

Overview

HP Pro mt440 G3 Mobile Thin Client



Left

- | | |
|-----------------------------------|---|
| 1. Internal Microphones (2) | 5. Clickpad |
| 2. Webcam LED (Optional) | 6. SuperSpeed USB 3.2 Gen 1x1 Type-A port |
| 3. Camera Shutter | 7. Ethernet Port (RJ-45) |
| 4. Combo Web/IR Camera (Optional) | 8. Nano Security Lock Slot (Lock sold separately) |

Overview



Right

1. Power Button Key
 2. Power Connector
 3. SuperSpeed+ USB 3.2 Gen 2x1 Type-C® (USB Power Delivery, DisplayPort™ 1.4)
 4. SuperSpeed USB 3.2 Gen 1x1 Type-A port
 5. SuperSpeed USB 3.2 Gen 1x1 Type-A port
 6. HDMI 2.1 Port (Cable not included)
 7. Audio Combo Jack
 8. External SIM (WWAN Optional Model)
 9. Touch Fingerprint Sensor² (Select Models)
1. Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.
2. Not available on ThinPro

Overview

AT A GLANCE

- Choice of Windows 10 IoT Enterprise 2021 LTSC, HP ThinPro OS, HP Smart Zero OS, FreeDOS
- 12th generation Intel® Celeron™ 7305 processor
- Intel UHD Graphics for 12th Gen Intel Processors
- Fast and upgradeable dual channel DDR4 SODIMM memory up to 16 GB
- Choice of 35.56 cm (14") diagonal HD, Ultra Wide Viewing Angle FHD, Touch or Non-Touch screen
- Features redesigned quiet and responsive HP Keyboard and backlit options
- Choice of solid state drives up to 256GB (Optional)
- Multi-layered security with HP SureStart Gen7, HP Privacy Camera, and Touch Fingerprint reader, Tamper Lock, HP Biosphere
- Take manageability to the next level with HP Cloud Endpoint Manager
- Supports wireless options for connectivity on the go including gigabit-speed Wi-Fi® 6 and CAT16 4G/LTE WWAN (Optional)
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Select dock and display support
- Passed MIL-STD 810H tests
- Battery options 42.75 Wh and 51.3 Wh
- Battery life up to 8 hrs.48 minutes
- Optimize your video calls with an 720 p Wide Field of View HD camera

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

Technical Specifications

PRODUCT NAME

HP Pro mt440 G3 Mobile Thin Client

OPERATING SYSTEM

Preinstalled Windows 10 IoT Enterprise¹
 HP ThinPro²
 HP Smart Zero Core²
 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, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

2. Not all features are available with HP ThinPro, Smart Zero Core and FreeDOS.

PROCESSORS

Processor ^{3,4,5}	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® Celeron® 7305	5	1	4	5	8MB	N/A	N/A	1.1 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. 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

Supports
 Support HD decode, DX12, HDMI 2.1

8. HD content required to view HD images.

Technical Specifications

DISPLAY

Non-Touch

35.6 cm (14") diagonal FHD UWVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD camera (1920x1080)^{8,10}

35.6 cm (14") diagonal FHD UWVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD camera and WWAN (1920x1080)^{8,10}

35.6 cm (14") diagonal HD SVA eDP + PSR anti-glare, narrow bezel bent, 250 nits, 45% NTSC (1366 x 768)^{8,10}

35.6 cm (14") diagonal HD SVA eDP anti-glare, narrow bezel bent, 250 nits, 45% NTSC for HD camera (1366 x 768)^{8,10}

Touch*

35.6 cm (14") diagonal FHD UWVA eDP + anti-glare, narrow bezel bent, touch-on-panel screen, 250 nits, 45% NTSC for HD camera (1920x1080)^{8,9,10,12}

HDMI

Support resolutions up to 4k 60Hz

Display Size

14" diagonal

35.6 cm (14") diagonal

* Touchscreen only available with Windows 10 IoT Enterprise

8. HD content required to view HD images.

9. Sold separately or as an optional feature.

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

12. Actual brightness will be lower with touchscreen

DOCKING (Sold Separately)

Docking station model #1

HP USB-C Dock G5

Displays

HP E24m G4 FHD USB-C Conferencing With HDMI With DisplayPort Monitor

HP E24u G4 FHD USB-C Monitor

HP E27m G4 QHD USB-C Conferencing With HDMI With DisplayPort Monitor

HP E27u G4 QHD With HDMI With DisplayPort Monitor

Technical Specifications

Docking station model	MTC Supported	Total number of supported displays	Max. resolution support	Dock Connector	Technical limitations
HP Thunderbolt Dock 120W G4	HP Elite mt645 G7	3	Dual 4k @60Hz	2xDP, 1xHDMI, 1xUSB-C DP	Not available with mt440 G3 USB 4 not supported HP ThinPro 8.0 SP3 and later versions support HP Thunderbolt G4 Dock with mt645 Dual RAM is required to support 3 displays (one notebook display + dual 4k@60hz on dock).
HP USB-C Dock G5	HP Elite mt645 G7, HP Pro mt440 G3	3	Dual 4k @60Hz	2xDP, 1xHDMI	HP ThinPro 8.0 SP3 and later versions support HP USB-C Dock G5 with mt440, mt645 Dual RAM is required to support 3 displays (one notebook display + dual 4k@60hz on dock).

STORAGE AND DRIVES

Primary Storage

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

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

13. For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30 GB (for Windows 10 and 11) is reserved for system recovery software.

MEMORY

Maximum Memory

16 GB DDR4-3200 SDRAM ¹⁵

Memory

16 GB DDR4-3200 SDRAM (2 x 8 GB) ¹⁵

8 GB DDR4-3200 SDRAM (2 x 4 GB) ¹⁵

Memory Slots

2 SODIMM

Both slots are accessible/upgradeable by IT or self-maintainers only.

DDR4 PC4 SODIMMS, system runs at 3200

Supports Dual Channel Memory

15. 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

Technical Specifications

WLAN

Intel® AX211 Wi-Fi 6 +Bluetooth® 5.2 M.2 2230 160MHz CNVi World-Wide WLAN ^{17,20}

Realtek 8852BE Wi-Fi6 + Bluetooth® 5.2 M.2 2230 PCI-e+ USB World-Wide WLAN ^{17,20}

WWAN

Intel® XMM 7560 R+ LTE-Advanced Pro Cat16^{18,21}

Ethernet

Realtek RTL8111HSH 10/100/1000 Integrated NIC ¹⁹

17. 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 prior 802.11 specs. 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.

18. WWAN module is optional, must be configured at the factory and requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.

19. 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.

20. optional and must be configured at purchase

21. WWAN only available with Windows 10 IoT Enterprise OS.

AUDIO/MULTIMEDIA

Audio

2 Integrated stereo speakers

Integrated microphone (Dual Array)

Speaker Power

2W/4ohm Per speaker

Camera

720p HD camera⁸

8. HD content required to view HD images.

Technical Specifications

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard, full-size, spill resistant with numeric keypad and optional backlit ²⁰

Pointing Device

Clickpad with multi-touch gesture support

Function Keys

F1 - Display Switching

F2 - Blank

F3 - Brightness Down

F4 - Brightness Up

F5 - Audio Mute

F6 - Volume Down

F7 - Volume Up

F8 - Mic Mute

F9 - Blank or Backlit Toggle

F10 - Insert

F11 - Airplane Mode

Print Screen

Power Button (with LED)

Hidden Function Keys

Fn+R - Break

Fn+S - Sys Rq

Fn+C - Scroll Lock

[20. Backlit keyboard is an optional feature.](#)

Technical Specifications

SOFTWARE AND SECURITY

Software

HP Connection Optimizer -"Windows Only"
HP Hotkey Support -"Windows Only"
HP EasyShell -"Windows only"
HP Write Manager -"Windows Only"
HP Thin Update -"Windows Only"
HP Easy Update "ThinPro Only"

Manageability Features

HP Cloud Endpoint Manager
HP Device Manager
HP Write Filter
HP BIOS Configuration Utility

Security Management

HP Sure Start Gen7²⁹
HP Tamper Lock-optional
Pre booth Authentication
Support for chassis padlocks and cable lock devices
BIOS Update via Network HP

BIOS

HP BIOSphere Gen6³¹
HP Secure Erase³²
BIOS Update via Network
TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)
HP Fingerprint Sensor³⁴
USB enable/disable (via BIOS)
Power-on password (via BIOS)
Setup password (via BIOS)

Security

TPM

Model: Nuvoton NPCT760HAAYX
Version: 7.2.3.0
Revision: TPM 2.0
FIPS 140-2 Compliant: Yes

IPv6 Compliance

TBC

FirstNet Certified

No

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

UEFI version: 2.7

Class: 3

Technical Specifications

- 29. HP Sure Start Gen7 is available on select HP PCs.
- 31. HP BIOSphere Gen6 features may vary depending on the platform and configuration.
- 32. For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method.
- 34. HP Fingerprint Reader is an optional feature that must be configured at purchase. Finger print sensor is available with Windows 10 IoT Enterprise OS only.

SOFTWARE SUPPORT

Host Environment	Protocol	HP	Microsoft
		ThinPro	Windows 10 IoT Enterprise 2021
Remote Desktop Services	Remote FX (RFX), RDP	✓	✓
Citrix®	ICA, HDX	✓	✓
VMware® Horizon	RDP, PCoIP, Blast Extreme	✓	✓

Protocol Clients	HP	Microsoft
	ThinPro	Windows 10 IoT Enterprise 2021
Citrix® Workspace app	✓	✓
Microsoft Remote Desktop Client		✓
Free Remote Desktop Client	✓	
VMware™ Horizon View™ Client	✓	✓
HP Remote Graphics Software (RGS)	via add-on	✓
TurboSoft TTerm for Linux® Terminal emulation Software	via add-on	
TurboSoft TTWin Terminal emulation software		via add-on
AVD/Win365	via add-on	via add-on
AWS Amazon Workspace	via add-on	via add-on
HP Anyware ¹	via add-on	via add-on

¹HP Anyware supports Windows®, Linux® and MacOS® host environments and Window, Linux, MacOS, iOS®, Android®, and Chrome OS® end-user devices. For more on the system requirements for installing HP Anyware, refer to the Admin Guides at: <https://docs.teradici.com/find/product/cloud-access-software>

Technical Specifications

POWER

Power Supply

- HP Smart 65 W External AC power adapter ³⁵
- HP Smart 65 W EM External AC power adapter ³⁵
- HP Smart 65 W USB Type-C adapter ³⁵
- HP Smart 45 W External AC power adapter ³⁵
- HP Smart 45 W USB Type-C adapter ³⁵

Battery

- HP Long Life 3-cell, 42.75 Wh Polymer ^{36,37}
- HP Long Life 3-cell, 51.3 Wh Polymer ^{36,37}

Power Cord

- 3-wire plug - 1 ³⁵
- 2-wire plug - 1 ³⁵

Battery life

- Up to 8 hrs.48 minutes ³⁸

35. Availability may vary by country.

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

37. 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.

38. 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.

WEIGHTS & DIMENSIONS

Product Weight

42.75Wh

- Starting at 3.03 lbs³⁹
- Starting at 1.38 kg ³⁹

51.3 Wh

- Starting at 3.14 lbs³⁹
- Starting at 1.42 kg ³⁹

Product Dimensions (W x D x H)

- 12.67 x 8.42 x 0.78 in
- 32.19 x 21.39 x 1.99 cm

39. Weight will vary by configuration.

Technical Specifications

PORTS/SLOTS

- 1 SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)
- 3 SuperSpeed USB Type-A 5Gbps signaling rate (1 charging, 1 powered port)
- 1 HDMI 2.1 ⁴⁰
- 1 RJ-45
- 1 Headphone/microphone combo jack
- 1 AC power
- 1 External Nano SIM slot for WWAN (optional)

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

Technical Specifications

SERVICE AND SUPPORT

HP Services offers 1-year or 3-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 specials only 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>.⁴¹

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

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)

Nominal Operating Voltage	19V
Integrated graphics	Yes
Max Operating Power	UMA U15 < 45W, UMA U28 < 65W

Temperature

Operating	32° to 95° F (0° to 35° C) (No sustained direct exposure to sunlight) (System performance may be reduced above 32°C (89.6°F))
Non-operating	-4° to 140° F (-20° to 60° C)

Relative Humidity

Operating	10% to 90% (non-condensing)
Non-operating	5% to 95% (38.7° C (101.6° F) maximum wet bulb tempera-ture; non-condensing)

Shock

Operating	40 G, 2 ms, half-sine
Non-operating	200 G, 2 ms, half-sine

Random Vibration

Operating	1.043 grams
Non-operating	3.5 grams

Altitude (unpressurized)

Operating	10,000 ft (3,048 m)
Non-operating	40,000 ft (12,192 m)

Planned Industry Standard Certifications

Regulatory Model Number	HSN-Q32C-4
UL	Yes
CSA	Yes
FCC Compliance	Yes
ENERGY STAR®	Yes ⁴²
EPEAT®	EPEAT® Gold in the United States ⁴³
ICES	Yes
Australia /	Yes
NZ A-Tick Compliance	Yes
CCC	Yes
Japan VCCI Compliance	Yes
KC	Yes
BSMI	Yes
CE Marking Compliance	Yes
BNCI or BELUS	Yes
CIT	Yes
EAC	Yes
Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

42. Configurations of the HP Pro mt440 G3 Mobile Thin Client that are ENERGY STAR® qualified are identified as HP Pro mt440 G3 Mobile Thin Client ENERGY STAR on HP websites and on <http://www.energystar.gov>.

43. 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.

Technical Specifications

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.

Panel LCD 14 inch FHD (1920 x 1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR bent Touch on Panel NBWZ	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 Pixel Resolution Color Gamut Coverage Color Depth Viewing Angle Low Blue Light Power Consumption (W, EBL@ 150nits max/ 200nits max)	316.170 x 186.400 mm (max) (w/ PCB) 309.370 x 174.020 mm (typ.) 305 g (max) 14.0 (inch) 3.0 mm/ 5.0 mm (PCB) (max) eDP 1.2 Anti-Glare On-cell Yes ¹ 600:1 (typ.) 60 Hz 250 nits 1920 x 1080 (FHD) LED RGB Stripe NTSC 45% 6 bits (Hi FRC supportive w/ condition to enable) UWVA 85/85/85/85 No 2.3W max./2.8W max.
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Panel LCD 14 inch FHD (1920 x 1080) Anti-Glare WLED UWVA sRGB 100percent cg 400nits eDP 1.4+PSR2 bent LP NB2X	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 Pixel Resolution Color Gamut Coverage Color Depth Viewing Angle Low Blue Light	315.070 x 186.600 mm (max) 309.370 X 174.020mm (typ.) 200 g (max) 14.0 (inch) 2.0 mm/4.0 mm (w/PCB) (max) eDP 1.4 Anti-Glare No 1200:1 (typ.) 60Hz 400 nits 1920 x 1080 (FHD) LED RGB Stripe sRGB 100% (NTSC 72%) 6 bits UWVA 85/85/85/85 No
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Technical Specifications

Power Consumption (W, EBL@ 150nits max/ 200nits max) 2.07W max./ 2.5W max.

Panel LCD 14-in FHD (1920 x 1080) Anti-Glare WLED UWVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ bent

Outline Dimensions (W x H) 316.170 x 186.400 mm (max) (w/ PCB)
Active Area 309.370 x 174.020 mm (typ.)
Weight 300 g (max)
Diagonal Size 14.0 (inch)
Thickness 3.0 mm/ 5.0 mm (PCB) (max)
Interface eDP 1.2
Surface Treatment Anti-Glare
Touch Enabled No
Contrast Ratio 600:1 (typ.)
Refresh Rate 60 Hz
Brightness 250 nits
Pixel Resolution - Format 1920 x 1080 (FHD)
Backlight LED
Pixel Resolution RGB Stripe
Color Gamut Coverage NTSC 45%
Color Depth 6 bits (Hi FRC supportive w/ condition to enable)
Viewing Angle UWVA 85/85/85/85
Low Blue Light No
Power Consumption (W, EBL@ 150nits max/ 200nits max) 2.205W Max/2.716W Max

Panel LCD 14-in HD (1366 x 768) Anti-Glare WLED SVA 45percent cg 250nits eDP 1.2 w/o PSR NWBZ bent

Outline Dimensions (W x H) 316.110 x 186.370 mm (max)
Active Area 309.400 x 173.950 mm (typ.)
Weight 300 g (max)
Diagonal Size 14.0 (inch)
Thickness 3.0 mm / 5.0 mm (w/PCB) (max)
Interface eDP 1.2 (1 lane)
Surface Treatment Anti-Glare
Touch Enabled No
Contrast Ratio 300:1 (typ.)
Refresh Rate 60 Hz
Brightness 250 nits
Pixel Resolution - Format 1366 x 768 (HD)
Backlight LED
Pixel Resolution RGB Stripe
Color Gamut Coverage NTSC 45%
Color Depth 6 bits
Viewing Angle SVA 45/45/15/35
Low Blue Light No

Technical Specifications

**Power Consumption (W, EBL@
150nits max/ 200nits max)**

2.52W max./ 2.86W 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 10 and 11) is reserved for system recovery software.

SSD 128GB 2230 PCIe NVMe Value	Form Factor	M.2 2230
	Capacity	128GB
	NAND Type	Value
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Weight	0.01 lb (5 g)
	Interface	PCIe NVMe Gen3
	Maximum Sequential Read	Up to 2100 MB/s
	Maximum Sequential Write	Up to 1200 MB/s
	Logical Blocks	250,069,680
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	Pyrite; TRIM; L1.2

SSD 256GB 2280 PCIe NVMe Value	Form Factor	M.2 2280
	Capacity	256GB
	NAND Type	Value
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Interface	PCIe NVMe Gen3
	Maximum Sequential Read	Up to 2900 MB/s
	Maximum Sequential Write	Up to 1400 MB/s
	Logical Blocks	500,118,192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; TRIM; L1.2

Technical Specifications

NETWORKING/COMMUNICATIONS

<p>Intel® AX211 Wi-Fi 6 and Bluetooth® 5.2 M.2 160MHz CNVi WW WLAN non-vPro¹</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</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 : 1733Mbps •802.11ax : max 2.4Gbps
<p>Modulation</p>	<p>Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM</p>
<p>Security³</p>	<ul style="list-style-type: none"> •IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •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 : +17dBm minimum • 802.11g : +16dBm minimum • 802.11a : +17dBm minimum • 802.11n HT20(2.4GHz) : +14dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum

Technical Specifications

- 802.11n HT20(5GHz) : +14dBm minimum
- 802.11n HT40(5GHz) : +13dBm minimum
- 802.11ac VHT80(5GHz) : +10dBm minimum
- 802.11ac VHT160(5GHz) : +10dBm minimum
- 802.11ax HE40(2.4GHz) : +12dBm minimum
- 802.11ax HE80(5GHz) : +10dBm minimum
- 802.11ax HE160(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 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(VHT80) : -84dBm maximum
- 802.11ac, MCS9(VHT80) : -59dBm maximum
- 802.11ac, MCS9(VHT160) : -58.5dBm maximum
- 802.11ax, MCS11(HE40) : -57dBm maximum
- 802.11ax, MCS11(HE80) : -54dBm maximum
- 802.11ax, MCS11(HE160) : -53.5dBm maximum

Antenna type

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

Form Factor

PCI-Express M.2 MiniCard

Dimensions

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 1216: 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 Wireless Technology

Bluetooth Specification 4.0/4.1/4.2/5.0/5.1/5.2 Compliant

Technical Specifications

Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy: 3 Mbps data rate; 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 + 9.5 dBm for BR and EDR.

1. 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 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® 5.2 (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>	<ul style="list-style-type: none"> Wi-Fi certified modules
	<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>	<ul style="list-style-type: none"> Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
	<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>	<ul style="list-style-type: none"> Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
	<p>Roaming</p>	<ul style="list-style-type: none"> IEEE 802.11 compliant roaming between access points
	<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

	<ul style="list-style-type: none"> • 802.11ac VHT80(5GHz) : +11.5dBm minimum • 802.11ax HE40(2.4GHz) : +10dBm minimum • 802.11ax HE80(5GHz) : +10dBm minimum
Power Consumption	<ul style="list-style-type: none"> • Transmit mode: 2.5 W • 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 1216: 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 Wireless Technology

Bluetooth Specification	4.0/4.1/4.2/5.0/5.1 Compliant/5.2 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

Technical Specifications

Transmit Power

Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
 Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
 The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.

1. 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 prior 802.11 specs. 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.
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).

Intel® XMM™ 7560 R+ LTE-Advanced Pro^{1,2}

Technology/Operating bands

FDD LTE:
 2100 (Band 1), 1900 (Band 2), 1800 (Band 3),
 1700/2100 (Band 4), 850 (Band 5), 2600 (Band 7), 900 (Band 8), 700 (Band 12 lower), 700 (Band 13 upper), 700 (Band 14 upper), 700 (Band 17 lower), 850 (Band 18 lower), 850 (Band 19 upper), 800 (Band 20), 1900 (Band 25), 850 (Band 26), 700 (Band 28), 700 (Band 29 RX only), 2300 (Band 30), 1700/2100 (Band 66), 600 (band 71).

TDD LTE:
 2100 (Band 34), 2600 (Band 38), 1900 (Band 39), 2400 (Band 40), 2500 (Band 41), 3500 (Band 42), 3700 (Band 43), 3700 (band 48), 5200 (Band 46 RX only) MHz;

HSPA+:
 2100 (Band 1), 1900 (Band 2), 1700/2100 (Band 4), 850 (Band 5), 900 (Band 8) MHz

Wireless protocol standards

3GPP Release 12 LTE Specification DL-CAT.16, DL 100MHz BW throughput up to 978Mbps; UL-CAT.13 40MHz throughput up to 150Mbps

GPS GPS bands

WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B) 1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz

Maximum data rates

LTE: 978 Mbps (Download), 150 Mbps (Upload)
 DC-HSPA+: 42 Mbps (Download), 5.76 Mbps (Upload)
 HSPA+: 21Mbps (Download), 5.76 Mbps (Upload)

Maximum output power

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

Maximum power consumption

LTE: 1,200 mA (peak); 900 mA (average)
 HSPA+: 1,100 mA (peak); 800 mA (average)

Form Factor

M.2, 3042-S3 Key B

Weight

6 g

Dimensions (Length x Width x Thickness)

42 x 30 x 2.3 mm

Technical Specifications

1. Mobile Broadband is an optional feature. Connection requires wireless data service contract, network support, and is not available in all areas. Contact service provider to determine the coverage area and availability. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products or in all countries.
2. Only available with Windows 10 IoT Enterprise OS.

Realtek RTL8111HSH 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	Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30))
	Interface	PCIe + SMBus
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller

Technical Specifications

POWER

AC Adapter 45 Watt nPFC Standard USB type C Straight 1.8m	Dimensions	94.0mm x 40.0mm x 26.5mm
	Weight	192.5g +/-10%
	Input	
	Input Efficiency	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec: 5V: 81.5% 9V: 86.7% 12V: 87.41% 15V: 87.8%
	Input frequency range	47 to 63 Hz
	Input AC current	Max. 1.4 A at 90 Vac
	Output	
	Output power	5V/15W 9V/27W 12V/36W 15V/45W
	DC output	5V/9V/12V/15V
	Hold-up time	5ms at 115 Vac input
	Output current limit	<5.0A
	Connector	USB Type-C
	Environmental Design	
	Operating temperature	32° to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
	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.

AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	Dimensions	95 x 45 x 26.5 mm
	Weight	unit: 200g +/- 10g
	Input	
	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
	Input frequency range	47 ~ 63 Hz
	Input AC current	Max. 1.4 A at 90 Vac
	Output	
	Output power	45W
	DC output	19.5V

Technical Specifications

Hold-up time	5ms at 115 Vac input
Output current limit	<8.0A
Connector	4.5mm Barrel Type
Environmental Design	
Operating temperature	32° to 95° F (0° to 35° C)
Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)
Altitude	0 to 16,400 ft (0 to 5000m)
Humidity	20% to 95%
Storage Humidity	10% to 95%
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.

AC Adapter 65 Watt nPFC Standard USB type C Straight 1.8m	Dimensions	90.0 x 51 x 28.5mm
	Weight	unit: 250g +/- 10g
	Input	
	Input Efficiency	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec: 5V: 81.5% 9V: 86.7% 12V: 88% 15V: 88% 20V: 89%
	Input frequency range	47 ~ 63Hz
	Input AC current	1.6 A at 90 VAC and maximum load
	Output	
	Output power	5V/15W 9V/27W 12V/60W 15V/60W 20V/65W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input
	Output current limit	<8.0A
	Connector	USB Type-C
	Environmental Design	
	Operating temperature	32° to 95° F (0° to 35° C)
Non-operating (storage) temperature	-4° to 185° F (-20° to 85° C)	
Altitude	0 to 16,400 ft (0 to 5000m)	

Technical Specifications

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

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

Dimensions	102 x 55 x 30mm
Weight	unit: 250g +/- 10g
Input	
Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230Vac
Input frequency range	47 ~ 63 Hz
Input AC current	Max. 1.7 A at 90 Vac
Output	
Output power	65W
DC output	19.5V
Hold-up time	5ms at 115 Vac input
Output current limit	<11.0A
Connector	4.5mm Barrel Type
Environmental Design	
Operating temperature	32°F to 95°F (0°to 35°C)
Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
Altitude	0 to 16,400 ft (0 to 5000m)
Humidity	20% to 95%
Storage Humidity	10% to 95%
EMI and Safety Certifications	<p>Eg:</p> <p>*CE Mark - full compliance with LVD and EMC directives</p> <p>* Worldwide safety standards - IEC60950-1 and/or IEC62368-1, EN60950-1 and/or EN62368-1, UL60950-1 and/or UL62368-1 , Class1, SELV;</p> <p>Agency approvals - C-UL-US, NORDICS, DENAN, EN55032 Class B, FCC Class B, CISPR32 Class B, CCC, NOM-001 NYCE.</p> <p>* MTBF - over 200,000 hours at 25°C ambient condition.</p>

Technical Specifications

AC Adapter 65 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	Dimensions	90 x 51 x 28.5mm
	Weight	Unit: 230g +/-10%
	Input	
	Input Efficiency	88.0 % at 115 Vac and 89.0 % at 230 Vac
	Input frequency range	47 ~ 63 Hz
	Input AC current	Max. 1.7 A at 90 Vac
	Output	
	Output power	65W
	DC output	19.5V
	Hold-up time	5 ms at 115 Vac input
	Output current limit	<11.0A
	Connector	4.5mm Barrel Type
	Environmental Design	
	Operating temperature	32°F to 95°F (0°to 35°C)
	Non-operating (storage) temperature	-4°F to 185°F (-20°to 85°C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
Storage Humidity	10% to 95%	
EMI and Safety	Eg:	
Certifications	*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.	

AC Adapter 65 Watt nPFC Slim USB type C Straight 1.8m	Dimensions	88x53.5x21mm
	Weight	unit: 220g +/- 10g
	Input	
	Input Efficiency	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 12V/5A 89% min at 115 Vac/ 230Vac @ 15V/4.33A 89% min at 115 Vac/ 230Vac @ 20V/3.25A
	Input frequency range	47 ~ 63 Hz
	Input AC current	1.7 A at 90 VAC and maximum load
	Output	
	Output power	65W
	DC output	5V/9V/12V/15V/20V
	Hold-up time	5ms at 115 Vac input
	Output current limit	<8.0A
	Connector	USB Type C
Environmental Design		
Operating temperature	32°F to 95°F (0°to 35°C)	

Technical Specifications

Non-operating (storage) temperature	-4°F to 185°F (-20° to 85°C)
Altitude	0 to 16,400 ft (0 to 5000m)
Humidity	5% to 95%
Storage Humidity	5% to 95%
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.

RH 42Whr Long Life Polymer Fast Charge 3 cell Battery	Dimensions (H x W x L)	6.2 x 76.25 x 249.50 mm (0.244 x 3.002 x 9.823 inch)
	Weight	0.18 kg (0.397 lb)
	Cells/Type	3cell Lithium-Ion Polymer cell / 545974
	Energy	
	Voltage	11.4V
	Amp-hour capacity	3.752Ah
	Watt-hour capacity	42.75Wh
	Temperature	
	Operating (Charging)	32° to 113° F (0° to 45° C)
	Operating (Discharging)	14° to 122° F (-10° to 60° C)
	Fuel Gauge LED	NA
	Warranty	Follow product spec
	Optional Travel Battery Available	No

Technical Specifications

RH 51Whr Long Life Polymer Fast Charge 3 cell Battery	Dimensions (H x W x L)	6.50 x 67.80 x 254.00 mm (0.256 x 2.669 x 10 inch)
	Weight	0.2025 kg (0.446 lb)
	Cells/Type	3cell Lithium-Ion Polymer cell / 566075
	Energy	
	Voltage	11.58V
	Amp-hour capacity	4.431Ah
	Watt-hour capacity	51.3Wh
	Temperature	
	Operating (Charging)	32° to 113° F (0° to 45° C)
	Operating (Discharging)	14° to 122° F (-10° to 60° C)
	Fuel Gauge LED	NA
	Warranty	Follow product spec
	Optional Travel Battery Available	No

Technical Specifications

AUDIO

HD Stereo Codec	ALC3247-CG
Audio I/O Ports	Headset: CTIA only and Headphone-out
Internal Speaker Amplifier	ALC 3247 has Embedded Class-D 2W Stereo Amplifier
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control panel to allow independent audio. Following MSFT Behavior
Sampling	DAC:44.1k/48kHz ADC:48kHz
Wavetable Syntheses	NA
Analog Audio	Support 3.5mm Headset: CTIA only and Headphone-out
# of Channels on Line-Out	NA
Internal Speaker	Yes

FINGERPRINT READER

Sensor vendor	Elan efsa80ST
Sensor type	Capacitive
DPI resolution	508 dpi
Scan area	80*80 pixels
False Rejection Rate	<3%
False Acceptance Rate	1/100K
Mobile Voltage Operation	2.7V to 3.6V
Operating Temperature	-4 – 175°F (-20° ~ +80°C)
Current Consumption	
Image	50mA peak
Low Latency Wait For Finger	900uA
Capture Rate	30 frame/sec
ESD Resistance	+15KV
Detection Matrix	80*80 pixels/ 508 dpi / 4*4mm sensor area

COUNTRY OF ORIGIN

China

Technical Specifications

ENVIRONMENTAL DATA

Eco-Label Certifications & declarations

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:

- IT ECO declaration
- US ENERGY STAR®
- US Federal Energy Management Program (FEMP)
- EPEAT[™] Gold registered in the United States. See <http://www.epeat.net> for registration status in your country.
- TCO Certified
- IEC 60601-1-2:2014 EN60601-1-2: 2015
- China Energy Conservation Program (CECP)
- China State Environmental Protection Administration (SEPA)
- Taiwan Green Mark
- Korea Eco-label
- Japan PC Green label*

Sustainable Impact Specifications

- Ocean-bound plastic in System Fan and Speaker ¹
- 10% post-consumer recycled plastic ²
- Low halogen³
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable⁴
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable⁵
- Bulk packaging available

System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.

Energy Consumption (in accordance with US ENERGY STAR® test method)

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	4.18 W	4.1 W	4.16 W
Normal Operation (Long idle)	0.93 W	0.92 W	0.96 W
Sleep	0.93 W	0.92 W	0.96 W
Off	0.25 W	0.25 W	0.29 W

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.

Heat Dissipation*

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	14.3 BTU/hr	14 BTU/hr	14.2 BTU/hr
Normal Operation (Long idle)	3.2 BTU/hr	3.1 BTU/hr	3.3 BTU/hr
Sleep	3.2 BTU/hr	3.1 BTU/hr	3.3 BTU/hr
Off	0.9 BTU/hr	0.9 BTU/hr	1 BTU/hr

Technical Specifications

***NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L _{WAd} , bels)	Sound Pressure (L _{pAm} , decibels)
Typically Configured – Idle	2.6	15.5
Fixed Disk – Random writes	2.7	22.8
Optical Drive – Sequential reads	3.3	26.2

Longevity and Upgrading This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the

Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.

- Additional Information**
- 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 93.2% recycle-able when properly disposed of at end of life.

Packaging Materials	External:	PAPER/Corrugated	0.281 g
		PAPER/Molded Pulp	0.122 g
	Internal:	PLASTIC/Polyethylene low density - LDPE	0.009 g

The plastic packaging material contains at least 100% recycled content.

The corrugated paper packaging materials contains at least 35.6% recycled content.

RoHS Compliance HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.

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.

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.

To obtain a copy of the HP RoHS Compliance Statement, see [HP RoHS position statement](#).

Technical Specifications

Material Usage

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):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants – may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Bis(2-Ethylhexyl) phthalate (DEHP)
- Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP)
- Diisobutyl phthalate (DIBP)
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

Packaging Usage

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

End-of-life Management and Recycling

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.

Technical Specifications

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.

HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:

Global Citizenship Report

<http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www8.hp.com/us/en/hp-information/environment/ecolabels.html>

ISO 14001 certificates:

<http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842>

and

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

Footnotes

¹Percentage of ocean-bound plastic contained in each component varies by product

²Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.

³External power supplies, WWAN modules, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be Low Halogen.

⁴100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.

⁵Fiber cushions made from 100% recycled wood fiber and organic materials.

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

DOCKING (Sold Separately)

Docking station model #1	HP USB-C Dock G5
Total number of supported displays (incl. the notebook display)	3
Max. resolutions supported	Dual 5K@ 30Hz + 1 4K UHD (multi-function mode) 5120x2880 Highest resolution with dual displays is two 8K@ 60Hz host in High Resolution mode.
Dock Connectors	1xHDMI, 2xDP

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

Category	Description	Part Number
Cases	HP Business 14.1 Sleeve	2UW01AA
	HP Business Slim 17.3 Top Load	2UW02AA
	HP Executive 14.1 Tote	6KD10AA
	HP Executive 15.6 Backpack	6KD07AA
	HP Executive 15.6 Top Load	6KD06AA
	HP Executive 17.3 Backpack	6KD05AA
	HP Executive 17.3 Top Load	6KD08AA
	HP Executive Leather 15.6 Top Load	6KD09AA
	HP Executive Slim 14.1 Top Load	6KD04AA
	HP Prelude G2 15.6 Backpack	1E7D6AA
	HP Prelude G2 15.6 Top Load	1E7D7AA
	HP Prelude Pro Recycled 15.6 Backpack	1X644AA
	HP Prelude Pro Recycled 15.6 Top Load	1X645AA
	HP Renew 14 Laptop Sleeve	2E6U9AA,2E6V0AA
	HP Renew Business 14.1 Laptop Sleeve	3E2U7AA
	HP Renew Business 17.3 Laptop Backpack	3E2U5AA
	HP Renew Business 17.3 Laptop Bag	3E2U6AA
HP Renew Business 14.1 Laptop Bag	3E5F9AA	
HP Renew Business 15.6 Laptop Bag	3E5F8AA	
Docking	HP USB-C Dock G5	5TW10AA
Adapter	HP HDMI to DVI Adapter	F5A28AA
	HP HDMI to VGA Adapter	H4F02AA
	HP USB-C to DisplayPort Adapter	N9K78AA
	HP USB-C to HDMI 2.0 Adapter	1WC36AA
	HP USB-C to USB 3.0 Adapter	N2Z63AA
	HP USB-C to VGA Adapter	N9K76AA
Displays	HP E24m G4 FHD USB-C Conferencing With HDMI With DisplayPort Monitor	
	HP E24u G4 FHD USB-C Monitor	
	HP E27m G4 QHD USB-C Conferencing With HDMI With DisplayPort Monitor	
	HP E27u G4 QHD With HDMI With DisplayPort Monitor	
Keyboard/Combo	HP 125 WD USB Keyboard	266C9AA
	HP 320K WD USB Keyboard	9SR37AA
	HP 225 Wired Mouse and Keyboard Combo	286J4AA
	HP 235 Wireless Mouse and Keyboard Combo	1Y4D0AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA
	HP Wireless USB Premium Keyboard	Z9N41AA#ABA
Mouse	HP USB Premium Wireless Mouse	1JR31AA
	HP 125 USB-A Wired Mouse	265A9AA

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

	HP 128 USB Laser Wired Mouse	265D9AA
	HP 320M USB-A Wired Mouse	9VA80AA
	HP Creator USB-A+Bluetooth 935 Wireless Mouse Black	1D0K8AA
	HP USB-A+Bluetooth Travel Bluetooth Mouse	6SP30AA
Power	HP 65W USB-C Auto Chevy AC Power Adapter	5TQ76AA
	HP 45W 4.5 mm Smart AC Power Adapter	H6Y88AA
	HP 45W USB-C G2 Zeus AC Power Adapter	1HE07AA
	HP 45W USB-C LC Dali AC Power Adapter	1MZ01AA
	HP 65W 4.5 mm LC Smart non-EM India Ony AC Power Adapter	3FF84AA#ACJ
	HP 65W 4.5 mm Smart AC Power Adapter	H6Y89AA
	HP 65W 4.5 mm wDongle 7.4 mm Slim AC Power Adapter	H6Y82AA
	HP 65W USB-C Hades AC Power Adapter	1HE08AA
	HP 65W USB-C LC AC Power Adapter	1P3K6AA
Commodity	HP Nano Keyed Cable Lock	1AJ39AA
	HP Nano Master Keyed Cable Lock	1AJ40AA
	HP SureKey Standard/Nano/Wedge Cable Lock	6UW42AA

Summary of Changes

Date of change:	Version History:	Updated	Description of change:
October 31, 2022	From v1 to v2	Changed	Format page 2 and 12
January 11, 2023	From v2 to v3	Changed	POWER section
February 17, 2023	From v3 to v4	Added	SOFTWARE SUPPORT section
May 23, 2023	From v4 to v5	Changed	DOCKING section

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