System Configuration | <p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.</p> | | |
| Energy Consumption (in accordance with US ENERGY STAR® test method) | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 50Hz |
| Normal Operation (Sort idle) | 4.97 W | 4.94 W | 4.87 W |
| Normal Operation (Long idle) | 2.74 W | 2.79 W | 2.72 W |
| Sleep | 0.42 W | 0.42 W | 0.44 W |
| Off | 0.14 W | 0.14 W | 0.17 W |
| | <p>NOTE: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p> | | |
| Heat Dissipation* | 115VAC, 60Hz | 230VAC, 50Hz | 100VAC, 50Hz |
| Normal Operation (Short idle) | 17 BTU/hr | 16.9 BTU/hr | 16.7 BTU/hr |
| Normal Operation (Long idle) | 9.4 BTU/hr | 9.5 BTU/hr | 9.3 BTU/hr |
| Sleep | 1.4 BTU/hr | 1.4 BTU/hr | 1.5 BTU/hr |
| Off | 0.5 BTU/hr | 0.5 BTU/hr | 0.6 BTU/hr |

Technical Specifications

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| | <p>*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p> | | |
| Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296) | | Sound Power (L _{WAd} , bels) | Sound Pressure (L _{pAm} , decibels) |
| | Typically Configured – Idle | 2.7 | 16.2 |
| | Fixed Disk – Random writes | 2.8 | 18.6 |
| | Optical Drive – Sequential reads | N/A | N/A |
| Longevity and Upgrading | <p>This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the</p> | | |
| | <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</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 (EPEAT) standard at the Gold level, see www.epeat.net • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product is 94.2% recycle-able when properly disposed of at end of life. | | |
| Packaging Materials | External: | PAPER/Corrugated | 295 g |
| | | PAPER/Molded Pulp | 141 g |
| | Internal: | PLASTIC/Polyethylene low density - LDPE | 10 g |
| | | PLASTIC/Polypropylene - PP | 4 g |
| | The plastic packaging material contains at least 0.0% recycled content. | | |
| The corrugated paper packaging materials contains at least 57.0% recycled content. | | | |
| RoHS Compliance | <p>HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.</p> <p>We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products.</p> <p>We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.</p> <p>To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.</p> | | |
| 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> | | |

Technical Specifications

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| | <p>);</p> <ul style="list-style-type: none"> • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics • Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • Bis(2-Ethylhexyl) phthalate (DEHP) • Benzyl butyl phthalate (BBP) • Dibutyl phthalate (DBP) • Diisobutyl phthalate (DIBP) • Formaldehyde • Halogenated Diphenyl Methanes • Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBEBs) • 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>HP offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the 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

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| <p>HP, Inc. Corporate Environmental Information</p> | <p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</p> <p>ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</p> |
| <p>footnotes</p> | <ul style="list-style-type: none"> • Percentage of ocean-bound plastic contained in each component varies by product • Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard. • External power supplies, WWAN modules, power cords, cables and peripherals excluded. • 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers. • Fiber cushions made from 100% recycled wood fiber and organic materials. |

COUNTRY OF ORIGIN

China

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

| Category | Description | Part Number |
|-----------------------------|---|-------------|
| Audio/Video | HP Wired USB-A Stereo Headset | 428K6AA |
| | HP Wired 3.5mm Stereo Headset | 428K7AA |
| | HP 500 BT Headset | 53L34AA |
| | HP 365 BT Speaker | 567D3AA |
| Cases | HP Prelude Backpack 15.6 | 1E7D6AA |
| | HP Prelude Top Load 15.6 | 1E7D7AA |
| | HP Prelude Pro Recycle Backpack | 1X644AA |
| | HP Prelude Pro Recycle Top Load | 1X645AA |
| | HP Prelude Pro Recycle Backpack | 1X644AA |
| | HP Prelude Pro Recycle Top Load | 1X645AA |
| | HP Executive 15.6 Backpack | 6KD07AA |
| | HP Executive 15.6 Top Load | 6KD06AA |
| | HP Renew Business 17.3" Backpack | 3E2U5AA |
| | HP Renew Business 15.6" Bag | 3E5F8AA |
| HP Renew Business 17.3" Bag | 3E2U6AA | |
| Adapter | HP USB 3.0 to Gigabit Adapter | N7P47AA |
| | HP USB-C to RJ45 Adapter | V7W66AA |
| | HP USB-C to USB 3.0 Adapter | N2Z63AA |
| | HP USB-C to RJ45 Adapter G2 | 4Z527AA |
| | HP USB 3.0 to Gig RJ45 Adapter G2 | 4Z7Z7AA |
| Keyboard/Combo | HP 975 USB+BT Dual-Mode Wireless Keyboard | 3Z726AA |
| | HP 655 Wireless Keyboard and Mouse Combo | 4R009AA |
| | HP 225 Wired Mouse and Keyboard Combo | 286J4AA |
| | HP 235 Wireless Mouse and Keyboard Combo | 1Y4D0AA |
| Mouse | HP USB Premium Wireless Mouse | 1JR31AA |
| | HP 435 Multi-Device Wireless Mouse | 3B4Q5AA |
| | HP Creator USB-A+Bluetooth 935 Wireless Mouse Black | 1D0K8AA |
| | HP USB-A+Bluetooth Travel Bluetooth Mouse | 6SP30AA |
| | HP 235 Slim Wireless Mouse | 4E407AA |
| Power | HP 65W Smart AC Adapter | H6Y89AA |
| Commodity | HP USB DVD-Writer EXT ODD | F2B56AA |

Summary of Changes

| Date of change | Version History | | Description of change |
|------------------|-----------------|---------|---|
| March 14, 2022 | V1 to V2 | Added | Battery Compliance in Power section; Environmental Data section |
| April 11, 2022 | V2 to V3 | Added | Reference for USB ports |
| April 25, 2022 | V3 to V4 | Added | MIL-STD test in At a Glance section |
| June 10, 2022 | V4 to V5 | Updated | TechSpecs |
| June 15, 2022 | V5 to V6 | Added | Added note in Manageability Feature |
| June 30, 2022 | V6 to V7 | Updated | Intel® Pentium® Silver Processor |
| August 5, 2022 | V7 to V8 | Updated | Eco-Label Certifications & declarations |
| August 8, 2022 | V8 to V9 | Updated | Memory Slots |
| October 20, 2022 | V9 to V10 | Updated | Bluetooth version |
| March 6, 2023 | V10 to V11 | Updated | Storage and Drives section |
| March 22, 2023 | V11 to V12 | Updated | USB Type C® description |
| April 24, 2024 | V12 to V13 | Updated | Memory Section |
| May 24, 2024 | V13 to V14 | Removed | Options and Accessories section |

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