Overview

HP Elite mt645 G7 Mobile Thin Client

Left

1. Internal Microphones (2)
2. Webcam LED (Optional)
3. HD TNR and IR Camera (Optional)
4. IR Camera LED (Optional)
5. Camera Shutter (Only available with webcam)

6. Clickpad
7. Smartcard Reader (Optional)
8. SuperSpeed USB Type-A 5Gbps signaling rate port (USB 3.2 Gen 1)
9. Ethernet Port (RJ-45)
10. Nano Security Lock Slot (Lock sold separately)

Overview

Right

1. Power Button Key
2. Power Connector
3. SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)
4. SuperSpeed USB Type-A 5Gbps signaling rate port (Powered port) (USB 3.2 Gen 1)
5. SuperSpeed USB Type-A 5Gbps signaling rate port (USB 3.2 Gen 1)

6. HDMI 2.0b Port (Cable not included)
7. Audio Combo Jack
8. External SIM Card Slot (Optional)
9. Touch Fingerprint Sensor (Select Models)

Overview

AT A GLANCE

- Choice of Windows 10 IoT Enterprise 2021 LTSC, HP ThinPro OS, HP Smart Zero OS, FreeDOS, IGEL OS
- Fast and upgradeable dual channel DDR4 SODIMM memory up to 16 GB
- Choice of AMD Barcelo™ 5000 series mobile processors R5 and R3
- Choice of 35.56 cm (14") diagonal HD, Ultra-Wide Viewing Angle FHD, Touch* or Non-Touch screen, and Privacy Panel option.
- Choice of solid state drives up to 256 GB
- Take manageability to the next level with HP Cloud Endpoint Manager
- Multi-layered security with HP SureStart Gen7, HP Sure View Gen4, HP Secure Erase, Touch Fingerprint reader, and Tamper Lock, HP IR camera (Windows Only), Camera with Privacy Shutter.
- Supports wireless options for connectivity on the go including gigabit-speed Wi-Fi 6** and CAT9 4G/LTE WWAN (Windows only).
- Supports fast charging (50% in 30 minutes) with no impact on battery recharge cycles
- Supports HP USB-C® Dock G5 and Thunderbolt Dock G4
- Passed MIL-STD 810H tests
- Optimize your video calls with an HD camera that adjusts to the lighting in your environment.
- 180˚synchronized hinge allows the mobile thin client to lay completely flat, without lifting the keyboard, and includes everyone with visibility from multiple angles.

* Touch only available with Windows 10 IoT
** Wi-Fi 6 option only available for Mobile Thin Client

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

Technical Specifications

PRODUCT NAME

HP Elite mt645 G7 Mobile Thin Client

OPERATING SYSTEM

Preinstalled   Windows 10 IoT Enterprise 2021 LTSC [1]
HP ThinPro
HP Smart Zero Core
FreeDOS
IGEL OS

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. ISP fees may apply, and additional requirements may apply over time for updates. See http://www.windows.com.

PROCESSORS

AMD Ryzen™ 5 5625U with AMD Radeon™ Graphics (2.30 GHz base clock, 16 MB L3 cache, 6 cores, 12 threads) [3,4,6]
AMD Ryzen™ 3 5425U with AMD Radeon™ Graphics (2.70 GHz base clock, 8 MB L3 cache, 4 cores, 8 threads) [3,4,6]

Processor Family
AMD Ryzen™ processor [6]

3. Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. AMD 's numbering is not a measurement of clock speed.

4. Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.

6. In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on http://www.support.hp.com.

QuickSpecs

Technical Specifications

CHIPSET

Chipset is integrated with processor.

GRAPHICS

Integrated
AMD Radeon™ Graphics

Supports
Support HD decode, DX12, HDMI 2.0b [7]

7. HD content required to view HD images.

DISPLAY

Non-Touch
35.56 cm (14") diagonal FHD UWVA eDP anti-glare Low Blue Light narrow bezel bent, 1000 nits, 100% sRGB for HD + IR camera and WWAN HP Sure View Gen4 integrated privacy screen (1920 x 1080) with HP Eye Ease [8,9,10, 11,12]
35.56 cm (14") diagonal FHD UWVA eDP anti-glare, low power, bent, 400 nits,72% NTSC for HD + IR camera and WWAN (1920 x 1080) [8,9,10]
35.56 cm (14") diagonal FHD UWVA eDP anti-glare narrow bezel bent, 250 nits,45% NTSC for HD camera and WWAN (1920 x 1080) [8,9,10]
35.56 cm (14") diagonal FHD UWVA eDP anti-glare narrow bezel bent, 250 nits,45% NTSC for HD camera (1920 x 1080) [8,9,10]
35.6 cm (14") diagonal, FHD UWVA eDP 1.2 w/o PSR, Anti-Glare, 250 nits, 45% NTSC Narrow Bezel bent (1920 x 1080) [8,9,10]

Touch
35.56 cm (14") diagonal FHD Anti-Glare UWVA eDP narrow bezel bent touch-on-panel screen, 250 nits, 45% NTSC for HD camera (1920 x 1080) [8,9,10,12]

Display Size
14" diagonal
35.6 cm (14") diagonal

HDMI
Support resolutions up to 4k 60Hz

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.
11. HP Sure View Reflect integrated privacy screen is an optional feature that must be configured at purchase and is designed to function in landscape orientation.
12. Actual brightness will be lower with touchscreen or HP Sure View.

Technical Specifications

DOCKING (Sold Separately)

Docking station model #1	HP USB-C® Dock G5
Docking station model #2	HP Thunderbolt 120W G4 Dock and HP Thunderbolt 280W G4 Dock

Docking station model	MTC Supported	Total number of supported displays	Max. resolutions 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 M.2 Storage
128 GB PCIe® NVMe™ M.2 Value Solid State Drive [13]
256 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.
14. Only functions at the Gen3x4 capacity with AMD Ryzen Barcelo processor.

MEMORY

Maximum Memory
16 GB DDR4-3200 SDRAM [16]

Memory
16 GB DDR4-3200 SDRAM (1 x 16 GB) [16]
16 GB DDR4-3200 SDRAM (2 x 8 GB) [16]
8 GB DDR4-3200 SDRAM (1 x 8 GB) [16]
8 GB DDR4-3200 SDRAM (2 x 4 GB) [16]

Memory Slots
2 SODIMM
Both slots are customer accessible / upgradeable

Technical Specifications

DDR4 PC4 SODIMMS (Processor runs at 3200 MT/s)
Supports Dual Channel Memory

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

NETWORKING/COMMUNICATIONS

WLAN
Realtek RTL8852BE 802.11ax 2x2 Wi-Fi 6 + BT5.3 [17]
Qualcomm® Fast Connect 6900 Wi-Fi 6 + BT5.3 (802.11ax 2x2) [17]

NOTE: Wi-Fi 6E not available. Thin client customers will only have Wi-Fi 6 support.

WWAN*
Intel® XMM™ 7560 R+ LTE-Advanced Pro Cat 16 [19]

NFC*
NXP NPC300 Near Field Communication Module (NFC Mirage WNC XRAV-1)

Ethernet
Realtek RTL8111HSH 10/100/1000 Integrated NIC [20]
Realtek RTL8111FPH 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 6 is backwards compatible with prior 802.11 specs.
19. WWAN module is an optional feature, requires factory configuration and requires separately purchased service contract. Check with service provider for coverage and availability in your area. Connection speeds will vary due to location, environment, network conditions, and other factors. 4G LTE not available on all products, in all regions.
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.
*Only available on Windows 10 IoT

Technical Specifications

AUDIO/MULTIMEDIA

Audio
2 Integrated stereo speakers
Integrated microphone (Dual Array)

Speaker Power
2W/4ohm Per speaker

Camera
720p HD camera with Temporal Noise Reduction [8,9]
720p HD camera+IR Camera with Temporal Noise Reduction [8,9,10]

8. HD content required to view HD images.
9. Sold separately or as an optional feature.
10. Only available with Windows 10 IoT

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard
HP Premium Keyboard, spill resistant with optional backlit function [21]

Pointing Device
Clickpad with multi-touch gesture support

Function Keys
F1 - Display Switching
F2 - Blank or SureView On/Off
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 - Wireless

Hidden Function Keys
Fn+R - Break
Fn+S - Sys Rq
Fn+C - Scroll Lock

21. Backlit keyboard is an optional feature.

Technical Specifications

SOFTWARE AND SECURITY

Software

HP Easy Shell (Windows Only)[40]
HP Write Manager (Windows Only)
HP ThinUpdate (Windows Only)
HP Easy Update (ThinPro Only)
HP Connection Optimizer[32]

HP Manageability Features

HP Cloud Endpoint Manager
HP Device Manager
HP Write Filter;
Windows Defender;
HP BIOS Configuration Utility

Security Management

Pre boot Authentication
Support for chassis padlocks and cable lock devices
BIOS Update via Network HP
HP Sure Start Gen7 [33]
HP Tamper Lock

BIOS

HP BIOSphere Gen6 [36]
HP Secure Erase [37]
BIOS Update via Network
HP Fingerprint Sensor [39]
Is the BIOS on this notebook ISO/IEC 19678:2015 (formerly NIST 800-147) compliant?: Yes
UEFI version: 2.7
Class: Class 3

Security

IR camera
Privacy shutter
TPM
TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)
Model: Infineon SLB9672VU2.0
Version:15.22
Revision: TPM 2.0
FIPS 140-2 Compliant: Yes

Smartcard Reader

Model number: Alcor AU9560
FIPS 201 Compliant: Yes

IPv6 Support

Yes
FirstNet Certified
No

Technical Specifications

32. HP Connection Optimizer requires Windows 10 and beyond version.

33. HP Sure Start Gen7 is available on select HP PCs and requires Windows 10 and higher

36. HP BIOSphere Gen6 features may vary depending on the platform and configuration.

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

39. Fingerprint Reader is an optional feature that must be configured at purchase. Only available on Windows 10 IoT

40. HP Easy Shell is currently available on Windows Embedded Standard 7E, Windows Embedded Standard 7P, Windows Embedded 8 Standard, Windows Embedded 8.1 Industry Pro, Windows 10 IOT Enterprise 2016 LTSC, and Windows 10 IoT Enterprise 2019.

SOFTWARE SUPPORT

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

Protocol Clients	HP ThinPro	Microsoft 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

[1]HP 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
AC Adapter 45 Watt nPFC Standard USB type C® Straight 1.8m [41]
AC Adapter 65 Watt nPFC Slim USB type C® Straight 1.8m [41]
AC Adapter 65 Watt nPFC Standard USB type C® Straight 1.8m [41]
AC Adapter 65 Watt Smart nPFC EM Barrel 4.5mm [41]
AC Adapter 65 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m [41]

Battery
HP Long Life 3-cell, 42.75 Wh Polymer [42,43]
HP Long Life 3-cell, 51.3 Wh Polymer [42,43]
Compliant with UL 1642 Standard

Power Cord
3-wire plug - 1m
2-wire plug - 1m

Battery Life
Up to 16 hours and 4 minutes
51whr battery (HP Long Life 3-Cell, 51 Whr Polymer, UMA graphic, AMD R7, 200 nits display, 8G memory, 256 GB SSD) [44]
42whr battery (HP Long Life 3-Cell, 42 Whr Polymer, UMA graphic, AMD R7, 200 nits display, 8G memory, 256 GB SSD) [44]

Battery Weight
HP Long Life 3-cell - 42.75 Wh Polymer - .40 lb
HP Long Life 3-cell - 51.3 Wh Polymer - .45 lb
HP Long Life 3-cell - 42.75 Wh Polymer - 181.83 g
HP Long Life 3-cell - 51.3 Wh Polymer - 203.56 g

41. Availability may vary by country.
42. Battery is internal and not replaceable by customer. Serviceable by warranty.
43. 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.
44. 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 3.04 lb [45]

Starting at 1.38 kg [45]

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

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

PORTS/SLOTS

Ports

1 SuperSpeed USB Type-C® 10Gbps signaling rate (USB Power Delivery, DisplayPort™ 1.4)

3 SuperSpeed USB Type-A 5Gbps signaling rate Port includes 1 Powered port (USB 3.2 Gen 1)

1 AC power

1 HDMI 2.0b [46]

1 Headphone/microphone combo jack

1 Nano SIM slot for WWAN (optional)

1 RJ-45

Expansion Slots

Smart Card Reader (optional)

46. HDMI cable sold separately.

Technical Specifications

SERVICE AND SUPPORT

1-year and 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 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. [47]

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

CERTIFICATION AND COMPLIANCE

Energy Efficiency Compliance: ENERGY STAR® certified
Energy Efficiency Compliance: EPEAT® registered [48]
Environmental Specifications: Low halogen [49]
Environmental Specifications: TCO 9.0 Certification
IEC 60601-1-2:2014 and EN 6060101-2:2015 compliant

48. 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
49. External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

Technical Specifications

SYSTEM UNIT

Nominal Operating Voltage	19V
Average Operating Power	7.52W (Idle)
Integrated graphics	Yes (AMD Radeon™ Graphics)
Discrete Graphics	N/A
Max Operating Power	UMA < 45W

Temperature	
Operating	32° to 95° F (0° to 35° C)
Non-operating	-4° to 140° F (-20° to 60° C)

Relative Humidity	
Operating	10% to 90%, non-condensing
Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature

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

Random Vibration	
Operating	1.043 grams
Non-operating	3.5 grams

Altitude (unpressurized)	
Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)

Planned Industry Standard Certifications	
Regulatory Model Number	HSN-Q35C-4
UL	Yes
CSA	Yes
FCC Compliance	Yes
ENERGY STAR®	Yes [50]
EPEAT®	EPEAT® Gold in United States [51]
ICES	Yes
Australia /	Yes
NZ A-Tick Compliance	Yes
CCC	Yes
Japan VCCI Compliance	Yes
KC	Yes
BSMI	Yes
CE Marking Compliance	Yes
BNCI or BELUS	Yes
CIT	Yes
GOST	Yes
Saudi Arabian Compliance (ICCP)	Yes
SABS	Yes
UKRSERTCOMPUTER	Yes

Technical Specifications

50. Configurations that are ENERGY STAR® certified are identified as HP Elite mt645 G7 Mobile Thin Client ENERGY STAR on HP websites and on http://www.energystar.gov.
51. 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.

14.0 in FHD (1920 x 1080) Anti-Glare UWVA Low Blue Light sRGB NB2Y 1000 eDP 1.3+PSR 100 PrivacyG4 Plus bent LCD Panel		
Outline Dimensions (W x H)	314.612x 185.330 (max)	
Active Area	309.312 x 173.990 mm (typ)	
Weight	230 g	
Diagonal Size	14 inch	
Thickness	2.2/3.9 (max)	
Interface	eDP 1.3	
Surface Treatment	Anti-Glare	
Touch Enabled	No	
Contrast Ratio	1500:1	
Refresh Rate	60 Hz	
Brightness	1000 nits	
Pixel Resolution	1920 x1080 (FHD)	
Format	WLED	
Backlight	RGB	
Color Gamut Coverage	sRGB 100%	
Color Depth	8	
Viewing Angle	UWVA 85/85/85/85	
Low Blue Light	Yes	
Power Consumption (W, EBL@ 150nits max/ 200nits max)	NA	

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 NWBZ		
Outline Dimensions (W x H)	316.170 x 186.400 (max)	
Active Area	309.370 x 174.020 mm (typ)	
Weight	305 g (max)	
Diagonal Size	14.0 inch	
Thickness	3.0 / 5.0 (max)	
Interface	eDP 1.2	
Surface Treatment	Anti-Glare On-cell	
Touch Enabled	Yes[1]	
Contrast Ratio	600:1 (typ)	
Refresh Rate	60 Hz	
Brightness	250 nits[1]	
Pixel Resolution	1920 x 1080 (FHD)	
Format	WLED	
Backlight	RGB	

Technical Specifications

	Color Gamut Coverage	NTSC 45%
	Color Depth	6 (Hi FRC w/ condition to enable)
	Viewing Angle	UWVA 85/85/85/85
	Low Blue Light	No
	Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.30 (max)/ 2.80 (max)

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)	315.070 x 186.600 (max)
	Active Area	309.370 X 174.020 mm (typ)
	Weight	200 g (max)
	Diagonal Size	14.0 inch
	Thickness	2.0 /4.0 (max)
	Interface	eDP 1.4
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	1200:1 (typ)
	Refresh Rate	60 Hz
	Brightness	400 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format	WLED
	Backlight	RGB
	Color Gamut Coverage	sRGB 100%
	Color Depth	6
	Viewing Angle	UWVA 85/85/85/85
	Low Blue Light	No
	Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.07 (max)/ 2.50 (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 x D)	316.170 x 186.400 (max)
	Active Area	309.370 x 174.020 mm (typ)
	Weight	300 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 / 5.0 (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	1920 x 1080 (FHD)
	Format	WLED
	Backlight	RGB
	Color Gamut Coverage	NTSC 45%
	Color Depth	6 (Hi FRC w/ condition to enable)

Technical Specifications

Viewing Angle	UWVA 85/85/85/85
Low Blue Light	No
Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.205 (max)/ 2.716 (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 x D)	316.110 x 186.370 (max)
	Active Area	309.400 x 173.950 mm (typ)
	Weight	300 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 / 5.0 (max)
	Interface	eDP 1.2
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	300:1 (typ)
	Refresh Rate	60 Hz
	Brightness	250 nits
	Pixel Resolution	1366 x 768 (HD)
	Format	WLED
	Backlight	RGB
	Color Gamut Coverage	NTSC 45%
	Color Depth	6
	Viewing Angle	SVA 45/45/15/35
	Low Blue Light	No
	Power Consumption (W, EBL@ 150nits max/ 200nits max)	2.52 (max) / 2.86 (max)

Technical Specifications

STORAGE AND DRIVES

For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less.

SSD 128GB 2230 PCIe NVMe Value		
	Drive Weight	M.2 2230
	Rotation speed	128GB
	NAND Type	TLC
	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	250069680
	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	500118192
	Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]
	Features	ATA Security; TRIM; L1.2

Technical Specifications

NETWORKING/COMMUNICATIONS

Qualcomm® Fast Connect 6900 Wi-Fi 6 + BT5.3 (802.11ax 2x2, AMD AIM-T AME, supporting gigabit data rate)[1]		
	Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11u IEEE 802.11v IEEE 802.11w
	Interoperability	Wi-Fi® certified
	Frequency Band	•802.11b/g/n/ax 2.402 – 2.482 GHz •802.11a/n/ac/ax 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz
	Data Rates	•802.11b: 1, 2, 5.5, 11 Mbps •802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) •802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
	Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM, 4096QAM
	Security[3]	•AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •IEEE 802.11i
	Network Architecture Models	Wi-Fi® Direct in Win10 for peer-to-peer connection. Infrastructure (Access Point Required)
	Roaming	IEEE 802.11 compliant roaming between access points
	Output Power[2]	2.4GHz (MIMO, typical): • 802.11b: +18dBm • 802.11g: +16.5dBm • 802.11n/ac/ax (HT20/VHT20/HE20): +16dBm • 802.11n/ac/ax (HT40/VHT40/HE40): +12.5dBm 5GHz (MIMO, typical): • 802.11a: +13dBm • 802.11n/ac/ax (HT20/VHT20/HE20): +13.5dBm • 802.11n/ac/ax (HT40/VHT40/HE40): +12.5dBm

Technical Specifications

	• 802.11ac/ax (VHT80/HE80): +11.5dBm	
	• 802.11ax HE160: +11.5dBm	
	6GHz LPI mode (MIMO, typical):	
	• 802.11a: 0dBm	
	• 802.11ax HE20: +1dBm	
	• 802.11ax HE40: +4dBm	
	• 802.11ax HE80: +7dBm	
	• 802.11ax HE160: +7.5dBm	
Power Consumption	•Transmit mode: 3.0 W	
	•Receive mode: 2.0 W	
	•Idle mode (WLAN associated): 300mW	
	•Idle mode (WLAN unassociated): 100mW	
	•Modern Connected Standby: 10mW	
	•Radio disabled: 8 mW	
Power Management	ACPI and PCI Express compliant power management	
	802.11 compliant power saving mode	
Receiver Sensitivity[4]	2.4GHz (SISO):	
	• 802.11b, 11Mbps: -82dBm maximum	
	• 802.11g, 54Mbps: -71dBm maximum	
	• 802.11n, MCS7: -64dBm maximum	
	• 802.11ac, MCS9: -52dBm maximum	
	• 802.11ax, MCS11(HT40): -49dBm maximum	
	5GHz (SISO):	
	• 802.11a, 54Mbps: -71dBm maximum	
	• 802.11n, MCS07: -64dBm maximum	
	• 802.11ac, MCS9: -52dBm maximum	
	• 802.11ax, MCS11(HE80/HE160): -46dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure.	
	Two embedded dual band 2.4/5/6 GHz antennas are provided to the card to support WLAN MIMO 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: 3g	
Operating Voltage	3.3 +/ 0.165v	
Temperature	**Operating**	−10° to 60° C
	Non-operating	−40° to 85° C
Humidity	**Operating**	10% to 60% (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	N/A	

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

Technical Specifications

		Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
	Transmit Power	The Bluetooth component shall operate as a Class 1.5 Bluetooth device with a maximum transmit power of + 14 dBm and 10 dBm for BR and EDR, respectively.

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).

Realtek RTL8852BE 802.11ax 2x2 Wi-Fi 6 + BT5.3 (802.11ax 2x2, supporting gigabit data rate) [1]	**Wireless LAN Standards**	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
	Interoperability	Wi-Fi® certified modules
	Frequency Band	•802.11b/g/n/ax 2.402 – 2.482 GHz •802.11a/n/ac/ax 4.9 – 4.95 GHz (Japan) 5.15 – 5.25 GHz 5.25 – 5.35 GHz 5.47 – 5.725 GHz 5.825 – 5.850 GHz
	Data Rates	•802.11b: 1, 2, 5.5, 11 Mbps •802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps •802.11n: max 300Mbps •802.11ac: max 866.7Mbps • 802.11ax: max 1201Mbps
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
	Security[3]	•IEEE and WiFi certified 64 / 128 bit WEP encryption for a/b/g mode only •AES-CCMP: 128 bit in hardware •802.1x authentication •WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. •WPA2 certification •WPA3 certification

Technical Specifications

	• IEEE 802.11i	
	• WAPI	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power[2]	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ax HE40(2.4GHz): +10dBm minimum • 802.11ax HE80(5GHz): +10dBm minimum	
Power Consumption	• 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 Sensitivity[4]	• 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** **Non-operating**	14° to 158° F (−10° to 70° C) −40° to 176° F (−40° to 80° C)
Humidity	**Operating** **Non-operating**	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	**Operating** **Non-operating**	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF LED Off – Radio ON	

Technical Specifications

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. 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).

Technical Specifications

Intel® XMM™ 7560 R+ LTE-Advanced Pro[1,*]	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 WCDMA R99, 3GPP Release 5, 6, 7 and 8 UMTS Specification
	GPS	Standalone GPS/Beidou/Glonass, A-GPS (MS-A, MS-B)
	GPS bands	1575.42 MHz ± 1.023 MHz, GLONASS 1596-1607MHz, Beidou 1561.098 MHz
	Maximum data rates	LTE: 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 HSPA+: 23.5 dBm
	Maximum power consumption	LTE : 1,200 mA (peak) ; 900 mA (average) HSPA+ : 1,100 mA (peak) ; 800 mA (average)
	Form Factor	M.2, 3042-S3 Key B
	Weight	6 g
	Dimensions (Length x Width x Thickness)	42 x 30 x 2.3 mm
	eSIM	Support

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.
* Windows 10 IoT only. ThinPro support for WWAN not available at launch.

Technical Specifications

NXP NPC300 Near Field Communication Module*		
	Dimensions (L x W x H)	Module 17 mm by 10 mm by 2.0 mm
	Chipset	NPC300
	System interface	I2C
	NFC RF standards	ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 ISO/IEC 18092 ECMA-340 NFCIP-1 Target and Initiator ECMA-320 NFCIP-2
	NFC Forum Support Reader (PCD-VCD) Mode(1)	Tag Type 1, Type 2, Type3 and Type 4, NFCIP-1 and NFCIP-2 ISO/IEC 14443 A ISO/IEC 14443 B ISO/IEC 15693 MIFARE 1K MIFARE 4K MIFARE DESFire FeliCa Jewel and Topaz cards
	Card Emulation (PICC-VICC) Mode(1)	ISO/IEC 14443 A ISO/IEC 14443 B and B' MIFARE FeliCa
	Frequency	13.56 MHz
	NFC Modes Supported	Reader/Writer, Peer-to-Peer
	Raw RF Data Rates	106, 212, 424, 848 kbps
	Operating temperature	0℃ to 70℃
	Storage temperature	-20℃ to 125℃
	Humidity	10-90% operating 5-95% non-operating
	Supply Operating voltage	2.97 to 5.5 Volts
	I/O Voltage	1.8V or 3.3V
	Power Consumption (Booster enable, VBAT= 3.3V, VCC_BOOST = 5V)	
	Mode	Power Consumption, Typical
	Polling	7.3 mA
	Detected Test Tag Type 1	32.9 mA
	Detected Test Tag Type 2	70.7 mA
	Detected Test Tag Type 3	79.2 mA
	Detected Test Tag Type 4	64.9 mA
	Antenna	Antenna connector, 0.5mm pitch, 7 connector FPC. Antenna matching is external to module.

*Windows only

Technical Specifications

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	Wake-on-LAN from modern standby or sleep state (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
	Interface	PCIe + SMBus
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller

Realtek RTL8111FPH 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) 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
	Interface	PCIe + SMBus
	NIC Device Driver Name	Realtek PCIe GBE Ethernet Family Controller

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.

AC Adapter 45 Watt nPFC Standard USB type C® Straight 1.8m	Dimensions (H x W x D)		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 ~ 63Hz
		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°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 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.
AC Adapter 45 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	Dimensions		95x45x26.5mm
	Weight		unit: 200g +/- 10g
	Input	Input Efficiency	87.74 % at 115 Vac and 88.4 % at 230Vac
		Input frequency range	47 ~ 63 Hz
		Input AC current	Max. 1.4 A at 90 Vac
	Output	Output power	45W
		DC output	19.5V
		Hold-up time	5ms at 115 Vac input

Technical Specifications

		Output current limit	<8.0A
	Connector	4.5mm Barrel Type	
	Environmental Design	**Operating temperature**	32ºF to 95ºF (0ºto 35ºC)
		Non-operating (storage) temperature	-4ºF to 185ºF (-20ºto 85ºC)
		Altitude	0 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.	

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 ~ 63 Hz
		Input AC current	1.6 A at 90 VAC and maximum load 5V/15W 9V/27W 12V/60W 15V/60W
	Output	**Output power**	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**	32ºFto 95ºF (0ºto 35ºC)
		Non-operating (storage) temperature	-4ºFto 185ºF (-20ºto 85ºC)
		Altitude	0 to 16,400 ft (0 to 5,000m)
		Humidity	20% to 95
		Storage Humidity	10% to 95%

Technical Specifications

	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 Smart nPFC EM Barrel 4.5mm	**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 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.	
AC Adapter 65 Watt Smart nPFC Standard Barrel 4.5mm Right Angle 1.8m	**Dimensions**	90 x 51 x 28.5mm	
	Weight	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
	Outpu	**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	

Technical Specifications

Environmental Design	**Operating temperature**	32ºF to 95ºF (0ºto 35ºC)	
	Non-operating (storage) temperature	-4ºF to 185ºF (-20ºto 85ºC)	
	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 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**	32ºF to 95ºF (0ºto 35ºC)
		Non-operating (storage) temperature	-4ºF to 185ºF (-20ºto 85ºC)
		Altitude	0 to 16,400 ft (0 to 5,000m)
		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.	

Technical Specifications

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[1]	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	N/A	
Warranty		
Optional Travel Battery Available	No	

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[1]	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	N/A	
Warranty		
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: 48kHz ADC: 44.1k/48kHz
Wavetable Syntheses	N/A
Analog Audio	Support 3.5mm Headset: CTIA only and Headphone-out
# of Channels on Line-Out	N/A
Internal Speaker	Yes

*Windows 10IoT only

FINGERPRINT READER

Sensor vendor	Model: Elan efsa80ST (module P1515E)
Sensor type	Capacitive
DPI resolution	508 dpi
Scan area	80*80 pixels
False Rejection Rate	FRR: ≤ 3%
False Acceptance Rate	FAR: 1:100K
Mobile Voltage Operation	2.7V to 3.6V
Operating Temperature	-4°F – 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

*Windows only

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 • 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 Speaker enclosure[1] • 15% post-consumer recycled plastic[2] • Low halogen[3] • Outside Box and corrugated cushions are 100% sustainably sourced and recyclable[4] • Recycled Plastic cushions[5] • 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 (Sort idle)	5.57 W	5.47 W	5.01 W
Normal Operation (Long idle)	0.95 W	1.31 W	1.23 W
Sleep	0.95 W	1.31 W	1.23 W
Off	0.30 W	0.30 W	0.28 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)	19 BTU/hr	18.7 BTU/hr	17.1 BTU/hr
Normal Operation (Long idle)	3.2 BTU/hr	4.5 BTU/hr	4.2 BTU/hr
Sleep	3.2 BTU/hr	4.5 BTU/hr	4.2 BTU/hr
Off	1 BTU/hr	1 BTU/hr	1 BTU/hr
	***NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		

Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L$_{Wad}$, bels)	Sound Pressure (L$_{pAm}$, decibels)
Typically Configured – Idle	2.2	13.3
Fixed Disk – Random writes	2.7	18.3
Optical Drive – Sequential reads	2.9	22.4

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 ISO01043. • This product is 93.2% recycle-able when properly disposed of at end of life.

Packaging Materials	External:	PAPER/Corrugated	220 g
	Internal:	PLASTIC/EPE (Expanded Polyethylene)	170 g
		PLASTIC/Polyethylene low density – LDPE	55 g
		PLASTIC/Polypropylene – PP	3 g
	The plastic packaging material contains at least 0.0% recycled content.		
	The corrugated paper packaging materials contains at least 54.5% 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 **Error! Hyperlink reference not valid.** HP RoHS position statement.
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

Technical Specifications

	• 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. 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.

Technical Specifications

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	1. Percentage of ocean-bound plastic contained in each component varies by product 2. Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard. 3. External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen. 4. 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers. 5. Any plastic cushions are made from >90% recycled plastic.

COUNTRY OF ORIGIN

China

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)
Dock Connectors	1xHDMI, 2xDP
Technical limitations	Three maximum displays supported are two 5K@ 30 Hz on DP ports plus one 4K UHD@ 30 Hz on HDMI in Multi-function mode The highest resolution for a non-Thunderbolt host in multi-function mode is a single 5K dual cable (using both DP ports) + (1) 4K on HDMI port.
Docking station model #2	HP Thunderbolt Dock G2
Total number of supported displays (incl.the notebook display)	4
Max.resolutions supported	Dual 4K @30Hz or dual 4K UHD @ 60Hz is supported Dual 8K@ 60Hz for TB hosts or USB-C® hosts DP 1.4 with DSC in high res mode
Dock Connectors	2xDP, 1xVGA, 1xTB, 1xUSB-C® alt-mode
Technical limitations	Thunderbolt Hosts: Maximum of (4) displays with maximum resolution of 5K@ 30Hz running Thunderbolt host. Maximum resolution possible is dual 8K displays @ 60Hz running Thunderbolt host or running a non-Thunderbolt host in high resolution mode @30Hz Non-Thunderbolt hosts: Non-Thunderbolt hosts support (3) displays with a maximum resolution of (2) 5K single cable + (1) 4K UHD @ 60 Hz in high resolution mode. In multi-function mode the maximum resolution for (3) displays is (2) 5K single cable @ 30Hz + (1) 4K UHD @ 30Hz.

QuickSpecs

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

Category	Description	Part Number
Audio/Video	HP Wired 3.5mm Stereo Headset	428K7AA
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 Thunderbolt 120W G4 Dock	4J0A2AA
	HP USB-C 120W G5 Dock	26D32AA
	HP Thunderbolt 280W G4 Dock w/Combo Cable	4J0G4AA
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
Keyborad/Combo	HP 975 USB+BT Dual-Mode Wireless Keyboard	3Z726AA
	HP 455 Programmable Wireless Keyboard	4R177AA
	HP 125 WD USB Keyboard	266C9AA
	HP 320K WD USB Keyboard	9SR37AA
	HP 655 Wireless Keyboard and Mouse Combo	4R009AA
	HP 225 Wired Mouse and Keyboard Combo	286J4AA
	HP 235 Wireless Mouse and Keyboard Combo	1Y4D0AA
	HP Slim Wireless Keyboard and Mouse	T6L04AA
	HP Wired Desktop 320MK Mouse and Keyboard	9SR36AA
	HP Wireless Rechargeable 950MK Mouse and Keyboard	3M165AA

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

Mouse	HP USB Premium Wireless Mouse	1JR31AA
	HP 435 Multi-Device Wireless Mouse	3B4Q5AA
	HP 125 USB-A Wired Mouse	265A9AA
	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 Multi-Device 635 Wireless Mouse Black	1D0K2AA
	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 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 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		Description of change
January 11, 2023	From v1 to v2	Changed	POWER section
February 17, 2023	From v2 to v3	Added	SOFTWARE SUPPORT section
March 13, 2023	From v3 to v4	Changed	CERTIFICATION AND COMPLIANCE section
May 23, 2023	From v4 to v5	Changed	DOCKING section
December 11, 2023	From v5 to v6	Changed	NETWORKING/COMMUNICATIONS section
March 12, 2024	From v6 to v7	Changed	OPERATING SYSTEM section