

Overview

HP Engage Flex Mini



1. Type-C® SuperSpeed USB 10Gbps signaling rate port (charge support up to 5V/3A)
2. Type-A SuperSpeed USB 10Gbps signaling rate port
3. Type-A SuperSpeed USB 5Gbps signaling rate port (charge support up to 5V/1.5A)
4. Combo Audio Jack with CTIA and OMTP headset support
5. Dual-state power button
6. Hard drive activity light

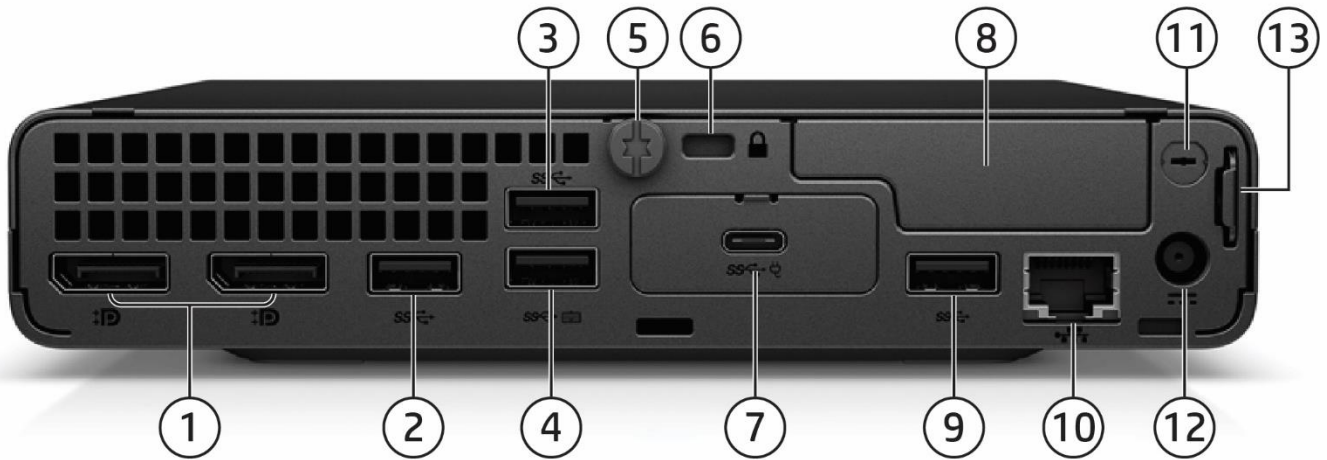
Not Shown

(3) M.2 (1 as M.2 2230 socket for WLAN/BT and 2 as M.2 2280 socket for storage)

(1) 2.5" internal storage drive bay

Overview

HP Engage Flex Mini



1. (2) Dual-Mode DisplayPort™ 1.4 (DP++)
2. Type-A SuperSpeed USB 5Gbps signaling rate port
3. Type-A SuperSpeed USB 5Gbps signaling rate port (Supporting wake from S4/S5 with keyboard/mouse connected and enabled in BIOS)
4. Type-A SuperSpeed USB 10Gbps signaling rate port (Supporting wake from S4/S5 with keyboard/mouse connected and enabled in BIOS)
5. Cover release thumbscrew
6. Standard cable lock slot (10 mm)
7. Flex Port 1, choice of:
 - DisplayPort™
 - HDMI 2.0a
 - VGA
 - RS-232 Serial¹
 - Intel® I225-LM 2.5 Gigabit Network Connection LOM (non-vPro®)
 - Type-C® SuperSpeed USB 10Gbps signaling rate port w/ DisplayPort™ Alt Mode and power intake via USB Type-C® Power Delivery up to 100W
8. Flex Port 2², choice of:
 - 2x Type-A Hi-Speed USB 480Mbps signaling rate port
 - Serial
9. Type-A SuperSpeed USB 10Gbps signaling rate port
10. RJ45 network connector
11. External WLAN antenna opening²
12. Power connector
13. Retractable Padlock loop

1. Sold separately or as an optional feature
 2. Must be configured at time of purchase

Standard Features and Configurable Components

AT A GLANCE

- HP developed and engineered UEFI V2.7 BIOS supporting security, manageability and software image stability
- Latest commercial class Intel® 400 Series chipsets supporting latest Intel® 10th Generation Core™ processors, featuring integrated Intel® UHD Graphics
 - Intel Standard Manageability (ISM) comes standard for Intel® Core™ and Pentium® configurations
 - Optional Intel® vPro® Technology upgrade with selected Core™ i5 and Core™ i7 processors (vPro® is optional and requires factory configuration)
- Choice of Windows 10 Professional, Windows 10 IoT Enterprise 2019 LTSC, and FreeDOS
- Integrated 10/100/1000 Ethernet Controller, with optional Wi-Fi 6 (802.11ax) and Wi-Fi 5 (802.11ac) and Bluetooth®
- Up to 64 GB of DDR4 Synchronous Dynamic Random Access Memory (SDRAM)
- Support for up to three video outputs via two standard video connectors and an optional third video port connector which provides the following choices: DisplayPort™, HDMI, VGA, or USB Type-C® with DisplayPort™ Output
- Reduce clutter with single cable connection for power and video through USB Type-C® enabled displays with the optional USB Type-C® port w/ DisplayPort™ Alt Mode and power intake via USB Type-C® Power Delivery up to 100W; reduce desktop footprint with the device mounted behind a USB-C® enabled display or enable a “All-in-One” experience by docking into HP Mini-in-One 24 Display
- Multiple data drives setup in a RAID array
- Optional Serial port available on all form factors
- Trusted Platform Module (TPM) 2.0
- HP Sure Run Gen3
- HP Sure Recover Gen3
- HP SureSense
- HP SureStart Gen6
- HP BIOSphere Gen6
- HP Client Security Manager Gen6
- HP Sure Click
- HP Manageability Integration Kit Gen4
- HP Image Assistant Gen5
- HP Support Assistant
- High efficiency energy saving power supply
- ENERGY STAR® certified. EPEAT® registered where applicable. EPEAT® registration varies by country. See <http://www.epeat.net> for registration status by country.
- Low halogen
- All form factors undergo up to 13 MIL-STD tests
- Dust filter available
- Protected by HP Services, including limited warranties up to 3-3-3 (terms and conditions vary by country; certain restrictions and exclusions apply); Optional Care Packs available with up to 5 years Next Business Day Onsite Hardware Support
- Compliance with CE (Class B) / FCC (Class B) / UL (UL60950-1 / UL62368-1) / CSA (CSA C22.2 No.60950-1-07 / CSA C22.2 No. 62368-1-14) / ICES-003 / CCC / VCCI (Class B) / KCC (Class B)

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

PRODUCT NAME

HP Engage Flex Mini

OPERATING SYSTEM

Standard Features and Configurable Components

Preinstalled	Windows® 10 Pro 64 ¹ Windows® 10 IoT Enterprise 2019 LTSC for Retail FreeDOS
Web Support	Windows® 10 Enterprise 64 (Web Support) ¹

1. Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com/>.

NOTE: Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel® and AMD® 7th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on <http://www.support.hp.com>. A full list of HP products and the Windows 10 versions tested is available on the HP support website. <https://support.hp.com/us-en/document/c05195282>

SUPPORTED VERSIONS

HP tested Windows 10, version 1809 on this platform. For testing information on newer versions of Windows 10, please see <https://support.hp.com/document/c05195282>

CHIPSET

Intel® Q470

Standard Features and Configurable Components

PROCESSORS

10th Generation Intel® Core™ Processors

Intel® Core™ i9-10900T Processor¹

35W

1.9 GHz base frequency

Up to 4.6 GHz max. turbo frequency with Intel® Turbo Boost Technology²

20 MB cache, 8 cores, 16 threads

Intel® UHD Graphics 630

Supports DDR4 memory up to 2933 MT/s data rate

Supports Intel® vPro® Technology and Intel® Stable Image Platform Program (SIPP)³

Intel® Core™ i7-10700T Processor¹

35W

2.0 GHz base frequency

Up to 4.5 GHz max. turbo frequency with Intel® Turbo Boost Technology²

16 MB cache, 8 cores, 16 threads

Intel® UHD Graphics 630

Supports DDR4 memory up to 2933 MT/s data rate

Supports Intel® vPro® Technology and Intel® Stable Image Platform Program (SIPP)³

Intel® Core™ i5-10500T Processor¹

35W

2.3 GHz base frequency

Up to 3.8 GHz max. turbo frequency with Intel® Turbo Boost Technology²

12 MB cache, 6 cores, 12 threads

Intel® UHD Graphics 630

Supports DDR4 memory up to 2666 MT/s data rate

Supports Intel® vPro® Technology and Intel® Stable Image Platform Program (SIPP)³

Intel® Core™ i3-10100T Processor¹

35W

3.0 GHz base frequency

Up to 3.8 GHz max. turbo frequency with Intel® Turbo Boost Technology²

6 MB cache, 4 cores, 8 threads

Intel® UHD Graphics 630

Supports DDR4 memory up to 2666 MT/s data rate

Intel® Pentium® Processors

Intel® Pentium® Gold G6400T Processor¹

35W

3.4 GHz base frequency

4 MB cache, 2 cores, 4 threads

Intel® UHD Graphics 610

Supports DDR4 memory up to 2666 MT/s data rate

Standard Features and Configurable Components

Intel® Celeron® Processors

Intel® Celeron® G5905T Processor¹

35W

3.3 GHz base frequency

4 MB cache, 2 cores, 2 threads

Intel® UHD Graphics 610

Supports DDR4 memory up to 2666 MT/s data rate

1: Multi-core 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. Intel® Turbo Boost technology requires a PC with a processor with Intel Turbo Boost capability. Intel Turbo Boost performance varies depending on hardware, software and overall system. See www.intel.com/technology/turboboost for more information.

3. Some functionality of vPro® technology, such as Intel Active management technology and Intel Virtualization technology, requires additional 3rd party software in order to run. Availability of future "virtual appliances" applications for Intel vPro® technology is dependent on 3rd party software providers. Compatibility with future "virtual appliances" is yet to be determined.

NOTE: Memory speed 2666 and 2933 MT/s can be achieved via two UDIMMs per channel (2DPC) when populated with the same part number.

GRAPHICS

Integrated Graphics

Intel® UHD Graphics 630 (integrated on 10th gen Core i7/i5/i3 processors and Pentium® Gold G-6600, G-6500, and G-6500T)

Intel® UHD Graphics 610 (integrated on Pentium® Gold G-6400, G-6400T)

Adapters and Cables

HP DisplayPort to DVI-D Adapter

HP DisplayPort to HDMI True 4K Adapter

HP DisplayPort to VGA Adapter

HP USB to Serial Port Adapter

STORAGE

2.5 inch SATA Hard Disk Drives (HDD)

500 GB 7200RPM 2.5in SATA HDD

1 TB 7200RPM 2.5in SATA HDD

2 TB 5400RPM 2.5in SATA HDD

500 GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD*

500 GB 7200RPM 2.5in Self Encrypted Federal Information Processing Standard SATA HDD*

* Storage DriveLock does not work with Self Encrypting

M.2 PCIe NVMe Solid State Drives (SSD)

256GB M.2 2280 PCIe NVMe SSD

512GB M.2 2280 PCIe NVMe SSD

128GB M.2 2280 PCIe NVMe Three Layer Cell SSD

256GB M.2 2280 PCIe NVMe Three Layer Cell SSD

512GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Standard Features and Configurable Components

1TB M.2 2280 PCIe NVMe Three Layer Cell SSD

2TB M.2 2280 PCIe NVMe Three Layer Cell SSD

256GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD*

512GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD*

* Storage DriveLock does not work with Self Encrypting

MEMORY

DDR4-2666 (Transfer rates up to 2666 MT/s), 64 GB, 2 SODIMM

DDR4-3200 (Transfer rates up to 3200 MT/s), 64 GB, 2 SODIMM

Memory Configuration

4 GB (4 GB x 1)

8 GB (4 GB x 2)

8 GB (8 GB x 1)

16 GB (8 GB x 2)

16 GB (16 GB x 1)

32 GB (32 GB x 1)

32 GB (16 GB x 2)

64 GB (32 GB x 2)

NOTE: For systems configured with more than 3 GB of memory and a 32-bit operating system, all memory may not be available due to system resource requirements. Addressing memory above 4 GB requires a 64-bit operating system.

NOTE: Memory modules support data transfer rates up to 2666 MT/s and 3200 MT/s respectively depending on memory module used; actual data rate is determined by the system's configured processor and memory configuration. See processor specifications for supported memory data rate.

NOTE: All memory slots are customer accessible / upgradeable.

NOTE: Memory speed 2666 and 2933 MT/s can be achieved via two UDIMMs per channel (2DPC) when populated with the same part number.

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

Intel® I219-LM Gigabit Network Connection (standard)

Wireless¹

Intel® Wi-Fi 6 AX201 802.11ax 2x2 with Bluetooth® M.2 Combo Card vPro®

Intel® Wi-Fi 6 AX201 802.11ax 2x2 with Bluetooth® M.2 Combo Card non-vPro®

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. The specifications for Wi-Fi 6 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax WLAN devices. Only available in countries where 802.11ax is supported.

Standard Features and Configurable Components

KEYBOARDS AND POINTING DEVICES

Keyboards

- HP Wired Desktop 320K Keyboard
- HP USB Business Slim Wired SmartCard CCID Keyboard
- HP USB & PS/2 Washable Standalone Wired Keyboard
- HP USB Wired Keyboard
- HP Universal USB Wired Keyboard

Keyboard & Mouse Combo

- HP Premium Wireless Keyboard and Mouse
- HP Premium USB Wired Keyboard and Mouse
- HP Business Slim Wireless Keyboard and Mouse
- HP USB PS/2 Washable Keyboard and Mouse Wired

Mouse

- HP Wired Desktop 320M Mouse
- HP USB Optical Wired Mouse
- HP USB Hardened Optical Wired Mouse
- HP USB 1000dpi Laser Mouse
- HP USB & PS/2 Washable Wired Mouse Standalone
- HP USB Premium Wired Mouse
- HP USB Fingerprint Mouse

NOTE: Availability may vary by country

SECURITY

TPM 2.0 (FW: 7.85) endpoint security controller (Infineon SLB9670) shipped with Windows 10. Common Criteria EAL4+ Certified. FIPS 140-2 Level 2 Certified.

Intrusion Sensor (integrated in the system board, can be enabled/disabled through BIOS)

Support for chassis cable lock devices (10mm barrel or smaller)

Support for chassis padlocks devices

SATA port disablement (via BIOS)

Serial, USB enable / disable (via BIOS)

Intel® Identify Protection Technology (IPT)¹

Removable media write/boot control

Power-on password (via BIOS)

Setup password (via BIOS)

Standard Features and Configurable Components

1. Models configured with Intel® Core™ processors have the ability to utilize advanced security protection for online transactions. IPT, used in conjunction with participating web sites, provides double identity authentication by adding a hardware component in addition to the usual username and password. IPT is initialized through an HP Client Security module.

PORTS

Internal Slots and Ports

M.2 PCIe	(1) M.2 PCIe x1 2230 (for WLAN) (2) M.2 PCIe x4 2280 (for storage)
Integrated SATA storage connector	1

NOTE: For Desktop Mini with M.2 Storage config, there will be no SATA drive bracket. If you plan to use or upgrade the storage with any 2.5" SATA drive, please select a DM SATA Drive Bracket (available as both factory configured and after market option).

Bays

(1) 2.5" Internal Storage Drive

1. Must be configured at time of purchase

Standard User Accessible Ports

Type-A SuperSpeed USB 5Gbps signaling rate port	1 (front) 2 (rear)
Type-A SuperSpeed USB 10Gbps signaling rate port	1 (front) 2 (rear)
Type-C® SuperSpeed USB 10Gbps signaling rate port	1 (front)
Video	2 DisplayPort™ 1.4 (rear)
Audio	1 Combo Audio Jack with CTIA and OMTP headset support (front)
Network Interface	1 RJ45 (rear)

Rear Configurable Ports

Flexible Port 1, choice of one of the following:

SuperSpeed USB 10Gbps signaling rate port w/ DisplayPort™ Alt Mode and power intake via USB Type-C® Power Delivery up to 100W
DisplayPort™ 1.4 or HDMI 2.0a or VGA
Serial (RS-232) pin-out ¹
2.5 GbE NIC

1. Sold separately or as an optional feature

Standard Features and Configurable Components

Flexible Port 2, choice of one of the following:¹

Type-A USB (2) Hi-Speed USB 480Mbps signaling rate
Serial (RS-232) pin-out

1. Must be configured at time of purchase

USB SPECIFICATION AND MARKETING NAME MAPPING TABLE

Marketing Name	Technical Terminology
Hi-Speed USB 480Mbps signaling rate	USB 2.0
SuperSpeed USB 5Gbps signaling rate	USB 3.2 Gen 1
SuperSpeed USB 10Gbps signaling rate	USB 3.2 Gen 2
SuperSpeed USB 20Gbps signaling rate	USB 3.2 Gen 2x2

Standard Features and Configurable Components

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled Software

BIOS

- HP BIOSphere Gen6¹⁷
- HP Secure Erase¹⁸
- HP DriveLock & Automatic DriveLock²⁰
- BIOS Update via Network
- Absolute Persistence Module¹⁹
- Pre-boot Authentication

Software

- HP Desktop Support Utility
- HP JumpStart
- HP Privacy Settings
- HP Setup Integrated OOBE
- HP Support Assistant²¹
- HP Noise Cancellation Software
- Buy Office (sold separately)

Manageability Features

- HP Driver Packs²²
- HP System Software Manager (SSM) (download)
- HP BIOS Config Utility (BCU) (download)
- HP Cloud Recovery³⁸
- HP Client Catalog (download)
- HP Image Assistant Gen5
- HP Manageability Integration Kit for Microsoft System Center Configuration Management Gen4²³
- Ivanti Management Suite (download) ²⁴
- HP Smart Support³⁹

Client Security Software

- HP Client Security Manager Gen6²⁵
- HP Power On Authentication
- Windows Defender²⁷

Security Management

- Trusted Platform Module TPM 2.0 Embedded Security Chip shipped with Windows 10. (Common Criteria EAL4+ Certified)
- Serial, USB enable/disable (via BIOS)
- Power-on password (via BIOS)
- Setup password (via BIOS)
- Support for chassis padlocks and cable lock devices
- HP Sure Sense³⁴
- HP Sure Click³⁷
- HP Sure Start Gen6³⁰
- HP Sure Run Gen3³⁵
- HP Sure Recover Gen3³⁶

17. HP BIOSphere Gen6 is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations.

18. Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. "Clear" sanitation method.

19. 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

Standard Features and Configurable Components

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.

20. Storage Drivelock does not work with Self Encrypting

21. HP Support Assistant requires Windows and Internet access.

22. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.

23. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>

24. Ivanti Management Suite subscription required.

25. HP Client Security Manager Gen6 requires Windows and is available on the select HP Elite and Pro PCs.

26. HP Sure Sense requires Windows 10.

27. Windows Defender Opt In, Windows 10, and internet connection required for updates.

30. HP Sure Start Gen6 is available on select HP PCs.

35. HP Sure Run Gen3 is available on select Windows 10 based HP Pro, Elite and Workstation PCs with select Intel® or AMD processors.

36. HP Sure Recover Gen3 requires an open network connection. You must back up important files, data, photos, videos, etc. before use to avoid loss of data.

37. HP Sure Click requires Windows 10 and supports Microsoft Internet Explorer, Google Chrome™, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.

38. HP Cloud Recovery is available for HP Elite and Pro desktops and laptops PCs with Intel® or AMD processors and requires an open, wired network connection. Note: You must back up important files, data, photos, videos, etc. before use to avoid loss of data. Detail please refer to: <https://support.hp.com/us-en/document/c05115630>.

39. HP Smart Support is available to commercial customers through your HP Service Representative and HP Factory Configuration Services; or it can be downloaded at: <http://www.hp.com/smart-support>. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights.

Standard Features and Configurable Components

UNIT ENVIRONMENT AND OPERATING CONDITIONS

General Unit Operating Guidelines

- Keep the computer away from excessive moisture, direct moisture and the extremes of heat and cold, to ensure that unit is operated within the specified operating range.
- Leave a 10.2 cm (4 in) clearance on all vented sides of the computer to permit the required airflow.
- Never restrict airflow into the computer by blocking any vents or air intakes.
- Do not stack computers on top of each other or place computers so near each other that they are subject to each other's re-circulated or preheated air.
- Occasionally clean the air vents on the front, back, and any other vented side of the computer. Lint, dust and other foreign matter can block the vents and limit the airflow.
- If the computer is to be operated within a separate enclosure, intake and exhaust ventilation must be provided on the enclosure, and the same operating guidelines listed above will still apply.

Temperature Range	Operating: 5° to 35° C ¹ Non-Operating for AiO: -20° to 60° C ¹ Non-Operating for MT/SFF/DM: -30° to 60° C ¹
Relative Humidity	Operating: 5% to 90% (non-condensing at ambient) Non-operating: 5% to 90% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 5000m Non-operating: 50000ft (15240 m)

1. Operating temperature is de-rated 1.0 deg C per 300 m (1000 ft) to 3000 m (10,000 ft) above sea level, no direct sustained sunlight. Maximum rate of change is 10 deg C/Hr. The upper limit may be limited by the type and number of options installed.

Standard Features and Configurable Components

ENVIRONMENTAL & INDUSTRY

Eco-Label Certifications & declarations	<p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> • IT ECO declaration • US ENERGY STAR® • US Federal Energy Management Program (FEMP) • EPEAT® Gold registered in the United States. See http://www.epeat.net for registration status in your country¹. • TCO certified • China Energy Conservation Program (CECP) • China State Environmental Protection Administration (SEPA) • Taiwan Green Mark • Korea Eco-label • Japan PC Green label* <p>¹Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.</p>		
Sustainable Impact Specifications	<ul style="list-style-type: none"> • Ocean-bound plastic in Speaker box • 40% post-consumer recycled plastic • External Power Supply 90% Efficiency • 80 Plus® Gold/Platinum/Silver/Titanium power supplies available • Outside Box and corrugated cushions are 100% sustainably sourced and recyclable • Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable 		
System Configuration	<p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a “Typically Configured Notebook”.</p>		
Energy Consumption (in accordance with US ENERGY STAR® test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	7.50 W	7.65 W	7.25 W
Normal Operation (Long idle)	7.03 W	7.15 W	6.90 W
Sleep	0.71 W	0.75 W	0.70 W
Off	0.54 W	0.59 W	0.53 W
	<p>NOTE: Energy efficiency data listed is for an ENERGY STAR® certified product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are certified with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® certified configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p>		
Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 50Hz
Normal Operation (Short idle)	25.59 BTU/hr	26.11 BTU/hr	24.74 BTU/hr
Normal Operation (Long idle)	23.97 BTU/hr	24.40 BTU/hr	23.55 BTU/hr
Sleep	2.44 BTU/hr	2.58 BTU/hr	2.41 BTU/hr
Off	1.86 BTU/hr	2.02 BTU/hr	1.83 BTU/hr
	<p>NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>		

Standard Features and Configurable Components

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WA} , bels)	Sound Pressure (L_{pAm} , decibels)	
Typically Configured – Idle	3.2	23	
Fixed Disk – Random writes	3.8	28	
Optical Drive – Sequential reads	4.6	38	
Longevity and Upgrading	<p>This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the</p> <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>		
Additional Information	<ul style="list-style-type: none"> • This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product is 92.6% recycle-able when properly disposed of at end of life. <p>*Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.</p>		
Packaging Materials (vary by country)	External:	PAPER/Corrugated	450 g
	Internal:	PAPER/Molded pulp	74 g
		PLASTIC/Polyethylene low density	5 g
	The plastic packaging material contains at least 100% recycled content.		
The corrugated paper packaging materials contains at least 80% recycled content.			
RoHS Compliance	<p>HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.</p> <p>We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products.</p> <p>We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.</p> <p>To obtain a copy of the HP RoHS Compliance Statement, see. HP RoHS position statement.</p>		
Material Usage	<p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):</p> <ul style="list-style-type: none"> • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics 		

Standard Features and Configurable Components

	<ul style="list-style-type: none"> • 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)
<p>Packaging Usage</p>	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
<p>End-of-life Management and Recycling</p>	<p>HP offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>
<p>End-of-life Management and Recycling</p>	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html 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</p>

Standard Features and Configurable Components

	http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf
Footnotes	<ul style="list-style-type: none"> • Percentage of ocean-bound plastic contained in each component varies by product • Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard. • External power supplies, WWAN modules, power cords, cables and peripherals excluded. • 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers. • Fiber cushions made from 100% recycled wood fiber and organic materials.

SERVICE AND SUPPORT

On-site Warranty¹: Three-year (3-3-3) limited warranty delivers three years of on-site, next business day² service for parts and labor and includes free support 24 x 7³. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: <http://www.hp.com/go/cpc>.⁴

1. Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.
2. On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
3. Technical telephone support applies only to HP-configured and third-party HP qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.
4. HP Care Packs are sold separately. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit www.hp.com/go/cpc. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

Technical Specifications - Processors

PROCESSORS

10th Generation Intel® Core™ Processors

All HP Engage Flex models featuring this technology include processors that are part of the Intel® Stable Image Platform Program (SIPP) designed to ensure the stability promise inherent in the value proposition of the HP Engage Flex Mini.

Intel® Active Management Technology (AMT) v12¹ – An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 12 includes the following advanced management functions:

- Support for configuration of Intel AMT 12.0 capabilities
- No reset after provisioning
- Support for Intel Enterprise Digital Fence
- The Platform Discovery Utility can now discover these additional Intel products:
 - Intel Identity Protection Technology with One Time Password
 - Public Key Infrastructure
 - Multi Factor Authentication
- Profile Editor and Profile Editor Plugin Interface
- Required Permissions for Solutions Framework

1. Intel® Active Management Technology requires an Intel® AMT-enabled chipset, network hardware and software, as well as connection with a power source and a corporate network connection. Setup requires configuration by the purchaser and may require scripting with the management console or further integration into existing security frameworks to enable certain functionality. It may also require modifications of implementation of new business processes.

Technical Specifications – Graphics

GRAPHICS

Intel® UHD Graphics (integrated)

Graphics Controller	Integrated
DisplayPort™	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays connected to any output controlled by Intel® Graphics
HDMI	Supports HDMI 2.0a features Supports HDCP 2.2 Supports audio over HDMI
VGA	VGA output
USB-C® DP Alt Mode	DisplayPort™ over the USB-C® module
Memory	The actual amount of maximum graphics memory can be >4GB. System memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.
Maximum Color Depth	up to 10 bits/color HEVC 10b Enc/Dec HW VP9 10b Dec HW
Graphics/Video API Support	HDR Rec. 2020 DX12
Max. Resolution (VGA)	2048 x 1536@60Hz
Max. Resolution (HDMI)	4096 x 2160@60Hz
Max. Resolution (DP)	4096 x 2160@60Hz

Technical Specifications – Storage

HARD DISK AND SOLID STATE STORAGE**500 GB 7200RPM 2.5in SATA HDD**

Capacity	500 GB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	Up to 128 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.267 in/6.8 mm (nominal)
Width (nominal)	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

1 TB 7200RPM 2.5in SATA HDD

Capacity	1 TB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	Up to 128 MB
Logical Blocks	1,953,525,168
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (Max.)
Width (nominal)	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

2 TB 5400RPM 2.5in SATA HDD

Capacity	2 TB
Rotational Speed	5,400 rpm
Interface	SATA 6 Gb/s
Buffer Size	128 MB
Logical Blocks	3,907,050,336
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (nominal)
Width (nominal)	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications – Storage

500 GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD

Capacity	500 GB
Architecture	Self-Encrypting (SED) Solid State Drive with SATA interface
Interface	SATA 6 Gb/s
Buffer Size	128 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.283 in/7.2 mm (Max)
Width	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

500 GB 7200RPM 2.5in Self Encrypted Federal Information Processing Standard SATA HDD

Capacity	500 GB
Architecture	Self-Encrypting (SED) Solid State Drive with SATA interface
Interface	SATA 6 Gb/s
Buffer Size	128 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.283 in/7.2 mm (Max)
Width	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

256 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	256 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 1600MB/s
Maximum Sequential Write	Up to 780MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications – Storage

512 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 1600MB/s
Maximum Sequential Write	Up to 860MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

128 GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	128 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 2800MB/s
Maximum Sequential Write	Up to 600MB/s
Logical Blocks	250,069,680
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

256 GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	256GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 2700MB/s
Maximum Sequential Write	Up to 1000MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications – Storage

512 GB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 2900MB/s
Maximum Sequential Write	Up to 1100MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

1 TB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	1 TB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 3480MB/s
Maximum Sequential Write	Up to 3037MB/s
Logical Blocks	2,000,409,264
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	TRIM; ASPM L1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

2 TB M.2 2280 PCIe NVMe Three Layer Cell SSD

Drive Weight	< 10g
Capacity	2 TB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 3500MB/s
Maximum Sequential Write	Up to 3000MB/s
Logical Blocks	3,907,029,168
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	TRIM; ASPM L1.2

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications – Storage

256 GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD

Drive Weight	< 10g
Capacity	256 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 2700MB/s
Maximum Sequential Write	Up to 1000MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2; TCG-OPAL2 security

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

512 GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Maximum Sequential Read	Up to 2900MB/s
Maximum Sequential Write	Up to 1100MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2; TCG-OPAL2 security

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications – Networking and Communications

NETWORKING AND COMMUNICATIONS

Intel i219LM 10/100/1000 Integrated NIC vPro®	
Connector	RJ-45
System Interface	PCI (Intel proprietary) + SMBus
Data rates supported	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
IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
Performance	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling(Hash Mode Only) Jumbo Frame 9K
Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Management Interface	Auto MDI/MDIX Crossover cable detection
IT 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
Security & Manageability	Intel® vPro® support with appropriate Intel® chipset components

Technical Specifications – Networking and Communications

Intel® I225-LM 2.5 Gigabit Network Connection LOM (non-vPro®)	
Connector	RJ-45
System Interface	PCI (Intel proprietary) + SMBus
Data rates supported	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, 100 & 1000 Mbit/s
IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet) IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BASE-T IEEE
Performance	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW
Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Management Interface	Auto MDI/MDIX Crossover cable detection

Intel Wi-Fi 6 AX201 + BT5 (802.11ax 2x2, non-vPro®, supporting gigabit file transfer speeds**)*	
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	Features Wi-Fi 6 technology
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

Technical Specifications – Networking and Communications

Data Rates	<ul style="list-style-type: none"> • 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
Security	<ul style="list-style-type: none"> • IEEE compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • 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	<ul style="list-style-type: none"> • 802.11b : +18.5dBm minimum • 802.11g : +17.5dBm minimum • 802.11a : +18.5dBm minimum • 802.11n HT20(2.4GHz) : +15.5dBm minimum • 802.11n HT40(2.4GHz) : +14.5dBm minimum • 802.11n HT20(5GHz) : +15.5dBm minimum • 802.11n HT40(5GHz) : +14.5dBm minimum • 802.11ac VHT80(5GHz) : +11.5dBm minimum • 802.11ac VHT160(5GHz) : +11.5dBm minimum • 802.11ax HT40(2.4GHz) : +10dBm minimum • 802.11ax VHT160(5GHz) : +10dBm minimum
Power Consumption	<ul style="list-style-type: none"> • Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
Receiver Sensitivity	<ul style="list-style-type: none"> •802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -84dBm maximum • 802.11a/g, 6Mbps : -86dBm maximum • 802.11a/g, 54Mbps : -72dBm maximum • 802.11n, MCS07 : -67dBm maximum • 802.11n, MCS15 : -64dBm maximum • 802.11ac, MCS0 : -84dBm maximum • 802.11ac, MCS9 : -59dBm maximum •802.11ax, MCS11(HT40): -59dBm maximum •802.11ax, MCS11(VHT160): -58.5dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard with CNVi Interface
Dimensions	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Type 2230 : 2.8g 2. Type 126: 1.3g

Technical Specifications – Networking and Communications

Operating Voltage	3.3v +/- 9%
Temperature	Operating: 14° to 158° F (–10° to 70° C) Non-operating: –40° to 176° F (–40° to 80° C)
Humidity	Operating: 10% to 90% (non-condensing) Non-operating: 5% to 95% (non-condensing)
Altitude	Operating: 0 to 10,000 ft (3,048 m) Non-operating: 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON
Subtitle	HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC60950-1/IEC62368-1 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

*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. The specifications for Wi-Fi 6 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax WLAN devices. Only available in countries where 802.11ax is supported.

**Gigabit* Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Technical Specifications – Networking and Communications

Intel Wi-Fi 6 AX201 + BT5 (802.11ax 2x2, vPro®, supporting gigabit file transfer speeds**)*	
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	Features Wi-Fi 6 technology
Frequency Band	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz
Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz) • 802.11ax : MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz & 160MHz)
Modulation	Direct Sequence Spread Spectrum OFDM, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
Security	• IEEE compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • 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	• 802.11b : +18.5dBm minimum • 802.11g : +17.5dBm minimum • 802.11a : +18.5dBm minimum • 802.11n HT20(2.4GHz) : +15.5dBm minimum • 802.11n HT40(2.4GHz) : +14.5dBm minimum • 802.11n HT20(5GHz) : +15.5dBm minimum • 802.11n HT40(5GHz) : +14.5dBm minimum • 802.11ac VHT80(5GHz) : +11.5dBm minimum • 802.11ac VHT160(5GHz) : +11.5dBm minimum • 802.11ax HT40(2.4GHz) : +10dBm minimum • 802.11ax VHT160(5GHz) : +10dBm minimum

Technical Specifications – Networking and Communications

Power Consumption	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> •802.11b, 1Mbps : -93.5dBm maximum •802.11b, 11Mbps : -84dBm maximum • 802.11a/g, 6Mbps : -86dBm maximum • 802.11a/g, 54Mbps : -72dBm maximum • 802.11n, MCS07 : -67dBm maximum • 802.11n, MCS15 : -64dBm maximum • 802.11ac, MCS0 : -84dBm maximum • 802.11ac, MCS9 : -59dBm maximum •802.11ax, MCS11(HT40): -59dBm maximum •802.11ax, MCS11(VHT160): -58.5dBm maximum
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications
Form Factor	PCI-Express M.2 MiniCard with CNVi Interface
Dimensions	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0/5.1 Wireless Technology	
Bluetooth Specification	4.0/4.1/4.2/5.0/5.1 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.
Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth Software Supported Link Topology	Microsoft Windows Bluetooth Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249

Technical Specifications – Networking and Communications

Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive IEC60950-1/IEC62368-1 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
Security & Manageability	Intel® vPro® support with appropriate Intel® chipset components <i>*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. The specifications for Wi-Fi 6 are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ax WLAN devices. Only available in countries where 802.11ax is supported.</i> <i>**Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.</i>

Technical Specifications – Input/Output Devices

I/O DEVICES

HP Business Slim Standalone Wired Keyboard		
Physical Characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	171.97 x 68.35 x 8.27 in (436.8± 1.5 x 137.6± 1.0 x 21.0± 1.0 cm)
	Weight	1.32 lb (0.6± 0.08 kg)
Electrical	Operating voltage	4.4-5.25VDC
	Power consumption	50-mA maximum (with 5 VDC power supplied and three LEDs ON)
	System interface	USB or PS/2
	ESD	Contact Discharge: 2, 4,6,8KV Air Discharge: 2, 4, 8,10,12.5KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	60±12.5g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	Minus 30 degrees to 60 degrees Celsius
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

Technical Specifications – Input/Output Devices

HP USB Business Slim Wired SmartCard CCID Keyboard		
Physical Characteristics	Keys	104, 105, 109 layout (depending upon country)
	Dimensions (L x W x H)	17.34 x 5.68 x 0.78in (440.6 x 144.5 x 1.98 cm)
	Weight	1.32 lb (598g)
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption	100mA (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 12.5 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	CE Marking, TUV, EAC, FCC, cULus/CSAus, ICES, RCM, VCCI, KCC, BSMI	
Ergonomic compliance	ISO 9241-4, TUVGS	

Technical Specifications – Input/Output Devices

HP Premium Standalone Wireless Keyboard		
Physical Characteristics	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	17.04 x 5.55 x 0.52 in (433 x 141 x 13.2 mm)
	Weight	1.54 lb (698g)
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption	35mA (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence	
Approvals	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC	
Ergonomic compliance	TUVGS	

Technical Specifications – Input/Output Devices

HP USB Premium Wired Keyboard		
Physical Characteristics	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	17.04 x 5.55 x 0.52 in (433 x 141 x 13.2 mm)
	Weight	1.54 lb (698g)
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption	35mA (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC	
Ergonomic compliance	TUVGS	

Technical Specifications – Input/Output Devices

HP USB Wired Keyboard		
Physical Characteristics	Keys	104, 105, 106, 108, 109 layouts
	Dimensions (L x W x H)	18.12 x 6.47 x 1.10 in (460.28 x 164.31 x 27.88 mm)
	Weight	1.98 lb (900g) min
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption	50mA Max (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	60±14g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	CUL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC	
Ergonomic compliance	TUVGS	

HP Universal USB Wired Keyboard		
Physical Characteristics	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	18.15 x 6.02 x 1.08 in (461 x 153 x 27.4 mm)
	Weight	1.32 lb (600g) min
Electrical	Operating voltage	5 VDC, +/-5%

Technical Specifications – Input/Output Devices

	Power consumption	50mA Max (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Mid-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC	
Ergonomic compliance	TUVGS	

HP Universal USB Wired Mouse

Dimensions (H x L x W)	4.53 x 2.50 x 1.40 in (115 x 63.46 x 35.48 mm)	
Weight	0.18lb (80g)	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	50mA Max

Technical Specifications – Input/Output Devices

	Resolution	1,000 DPI
	Sensor	Pixart PAN3606DL
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	9G(max), 1G=9.8m/s ²
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

HP Optical Mouse		
Dimensions (H x L x W)	4.53 x 2.48 x 1.46 in (115.2x 63 x37 mm)	
Weight	0.22lb (101.6g)	
Environmental	Operating temperature	41° to 122° F (5° to 50° C)
	Non-operating temperature	(-4° to 140° F)(-20° to 60° C)
	Operating humidity	10% to 85% (non-condensing at ambient)
	Non-operating humidity	5% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s ²
	System interface	USB or PS/2
Mechanical	Switch actuation	60±15g nominal peak force with tactile feedback
	Switch life	3 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC

HP USB 1000dpi Laser Mouse		
Dimensions (H x L x W)	115 * 62.9 * 37 mm (L * W * H)	
Weight	0.22lb (101.6g)	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces

Technical Specifications – Input/Output Devices

	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	100mA
	Resolution	1,000 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s ²
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

HP USB Premium Wired Mouse

Dimensions (H x L x W)	4.21 x 2.64 x 1.52 in (107 x 67 x 38.7 mm)	
Weight	0.19lb (90g)	
Environmental	Operating temperature	50° to 122°F (10° to 50° C)
	Non-operating temperature	-22° to 140°F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	50 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	12mA
	Resolution	800, 1200, 1600 DPI
	Sensor	Pixart PAN3606DL
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s ²
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, C-Tick, KC

Technical Specifications – Input/Output Devices

HP USB Fingerprint Mouse		
Dimensions (H x L x W)	107 x 67 x 38.7 mm	
Weight	85 g	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	130mA
	Resolution	1,200 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s ²
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

Technical Specifications – Audio/Multimedia

AUDIO/MULTIMEDIA

Type	Integrated
HD Stereo Codec	Realtek ALC3205
Audio I/O Ports	Front: Headset connector supports a CTIA and OMTP style headset and is re-taskable as a Line-in, Line-out, Microphone-in or Headphone-out port
Internal Speaker Amplifier	2W class D mono amplifier for the internal speaker only. External speakers must be powered
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker.
Sampling	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 192 kHz for DAC and 44.1 kHz to 96 kHz for ADC
Wavetable Syntheses	Yes - Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes

Technical Specifications – Power

POWER

External Power Supplies	65W EPS, 88% average efficiency at 115V & 89% at 230Vac
Operating Voltage Range	90Vac~264Vac
Rated Voltage Range	100Vac~240Vac
Rated Line Frequency	50HZ~60HZ
Operating Line Frequency	47HZ~63HZ
Rated Input Current with Energy Efficient* Power Supply	65W ≤ 1.7A
DC Output	+19.5V

Current Leakage (NFPA 99: 2102)	Less than 500 microamps of leakage current at 264 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. Less than 100 microamps of leakage current at 264 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.
Power Supply Fan	N/A
Power cord length	6.0 ft. (1.83 m)
Dimensions	65W: 102 x 55 x 30 mm

The power supply shall comply with harmonic input current requirements as detailed in EN61000-3-2 and JEIDA MITI standards. The harmonic input current requirements must be met under the following operating conditions:

Load Requirements: 50% and 100%

Input Voltage: 230Vac/50Hz.

For active power factor correction the power factor at 50% & 100% loads shall be greater than 0.9 over the entire nominal input voltage range (100-127VAC and 200-240VAC).

Condition	Standard Efficiency	82/85/82%	85/88/85%	87/90/87%	90/92/89%	Input Voltage
10% of Rated Load	-	75%	81%	84%	86%	115Vac/60HZ
20% of Rated Load	-	82%	85%	87%	90%	115Vac/60HZ
50% of Rated Load	-	85%	88%	90%	92%	115Vac/60HZ
	PF>0.9	PF>0.9	PF>0.9	PF>0.9	PF>0.95	
100% of Rated Load	70%	82%	85%	87%	89%	115Vac/60HZ
	PF>0.9	PF>0.9	PF>0.9	PF>0.9	PF>0.9	230Vac/50HZ

Technical Specifications – Weights and Dimensions

WEIGHTS & DIMENSIONS¹

Chassis (W x D x H)	6.97 x 6.89 x 1.35 in 177 x 175 x 34.2 mm
System Volume	64 cu in 1.05 L
System Weight ²	2.74 lbs 1.25 kg
Max Supported Weight (desktop orientation)	N/A
Packaging Dimension (W x D x H)	19.57 x 5.04 x 8.78 in (497 x 128 x 223 mm)
	MPP: 19.61 x 9.25 x 5.20 in (498 x 235 x 132 mm)
Shipping Weight	6.52 lbs (2.97 kg)
	MPP: 7.50 lbs (3.40 kg)
Palletization Profile	18-units per layer 5 or 6 layers max depending on details of air freight 90 or 108 units per pallet depending on details of air freight 45.354 x 39.13 x 57.80 in, 1152 x 994 x 1468 mm (include pallet)
Palletization Profile (Molded Pulp)	10-units per layer 10 to 19 layers max depending on details of freight 100 or 190 units per pallet depending on details of freight 46.26 x 39.21 x 103.74 in, 1175 x 996 x 2635 mm (including pallet)

1. Packaging material used will vary by country

2. Configured with 1 HDD only

Technical Specifications – Miscellaneous Features

MISCELLANEOUS FEATURES

Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Intel® Wired for Management support; industry wide initiative to make Intel® architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
 - Power LED will blink red 2 to 5 times, then blink white 2 or more times, then repeat (with beep tones for each blink initially):
 - 2 red + 2 white User must provide file for BIOS recovery (USB storage typically)
 - 2 red + 3 white User must enter a key sequence to proceed with recovery by policy
 - 2 red + 4 white BIOS recovery is in progress
 - 3 red + 2 white Memory could not be initialized
 - 3 red + 3 white Graphics adaptor could not be found
 - 3 red + 4 white Power supply failure / not connected
 - 3 red + 5 white Processor not installed
 - 3 red + 6 white Current processor does not support an enabled feature
 - 4 red + 2 white Processor has exceeded its temperature threshold / system thermal shutdown
 - 4 red + 3 white System internal temperature has exceeded its threshold
 - 5 red + 2 white System controller firmware is not valid
 - 5 red + 3 white System controller detected BIOS is not executing
 - 5 red + 4 white BIOS could not complete initialization / mainboard failure
 - 5 red + 5 white System controller rebooted the system after a health or recovery timer triggered
- HP PC Hardware Diagnostics UEFI:
 - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software5
- 5 Aux Power LED on System mainboard
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, memory & optical drive removal (For MT, SFF, and DM only)
- Green Pull Tabs, and Quick Release Latches for easy Identification

Technical Specifications – Miscellaneous Features

Additional Features

Product Orientation

Desktop Mini (DM) can be oriented as either a desktop (horizontal) or a tower (vertical) with optional vertical stand.

Drive Protection System

DPS Access through F10 Setup during Boot

A diagnostic hard drive self- test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user. Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.

The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures.

SMART Technology (Self-Monitoring, Analysis and Reporting Technology)

Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted.

SMART I - Drive Failure Prediction

Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count.

SMART II - Off-Line Data Collection

By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure.

SMART III - Off-Line Read Scanning with Defect Reallocation

IOEDC: I/O Error Detection Circuitry

SMART IV - End-to-End CRC for hard drives

Detects errors in Read/Write buffers on HDD cache RAM

After Market Options

AFTER MARKET OPTIONS

Graphics Solutions

HP DisplayPort To HDMI True 4k Adapter
HP HDMI Standard Cable Kit
HP DisplayPort Cable Kit
HP DisplayPort To VGA Adapter
HP DisplayPort To DVI-D Adapter

Part Number

2JA63AA
T6F94AA
VN567AA
AS615AA
FH973AA

Desktop Mini Accessories

HP Desktop Mini Port Cover v2
HP Desktop Mini 2.5" SATA Drive Bay kit v2
HP Desktop Mini LockBox V2
HP Desktop Mini DVD-Writer ODD Expansion Module
HP Desktop Mini I/O Expansion Module
HP Desktop Mini Security/Dual VESA Sleeve v3
HP Desktop Mini Security/Dual VESA Sleeve v3 with Power Supply Holder
HP B300 PC Mounting Bracket with Power Supply Holder
HP Desktop Mini Vertical Chassis Stand
HP DM Power Supply Holder Kit v2

Part Number

13L69AA
13L70AA
3EJ57AA
K9Q83AA
K9Q84AA
13L67AA
13L68AA
7DB37AA
G1K23AA
7DB38AA

Data Storage Drives

HP PCIe NVME TLC 256GB SSD M.2 Drive
HP PCIe NVME TLC 512GB SSD M.2 Drive

Part Number

1CA51AA
X8U75AA

After Market Options

Input Devices

HP Wired Desktop 320K Keyboard	<u>9SR37AA</u>
HP USB Antimicrobial Business Slim Keyboard and Mouse	<u>Z9H50AA</u>
HP USB Business Slim CCID SmartCard Keyboard	<u>Z9H48AA</u>
HP USB Keyboard	<u>QY776AA</u>
HP USB Premium Keyboard	<u>Z9N40AA</u>
HP Wired Desktop 320MK Mouse and Keyboard	<u>9SR36AA</u>
HP USB PS/2 Washable Keyboard & Mouse	<u>BU207AA</u>
HP Wireless Business Slim Keyboard and Mouse	<u>N3R88AA</u>
HP Wireless Premium Keyboard	<u>Z9N41AA</u>
HP Wired Desktop 320M Mouse	<u>9VA80AA</u>
HP Wireless Premium Mouse	<u>1JR31AA</u>
HP USB Grey v2 Mouse	<u>Z9H74AA</u>
HP USB Premium Mouse	<u>1JR32AA</u>
HP USB 1000dpi Laser Mouse	<u>QY778AA</u>
HP USB Optical Mouse	<u>QY777AA</u>
HP USB Fingerprint Mouse	<u>4TS44AA</u>

System Memory

HP 4GB DDR4-2666 SODIMM	<u>3TK86AA</u>
HP 8GB DDR4-2666 SODIMM	<u>3TK88AA</u>
HP 16GB DDR4-2666 SODIMM	<u>3TK84AA</u>
HP 4GB DDR4-3200 SODIMM	<u>13L79AA</u>
HP 8GB DDR4-3200 SODIMM	<u>13L77AA</u>
HP 16GB DDR4-3200 SODIMM	<u>13L75AA</u>
HP 32GB DDR4-3200 SODIMM	<u>13L73AA</u>

Multimedia Devices

HP Business Headset v2	<u>T4E61AA</u>
HP S101 Speaker Bar	<u>5UU40AA</u>
HP UC Speaker Phone v2	<u>4VW02AA</u>

Security Devices

HP Dual Head Keyed Cable Lock	<u>T1A64AA</u>
HP Keyed Cable Lock 10mm	<u>T1A62AA</u>
HP Master Keyed Cable Lock 10mm	<u>T1A63AA</u>

Stands and Mounting Accessories

HP B250 PC Mounting Bracket	<u>8RA46AA</u>
HP B300 PC Mounting Bracket	<u>2DW53AA</u>
HP B500 PC Mounting Bracket	<u>2DW52AA</u>
HP Quick Release Bracket 2	<u>6KD15AA</u>

I/O Devices

HP DisplayPort Port Flex IO v2	<u>13L54AA</u>
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After Market Options

HP HDMI Port Flex IO v2	<u>13L55AA</u>
HP Type-C USB 3.1 Gen2 Port with 100W PD Flex IO v2	<u>13L60AA</u>
HP VGA Port Flex IO v2	<u>13L53AA</u>
HP Serial Port Flex IO v2	<u>13L56AA</u>
HP Serial Port Flex IO 2nd v2	<u>13L57AA</u>

NOTE: For more detail on HP I/O Devices please refer to the HP FLEX IO Option Cards QuickSpecs. URL is:
<https://www8.hp.com/h20195/v2/GetDocument.aspx?docname=c06712909>

Retail Peripherals & Options

Engage Advanced Fanless Hub

Part Number

9YH40AA

Change Log

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Date	Version History	Action	Description of Change
August 11, 2021	From v1 to v2	Changed	ENVIRONMENTAL & INDUSTRY section
September 30, 2021	From v2 to v3	Changed	Format page 2 & 10
January 18, 2022	From v3 to v4	Removed	Optane memory references