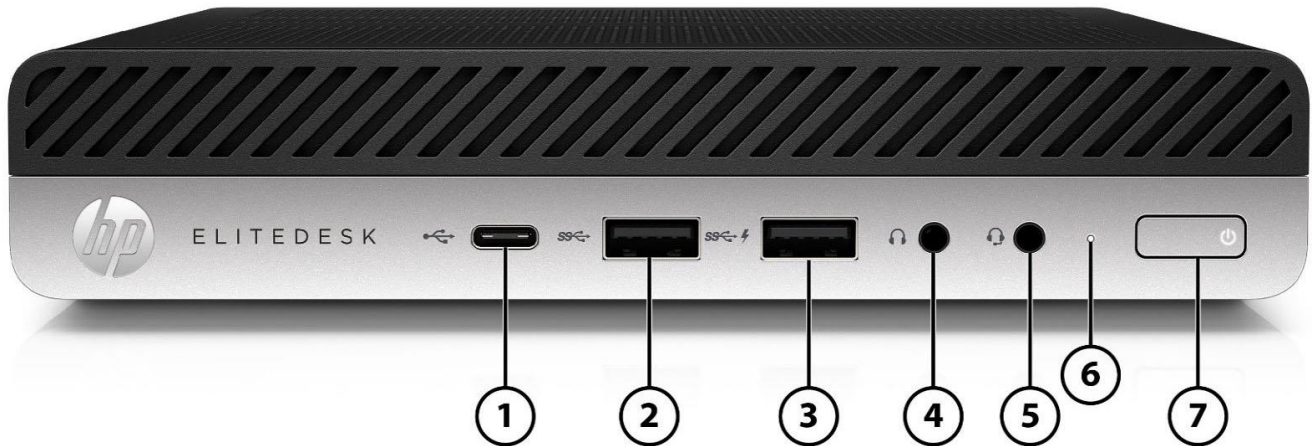


Overview

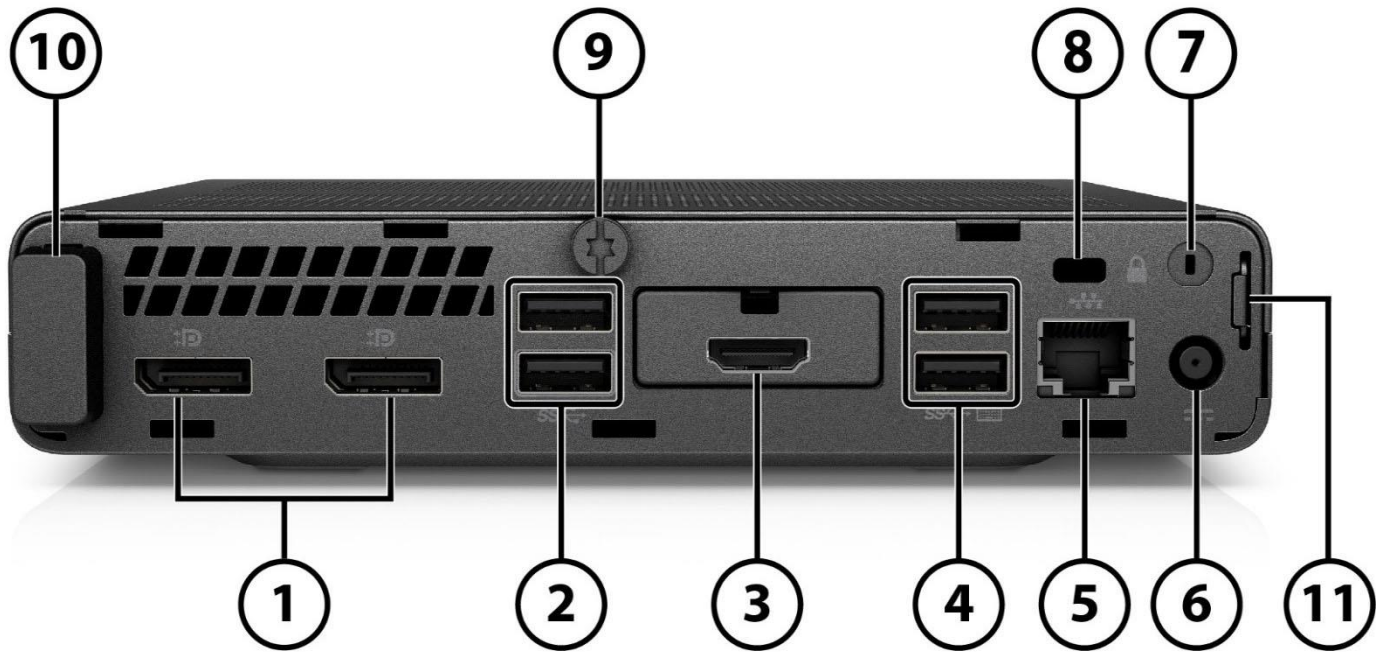
P Collaboration PC G5 with Intel Unite



1. USB Type-C™ 3.1 Gen 2 Port with Fast Charging
2. USB 3.1 Gen 2 Type A
3. USB 3.1 Gen 1 Type A (charging port)
4. Headphone connector
5. Universal Audio Jack with CTIA headset support
6. Hard Drive activity light
7. Dual-state power button

Overview

HP Collaboration PC G5 with Intel Unite



- | | | | |
|----|---|-----|--------------------------------|
| 1. | DisplayPort™ 1.2 | 7. | WLAN External Antenna Punchout |
| 2. | USB 3.1 Gen 2 (10Gbps/s) Type A | 8. | Universal Cable Lock Slot |
| 3. | Configurable Option card slot. | 9. | Cover Release Thumbscrew |
| 4. | USB 3.1 Gen 1 (5Gbps/s) Type A ¹ | 10. | WLAN Internal Antenna |
| 5. | RJ-45 Network Adapter | 11. | Padlock Loop |
| 6. | Power connector | | |

Not Shown

- Slots (1) Internal M.2 2230 connector for WLAN
(2) Internal M.2 SSD storage (2230 or 2280 connector)
- Bays (1) 2.5- inch SATA drive Bay
- Mounting Support for
- VESA Sleeve
 - Quick Release Bracket
 - B300/B500 Mounting bracket

1. Allows for wake from S4/S5 with keyboard/mouse when connected and enabled in BIOS

AT A GLANCE

Standard Features and Configurable Modules

AT A GLANCE

- Intel Unite conferencing solution built on Windows 10 Pro.
- Intel® Q370 chipset supporting Intel® 8th and 9th generation Core™ processors, featuring integrated Intel® UHD Graphics and Intel® vPro™ Technology (available with Core i5 and Core i7 processors) ^{1,4,5}
- Processors up to 95W
- Intel® 630 UHD graphics as well as optional discrete graphics²
- Intel® Ethernet Connection I219LM GbE LOM integrated network connection
- DDR4 Synchronous Dynamic Random Access Memory (SDRAM) (Transfer rates up to 2666 MT/s)
- Support for up to three monitors via two standard DisplayPort™ 1.2 connectors and an optional third video port connector which provides the following choices: HDMI 2.0a, VGA, DisplayPort™ 1.2, or USB Type-C™ with DisplayPort™ 1.2 for all platforms; USB Type-C™ with DisplayPort™ 1.2 and Power Delivery (PD)²
- Configurable 3rd rear I/O with video port (HDMI, DisplayPort™ 1.2, VGA, Type-C™ with DisplayPort™ 1.2) or Thunderbolt 3.0
- Models can be configured with multiple data drives in a RAID array
- Enhanced Security With:
 - HP Sure Click
 - HP Sure Start Gen5
 - HP Sure Run Gen2
 - HP Sure Recover Gen2
 - HP Manageability Integration Kit
 - HP WorkWise
 - HP BIOSphere Gen4
 - HP Client Security Manager Gen4
 - Notification with HP Image Assistant Gen3
 - Multifactor Authentication features include fingerprint reader (optional) and IR webcam (optional) both Windows Hello certified
- High efficiency energy saving power supply options
- ENERGY STAR® certified. EPEAT® 2019 registered where applicable/supported. Registration may vary by country. See <http://www.epeat.net> for registration status by country. Search keyword generator on HP's 3rd party option store for solar generator accessories at <http://www.hp.com/go/options>.
- CCC, CECP and SEPA Certified
- PC chassis and all internal components and modules are manufactured with low halogen content ³
- Protected by HP Services, including limited warranties up to 3-3-3 (terms and conditions vary by country; certain restrictions and exclusions apply); Care Packs available with up to 5 years Next Business Day Onsite Hardware Support

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. DisplayPort™ multi-stream monitors 'daisy-chained' together.

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

4. 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 of this generation of Intel vPro technology-based hardware with future "virtual appliances" is yet to be determined.

5. For full Intel® vPro™ functionality, Windows, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN card and discrete TPM 2.0 are required. See <http://Intel.com/vpro>

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

Standard Features and Configurable Modules

OPERATING SYSTEMS

Preinstalled

Windows® 10 Pro 64¹

Windows® 10 Pro 64 (National Academic License)²

Windows® 10 Home 64¹

Windows® 10 Home Single Language 64¹

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/>

2. Some devices for academic use will automatically be updated to Windows 10 Pro Education with the Windows 10 Anniversary Update. Features vary; see <https://aka.ms/ProEducation> for Windows 10 Pro Education feature information.

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>

CHIPSET

Intel® Q370 PCH-H- vPro™

Standard Features and Configurable Modules

PROCESSORS

Intel® 9th/8th Generation Core™ Processors

Intel® Core™ i9 9900K Processor with Intel® UHD Graphics 630 (2.1GHz, up to 4.4 GHz with Intel® Turbo Boost, 16MB cache, 8 cores) 95W^{1,2}; Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 9700K Processor with Intel® UHD Graphics 630 (2.0Hz, up to 4.3 GHz with Intel® Turbo Boost, 12MB cache, 8 cores) 95W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 9600K processor with Intel® UHD Graphics 630 (2.3 GHz, up to 3.9 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores)^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i9 9900 Processor with Intel® UHD Graphics 630 (2.1GHz, up to 4.4 GHz with Intel® Turbo Boost, 16MB cache, 8 cores) 65W^{1,2}; Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 9700 Processor with Intel® UHD Graphics 630 (2.0Hz, up to 4.3 GHz with Intel® Turbo Boost, 12MB cache, 8 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 9600 processor with Intel® UHD Graphics 630 (2.3 GHz, up to 3.9 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 9500 processor with Intel® UHD Graphics 630 (2.2 GHz, up to 3.7 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i9 9900T Processor with Intel® UHD Graphics 630 (2.1GHz, up to 4.4 GHz with Intel® Turbo Boost, 16MB cache, 8 cores) 35W^{1,2}; Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 9700T Processor with Intel® UHD Graphics 630 (2.0Hz, up to 4.3 GHz with Intel® Turbo Boost, 12MB cache, 8 cores) 35W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 9600T processor with Intel® UHD Graphics 630 (2.3 GHz, up to 3.9 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 35W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 9500T processor with Intel® UHD Graphics 630 (2.2 GHz, up to 3.7 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 35W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 8700T processor with Intel® UHD Graphics 630 (3.2 GHz, up to 4.6 GHz with Intel® Turbo Boost, 12 MB cache, 6 cores) 35W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 8500T processor with Intel® UHD Graphics 630 (2.4 GHz, up to 4.0 GHz with Intel® Turbo Boost, 12 MB cache, 6 cores) 35W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 8700K processor with Intel® UHD Graphics 630 (3.2 GHz, up to 4.6 GHz with Intel® Turbo Boost, 12 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 8600K processor with Intel® UHD Graphics 630 (3.1 GHz, up to 4.3 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i7 8700 processor with Intel® UHD Graphics 630 (3.2 GHz, up to 4.6 GHz with Intel® Turbo Boost, 12 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 8600 processor with Intel® UHD Graphics 630 (3.1 GHz, up to 4.3 GHz with Intel® Turbo Boost, 9 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Intel® Core™ i5 8500 processor with Intel® UHD Graphics 630 (2.4 GHz, up to 4.0 GHz with Intel® Turbo Boost, 12 MB cache, 6 cores) 65W^{1,2}, Supports Intel® vPro™ Technology^{3,4}

Standard Features and Configurable Modules

- 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 configuration. See <http://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 of this generation of Intel vPro technology-based hardware with future "virtual appliances" is yet to be determined.
4. For full Intel® vPro™ functionality, Windows, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN card and discrete TPM 2.0 are required. See <http://Intel.com/vpro>

GRAPHICS

Integrated Intel® Graphics

Intel® UHD Graphics 630 (integrated on 8th gen Core i7/i5)

Adapters and Cables

HP DisplayPort™ Cable

HP DisplayPort™ to DVI-D Adapter

HP DisplayPort™ to HDMI 4K Adapter

HP DisplayPort™ to VGA Adapter

HP USB-C™ to USB 3.0

HP USB to Serial Port Adapter

6. HD content required to view HD images.

Standard Features and Configurable Modules

STORAGE

2.5 inch SATA Hard Disk Drives (HDD)

500GB 7200RPM 2.5in SATA HDD

1TB 7200RPM 2.5in SATA HDD

2TB 5400RPM 2.5in SATA HDD

500GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD

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

2.5 inch SATA Solid State Hybrid Drives (SSHD)

500GB 5400RPM 2.5in SATA SSHD

1TB 5400RPM 2.5in SATA SSHD

2TB 5400RPM 2.5in SATA SSHD

2.5 inch Solid State Drives (SSD)

128GB 2.5in SATA Three Layer Cell SSD

256GB 2.5in SATA Three Layer Cell SSD

512GB 2.5in SATA Three Layer Cell SSD

256GB 2.5in SATA Self Encrypted OPAL2 Three Layer Cell SSD

512GB 2.5in SATA Self Encrypted OPAL2 Three Layer Cell SSD

256GB 2.5in SATA Self Encrypted Federal Information Processing Standard SSD

512GB 2.5in SATA Self Encrypted Federal Information Processing Standard SSD

M.2 PCIe NVMe Solid State Drives (SSD)

128GB M.2 2280 PCIe NVMe 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

1TB 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

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.

Standard Features and Configurable Modules

MEMORY

DDR4-2666 (Transfer rates up to 2666 MT/s), 32 GB, 2 SODIMM

Memory Configuration

4 GB (1 x 4 GB)

8 GB (2 x 4 GB)

8 GB (1 x 8 GB)

16 GB (2 x 8 GB)

16 GB (1 x 16 GB)

32 GB (2 x 16 GB)

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.

Memory modules support data transfer rates up to 2666 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

NOTE: All memory slots are customer accessible / upgradeable.

NETWORKING/COMMUNICATIONS

Ethernet (RJ45)

Intel® I219-LM Gigabit Network Connection LOM (standard)

Wireless¹

Intel® 9560 802.11AC 2x2 with Bluetooth® M.2 Combo Card vPro™

Intel® AX200 802.11AC 2x2 with Bluetooth® M.2 Combo Card vPro™

1. Wireless access point and Internet service required and not included. Availability of public wireless access points limited.

Standard Features and Configurable Modules

KEYBOARDS/POINTING DEVICES/BUTTONS AND FUNCTIONS KEYS

Keyboard

- HP USB and PS/2 Washable Keyboard
- HP USB Smart Card (CCID) Keyboard
- HP USB Business Slim Keyboard
- HP USB Keyboard
- HP PS/2 Keyboard

Mouse

- HP PS/2 Mouse
- HP USB Optical Mouse
- HP USB Premium Mouse
- HP USB 1000dpi Laser Mouse
- HP USB and PS/2 Washable Mouse
- Antimicrobial USB Mouse¹
- HP USB Hardened Mouse¹

1. Not available in all regions

SECURITY

- Trusted Platform Module (TPM) 2.0 (Infineon SLB9670). Common Criteria EAL4+ Certified. FIPS 140-2 Level 2 Certified
- Intrusion Sensor (integrated in the PCA, can be enabled/disabled through BIOS)
- Support for chassis cable lock devices
- Support for chassis padlocks devices
- SATA port disablement (via BIOS)
- Serial, USB enable/disable (via BIOS)
- Intel® Identify Protection Technology (IPT)¹
- Serial, parallel, USB enable/disable (via BIOS)
- Optional USB Port Disable at factory (user configurable via BIOS)
- Removable media write/boot control
- Power-on password (via BIOS)
- Setup password (via BIOS)

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 user name and password. IPT is initialized through an HP Client Security module

Standard Features and Configurable Modules

PORTS

I/O Ports – Standard

USB 3.1 Gen 1	1 front, 2 rear
USB 3.1 Gen 2	1 front, 2 rear
USB Type-C™ 3.1 Gen 2	1 front; 1 rear (option)
Video	2 DisplayPort™ 1.2 (rear) 1 Configurable video port (rear) (Choice of DisplayPort™ 1.2, HDMI™ 2.0, VGA, or USB Type-C™ with alt mode display port and power delivery) For models with discrete graphics: 1 DisplayPort™ 1.4 (rear)
Audio	1 Headphone (front), 1 Universal Audio Jack with CTIA headset support (front)
Network Interface	RJ45

I/O Ports – Optional

Serial (RS-232)	1 (rear)(option)
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I/O Ports – Internal Ports

Internal SATA storage connector (Data and Power)	1
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Slots

M.2 PCIe	1 M.2 PCIe x1 2230 (for WLAN) 2 M.2 PCIe x4 2280/2230 Combo (for storage)
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Bays

2.5" Internal Storage Drive	1
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SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

BIOS

- HP BIOSphere Gen5²
- HP DriveLock & Automatic DriveLock
- BIOS Update via Network
- Master Boot Record Security
- Power On Authentication
- HP Secure Erase³
- Absolute Persistence Module⁴
- Pre-boot Authentication
- Hp Wake on WLAN

Software

- HP Hotkey Support
- HP Jumpstarts
- HP Support Assistant⁶
- Buy Office (sold separately)

Standard Features and Configurable Modules

Manageability Features

- HP Driver Packs⁷
- HP System Software Manager (SSM) (download)
- HP BIOS Config Utility (BCU) (download)
- HP Client Catalog (download)
- HP Manageability Integration Kit Gen3⁸
- Ivanti Management Suite (download)⁹

Client Security Software

- HP Client Security Suite Gen5¹⁰
- HP Power On Authentication
- Windows Defender¹²

Security Management

- HP Secure Erase¹⁸
- TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)
- USB enable/disable and boot control (viaBIOS)
- Power-on password (viaBIOS)
- Setup password (viaBIOS)
- Support for chassis padlocks and cable lock devices
- Cover removal sensor
- HP Sure Click²⁰
- HP Sure Start Gen5¹⁴
- HP Sure Run Gen2¹⁷
- HP Sure Recover Gen2¹⁸
- HP Sure Sense²¹

2. HP BIOSphere Gen5 is available on select HP Pro and Elite PCs. See product specifications for details. Features may vary depending on the platform and configurations

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

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

9. Ivanti Management Suite subscription required.

10. HP Client Security Manager Gen5 requires Windows and is available on the select HP Pro and Elite PCs. See product specifications for details.

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

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

17. HP Sure Run Gen2 See product specifications for availability.

18. HP Sure Recover Gen2 See product specifications for availability. Requires an open, wired network connection. Not available on platforms with multiple internal storage drives. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. HP Sure Recover (Gen1) does not support platforms with Intel® Optane™.

20. HP Sure Click is available on select HP platforms and supports Microsoft® Internet Explorer, Google Chrome, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode. Check

<http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=4AA7-0922ENW> for all compatible platforms as they become available.

21. HP Sure Sense requires Windows 10. See product specifications for availability.

Standard Features and Configurable Modules

ENVIRONMENTAL & INDUSTRY

EPEAT® 2019 registered where applicable/supported. See <http://www.epeat.net> for registration status by country. Search keyword generator on HP's 3rd party option store for solar generator accessories at <http://www.hp.com/go/options>.

Low halogen (chassis, all internal components and modules)¹

TAA compliant models available

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

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: 50° to 95° F (10° to 35° C)* Non-operating: -22° to 140° F(-30° to 60° C)
Relative Humidity	Operating: 10% to 90% (non-condensing at ambient) Non-operating: 5% to 95% (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 Modules

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. 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.

CERTIFICATION AND COMPLIANCE

ENERGY STAR® certified; EPEAT® 2019¹

1. EPEAT® registered where applicable. EPEAT registration varies by country. See <http://www.epeat.net> for registration status by country. Search keyword generator on HP's 3rd party option store for solar generator accessories at <http://www.hp.com/go/options>.

Technical Specifications - Processors

PROCESSORS

Intel® 8th/9th Generation Core™ Processors

All HP Collaboration PC G5 with Intel Unite 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 Collaboration PC G5 with Intel Unite, thus making these models the most stable, secure, and manageable platforms available to enterprises today.

Intel® Advanced Management Technology (AMT) v12 – 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 new capabilities
- No reset after provisioning
- Support changes to BIOS table 130
- Support for Microsoft Windows Server 2012 R2
- Support for New Microsoft SQL Server Versions including Standard and Enterprise editions
- Support for Intel® SSD Prop 2500 Series
- Support for Intel® Enterprise Digital Fence
- The Platform Discovery Utility can now discover these additional Intel® products:
 - Intel® SSD Pro 2500 Series; Enterprise Digital Fence
 - Intel® Identity Protection Technology with One Time Password; Public Key Infrastructure; Multi Factor Authentication
 - Intel® Identity Protection Technology with Intel® WiGig
 - New Profile Editor and Profile Editor Plugin Interface
 - New Required Permissions for Solutions Framework

Technical Specifications - Graphics

GRAPHICS

Intel® UHD Graphics (integrated)

Graphics Controller	Integrated
DisplayPort 1.2™	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 (optional)	Supports HDMI 2.0a features Supports HDCP 2.2 Supports audio over HDMI
VGA (optional)	VGA output
USB-C™ DP Alt Mode (optional)	DisplayPort™ over the optional 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
Graphics/Video API Support	HEVC 10b Enc/Dec HW VP9 10b Dec HW HDR Rec. 2020 DX12

Technical Specifications – Storage

STORAGE

500 GB 7200RPM 2.5in SATA HDD

Capacity	500 GB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	16 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	32 MB
Logical Blocks	1,953,525,168
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.

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	32 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.267 in/6.8 mm (nominal)
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	32 MB
Logical Blocks	976,773,168
Seek Time	12 ms (Average)
Height	0.267 in/6.8 mm (nominal)
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 5400RPM 2.5in SATA SSHD

Capacity	500 GB
Rotational Speed	5,400 rpm
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash
Interface	SATA 6 Gb/s
Buffer Size	64 MB
NAND Flash	8 GB
Seek Time	12 ms (Average)
Height	0.267 in/6.8 mm (nominal)
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.

Technical Specifications – Storage

1 TB 5400RPM 2.5in SATA SSHD

Capacity	1 TB
Rotational Speed	5,400 rpm
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash
Interface	SATA 6 Gb/s
Buffer Size	64 MB
NAND Flash	8 GB
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (nominal)
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.

2 TB 5400RPM 2.5in SATA SSHD

Capacity	2 TB
Rotational Speed	5,400 rpm
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash
Interface	SATA 6 Gb/s
Buffer Size	128 MB
NAND Flash	8 GB
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (nominal)
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.

Technical Specifications – Storage

128 GB 2.5in SATA Three Layer Cell SSD

Drive Weight	<50g
Capacity	128 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 70K/40K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 380MB/s
Logical Blocks	250,069,680
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM

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 2.5in SATA Three Layer Cell SSD

Drive Weight	<62g
Capacity	256 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 55K/68K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 450MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM

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 2.5in SATA Three Layer Cell SSD

Drive Weight	<50g
Capacity	512 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 92K/83K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 500MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM

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 2.5in SATA Self Encrypted OPAL2 Three Layer Cell SSD

Drive Weight	<50g
Capacity	256 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 55K/80K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 500MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM; TCG-OPAL2.0 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 – Storage

512 GB 2.5in SATA Self Encrypted OPAL2 Three Layer Cell SSD

Drive Weight	<50g
Capacity	512 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 92K/83K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 500MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM; TCG-OPAL2.0 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.

256 GB 2.5in SATA Self Encrypted Federal Information Processing Standard SSD

Drive Weight	<40g
Capacity	256 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 55K/83K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 500MB/s
Logical Blocks	500,118,192
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM; FIPS 140-2 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 – Storage

512 GB 2.5in SATA Self Encrypted Federal Information Processing Standard SSD

Drive Weight	<45g
Capacity	512 GB
Height	7mm
Length	100.45mm
Width	69.85mm
Interface	SATA 3.0 (6Gb/s)
Performance	Up to Random Read/Write = 92K/83K IOPS
Maximum Sequential Read	Up to 530MB/s
Maximum Sequential Write	Up to 500MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	DIPM; TRIM; FIPS 140-2 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.

128 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	128GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Performance	Up to Random Read/Write = 60K/50K IOPS
Maximum Sequential Read	Up to 1400MB/s
Maximum Sequential Write	Up to 395MB/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.

Technical Specifications – Storage

256 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	256 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Performance	Up to Random Read/Write = 120K/170K IOPS
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.

512 GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	512 GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIe Gen3
Performance	Up to Random Read/Write = 200K/180K IOPS
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.

Technical Specifications – Storage

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 Gen3x4
Performance	Up to Random Read/Write = 140K/40K IOPS
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 Gen3x4
Performance	Up to Random Read/Write = 150K/180K IOPS
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 Gen3x4
Performance	Up to Random Read/Write = 270K/235K IOPS
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 Gen3x4
Performance	Up to Random Read/Write = 290K/240K IOPS
Maximum Sequential Read	Up to 2900MB/s
Maximum Sequential Write	Up to 2100MB/s
Logical Blocks	2,000,409,264
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

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 Gen3x4
Performance	Up to Random Read/Write = 150K/180K IOPS
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 Gen3x4
Performance	Up to Random Read/Write = 270K/235K IOPS
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	
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 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 standby and hibernation (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

Intel® 9560 802.11AC 2x2 with Bluetooth® M.2 Combo Card vPro™	
Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
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

Technical Specifications – Networking and Communications

	<ul style="list-style-type: none"> • 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	
Security¹	<ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • Cisco Certified Extensions, all versions through CCX4 and CCX Lite • WAPI 	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power²	<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 	
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 Sensitivity³	802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230: 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)

Technical Specifications – Networking and Communications

LED Activity	LED Amber – Radio OFF; LED White – Radio ON
	<ol style="list-style-type: none"> 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)
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
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
Range	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)
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 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 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

Technical Specifications – Networking and Communications

Intel Wi-Fi 6 AX200 + BT5 802.11ax 2x2, vPro, vPro	
Wireless LAN Standards	<ul style="list-style-type: none"> IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
Interoperability	Wi-Fi certified
Frequency Band	<ul style="list-style-type: none"> 802.11b/g/n/ax <ul style="list-style-type: none"> • 2.402 – 2.482 GHz 802.11a/n/ac/ax <ul style="list-style-type: none"> • 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	<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 OFDMA, BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security¹	<ul style="list-style-type: none"> • IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • 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 Power²	<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 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)

Technical Specifications – Networking and Communications

	<ul style="list-style-type: none"> • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW 	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity³	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	
Dimensions	Type 2230: 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230: 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating	14° to 158° F (-10° to 70° C)
	Non-operating	-40° to 176° F (-40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)

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

Bluetooth® Specification	4.0/4.1/4.2/5.0 Compliant	
Frequency Band	2402 to 2480 MHz	
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)	
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps BLE : 1 Mbps data rate; throughput up to 0.2 Mbps Legacy : Synchronous Connection Oriented links up to 3, 64 kbps, voice channels. Legacy : Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
Transmit Power	The Bluetooth® component shall operate as a Class II Bluetooth® device with a maximum transmit power of +4 dBm for BR and EDR.	
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW	
Range	Legacy Up to 33 ft (10 m) BLE Up to 99 ft (30 m)	
Bluetooth® Software Supported	Microsoft Windows Bluetooth® Software	

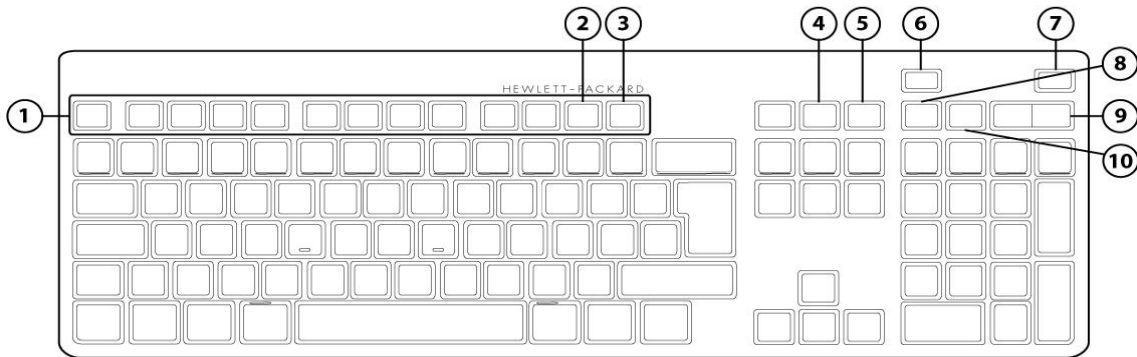
Technical Specifications – Networking and Communications

Link Topology	
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249 ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 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

Technical Specifications – I/O Devices

I/O DEVICES

HP USB Premium Keyboard



- | | |
|---|-----------------------|
| 1. Function Keys | 6. End/Decline a Call |
| 2. F11 Lync or Skype for Business Contact list ¹ | 7. Answer a Call |
| 3. F12 Lync or Skype for Business Calendar ² | 8. Microphone Mute |
| 4. Share Screen | 9. Volume Up/Down |
| 5. Stop Webcam | 10. Audio Mute |

1. [Microsoft Lync 2013, or Skype for Business, or Microsoft Outlook 2013 Contact list](#)

2. [Microsoft Lync 2013, or Skype for Business, or Microsoft Outlook 2013 Calendar](#)

HP USB Premium Keyboard

	Keys	104, 105 layout (depending upon country)
Physical Characteristics	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
	Microsoft® PC 99 - 2001	Functionally compliant
	Keycaps	Low-profile design
Mechanical	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

Technical Specifications – I/O Devices

	Cable length	6 ft. (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	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)
Environmental	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, C-Tick, KC	
Ergonomic compliance	TUVGS	
Kit contents	Keyboard, QSP	
Warranty Card	Product Notice	
Skylab USB Wired Keyboard		
	Keys	104, 105, 106, 107, 109 layout (depending upon country)
Physical Characteristics	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)
	Operating voltage	4.4-5.25VDC
	Power consumption	50-mA maximum (with 5 VDC power supplied and three LEDs ON)
Electrical	System interface	USB
	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
	Keycaps	Low-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
Mechanical	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft. (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
Environmental	Acoustics	43-dBA maximum sound pressure level

Technical Specifications – I/O Devices

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, C-Tick, KC

Ergonomic compliance

ANSI HFS 100, ISO 9241-4, and TUVGS

Kit contents

Keyboard, Installation Guide, Warranty card, Safety and Comfort Guide

HP USB Premium Mouse

Dimensions (H x L x W)

4.21 x 2.64 x 1.52 in (107 x 67 x 38.7 mmm)

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	12mA

Mechanical

Connector	USB 2.0
Type	3D mouse (3 keys and wheel)
Resolution	800, 1200, 1600 DPI
Sensor	Pixart PAN3606DL

Tracking speed

Tracking acceleration	8G(max), 1G=9.8m/s2
Cable length	6 ft. (1.8 m)

Regulatory approvals

Color	Jack Black
Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, C-Tick, KC

HP USB Mouse

Technical Specifications – I/O Devices

Dimensions (H x L x W)	37mm*115mm*62.9mm	
Weight	90 +10g/- 5 g	
Color	Black	
Connector	USB	
Mechanical	Resolution	800 DPI sensitivity
	Buttons	Two primary buttons and clickable scroll wheel

Technical Specifications – Audio

HIGH DEFINITION AUDIO

Type	Integrated
HD Audio Codec	Conexant CX20632
	Front: 1 - Headset connector supports a CTIA style headset and is re-taskable as a Line-in, Line-out, Microphone-in or Headphone-out port 1 - Headphone port
Audio I/O Ports	All ports are 3.5mm and support stereo
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 Supply

POWER SUPPLY

Unit Environment and Operating Conditions

Temperature Range	Operating: 5°C ~35°C Non-Operating: -40°C ~66°C
Relative Humidity	Operating 5% to 90% relative humidity at max inlet temperature Non-Operating 5% to 90% relative humidity at max inlet temperature
Maximum Altitude (unpressurized)	Operating: 5000m Non-operating: 50,000 ft. (15240 m)

80 PLUS Platinum	65W EPS, 89% average efficiency at 115V & 230Vac 90W EPS, 89% average efficiency at 115V & 230Vac 150W EPS, 89% average efficiency at 115V & 230Vac
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Operating Voltage Range	90Vac~264Vac
Rated Voltage Range	100Vac~240Vac
Rated Line Frequency	50HZ~60HZ
Operating Line Frequency	47HZ~63HZ
Rated Input Current	65W ≤ 1.6A 90W ≤ 1.2A 150W ≤ 2.2A

Rated Input Current with Energy Efficient* Power Supply	65W ≤ 1.6A 90W ≤ 1.2A 150W ≤ 2.2A
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DC Output	+19.5VV
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Current Leakage (NFPA 99: 2102)	Less than 500 microamps of leakage current at 120 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 120 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.
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Power cord length	6.0 ft. (1.83 m)
External Power Adapter	External power supply
Dimensions	65W: 113.5mm x 55mm x 30mm 90W: 132mm x 57mm x 30mm 150W: 160mm x 80mm x 40mm
Total Cord Length	6.0 ft. (1.83 m)

Technical Specifications – Weights & Dimensions

WEIGHTS & DIMENSIONS

Chassis (W x D x H)	177x175x34mm
System Volume	1.05L
System Weight	1.05 kg 2.31 lb
Stand Dimensions	160x117x18.5mm
Packaging (W x D x H)	497 x128 x223mm
Shipping Weight	2.95 kg 6.49 lb
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 75.551 in, 1152 x 994 x 1919 mm (include pallet)

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 / PCA failure
 - 5 red + 5 white System controller rebooted the system after a health or recovery timer triggered
- HP PC Hardware Diagnostics UEFI:

Technical Specifications – Weights & Dimensions

- 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 Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- 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, CD & Diskette Removal (For MT, SFF, and DM only)
- Green Pull Tabs, and Quick Release Latches for easy Identification

Additional Features

Drive Lock

Implementation of the industry standard ATA Security feature set. When enabled, it prevents software access to user data on the drive until one or two user-defined passwords are provided.

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

Technical Specifications – Environmental & Industry

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 registered where applicable. EPEAT® registration varies by country. See <http://www.epeat.net> for registration status in your country. Search keyword generator on HP's 3rd party option store for solar generator accessories at <http://www.hp.com/go/options>.

System Configuration

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

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

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	3.59 W	3.64 W	3.46 W
Normal Operation (Long idle)	3.11 W	3.14 W	3.04 W
Sleep	0.63 W	0.67 W	0.63 W
Off	0.60 W	0.64 W	0.59 W

NOTE: Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

Heat Dissipation*

	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	12 BTU/hr	12 BTU/hr	12 BTU/hr
Normal Operation (Long idle)	11 BTU/hr	11 BTU/hr	10 BTU/hr
Sleep	2 BTU/hr	2 BTU/hr	2 BTU/hr
Off	2 BTU/hr	2 BTU/hr	2 BTU/hr

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

Declared Noise Emissions

(in accordance with ISO 7779 and ISO 9296)

	Sound Power (L _{WAd} , bels)	Sound Pressure (L _{pAm} , decibels)
Typically Configured – Idle	3.1	19
Fixed Disk – Random writes	3.1	19

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:

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

This battery(s) in this product comply with EU Directive 2006/66/EC

Batteries

Batteries used in the product do not contain:
Mercury greater the 1ppm by weight
Cadmium greater than 20ppm by weight

Technical Specifications – Environmental & Industry

- Additional Information**
- Battery size: CR2032 (coin cell)
 Battery type: Lithium
- 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).
 - Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
 - This product contains 0% post-consumer recycled plastic (by wt.)
 - This product is 95.1% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	322 g
Internal:	PLASTIC/EPS (Expanded Polyethylene)	32 g
	PLASTIC/Polyethylene low density	5 g

The Plastic packaging material is made from 10.5% recycled content.

The corrugated paper packaging materials contains at least 43.8% recycled content.

- 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.
- 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)

Technical Specifications – Environmental & Industry

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 certifications:

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

and

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

Technical Specifications – After Market Options

AFTER MARKET OPTIONS

Graphics Solutions	Part Number
HP DisplayPort To HDMI True 4k Adapter	2JA63AA
HP DVI Cable Kit	DC198A
HP HDMI Standard Cable Kit	T6F94AA
HP DisplayPort Cable Kit	VN567AA
HP DisplayPort To VGA Adapter	AS615AA
HP DisplayPort To DVI-D Adapter	FH973AA

Desktop Mini Accessories	Part Number
HP Desktop Mini G4 Port Cover Kit	1ZE52AA
HP G4 Mini 2.5-inch SATA Drive Bay Kit	3TK91AA
HP Desktop Mini LockBox V2	3EJ57AA
HP Desktop Mini 500GB HDD/I/O Expansion Module	K9Q82AA
HP Desktop Mini DVD-Writer ODD Expansion Module	K9Q83AA
HP Desktop Mini I/O Expansion Module	K9Q84AA
HP Desktop Mini Security/Dual VESA Sleeve v2	2JA32AA
HP Desktop Mini Vertical Chassis Stand	G1K23AA
HP DM VESA Power Supply Holder Kit	1RL87AA

Data Storage Drives	Part Number
HP 256GB SATA TLC Non-SED Solid State Drive	P1N68AA
HP PCIe NVME TLC 256GB SSD M.2 Drive	1CA51AA
HP PCIe NVME TLC 512GB SSD M.2 Drive	X8U75AA

Input Devices	Part Number
HP USB Business Slim CCID SmartCard Keyboard	Z9H48AA
HP USB Business Slim (Grey) Keyboard (EMEA Only)	Z9H49AA
HP USB Business Slim Keyboard	N3R87AA
HP USB Collaboration Keyboard	Z9N38AA
HP USB Keyboard	QY776AA
HP USB Keyboard and Mouse Healthcare Edition	1VD81AA
HP USB Premium Keyboard	Z9N40AA
HP USB PS/2 Washable Keyboard & Mouse	BU207AA
HP Wireless Business Slim Keyboard and Mouse	N3R88AA
HP Wireless Collaboration Keyboard	Z9N39AA
HP USB Grey v2 Mouse (EMEA only)	Z9H74AA
HP USB Premium Mouse	1JR32AA
HP USB 1000dpi Laser Mouse	QY778AA
HP USB Hardened Mouse	P1N77AA

Technical Specifications – After Market Options

HP USB Mouse	QY777AA
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System Memory	Part Number
HP 4GB DDR4-2666 SODIMM	3TK86AA
HP 8GB DDR4-2666 SODIMM	3TK88AA
HP 16GB DDR4-2666 SODIMM	3TK84AA

Multimedia Devices	Part Number
HP Business Headset v2	T4E61AA
HP USB Business Speakers v2	N3R89AA

Security Devices	Part Number
HP Keyed Cable Lock 10mm	T1A62AA

Stands and Accessories	Part Number
HP B300 PC Mounting Bracket	2DW53AA
HP B500 PC Mounting Bracket	2DW52AA
HP Single Monitor Arm	BT861AA

I/O Devices	Part Number
HP DisplayPort Port Flex IO	3TK72AA
HP Fiber NIC Port Flex IO	3TK73AA
HP HDMI Port Flex IO (400/600/800)	3TK74AA
HP Thunderbolt 3.0 Port Flex IO	3TK77AA
HP Type-C™ USB 3.1 Gen2 Port Flex IO	3TK78AA
HP Type-C™ USB 3.1 Gen2 Port with PD Flex IO	3TK79AA
HP VGA Port Flex IO	3TK80AA
HP Serial Port Flex IO	3TK76AA

Intel® Optane Memory	Part Number
Intel® Optane Memory 16GB (Cache)	1WV97AA

Change Log

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Date of change:	Version History:		Description of change:
	From v1 to v2		