Overview

HP mt22 Mobile Thin Client

Left

1.	Internal Microphones (2)	7.	SD card reader
2.	Webcam	8.	Thermal Vent
3.	Privacy Shutter (Selective model only)	9.	USB 2.0 Port
4.	Webcam LED	10.	Standard Security Lock Slot (Lock sold separately)
5.	Clickpad[1]	11.	Power Button
6.	Hard Drive LED		

[1]Clickpad gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.

Overview

Right

1. Power Connector
2. USB Type-C™ 3.1 Gen 1 Port
3. Ethernet Port (RJ-45)
4. HDMI Port (Cable not included)

5. USB 3.1 Gen 1 Port
6. USB 3.1 Gen 1 Port
7. Headphone/Microphone Combo Jack
8. HP Fingerprint Sensor[1]

[1]Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.

QuickSpecs

HP mt22 Mobile Thin Client

Overview

At a Glance

- Preinstall Windows 10 IoT Enterprise, HP ThinPro[1]/HP Smart Zero
- 10th generation Intel® Celeron™ 5205U processor
- Your choice of display: 35.56 cm (14.0") diagonal HD, Ultra-Wide Viewing Angle FHD, and Touch[5,6] or Non-Touch screen
- Integrated Intel® UHD Graphics 620
- Enhanced security features including TPM 2.0[7], HP Sure Start Gen5, HP BIOSphere, Hardware enforced Firmware Protection, privacy webcam shutter and optional Fingerprint sensor[8]
- Passed 19 MIL-STD 810 G testing[2]
- Weight starting at 3.53 lbs (1.6 kg)[4]
- HP Long-Life Rechargeable battery, with HP Fast Charge Technology recharges 50% in 30 minutes[3]
- Supports wireless LAN for connectivity anywhere in the office
- 128 GB Solid State Drive
- Up to 8 GB system memory
- 720p HD webcam
- Spill-resistant and optional backlit Keyboard, and Clickpad[9] with multi-touch gestures enabled, taps enabled as default

1. Not all features and options compatible with HP ThinPro OS and HP Smart Zero.
2. MIL STD 810G testing is not intended to demonstrate fitness for U.S. Department of Defense contract requirements or for military use. Test results are not a guarantee of future performance under these test conditions. Damage under the MIL STD test conditions or any accidental damage requires an optional HP Accidental Damage Protection Care Pack.
3. Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode when used with the power adapter provided with the notebook. After charging has reached 50% capacity, charging speed will return to normal. Charging time may vary +/-10% due to System tolerance.
4. Does not include power adapter.
5. Touchscreen panels are an optional feature that must be configured at purchase.
6. Touchscreen gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.
7. TPM 2.0 is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon use of a customer-enabled application that can locate the TPM chip.
8. Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.
9. Clickpad gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.

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

Features

PRODUCT NAME

HP mt22 Mobile Thin Client

OPERATING SYSTEMS

Preinstalled Windows 10 IoT Enterprise[1]
HP ThinPro[2]
HP Smart Zero[2]

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/.
2. Not all features are available with HP ThinPro

PROCESSOR

Intel® Celeron™ 5205U processor with Intel® UHD Graphics 620 (1.9 GHz base frequency, 2 MB L3 cache, 2 cores)[1,2,3,4,5]

Processors Family

10th Generation Intel® Celeron™ processor[2]

[1]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.
[2]Processor speed denotes maximum performance mode; processors will run at lower speeds in battery optimization mode.
[3]Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information.
[4]Max Boost clock frequency performance varies depending on hardware, software and overall system configuration.
[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

Integrated with processor

GRAPHICS

Integrated

Features

Intel® UHD graphics 620[1]

Supports

Support HD decode, DX12, HDMI 1.4b up to 4K 30Hz

[1]HD content required to view HD images.

DISPLAYS

Non-Touch
35.56 cm (14") diagonal HD SVA eDP anti-glare slim, 220 nits, 45% NTSC two WLAN antennas (1366 x 768)[1,3]
35.56 cm (14") diagonal HD SVA eDP anti-glare slim, 220 nits, 45% NTSC for HD camera and two WLAN antennas (1366 x 768)[1,3]
35.56 cm (14") diagonal FHD IPS eDP anti-glare slim, 250 nits, 45% NTSC and two WLAN antennas (1920 x 1080)[1,3]
35.56 cm (14") diagonal FHD IPS eDP anti-glare slim, 250 nits, 45% NTSC for HD camera and two WLAN antennas (1920 x 1080)[1,3]

Touch

35.56 cm (14") diagonal FHD IPS eDP slim touch-on-panel screen, 250 nits, 45% NTSC for HD camera and two WLAN antennas   (1920 x 1080)[1,2,3,4]

HDMI
Supports resolutions up to 4K 30Hz

Display Size
14" diagonal
35.56cm (14") diagonal

[1]HD content required to view HD images.
[2]Touchscreen panels are an optional feature that must be configured at purchase.
[3]Touchscreen gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.
[4]Resolutions are dependent upon monitor capability, and resolution and color depth settings.

Displays support

Docking station model	Total number of supported displays (incl. the notebook display)	Max. resolutions supported	Dock Connectors	Technical limitations
HP Thunderbolt Dock 120W G2	3	Dual 4k @60Hz	2xDP, 1xVGA, 1xTB,1xUSB-C alt-mode	Dual 4k only with one display in to DP and + TB port or USB-C alt mode + TB port *Not Compatible with HP ThinPro

Features

HP USB-C Mini Dock	2	Single 4K @ 30Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time *Not Compatible with HP ThinPro
HP USB-C Travel Dock	2	Single 2K @ 60Hz	1xHDMI, 1xVGA	Single external display Only HDMI or VGA at the time *Not Compatible with HP ThinPro
HP USB-C/A Universal Dock G2	3	Dual 2.5K @ 60Hz	2xDP, 1xHDMI	
HP USB-C Dock G5	3	Dual 2.5K @ 60Hz or 4K @ 60Hz + FHD @ 60Hz	2xDP, 1xHDMI	*Not Compatible with HP ThinPro

STORAGE AND DRIVES

Primary M.2 Storage

128 GB M.2 SATA TLC Solid State Drive*

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

MEMORY

Maximum Memory
8 GB DDR4-2666 SDRAM

Memory
8 GB DDR4-2666 SDRAM (2 x 4 GB)[1]
4 GB DDR4-2666 SDRAM (1 x 4 GB)[1,2]

Memory Slots
2 SODIMM
Both slots are customer accessible / upgradeable
Comet Lake Celeron max transfer rates up to 2400 MT/s
Supports Dual Channel Memory

[1]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.
[2]Only available with HP ThinPro or HP Smart Zero.

Features

NETWORKING/COMMUNICATIONS

WLAN

Intel® Dual Band Wireless-AC 9560 802.11a/b/g/n/ac (2x2) WLAN and Bluetooth® 5[1] Combo(non-vPro™)[2]

Ethernet

Realtek 10/100/1000 GbE NIC[3]

[1]Intel® Dual Band Wireless-AC 9560 802.11a/b/g/n/ac (2x2) Wi-Fi® and Bluetooth® is an optional feature that requires Windows 10 IoT and must be configured at purchase.
[2]Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited.
[3]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.

AUDIO/MULTIMEDIA

Audio

Integrated Microphone (Mono or Dual Array)
2 Integrated Stereo Speakers

Speaker Power
2W/4ohm Per speaker

Camera
720p HD webcam*

*Sold separately or as an optional feature.

KEYBOARDS/POINTING DEVICES/BUTTONS & FUNCTION KEYS

Keyboard

HP Premium Keyboard, spill resistant with optional backlit function

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

Features

F8:	Mic Mute
F9:	Blank or Backlit Toggle
F10:	NumLock
F11:	Wifi Toggle
F12:	Sleep

Hidden Fuctions

Fn+R = Break
Fn+S = Sys Rq
Fn+C = Scroll Lock

*Clickpad gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.

SOFTWARE AND SECURITY

BIOS

HP BIOSphere Gen5[2]
BIOS Update via Network
Master Boot Record Security
Power on Authentication
Secure Erase[3]
Absolute Persistence Module[4]
Pre-boot Authentication

Software

HP Connection Optimizer
HP Hotkey Support
HP Noise Cancellation Software

Manageability Features

HP ThinUpdate
HP BIOS Config Utility (BCU)
HP Device Manager

Client Security Software

HP Write Filter
HP Fingerprint Sensor[5,1]
Windows Defender[6,8]

Security Management

Pre-boot Authentication
TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)[9]
USB enable/disable (via BIOS)
Power-on password (via BIOS) Setup password (via BIOS)
Support for chassis padlocks and cable lock devices
HP Sure Start Gen5[7]

Features

1.Fingerprint Reader is an optional feature that requires Windows 10 IoT and must be configured at purchase.

2.HP BIOSphere Gen5 is available on select HP Mobile Thin Clients. See product specifications for details. Features may vary depending on the platform and configurations.

3.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™.

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

5.HP Fingerprint Sensor sold separately or as an optional feature.

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

7.HP Sure Start Gen5 is available on select HP PCs with Intel processors. See product specifications for availability.

8.Windows Defender requires Windows 10 IoT

9.TPM 2.0 is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon use of a customer-enabled application that can locate the TPM chip.

POWER

Power Supply

- HP Smart 65 W External AC power adapter[1]
- HP Smart 65 W EM External AC power adapter[1]
- HP Smart 65 W USB Type-C™ adapter[1]
- HP Smart 45 W External AC power adapter[1]
- HP Smart 45 W USB Type-C™ adapter[1]

Primary Battery
HP Long Life 3-cell, 45 Wh Li-ion[2]

Battery life
Up to 14 hours and 45 minutes[3]

Power Cord
3-wire plug - 1m[1]
3-wire plug – 1.8m[1]
2-wire plug - 1m[1]
Duckhead power cord- 1m[1]
Duckhead power cord- 1.8m[1]

Battery Weight
0.49 lb
0.22 kg

[1]Availability may vary by country.

Features

[2]Battery is internal and not replaceable by customer. Serviceable by warranty.
[3]Windows 10 MM14 battery life will vary depending on various factors including product model, configuration, loaded applications, features, use, wireless functionality, and power management settings. The maximum capacity of the battery will naturally decrease with time and usage. See http://www.bapco.com for additional details.

WEIGHTS & DIMENSIONS

Product Weight

Starting at 3.53 lbs (Non-touch); Starting at 3.55 lbs (Touch[1])*
Starting at 1.6 kg (Non-touch); Starting at 1.61 kg (Touch[1])*
NOTE: Does not include power adapter.
[1]Touchscreen panels are an optional feature that must be configured at purchase.
Touchscreen gesture support is limited on HP ThinPro/HP Smart Zero, and functionality is dependent upon application being used.
*Weight will vary by configuration.

Product Dimensions (w x d x h)
12.76 x 9.36 x 0.71 in
32.42 23.77 x 1.8 cm

PORTS/SLOTS

1 USB 3.1 Type-C™ Gen 1 (Power delivery, DisplayPort™)

2 USB 3.1 Gen 1

1 USB 2.0 (Powered port)

1 HDMI 1.4b*

1 RJ-45

1 AC power

1 Headphone/Microphone Combo Jack

1 Standard Security Lock

Expansion Slots
1 SD
Supports SD, SDHC, SDXC

*HDMI cable sold separately.

SERVICE AND SUPPORT

HP Services offers 3-year and 1-year limited warranties and 90 day software limited warranty options depending on country. Batteries have a default one year limited warranty except for Long Life Batteries which will have same 1-year or 3- year limited warranty as the platform. 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.[1]

Features

[1]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.

COMPATIBILITY

HP TB Dock 120W w/Audio[1]	3YE87AA
HP USB-C™ Dock G5	5TW10AA
HP Universal Dock G2[1]	5TW13AA
HP USB-C™ Mini Dock[1]	1PM64AA
HP E243d Docking Monitor[1]	1TJ76AA
HP E273d monitor	5WN63AA/A8

[1]Not compatible with HP ThinPro

CERTIFICATION AND COMPLIANCE

ENERGY STAR® certified
EPEAT® 2019 Gold for US, Canada, UK, Australia, New Zealand, and India[1]
EPEAT® 2019 Silver for other countries[1]
Low halogen[2]
TCO NB 5.0 Certification

[1]Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.
[2]External power supplies, power cords, cables and peripherals are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

FACETS

Maximum Resolution: 1920 x 1080
Screen Size, imperial: 14 (diagonal)
Weight, Metric: 1.6
Weight, Imperial: 3.53

Technical Specifications

SYSTEM UNIT

Stand-Alone Power Requirements (AC Power)	Nominal Operating Voltage	19 V
	Average Operating Power	Win 10
	Integrated graphics	Yes
	Discrete Graphics	N17S-G2: 25 W N16S-GTR: 19 W
	Max Operating Power	Discrete < 65 W UMA < 45 W
Temperature	Operating	32° to 95° F (0° to 35° C) (Not writing optical)
	Non-operating	41° to 95° F (5° to 35° C) (Writing optical)
Relative Humidity	Operating	10% to 90%, non-condensing
	Non-operating	5% to 95%, 101.6° F (38.7° C) maximum wet bulb temperature
Shock	Operating	40 G, 2 ms, half-sine
	Non-operating	200 G, 2 ms, half-sine
Random Vibration	Operating	0.75 grms
	Non-operating	1.50 grms
Altitude (unpressurized)	Operating	-50 to 10,000 ft (-15.24 to 3,048 m)
	Non-operating	-50 to 40,000 ft (-15.24 to 12,192 m)
Planned Industry Standard Certifications	UL	Yes
	CSA	Yes
	FCC Compliance	Yes
	ENERGY STAR®	Select models[1]
	EPEAT	EPEAT® 2019 Gold for US, Canada, UK, Australia, New Zealand, and India[2] EPEAT® 2019 Silver for other countries[2]
	ICES	Yes
	Australia /NZ A-Tick Compliance	Yes
	CCC	Yes
	Japan VCCI Compliance	Yes
	KC	Yes
	BSMI	Yes
	CE Marking Compliance	Yes
	BNCI or BELUS	Yes
	CIT	Yes
	GOST	Yes
	Saudi Arabian Compliance (ICCP)	Yes
	SABS	Yes

[1]Configurations of the HP mt22 Mobile Thin Client is ENERGY STAR® certified are identified as HP mt22 Mobile Thin Client ENERGY STAR on HP websites and on http://www.energystar.gov.
[2]Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.

Technical Specifications

DISPLAYS

Panel LCD 14inch diagonal HD (1366 x 768) Anti-Glare WLED SVA 45% NTSC 220 nits eDP 1.2 w/o PSR slim NB non-touch	Outline Dimensions (W x H x D)	316.2 x 198.04 (max.)
	Active Area	309.4 x 173.95
	Weight	<280 g max.
	Diagonal Size	14.0 (inch)
	Thickness	3.0 mm max
	Interface	eDP 1.2 (1 lane)
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	300:1 (typ)
	Refresh Rate	60 Hz
	Brightness	220 nits typical (Panel Only)
	Pixel Resolution	1366 x 768 (HD)
	Format of LCD Pixel Arrangement	RGB
	Backlight	LED
	Color Gamut Coverage	45% of NTSC
	Color Depth	6 bits + Hi FRC
	Viewing Angle	SVA 40/40/15/30

Panel LCD 14inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45% NTSC 250 nits eDP slim NB	Outline Dimensions (W x H x D)	316.17 x 197.98 mm (max)
	Active Area	309.37 x 174.02 mm (typ.)
	Weight	285 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 mm (max)
	Interface	eDP 1.2 (2 lane)
	Surface Treatment	Anti-Glare
	Touch Enabled	No
	Contrast Ratio	600:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	250 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format of LCD Pixel Arrangement	RGB
	Backlight	LED
	Color Gamut Coverage	45% of NTSC
	Color Depth	6 bits

Technical Specifications

	Viewing Angle	UWVA 85/85/85/85

Panel LCD 14inch diagonal FHD (1920 x 1080) Anti-Glare WLED UWVA 45% NTSC 250 nits eDP slim Touch on Panel NWBZ	**Outline Dimensions (W x H x D)**	316.112 x 197.98 mm (max)
	Active Area	309.37 x 174.02 mm (typ.)
	Weight	290 g (max)
	Diagonal Size	14.0 inch
	Thickness	3.0 mm (panel side) / 3.2 mm (PCBA Side) (max)
	Interface	eDP 1.2
	Surface Treatment	Anti-Glare On-cell
	Touch Enabled	Yes
	Contrast Ratio	600:1 (typ.)
	Refresh Rate	60 Hz
	Brightness	250 nits
	Pixel Resolution	1920 x 1080 (FHD)
	Format of LCD Pixel Arrangement	RGB
	Backlight	LED
	Color Gamut Coverage	45% of NTSC
	Color Depth	6 bits
	Viewing Angle	UWVA 85/85/85/85

FINGERPRINT READER

Model	Synaptics Validity VFS7604 touch sensor
Mobile Voltage Operation	3.0V to 3.6V
Operating Temperature	0~60°C
Microphone In	Stereo
Headphone/Line Out	Stereo
Integrated Microphone	Yes, dual digital microphone array
Current Consumption Image	100mA Max
Low Latency Wait For Finger	260 uA
ESD Resistance	IEC 61000-4-2 4B (+/-15KV)
Detection Matrix	363 dpi / 7.4 x 6 mm sensor area
FRR (False Reject Rate) / FAR (False Acceptance Rate)	FRR <1% @ 1:50K FAR

Technical Specifications

NETWORKING/COMMUNICATIONS

WLAN

Intel® 9560
802.11a/b/g/n/ac (2 x 2)
Wi-Fi® and Bluetooth® 5.0
Combo1 non-vPro

Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
Interoperability	Wi-Fi® certified
Frequency Band	802.11b/g/n • 2.402 – 2.482 GHz 802.11a/n • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz
Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, 80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security[3]	• IEEE and WiFi compliant 64 / 128bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output 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

Technical Specifications

- • 802.11n HT40(2.4GHz): +14.5dBm minimum
- • 802.11n HT20(5GHz): +15.5dBm minimum
- • 802.11n HT40(5GHz): +14.5dBm minimum
- 802.11ac VHT80(5GHz): +11.5dBm minimum
- 802.11ac VHT160(5GHz): +11.5dBm minimum

Power Consumption	•Transmit mode:2.0 W •Receive mode:1.6 W •Idle mode (PSP) 180 mW (WLAN Associated) •Idle mode:50 mW (WLAN unassociated) •Connected Standby/Modern Standby: 10mW •Radio disabled: 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity[26]	802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard with CNVi Interface
Dimensions	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm
Weight	1. Type 2230: 2.8g 2. Type 126: 1.3g
Operating Voltage	3.3v +/- 9%
Temperature	Operating 14° to 158° F (−10° to 70° C) Non-operating −40° to 176° F (−40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON

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

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

Bluetooth Specification	4.0/4.1/4.2/5.0 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Signaling Data Rate	Legacy: 3 Mbps signaling data rate1

Technical Specifications

	BLE: 1 Mbps signaling data rate1
	1. Actual throughput may vary.
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Electrical Interface	USB 2.0 compliant
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

STORAGE AND DRIVES

SSD 128 GB 2280 M2 SATA-3 TLC		
	Form Factor	M.2 2280
	Capacity	128 GB
	NAND Type	TLC
	Height	0.09 in (2.3 mm)
	Width	0.87 in (22 mm)
	Weight	0.02 lb (10 g)
	Interface	ATA-8, SATA 3.0
	Maximum Sequential Read	Up To 520 MB/s

Technical Specifications

Maximum Sequential Write	Up To 450 MB/s	
Logical Blocks	250,069,680	
Operating Temperature	32° to 158°F (0° to 70°C) [ambient temp]	
Features	DIPM; TRIM; DEVSLP	

POWER

HP 45W Smart AC Adapter	**Dimensions (H x W x D)**	3.74 x 1.57 x 1.04 in (9.5 x 4.0 x 2.65 cm)	
	Weight	0.386 lb (175g) max Not including power cord. Power cord varies by country.	
	Input	90 to 265 VAC	
		Input Efficiency	87.74% at 115Vac and 88.4% at 230Vac
		Input frequency range	47 to 63 Hz
		Input AC current	1.4 A at 90 VAC
	Output	**Output power**	45W
		DC output	19.5V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8.0A
	Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
	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 5,000 m)
		Humidity	20% to 95%
		Storage Humidity	10% to 95%
	EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives	
		* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.	
		* MTBF - over 200,000 hours at 25°C ambient condition.	

HP 65W Smart AC adapter	**Dimensions**	90 x 51 x 28.5 mm	
	Weight	220 g +/- 10 g Not including power cord. Power cord varies by country.	
	Input	**Input Efficiency**	88% min at 115 VAC and 89% min at 230 VAC
		Input frequency range	47 to 63 Hz
		Input AC current	1.7 A at 90 VAC
	Output	**Output power**	65W
		DC output	19.5V

Technical Specifications

	Hold-up time	5 msec at 115 VAC input
	Output current limit	<11.0A
Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords	
Environmental Design	**Operating temperature**	32° F to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° F to 185° F (-20° to 85° C)
	Altitude	0 to 16,400 ft (0 to 5000m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives	
	* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.	
	* MTBF - over 200,000 hours at 25°C ambient condition.	

HP 65W EM Smart AC adapter	**Dimensions**	102 x 55 x 30 mm
	Weight	270 g +/- 10 g
		Not including power cord. Power cord varies by country.
	Input	**Input Efficiency**	87% min at 115V/230V
	Input frequency range	47 to 63 Hz
	Input AC current	1.7 A at 90 VAC and maximum load
	Output	**DC output**	65 W(19.5V/3.33A)
	Hold-up time	5 msec at 115 VAC input
	Output current limit	<11A, Over voltage protection- 29V max automatic shutdown
	Connector	4.5mm Barrel Type, 3 pin/grounded, mates with interchangeable cords
	Environmental Design	**Operating temperature**	32° F to 95° F (0° to 35° C)
	Non-operating (storage) temperature	-4° F to 185° F (-20° to 85° C)
	Altitude	0 to 5,000 m
	Humidity	0% to 95%
	Storage Humidity	0% to 95%
	EMI and Safety Certifications	*CE Mark - full compliance with LVD and EMC directives
	* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.
	* MTBF - over 200,000 hours at 25°C ambient condition.

Technical Specifications

AC Adapter 65 Watt nPFC USB type C™	**Dimensions**		74 x 74 x 28.5 mm
	Weight		245 g +/- 10 g
			Not including power cord. Power cord varies by country.
	Input	**Input Efficiency**	81.5% min at 115 Vac/ 230Vac @ 5V/3A 86.7% min at 115 Vac/ 230Vac @ 9V/3A 88% min at 115 Vac/ 230Vac @ 10V/5A 8 8% 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 AC current	1.7 A at 90 VAC and maximum load
		Output power	65 W
		DC output	5V/9V/10V/12V/15V/20V
		Hold-up time	5 msec at 115 VAC input
		Output current limit	<8.0A
	Connector		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 5000 m)
		Humidity	5% to 95%
		Storage Humidity	5% to 95%
	EMI and Safety Certifications		*CE Mark – full compliance with LVD and EMC directives
			* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.
			* MTBF - over 200,000 hours at 25°C ambient condition.
AC Adapter 45 Watt nPFC USB type C™	**Dimensions**		62.0 x 62.0 x 28.5 mm
	Weight		220 g +/- 10 g
			Not including power cord. Power cord varies by country.
	Input	**Input Efficiency**	Average Efficiency of 25%, 50%, 75%, 100% load condition with 115Vac/230Vac Spec:5V: 81.5%9V: 86.7%10V: 87.5%12V: 87.8%15V: 87.8%20V: 87.8%
		Input frequency range	47 to 63 Hz
		Input AC current	Max. 1.4 A at 90 Vac
		Output power	5V/15W 9V/27W 10V/37.5W 12V/45W 15V/45W 20V/45W

Technical Specifications

	DC output	5V/9V/10V/12V/15V/20V
	Hold-up time	5 msec at 115 VAC input
	Output current limit	<5.0A
Connector	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 5000 m)
	Humidity	20% to 95%
	Storage Humidity	10% to 95%
EMI and Safety Certifications	*CE Mark – full compliance with LVD and EMC directives	
	* Worldwide safety standards - IEC60950, EN60950, UL60950, Class1, SELV; Agency approvals - C-UL-US, NORDICS, DENAN, EN55022 Class B, FCC Class B, CISPR22 Class B, CCC, NOM-1 NYCE.	
	* MTBF - over 200,000 hours at 25°C ambient condition.	

3 Cell WHr 45 Long Life – Polymer HP Fast Charge Technology[1]	**Cells/Type**	3cell Lithium-Ion	
	Energy	**Amp-hour capacity**	3.900 Ah
		Watt-hour capacity	45Wh
	Temperature	**Operating (Charging)**	32˚ to 113˚ F (0˚ to 45˚ C)
		Operating (Discharging)	14˚ to 122˚ F (-10˚ to 60˚ C)

[1]Recharges the battery up to 50% within 30 minutes when the system is off or in standby mode when used with the power adapter provided with the notebook. After charging has reached 50% capacity, charging speed will return to normal. Charging time may vary +/-10% due to System tolerance.

ENVIRONMENTAL & INDUSTRY

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® •EPEAT® 2019 Silver in U.S. 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. •TCO 8.0 •Korea Eco-label
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

Technical Specifications

Normal Operation (Short	5.63 W	5.42 W	5.81 W
Normal Operation (Long	3.38 W	3.44 W	3.39 W
Sleep	0.83 W	0.79 W	0.81 W
Off	0.37 W	0.48 W	0.37 W
	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	19 BTU/hr	19 BTU/hr	20 BTU/hr
Normal Operation (Long	12 BTU/hr	12 BTU/hr	12 BTU/hr
Sleep	3 BTU/hr	3 BTU/hr	3 BTU/hr
Off	1 BTU/hr	2 BTU/hr	1 BTU/hr
	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 (LWAd, bels)		Sound Pressure (LpAm, decibels)
Typically Configured – Idle	2.5		14.2
Fixed Disk – Random writes	2.8		20.0
Optical Drive – Sequential reads	3.5		28.7
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include: • 3 USB ports • 1 PC card slot (type I/II) • 1 ExpressCard/54 slot		
	• 1 IEEE 1394 Port • 2 SODIMM memory slots • Optional expansion base docking station • 1 multi-bay II storage port Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.		

Technical Specifications

Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: Mercury greater the1ppm by weight Cadmium greater than 20ppm by weight Battery description: CR2032 (coin cell) Battery type: Lithium Battery description: 6-cell high capacity Lithium-Ion battery (optional 8 cell available)		
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 Silver level, see http://www.epeat.net •Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. •This product contains 12.55% post-consumer recycled plastic (by wt.) according to IEEE 1680.1- 2018 standard, criterion 4.2.1.1. •This product is 94.3% recycle-able when properly disposed of at end of life.		
Packaging Materials	**External:**	PAPER/Corrugated	0.230 g
		Paper/Paper	0.051 g
	Internal:	PLASTIC/EPE (Expanded Polyethylene)	0.048 g
		PLASTIC/Polyethylene low density	0.009 g
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/pdf/gse.pdf): • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics • Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • 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.		

Technical Specifications

	• 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 Inc. 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.
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

Country of Origin

China

QuickSpecs

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

Type	Description	Part Number
Cases	HP Essential Top Load Case	H2W17AA
	HP Essential Backpack	H1D24AA
	HP Essential Messenger Case	H1D25AA
Docking*	HP USB-C Mini Dock	1PM64AA
	HP Thunderbolt Dock 120W G2	2UK37AA
	HP TB Dock G2 w/ Combo Cable	3TR87AA
	HP TB Dock 120W G2 w/Audio	3YE87AA
	HP TB Dock 120W G2 Cable	3XB94AA
	HP TB Dock G2 Combo Cable	3XB96AA
	HP TB Dock G2 Audio Module	3AQ21AA
	HP USB-C/A Universal Dock G2	5TW13AA
	HP USB-C Dock G5*	5TW10AA
	HP E223d Docking Monitor	5VT82A8 5VT82AA
	HP E243d Docking Monitor	1TJ76AA
	HP E273d Docking Monitor	5WN63A8 5WN63AA
Input/Output	HP Comfort Grip Wireless Mouse	H2L63AA
	HP USB Essential Keyboard and Mouse	H6L29AA
	HP Ultra Mobile Wireless Mouse	H6F25AA
	HP 3-Button USB Laser Mouse	H4B81AA
	HP USB Travel Mouse	G1K28AA
	HP HDMI to DVI Adapter	F5A28AA
	HP Elite USB-C Hub	4WX89AA
	HP USB-C Travel Hub	Z9G82AA
Memory	4G B 2666MHz DDR4**	4VN05AA
	8 GB 2666MHz DDR4**	4VN06AA
Power	HP 45W Smart AC Adapter 4.5mm	H6Y88AA
	45W Smart Power Adapter 2 prong -4.5mm (Japan only)	L6F60AA
	65W Smart Power Adapter (w/ 4.5mm to 7.5mm DC dongle)	H6Y89AA
	HP 65W Slim AC Adapter	H6Y82AA
	HP 65W USB-C Slim Power Adapter	3PN48AA
	HP 65W USB-C Power Adapter	1HE08AA
	HP 45W USB-C Power Adapter	1HE07AA
	HP Power Bank	N9F71AA
	HP USB-C Power Bank	2NA10AA

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

Security	HP Essential Combination Lock 12.3mm	T0Y14AA
	HP Combination Lock	T0Y15AA
	HP Keyed Cable Lock 10mm	T1A62AA
UCC	HP Conferencing Keyboard	K8P74AA
	HP UC Speaker Phone	4VW02AA
	HP UC Wired Headset	K7V17AA

*Recommended for HP ThinPro
**Comet Lake Celeron max transfer rates up to 2400 MT/s

Date of change:	Version History:		Description of change:
March 27, 2020	From v1 to v2	Changed	Displays support section