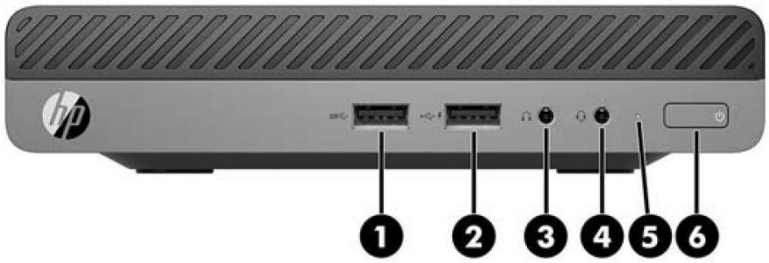
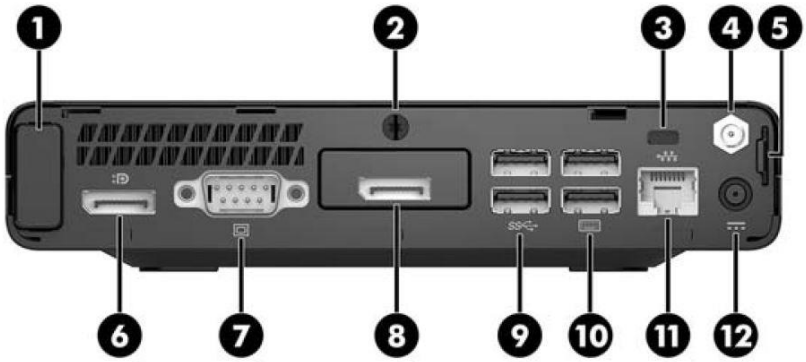
Overview

HP ProDesk 400 G3 Desktop Mini Business PC



1. USB 3.1 Gen 1 port
2. USB 3.1 Gen 1 charging port
3. Headphone connector
4. Universal Audio Jack with CTIA headset support
5. Hard drive activity light
6. Dual-state power button



1. Antenna cover
2. Cover lock switch
3. Cable lock slot
4. External antenna connector
5. Padlock loop
6. Dual-Mode DisplayPort™ (DP++)
7. Serial port
8. Choice of port (DisplayPort™, HDMI, VGA or Serial)
9. (2) USB 3.1 Gen 1 ports (black)
10. (2) USB 2.0 ports (black), allows for wake from S4/S5 with keyboard/mouse when connected and enabled in BIOS
11. RJ-45 network jack
12. Power connector

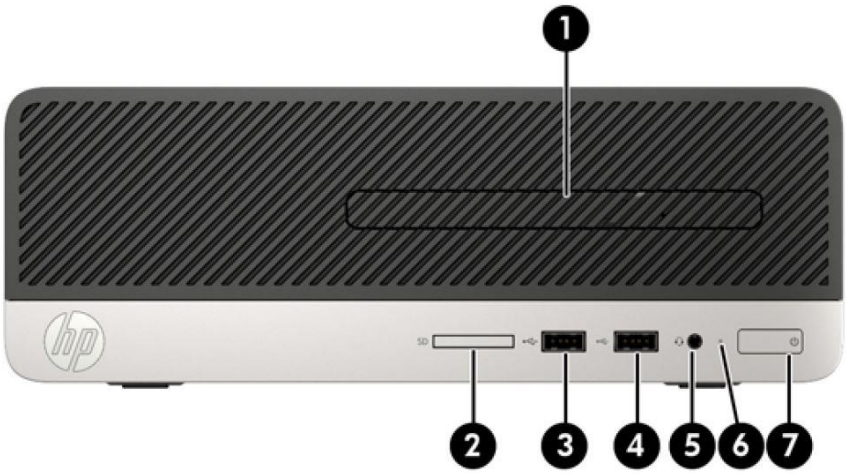
Not Shown

Slots	(1) internal M.2 2280 connector for optional wireless NIC (1) internal M.2 SSD storage (2230 or 2280 connector)
Bays	(1) 2.5” internal storage drive bay
VESA	Support for VESA 100 mounting system on bottom of PC chassis

Overview

Overview

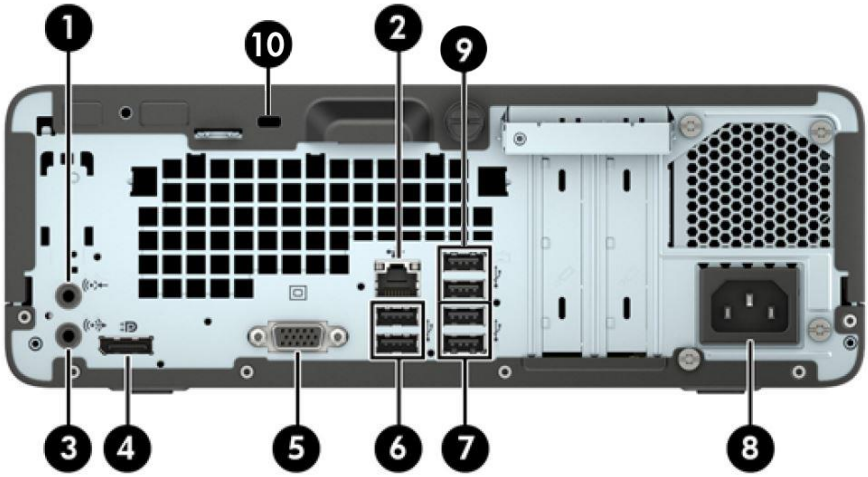
HP ProDesk 400 G4 Small Form Factor Business PC



1. Slim Optical Drive (optional)
2. SD card 3.0 reader (optional)
3. USB 3.1 Gen 1 port
4. USB 3.1 Gen 1 port
5. Universal Audio Jack with CTIA headset support
6. Hard drive activity light
7. Dual-state power button

Overview

HP ProDesk 400 G4 Small Form Factor Business PC



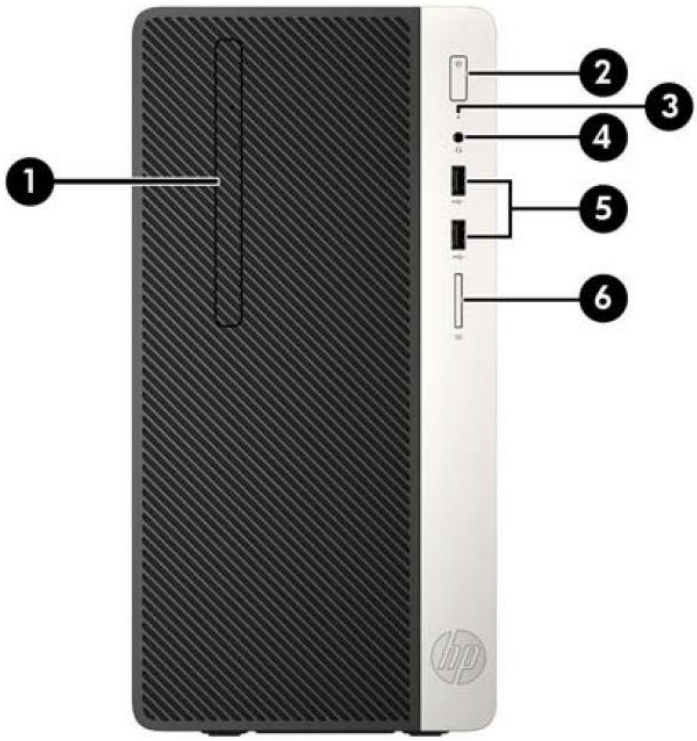
1. Audio-in connector
2. RJ-45 (network) jack
3. Audio-out connector
4. Dual-Mode DisplayPort™ (DP++) connector
5. VGA monitor connector
6. (2) USB 2.0 ports (black), allows for wake from S4/S5 with keyboard/mouse when connected and enabled in BIOS
7. (2) USB 3.1 Gen 1 ports
8. Power cord connector
9. (2) USB 2.0 ports
10. Cable lock slot

NOTE: The serial port is no longer standard to the chassis. A serial port and PS/2 port PCIe combination are available.

	Not Shown
Slots	(2) PCI Express x16 graphics connector; one wired as an x4 (1) internal M.2 PCIe x1 connector for optional wireless NIC
Bays	(1) 3.5” internal storage drive bay or 2.5” internal storage drive bay (1) 9.5mm slim optical drive bay

Overview

HP ProDesk 400 G4 and 480 G4* Microtower Business PC

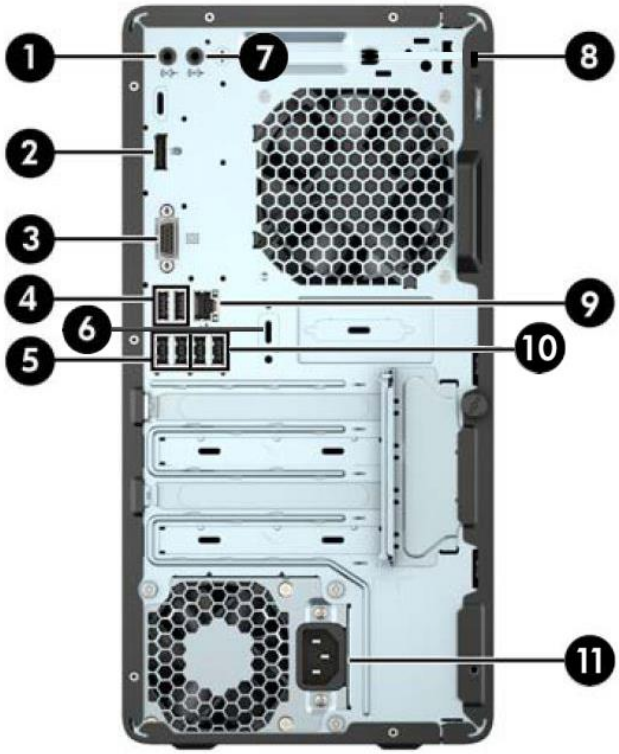


1. Slim Optical Drive (optional)
2. Dual-state power button
3. Hard drive activity light
4. Universal Audio Jack with CTIA headset support
5. (2) USB 3.1 Gen 1 ports
6. SD card 3.0 reader (optional)

*480 G3 model not available in all regions.

Overview

HP ProDesk 400 G4 and 480 G4* Microtower Business PC



1. Audio-out connector
2. Dual-Mode DisplayPort™ (DP++) connector
3. VGA monitor connector
4. (2) USB 2.0 ports (black), allows for wake from S4/S5 with keyboard/mouse when connected and enabled in BIOS
5. (2) USB 3.1 Gen 1 ports
6. Optional serial port
7. Audio-in connector
8. Cable lock slot
9. RJ-45 (network) jack
10. (2) USB 2.0 ports
11. Power cord connector

NOTE: The serial port is no longer standard to the chassis and a serial port and second serial port and PS/2 port combination are available from HP.
*480 G3 model not available in all regions.

	Not Shown
Slots	(2) PCI Express x1 graphics connectors; one wired as an x4 (1) PCI Express x1 accessory connector (1) internal M.2 PCIe x1 connector for optional wireless NIC NOTE: 480 MT model will offer (1) PCI connector instead of (1) PCI Express x1 accessory connectors
Bays	(1) 3.5” internal storage drive bay or 2.5” internal storage drive bay (1) 3.5” internal storage drive bay (1) 9.5mm internal optical drive bay

Overview

AT A GLANCE

- Choice of four form factors: Desktop Mini, Small Form Factor, Microtower and All-in-One (touch and non-touch configurations available) (AiO available 2H 2017)
- New commercial design on 400 G4 MT, 400 G4 SFF and 400 G3 DM
- HP-developed and engineered UEFI BIOS supporting security, manageability and software image stability
- H270 chipset supporting both Intel®7th generation Core™ processors and Intel® 6th generation Core™ processors
- Integrated Intel® HD Graphics; optional discrete graphics option available for MT and SFF form factors
- Processor support up to 65W for MT/SFF and up to 35W for Desktop Mini
- Realtek RTL8111 HSH GbE LOM Network Connection (standard)
- DDR4 Synchronous Dynamic Random Access Memory (SDRAM)
- Standard and high efficiency energy saving power supply options
- ENERGY STAR certified models available
- EPEAT® Gold registered in the United States. Registration may vary by country. See http://www.epeat.net for registration status in your country.
- Arsenic-free
- Dust filter available for all platforms

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

OPERATING SYSTEMS

Preinstalled

Windows 10 Pro 64[1]
Windows 10 Pro 64 (National Academic License)[3]
Windows 10 Home 64[1]
Windows 10 Home Single Language 64[1]
Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro)[2, 4]
Windows 7 Professional 32 (available through downgrade rights from Windows 10 Pro)[2, 4]

Pre-installed (other)
FreeDOS 2.0
NeoKylin Linux® 64

Web-supported only
Windows 10 Enterprise 64[1]
Windows 7 Enterprise 64[4]

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. This system is preinstalled with Windows 7 Pro software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

3. 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.

4. Only available with 6th generation (Intel) processors.

CHIPSET

Intel® H270

PROCESSORS*, **

*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

**NOTE: 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. 64-bit computing system required. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering is not a measurement of higher performance.

Intel® 7th Generation Core™ i7 Processors	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® Core™ i7-7700 Processor 65W Up to 4.2 GHz Max. Turbo Frequency (3.6 GHz base frequency) 8 MB cache, 4 cores, 8 threads		X	X	X

Overview

Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate				
Intel® Core™ i7-7700T Processor 35W Up to 3.8 GHz Max. Turbo Frequency (2.9 GHz base frequency) 8 MB cache, 4 cores, 8 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			

Intel® 7th Generation Core™ i5 Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Core™ i5-7500 Processor 65W Up to 3.8 GHz Max. Turbo Frequency (3.4 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X
Intel® Core™ i5-7500T Processor 35W Up to 3.3 GHz Max. Turbo Frequency (2.7 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			
Intel® Core™ i5-7600 Processor 65W Up to 4.1 GHz Max. Turbo Frequency (3.5 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X
Intel® Core™ i5-7600T Processor 35W Up to 3.7 GHz Max. Turbo Frequency (2.8 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			

Intel® 7th Generation Core™ i3 Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Core™ i3-7100 Processor 51W 3.9 GHz base frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X
Intel® Core™ i3-7100T Processor 35W 3.4 GHz base frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			
Intel® Core™ i3-7300 Processor 51W 4.0 GHz base frequency 4 MB cache, 2 cores, 4 threads		X	X	X

Overview

Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate				
Intel® Core™ i3-7300T Processor 35W 3.5 GHz base frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			
Intel® Core™ i3-7320 Processor 51W 4.1GHz base frequency 4 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X

Intel® 7th Generation Pentium® Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Pentium® G4560 Processor 54W 3.5 GHz Base Frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 610 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X
Intel® Pentium® G4560T Processor 35W 2.9 GHz Base Frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 610 Supports DDR4 memory up to 2400 MT/s data rate	X			
Intel® Pentium® G4600 Processor 51W 3.6 GHz Base Frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X
Intel® Pentium® G4600T Processor 35W 3.0 GHz Base Frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate	X			
Intel® Pentium® G4620 Processor 51W 3.7 GHz Base Frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 630 Supports DDR4 memory up to 2400 MT/s data rate		X	X	X

Intel® 7th Generation Celeron® Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Celeron ® G3930 Processor 51W 2.9 GHz Base Frequency 2 MB cache, 2 cores, 2 threads		X	X	X

Overview

Intel® HD Graphics 610 Supports DDR4 memory up to 2133 MT/s data rate				
Intel® Celeron ® G3930T Processor 35W 2.7 GHz Base Frequency 2 MB cache, 2 cores, 2 threads Intel® HD Graphics 610 Supports DDR4 memory up to 2133 MT/s data rate	X			
Intel® Celeron ® G3950 Processor 51W 3.0 GHz Base Frequency 2 MB cache, 2 cores, 2 threads Intel® HD Graphics 610 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X

Intel® 6th Generation Core™ i7 Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Core™ i7-6700 Processor 65W Up to 4.0 GHz Max. Turbo Frequency (3.4 GHz base frequency) 8 MB cache, 4 cores, 8 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Core™ i7-6700T Processor 35W Up to 3.6 GHz Max. Turbo Frequency (2.8 GHz base frequency) 8 MB cache, 4 cores, 8 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate	X			

Intel® 6th Generation Core™ i5 Processors	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
Intel® Core™ i5-6500 Processor 65W Up to 3.6 GHz Max. Turbo Frequency (3.2 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Core™ i5-6600T Processor 35W Up to 3.5 GHz Max. Turbo Frequency (2.7 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate	X			
Intel® Core™ i5-6500T Processor 35W Up to 3.1 GHz Max. Turbo Frequency (2.5 GHz base frequency) 6 MB cache, 4 cores, 4 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate	X			

Overview

Intel® 6th Generation Core™ i3 Processors	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® Core™ i3-6100 Processor 51W 3.7 GHz base frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Core™ i3-6100T Processor 35W 3.2 GHz base frequency 3 MB cache, 2 cores, 4 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate	X			

Intel® 6th Generation Pentium® Processors	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® Pentium® G4500 Processor 51W 3.5 GHz Base Frequency 3 MB cache, 2 cores, 2 threads Intel® HD Graphics 530 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Pentium ® G4400 Processor 54W 3.3 GHz Base Frequency 3 MB cache, 2 cores, 2 threads Intel® HD Graphics 510 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Pentium ® G4400T Processor 35W 2.9 GHz Base Frequency 3 MB cache, 2 cores, 2 threads Intel® HD Graphics 510 Supports DDR4 memory up to 2133 MT/s data rate	X			

Intel® 6th Generation Celeron® Processors	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® Celeron ® G3900 Processor 51W 2.8 GHz Base Frequency 2 MB cache, 2 cores, 2 threads Intel® HD Graphics 510 Supports DDR4 memory up to 2133 MT/s data rate		X	X	X
Intel® Celeron ® G3900T Processor 35W 2.6 GHz Base Frequency 2 MB cache, 2 cores, 2 threads Intel® HD Graphics 510 Supports DDR4 memory up to 2133 MT/s data rate	X			

Standard Features and Configurable Components

MEMORY*

Form Factor	Type	Maximum	Number of Slots
400 G3 DM	DDR4-2400 (Transfer rates up to 2400 MT/s)	32 GB	2 SODIMM
400 G4 SFF	DDR4-2400 (Transfer rates up to 2400 MT/s)	32 GB	2 DIMM
400 G4 MT	DDR4-2400 (Transfer rates up to 2400 MT/s)	32 GB	2 DIMM
480 G4 MT	DDR4-2400 (Transfer rates up to 2400 MT/s)	32 GB	2 DIMM

Both slots are customer accessible / upgradeable.

- 2,048 MB (2048 MB x 1)
- 4,096 MB (4096 MB x 1)
- 8,192 MB (8192 MB x 1)
- 16,384 MB (16,384 MB x 1)

* Full availability of 4 GB or more of memory requires a 64-bit operating system. With Windows 32-bit operating systems, the amount of usable memory is dependent upon your configuration, so that above 3 GB all memory may not be available due to system resource requirements.

Memory modules support data transfer rates up to 2400 MT/s; actual data rate is determined by the system's configured processor. See processor specifications for supported memory data rate.

STORAGE*

2.5 inch 7.2k RPM Hard Disk Drives	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
1TB SATA	X	X	X	X
500GB SATA	X	X	X	X

3.5" SATA 7.2k RPM Hard Disk Drives	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
500GB 7200RPM 3.5in		X	X	X
1TB 7200RPM 3.5in		X	X	X
2TB 7200RPM 3.5in		X	X	X

2.5 inch Solid State Hybrid Drives (SSHD)	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
1TB 5400RPM 2.5in 8GB Hybrid	X	X	X	X
500GB 5400RPM 2.5in 8GB Hybrid	X	X	X	X

3.5 inch Solid State Hybrid Drives (SSHD)	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
1TB 7200RPM 3.5in SSHD (SSHD)		X	X	X

2.5 inch Self-encrypting Drives (SED HDD)	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
500GB 7200RPM 2.5in SED OPAL2	X	X	X	X

2.5 inch Self-encrypting Drives (SED SSD)	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
256GB TLC SED SSD Opal 2 Drive	X	X	X	X
512GB TLC SED SSD Opal 2 Drive	X	X	X	X

Standard Features and Configurable Components

PCIe NMVe SSD Drives	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
HP 256GB Turbo Drive G2 PCIe TLC SSD Drive	X	X	X	X
HP 512GB Turbo Drive G2 PCIe TLC SSD Drive	X	X	X	X
HP 1TB Turbo Drive G2 PCIe TLC SSD Drive	X	X	X	X

2.5 SATA SSD Drives	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
HP SATA 128GB SSD Drive	X	X	X	X
HP SATA 256GB SSD Drive	X	X	X	X
HP 256GB TLC SSD Drive	X	X	X	X
HP 512GB TLC SSD Drive	X	X	X	X

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

Optical Disc Drives	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
HP 9.5mm G3 800/600/400 SFF G4 400 Microtower DVD-Writer*		X	X	X
HP 9.5mm G3 800/600/400 SFF G4 400 Microtower DVD-ROM		X	X	X

*HD-DVD discs cannot be played on this drive. No support for DVD-RAM. Actual speeds may vary. Don't copy copyright-protected materials. Double Layer discs can store more data than single layer discs. Discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

Media Card Reader	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
(Optional)* SD4 with 5-in-1 Interface from SD option to PCA is USB (Supports SD, SDXC, SDHC, UHS-I, UHS-II)		X	X	X

*Card sold separately

GRAPHICS

System Integrated Graphics

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® HD Graphics 530 (integrated on 6th gen Core i7/i5/i3 processors)	X	X	X	X
Intel® HD Graphics 630 (integrated on 7th gen Core i7/i5/i3 processors and Pentium G4620, 4600, 4600T)	X	X	X	X
Intel® HD Graphics 610 (integrated on Pentium G4560, G4560T, Celeron G3950, G3930, G3930T)	X	X	X	X

Optional Discrete Graphics Solutions

(optional and RX 460 device must be configured at purchase)	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
AMD Radeon™ R7 450 4GB FH PCIe x16*			X	X
AMD Radeon™ RX 460 2GB FH PCIe x16*			X	X
NVIDIA® GeForce® GT730 1GB PCIe x8 HDMI		X	X	X
NVIDIA® GeForce® GT730 2GB PCIe x8 DP		X	X	X

Standard Features and Configurable Components

*Requires 310W chassis

2nd Graphics Cards	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
AMD Radeon™ R7 450 4GB FH PCIe x16 G5 2nd**			X	X
NVIDIA® GeForce® GT730 1GB PCIe x8 HDMI 2nd***		X	X	X
NVIDIA® GeForce® GT730 2GB PCIe x8 DP 2nd****		X	X	X

**Available only with AMD Radeon™ R7 450.
***Available only with NVIDIA® GeForce® GT730 1GB.
****Available only with NVIDIA® GeForce® GT730 2GB

AUDIO/MULTIMEDIA

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Conexant CX20632 Audio Codec	X	X	X	X
Headset* front connector (3.5mm)	X	X	X	X
Headphone front connector (3.5mm)	X			
Line-out and Line-In rear connectors* (3.5mm)		X	X	X
Multi-streaming capable**	X	X	X	X
Internal speaker (standard)	X	X	X	X

*The DM, SFF, MT front headset connector supports CTIA style headsets. Headset connectors are retaskable to function as a Line-In, Microphone-In, Line-out or Headphone-out port. Rear audio input ports are re-taskable as a Line-in or Microphone-in port. External speakers must be powered externally.
**Multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the separate connectors or internal speakers. This allows for different audio applications to use separate audio ports on the system. For example, the front connector could be used with a headset for a communications application while the rear connector is being used with external speakers and a multimedia application.

NETWORKING/COMMUNICATIONS*

Ethernet (RJ-45) Integrated	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Realtek RTL8111 HSH GbE LOM Network Connection (standard)	X	X	X	X

Ethernet (RJ-45) Optional	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® Ethernet I210-T1 PCIe x1 Gb Network Interface Card (optional)		X	X	X

Wireless LAN (optional and all except for 7265 for SFF/TWR must be bought at purchase)	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Intel® 7265 802.11AC 2x2 Wi-Fi +Bluetooth® M.2 Combo Card non-VPro	X	X	X	X
Intel® 3168 802.11AC 2x2 Wi-Fi +Bluetooth® M.2 Combo Card non-VPro	X	X	X	X
Intel® 7260 802.11 a,b,g,n 2x2 M.2 Bluetooth® Disabled NIC**	X			

* Wireless access point and Internet service required and not included. Availability of public wireless access points limited.
**Wake on Lan feature is not available.

SLOTS

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Turbo Drive (M.2 PCIe)	1 ea. M.2 PCIe x1-2230 (for WLAN) 1 ea. M.2 PCIe x4-2280/2230 (for storage)	1 ea. M.2 PCIe x1-2230 (for WLAN)	1 ea. M.2 PCIe x1-2230 (for WLAN)	1 ea. M.2 PCIe x1-2230 (for WLAN)
PCI Express x1 (v3.0)	N/A	N/A	1 ea. 4.2” full height 6.6” length 10W max. power	N/A
PCI Express x16 (v3.0) (wired as a x4)	N/A	1 ea. 2.5” low profile 6.6” length 35W max. power	1 ea. 4.2” full height 6.6” length 35W max. power	1 ea. 4.2” full height 6.6” length 35W max. power
PCI Express x16 (v3.0)	N/A	1 ea. 2.5” low profile 6.6” length 35W max. power	1 ea. 4.2” full height 6.6” length 75W max. power	1 ea. 4.2” full height 6.6” length 75W max. power
PCI	N/A	N/A	N/A	1 ea. 4.2” full height 6.6” length

PORTS

I/O Ports – Standard

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
USB 2.0	2 (rear)	4 (rear)	4 (rear)	4 (rear)
USB 3.1 Gen1	2 (front) including 1 fast charging 2 (rear)	2 (front); 2 (rear)	2 (front); 2 (rear)	2 (front); 2 (rear)
USB Type-C™3.0 port	N/A	N/A	N/A	N/A
PS/2	N/A	Optional (see I/O Ports Optional below)	Optional (see I/O Ports Optional below)	Optional (see I/O Ports Optional below)
Video	1* DisplayPort™ 1* port (choice of DisplayPort™, HDMI or VGA)	1DisplayPort™ ; 1 VGA	1 DisplayPort™ 1 VGA	1 DisplayPort™; 1 VGA
Audio	Front: 1 Headset 1 Headphone	Front: 1 Headset; Rear: 1 Audio-out 1 Audio-in	Front: 1Headset; Rear: 1 Audio-out 1 Audio-in	Front: 1 Headset; Rear: 1 Audio-out 1 Audio-in
Network Interface	RJ-45	RJ-45	RJ-45	RJ-45

I/O Ports – Optional

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Serial (RS-232)	1 standard; 1 optional*	N/A	1 (optional) (rear)	1 (optional) (rear)
Serial (RS-232) and PS/2 combination	N/A	1 (optional)	1 (optional)	1 (optional)

*Replaces 1 of the optional video ports

I/O Ports — Internal ports	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
DM SATA storage connector	1	N/A	N/A	N/A
Internal SATA storage connector(s)	N/A	2	3	3

BAYS

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
5.25" Half Height ODD	N/A	N/A	N/A	N/A
9mm Slim ODD	N/A	1 ea.	1 ea.	1 ea.
Secure Digital (SD) 3 Reader	N/A	1 ea.	1 ea.	1 ea.
2.5” internal storage drive	1 ea.	1 ea.*	1 ea.*	1 ea.*
3.5” internal storage drive	N/A	1 ea.*	2 ea.*	2 ea.*

*SFF can be configured with either (1) 3.5” or (1) 2.5” internal storage drive; MT can be configured with either (2) 3.5” or (1) 3.5” and (1) 2.5” internal storage drive.

KEYBOARDS AND POINTING DEVICES

Keyboards	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
HP Conferencing Keyboard	X	X	X	X
HP USB PS/2 Washable Keyboard*	X	X	X	X
HP USB Business Slim CCID SmartCard Keyboard	X	X	X	X
HP USB Business Slim Keyboard	X	X	X	X
HP PS/2 Business Slim Keyboard		X	X	X
HP USB Business Slim Keyboard (China only)	X	X	X	X
HP USB Business Slim Grey Keyboard	X	X	X	X

Mice	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
HP PS/2 Mouse*		X	X	X
HP USB 1000dpi Laser Mouse	X	X	X	X
HP Grey V2 Mouse	X	X	X	X

Standard Features and Configurable Components

HP USB Mouse	X	X	X	X
HP USB PS/2 Washable Mouse*	X	X	X	X
HP USB Mouse (China only)	X	X	X	X
HP USB Hardened Mouse	X	X	X	X

Combo	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
HP Wireless Business Slim Keyboard and Mouse*	X	X	X	X
HP USB Keyboard and Mouse (China only)	X	X	X	X

Other	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
HP Mouse Pad	X	X	X	X

*Note Optional HP Internal Serial/PS/2 Ports is required to support this device.

ADAPTERS AND CABLES

	400 G3 DM	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**
HP DisplayPort™ Cable	X	X	X	X
HP DisplayPort™ to DVI-D Adapter	X	X	X	X
HP DisplayPort™ to HDMI 4K Adapter	X	X	X	X
HP DisplayPort™ to VGA Adapter	X	X	X	X
HP DVI Cable	X	X	X	X
HP 700mm DisplayPort™ Cable Kit	X			
HP USB to Serial Port Adapter	X			

I/O DEVICES

Optional Ports (only one can be chosen) must be configured at purchase except for PCIe x1 cards.

	DM	**SFF**	**MT**
HP DisplayPort™ Port	X	X	X
HP HDMI Port	X		
HP VGA Port	X	X	X
HP Internal Serial Port	X		X
HP Internal Serial/PS/2 Ports		X	X
HP PCIe x1 Parallel Port Card		X	X

DUST FILTERS

	DM	**SFF**	**MT**
G3 600 SFF/ G4 SFF Dust Filter		X	
HP G3 Mini Dust Filter	X		
G4 400 MT Dust Filter			X

Standard Features and Configurable Components

DESKTOP MINI ACCESSORIES (OPTIONAL)

	DM	SFF	MT
HP Desktop Mini DVD-Writer ODD Expansion Module	X		
HP Desktop Mini 500GB HDD/ I/O Expansion Module	X		
HP Desktop Mini I/O Expansion Module	X		
HP Desktop Mini Security/Dual VESA Sleeve	X		
HP DM VESA Power Supply Holder	X		
HP DM VESA Quick Deploy Adhesive	X		
HP Desktop Mini Vertical Chassis Stand	X		
HP Desktop Mini Port Cover Kit	X		
HP Quick Release Bracket	X		
HP DM Antenna/Wiring WLAN Kit	X		

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

BIOS
HP BIOSphere Gen3[1]
HP DriveLock | HP Automatic DriveLock
BIOS Update via Network
Master Boot Record Security
Power On Authentication
Secure Erase[2]
Absolute Persistence Module[3]
Pre-boot Authentication
HP LAN-WLAN Protection
HP Wireless Wakeup

Multi Media
CyberLink Power Media Player (select models only)
CyberLink Power2Go (select models only)

Communication / Connectivity
Native Miracast Support[4]

HP Value Add Software
HP ePrint Driver + JetAdvantage[5]
HP Hotkey Support - CMIT
HP Recovery Manager
HP Recovery Disc Creator (Windows 7 only)
HP Jumpstart
HP Support Assistant
HP Noise Cancellation Software
HP Velocity
HP Notifications

3rd Party

Foxit PhantomPDF Express for HP (Windows 7 only)

Microsoft Products
Buy Office
Bing Search
Skype[6]

Manageability
HP Driver Packs[7]
HP SoftPaq Download Manager (SDM)
HP System Software Manager (SSM)[7]
HP BIOS Config Utility (BCU)[8]
HP Client Catalog[7]
HP Manageability & Integration Kit (MIK)[7]
LANDESK Management[8]

For more information on HP Client Management Solutions refer to: http://www.hp.com/go/clientmanagement

Standard Features and Configurable Components

Client Security Software
HP Client Security
- HP Security Manager (including Credential Manager and Password Manager)
- HP Drive Lock
- HP Password Manager
- Absolute Persistence Module
- Power On Authentication

Microsoft Security Essentials[9] (Windows 7 only)
Microsoft Defender
HP WorkWise (requires Bluetooth®)[10]

Standard
Trusted Platform Module (TPM) 2.0 (Infineon SLB9670). Common Criteria EAL4+ Certified.
Downgradeable to TPM 1.2. Convertible to FIPS 140-2 Certified mode. (TPM 2.0 is not available for Win 7 32-bit.) Restrictions apply; contact your account manager for more details.

For more information on HP Client Security Software Suite, refer to http://www.hp.com/go/clientsecurity.

1 HP BIOSphere Gen 3 requires Intel® or AMD 7th generation processors.
2 For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.
3 Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/ computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
4 Miracast is a wireless technology your PC can use to project your screen to TVs, projectors, and streaming media players that also support Miracast. You can use Miracast to share what you're doing on your PC and present a slide show. For more information: http://windows.microsoft.com/en-us/windows-8/project-wireless-screen-miracast
5 Requires an Internet connection to HP web-enabled printer and HP ePrint account registration (for a list of eligible printers, supported documents and image types and other HP ePrint details, see www.hp.com/go/eprintcenter). Requires optional broadband module. Broadband use requires separately purchased service contract. Check with service provider for coverage and availability in your area. Separately purchased data plans or usage fees may apply. Print times and connection speeds may vary.
6 Skype is not offered in China.
7 Not preinstalled, however available for download at http://www.hp.com/go/clientmanagement
8 Subscription required.
9 Opt in and internet connection required for updates.
10 HP WorkWise smartphone app will soon be available as a free download on the App Store and Google Play. Requires Windows 10 Build 1607 or higher).

HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Pro 400 G3/G4 Business PC into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 14 languages.
- Update your BIOS via the cloud or standardize on a BIOS version hosted on Enterprise network.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification 2.5
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.

Standard Features and Configurable Components

- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Business Desktop computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Business Desktop computers, including BIOS updates from within Windows (HPBIOSUPDREC), HP Client Manager, and fail-safe recovery. In addition, the HP BIOS Configuration Utility enables replication of BIOS settings within Windows while the Replicated Setup feature provides the same capability within F10 setup. The BIOS Configuration Utility is available from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Pro models use ACPI to provide power conservation features.

S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 0.5W in S5 (when turned off). When S5 Max Power Savings feature is enabled below features are turned off:

- Power to slots
- Wake events other than power buttons (such as Wake on LAN)
- USB charging ports

HARDWARE SECURITY

SATA 0,1 port disablement (via BIOS)

Serial, USB enable/disable (via BIOS)

Solenoid Lock / Hood Sensor (MT/SFF only)

Hood Sensor for DM (integrated in the PCA, can be enabled/disabled through BIOS)

Support for chassis padlocks and cable lock devices

POWER SUPPLY

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Standard Efficiency	65W 89% average efficiency at 115Vac & 230Vac			
80 PLUS Bronze	N/A	180W active PFC 82/85/82% efficient at 20/50/100% load(115V)	180W active PFC 82/85/82% efficient at 20/50/100% load(115V) 310W active PFC 82/85/82% efficient at 20/50/100% load(115V)	180W active PFC 82/85/82% efficient at 20/50/100% load(115V) 310W active PFC 82/85/82% efficient at 20/50/100% load(115V)
Operating Voltage Range	90 - 264VAC	90 - 264VAC	90 - 264VAC	90 - 264VAC
Rated Voltage Range	100 - 240VAC	100 - 240VAC	100 - 240VAC	100 - 240VAC
Rated Line Frequency	50 - 60HZ	50 - 60HZ	50 - 60HZ	50 - 60HZ
Operating Line Frequency	47 - 63HZ	47 - 63HZ	47 - 63HZ	47 - 63HZ
Rated Input Current	65W/1.6A90W/1.4A	180W/2.3A	180W/2.3A 310W/4A	180W/2.3A 310W/4A
Rated Input Current with Energy Efficient* Power Supply	90W/1.4A	180W/2.3A	180W/2.3A 310W/4A	180W/2.3A 310W/4A
DC Output	+19.5V	+12V	+12V	+12V
Current Leakage (NFPA 99: 2102)	Less than 500 micro amps 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 micro amps of leakage current at 120 Vac with the ground wire intact with normal polarity, as required for Non-patient	Less than 500 micro amps 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 micro amps 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	Less than 500 micro amps 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 micro amps 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	Less than 500 micro amps 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 micro amps 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

Standard Features and Configurable Components

	Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.	facility or that contact patients in normal use. Per section 10.3.5.1.	facility or that contact patients in normal use. Per section 10.3.5.1.	facility or that contact patients in normal use. Per section 10.3.5.1.
Power Supply Fan	N/A	70mm variable speed	70mm variable speed	70mm variable speed
Power cord length	6.0 ft. (1.83 m) (Power cord only)	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)
External Power Adapter				
Dimensions	55x30x114mm (60W)	N/A	N/A	N/A
Total Cord Length	6 ft	N/A	N/A	N/A

*High efficiency power supply is a requirement for ENERGY STAR® certification in conjunction with a select range of processors and modules

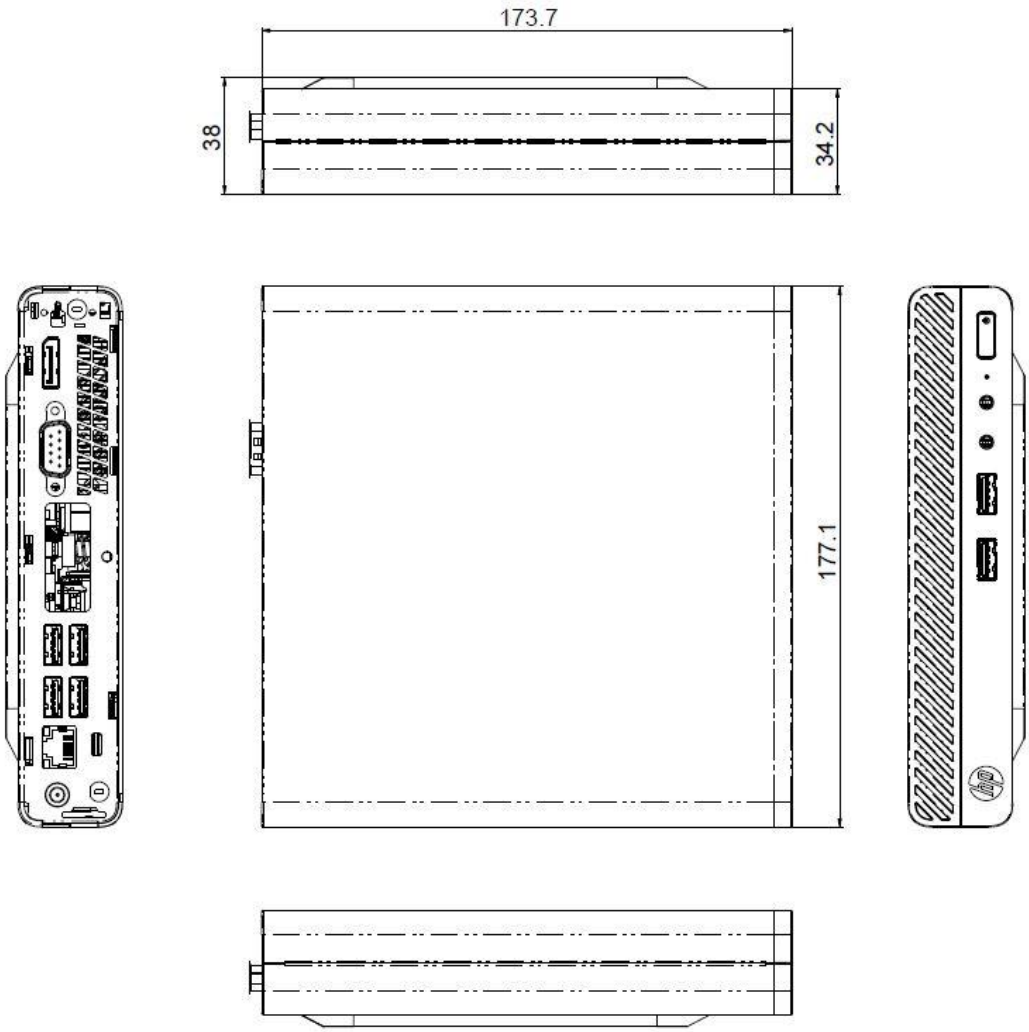
WEIGHTS & DIMENSIONS

(Configured with 2TB HDD, Wi-Fi card, graphics card)

	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT
Chassis (W x H x D) not including bezel	6.97 x 1.35 x 6.88 in 177 x 34.2 x 174.7 mm	10.6 x 3.7 x 11.7 in 270 x 95 x 296 mm	6.69 x 13.3 x 10.79 in 170 x 338 x 274 mm	6.69 x 13.3 x 10.79 in 170 x 338 x 274 mm
System Volume	64 cu in 1.06 L	463 cu in 7.6 L	960 cu in 15.74 L	960 cu in 15.74 L
System Weight*	2.67 lb 1.21 kg	10.14 lb 4.6 kg	12.06 lb 5.47 kg	12.06 lb 5.47 kg
Max Supported Weight (desktop orientation)	N/A	77 lb 35 kg	77 lb 35 kg	77 lb 35 kg
Packaging (H x W x D)	5.7 x 9.1 x 19.6 in 144.8 x 231.1 x 497.8 mm	19.65 x15.71 x 9.06 in 499 x 399 x 230 mm	19.65 x 15.35 x 11.73 in 499 x 390 x 298 mm	19.65 x 15.35 x 11.73 in 499 x 390 x 298 mm
Shipping Weight	6.1 lb 2.8 kg	15.59 lb. 7.08 kg	20.26 lb. 9.2 kg	20.26 lb. 9.2 kg
Palletization Profile	20-units per layer 4 layer max 80-units per pallet Footprint-39.21 x 46.61 in (996 x 1184 mm)	6-units per layer 10 layer max 60 per pallet 47.24 x 39.37 x 94.49 in (including pallet)	6-units per layer 7 layer max 42 per pallet 47.24 x 39.37 x 86.85 in (including pallet)	6-units per layer 7 layer max 42 per pallet 47.24 x 39.37 x 86.85 in (including pallet)
	Dependent on 40-Ft Stnd. Sea Container or 40-Ft High-cube Sea Container is used)			

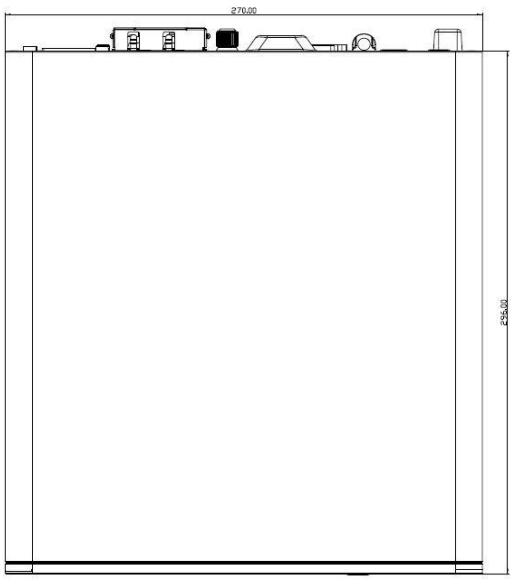
Standard Features and Configurable Components

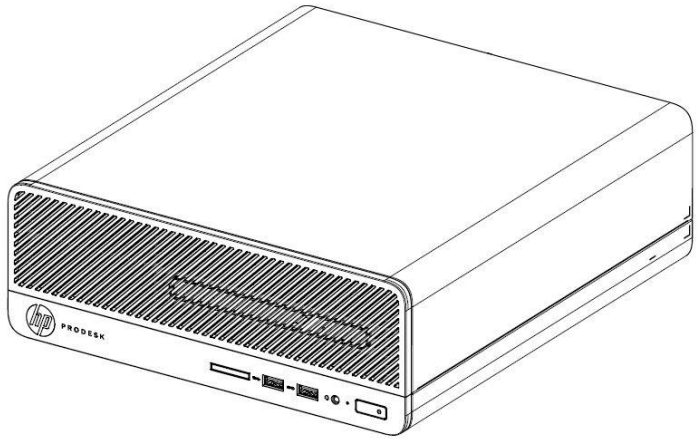
Desktop Mini Dimensions

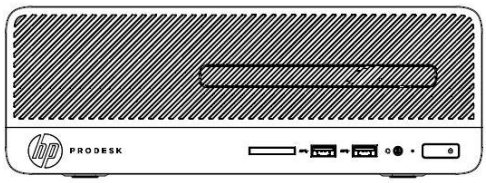


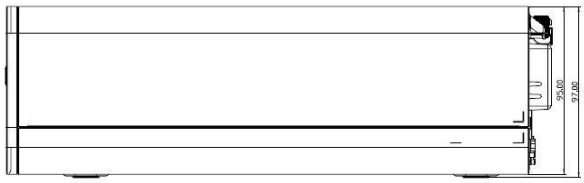
Standard Features and Configurable Components

Small Form Factor Dimensions



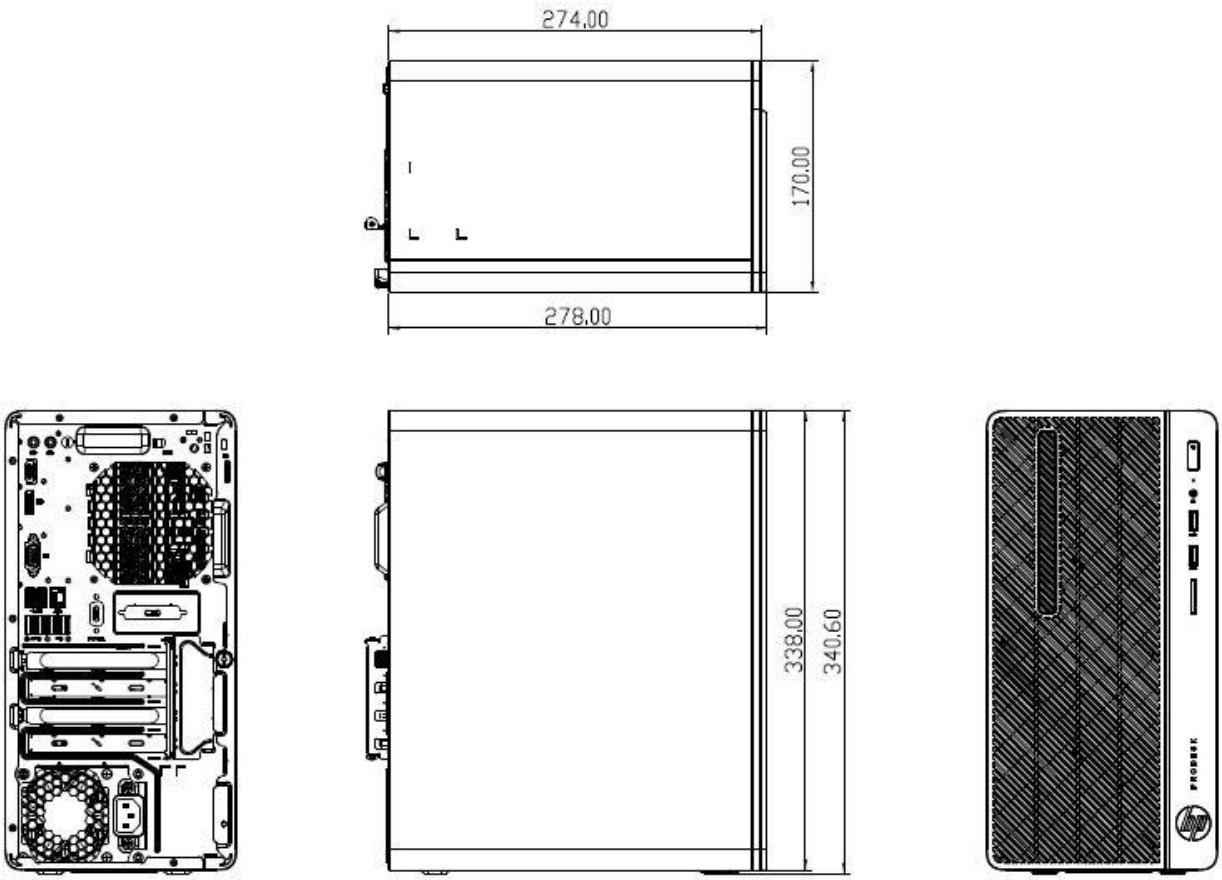






Standard Features and Configurable Components

Mictrotower Dimensions



ENVIRONMENTAL & INDUSTRY

ENERGY STAR® certified models available

EPEAT® registered where applicable/supported. See http://www.epeat.net for registration status by country.

TAA compliant models available

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)

*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.

SERVICE AND SUPPORT

On-site Warranty [1]: Three-year (3-3-3) limited warranty delivers three years of on-site, next business day [2] service for parts and labor and complimentary limited technical support.[3] 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.[4] To choose the right level of service for your HP product, visit HP Care Pack Central: www.hp.com/go/cpc

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.

NOTE 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.

NOTE 3: Technical telephone support applies only to HP-configured and third-party HP qualified hardware and software.

NOTE 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.

Technical Specifications – Graphics

GRAPHICS

Intel® HD Graphics (integrated)			
DisplayPort™	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays (including the integrated panel)		
Memory	The BIOS has options for selecting the dedicated memory size of 128MB, 256MB or 512MB Additional 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 Graphics Memory	Microsoft Windows 7	Windows 8.1	Windows 10
	Up to 1.7GB	Up to 1.8GB	>4 GB
	Note: the actual amount of maximum graphics memory can be less than the amounts listed above depending upon your computer's configuration.		
Maximum Color Depth	32 bits/pixel		

Graphics/Video API Support	6th Generation Core™ processors:
	• Next Generation Intel® Clear Video Technology HD Support is a collection of video playback and enhancement features that improve the end user's viewing experience
	  ○ Encode/transcode HD content
	  ○ Playback of high definition content including Blu-ray Disc
	  ○ Superior image quality with sharper, more colorful images
	• DirectX Video Acceleration (DXVA) support for accelerating video processing
	  ○ Full AVC/VC1/MPEG2/HEVC HW Decode
	• Advanced Scheduler 2.0, 1.0
	• Windows 7, Windows 8.1, Windows 10, Linux OS Support
	• DirectX 12.1
	• OpenGL 4.4
	• Open CL 1.2 (Intel® HD Graphics 510)
	• Open CL 1.2/2.0 (Intel® HD Graphics 530)		

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP. For All in One platforms, resolutions higher than the integrated panel resolution are not supported on the integrated panel.

Resolution	Refresh Rate	VGA	DisplayPort™	HDMI	Standard
640 x 480	60, 75, 85	X	X	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	X	X	IBM VGA

Technical Specifications – Graphics

800 x 600	60, 75, 85	X	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X*	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X*	X	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85		X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75		X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	CVT 3.69M9-R
2560 x 1600	60, 60RB		X	X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24		X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25		X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30		X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50		X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60		X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	SMPTE 274M
1920 x 1080	30		X	X	SMPTE 274M
1920 x 1080	24		X	X	SMPTE 274M

Technical Specifications – Graphics

1280 x 720	60		X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	SMPTE 296M
720 x 480	60		X	X	MHL (CEA-770.2)
720 x 576	50		X	X	ITU-R BT.1358
640 x 480	60		X	X	CEA (VESA DMT)
* 60Hz refresh rate only on VGA					

AMD Radeon™ R7 450 4GB PCIe x16 Graphics Card

Memory 4GB 128-bit wide frame buffer operating at 1125MHz.

Controller Clock Speed AMD® Radeon™ R9 350 GPU operating at 925 MHz

Multi-display Support A maximum of 4 displays are supported by the card. A maximum of 2 legacy displays (Native VGA, DVI, or displays connected with passive DisplayPort™ adapters are considered as legacy)

Graphics /API support DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3

Output Connectors 1 x Dual-Link DVI-I, 1x DisplayPort™; 1x HDMI; Includes DVI to VGA adapter

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort™	HDMI	Standard
640 x 480	60, 75, 85	X	X	X	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	X	X	X	IBM VGA
800 x 600	60, 75, 85	X	X	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	X	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	X	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	X	X	VESA DMT

Technical Specifications – Graphics

1600 x 900	60, 60RB, 75, 85	X	X	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X	X	X	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X	X	X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	X	X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	X	CVT 3.69M9-R
2560 x 1600	60, 60RB		X	X	X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		X	X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50			X		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50			X		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60			X		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	X	SMPTE 274M
1920 x 1080	30		X	X	X	SMPTE 274M
1920 x 1080	24		X	X	X	SMPTE 274M
1280 x 720	60		X	X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	X	SMPTE 296M
720 x 480	60		X	X	X	MHL (CEA-770.2)

AMD Radeon™ RX 460 4GB FH PCIe x16 Graphics Card

Memory	2GB 128-bit wide frame buffer operating at 1750MHz.
Controller Clock Speed	AMD® Radeon™ RX 360 GPU operating at up to 1.2GHz
Multi-display Support	A maximum of 4 displays are supported by the card.

Technical Specifications – Graphics

Graphics /API support	DIRECTX 12, Open GL 4.5, Open CL 2.0, AMD Video Coding Engine (VCE) 3.4 and AMD Universal Video Decoder(UVD)
Output Connectors	1 x Dual-Link DVI-D, 1x DisplayPort™; 1x HDMI

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Resolution	Refresh Rate*		DVI-D	DisplayPort™	HDMI	Standard
640 x 480	60, 75, 85		X	X	X	VESA DMT, CVT 0.31M3
720 x 400	70		X	X	X	IBM VGA
800 x 600	60, 75, 85		X	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85		X	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85		X	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85		X	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85		X	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85		X	X	X	VESA DMT
1280 x 960	60, 75, 85		X	X	X	VESA DMT
1280 x 1024	60, 75, 85		X	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB		X	X	X	VESA DMT
1440 x 900	60, 60RB		X	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85		X	X	X	VESA DMT
1680 x 1050	60, 60RB, 75		X	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60		X	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85		X	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85		X	X	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85		X	X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60, 75		X	X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	X	CVT 3.69M9-R
2560 x 1600	60, 60 RB		X	X	X	VESA DMT, CVT 4.10MA/4.10MA-R

Technical Specifications – Graphics

3840 x 2160	24			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		X	X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60			X	X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	X	SMPTE 274M
1920 x 1080	30		X	X	X	SMPTE 274M
1920 x 1080	24		X	X	X	SMPTE 274M
1280 x 720	60		X	X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	X	SMPTE 296M
720 x 480	60		X	X	X	MHL (CEA-770.2)

NVIDIA® GeForce® GT 730 1GB PCIe x8 HDMI Graphics Card

Memory	1GB GDDR5 64-bit wide frame buffer operating at 2.5GHz.
Controller Clock Speed	NVIDIA® Kepler™ GPU operating at 901 MHz
Multi-display Support	A maximum of 2 displays are supported by the card
Graphics /API support	Supports Microsoft DirectX 12, OpenGL 4.4 and OpenCL 2 API, Shade Model 5 and DirectCompute 11
Output Connectors	1 x Dual-Link DVI-I; 1x HDMI; Includes DVI to VGA adapter

Supported Display Resolutions and Refresh Rates

Note: other resolutions may be available but are not recommended as they may not have been tested and qualified by HP

Technical Specifications – Graphics

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	HDMI	Standard
640 x 480	60, 75, 85	X	X	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	X	X	IBM VGA
800 x 600	60, 75, 85	X	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X	X	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X	X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	CVT 3.69M9-R
2560 x 1600	60, 60RB		X	X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	50				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60				CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M

Technical Specifications – Graphics

4096 x 2160	30			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	50				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60				CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	SMPTE 274M
1920 x 1080	30		X	X	SMPTE 274M
1920 x 1080	24		X	X	SMPTE 274M
1280 x 720	60		X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	SMPTE 296M
720 x 480	60		X	X	MHL (CEA-770.2)

* >60 refresh rates only for analog (VGA) signaling

NVIDIA® GeForce® GT 730 2GB DP PCIe x8 Graphics Card	
Introduction	Get impressive graphics and high resolution dual-display performance in a low profile, PCI Express x8 graphics add-in card based on the NVIDIA® Kepler™ Graphics Processor. Improve your everyday PC, Web conferencing, and video or photo editing.
Memory	2GB GDDR5 64-bit wide frame buffer operating at 900 MHz
Controller Clock Speed	NVIDIA® Kepler™ GPU operating at 902 MHz
Multi-display Support	A maximum of 4 displays are supported by the card.
Graphics /API support	Supports Microsoft DirectX 12, OpenGL 4.4 and OpenCL 2 APIs, Shade Model 5, UVD 4.2, VCE 2.0, and DirectCompute 11
Output Connectors	1 x Dual-Link DVI-I, 1x DisplayPort™; Includes DVI to VGA adapter Display Port output is multi-mode capable, support Audio, HBR2 and MST

Resolution	Refresh Rate*	VGA (DVI-VGA adapter)	DVI-D	DisplayPort™	Standard
640 x 480	60, 75, 85	X	X	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	X	X	IBM VGA
800 x 600	60, 75, 85	X	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	X	X	VESA DMT, CVT 0.79M3

Technical Specifications – Graphics

1152 x 864	60, 75, 85	X	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X	X	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X	X	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	X	X	CVT 3.15M3
2560 x 1440	59.951		X	X	CVT 3.69M9-R
2560 x 1600	60, 60RB		X	X	VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		X	X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60			X	CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60			X	CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		X	X	VESA (SMPTE 274M)
1920 x 1080	50		X	X	SMPTE 274M
1920 x 1080	30		X	X	SMPTE 274M
1920 x 1080	24		X	X	SMPTE 274M
1280 x 720	60		X	X	VESA (CEA-770.3)
1280 x 720	50		X	X	SMPTE 296M
720 x 480	60		X	X	MHL (CEA-770.2)
720 x 576	50		X	X	ITU-R BT.1358

Technical Specifications – Graphics

640 x 480	60		X	X	CEA (VESA DMT)
* >60 refresh rates only for analog (VGA) signaling					

Technical Specifications – Hard Disk and Solid State Storage

HARD DISK AND SOLID STORAGE

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

HP 1 TB 7.2K SATA 6.0Gb/s 2.5" Hard Disk Drive		
Capacity	1,000,204,886,016 bytes	
Rotational Speed	7,200 rpm	
Interface	SATA 6 Gb/s	
Buffer Size	32 MB	
Logical Blocks	1,953,525,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	25 ms
Height (nominal)	0.374 in/9.5 mm	
Width (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
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.

HP 500 GB 7.2K SATA 6.0Gb/s 2.5" Hard Disk Drive*	
Capacity	500,107,862,016 bytes
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	16 MB

Technical Specifications – Hard Disk and Solid State Storage

Logical Blocks	976,773,168	
Seek Time (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	25 ms
Height (nominal)	0.267 in/6.8 mm	
Width (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
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.

500GB* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive

Formatted Capacity	500,107,862,016 bytes	
Spindle Speed	7,200 rpm	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Buffer Size	16 MB	
Logical Blocks	976,773,168	
Seek Time (average)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
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 – Hard Disk and Solid State Storage

HP 1 TB* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive*		
Formatted Capacity	1,000,204,886,016 bytes	
Rotational Speed	7,200 rpm	
Interface	Serial ATA 3.0 (6.0 Gb/s)	
Buffer Size	32 MB	
Logical Blocks	1,953,525,168	
Seek Time (average)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
Height (nominal)	1 in/2.54 cm	
Width (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
Operating Temperature	41° to 131° F (5° to 55° C)	
* 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.		

HP 2 TB* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive*		
Formatted Capacity	2 TB	
Rotational Speed	7,200 rpm	
Interface	SATA 6Gb/s NCQ	
Cache, Multisegmented (MB)	64 MB	
Seek Time (average)	Read	<8.5 ms
	Write	<9.5 ms
Height	1.028 in/26.11 mm	
Width	4.0 in/101.6 mm	
Depth	5.787 in/146.99 mm	
Weight	1.38 lb/626 g	
Operating Temperature	32° to 140° F (0° to 60° C)	
*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.		

Technical Specifications – Hard Disk and Solid State Storage

HP 1 TB* SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)*		
Formatted Capacity	1 TB	
Spindle Speed	5,400 rpm +/- 0.2%	
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
Interface	SATA 6 Gb/s	
Cache Buffer	64 MB	
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB	
Number of Sectors	976,773,168	
Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
Height	0.374 +/-.008 in (9.5 +/- 0.2 mm)	
Width	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
Length	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
Weight	0.254 lb/115 g (max)	
Operating Temperature	32° to 140° F (0° to 60° C)	
* For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.		

HP 500 GB SATA 6G 2.5” 8GB Solid State Hybrid Drive (SSHD)*	
Formatted Capacity	500 GB
Spindle Speed	5,400 rpm +/- 0.2%
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash
Interface	SATA 6 Gb/s
Cache Buffer	64 MB
NAND Flash Commercial Multilevel Cell (cMLC)	8 GB
Number of Sectors	976,773,168

Technical Specifications – Hard Disk and Solid State Storage

Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	12 ms
Height	0.268 +/-.008 in (6.8 +/- 0.2 mm)	
Width	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
Length	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
Weight	0.209 lb/95 g (max)	
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 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.		

HP 1-TB SATA 6G 3.5" 8GB Solid State Hybrid Drive (SSHD)*		
Formatted Capacity	1 TB	
Spindle Speed	7,200 rpm	
Drive Type	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
Interface	Serial ATA (SATA)	
Cache Buffer	64 MB	
NAND Flash Multilevel Cell (MLC)	8 GB	
Number of Sectors	1,953,525,168	
Seek Time (typical reads)	Single Track:	2.0 ms
	Average:	11 ms
Height	0.783 in / 2.01 cm	
Width	4 in / 10.2 cm	
Length	5.79 in / 14.7 cm	
Weight	0.88 lb/400 g	
Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications – Hard Disk and Solid State Storage

*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

500 GB* SATA 2.5" Self-Encrypting (SED) Opal 2 Solid State Drive*		
Unformatted Capacity	500GB	
Architecture	Self-Encrypting (SED) Solid State Drive with 25nm MLC NAND Flash and SATA interface	
Interface	Serial ATA 2.0 (3.0 Gb/s)	
NAND Flash	25nm MLC NAND Flash	
Height	.275 in/7mm	
Width	2.75 in/69.85 mm	
Length	3.95 in/100.5 mm	
Weight	0.161 lb (73 g)	
Bandwidth Performance	Sustained Sequential 128k Read:	Up to 450 MB/s
	Sustained Sequential 128k Write:	Up to 260 MB/s
	Random 4k Read:	Up to 46K IOPs
	Random 4k Write:	Up to 56K IOPs
Latency	Read:	55 µs
	Write:	55 µs
Power	SATA power consumption:	160 mW (active average); <85 mW (idle average)
Useful Drive Life	72TB written, up to 40GB/day for 5 years	
	Operating Temperature:	32° to 158° F (0° to 70° C)

Technical Specifications – Hard Disk and Solid State Storage

Environmental (all conditions, non-condensing)	Relative Humidity:	5% to 95%
	Shock:	1,500 G/1 ms
*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.		

256 GB SATA 2.5" TLC SED SSD Opal 2 Drive*			
Unformatted Capacity	256 GB 500,118,192 (User Addressable Sectors)		
Architecture	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group (TCG) OPAL 2.0 compliant encrypted solid state drive		
Interface	Serial ATA (6.0 Gb/s)		
Form Factor	2.5 inch		
Height	6.80 mm ± 0.20		
Width	69.85 mm ± 0.25		
Length	100.20 mm ± 0.25		
Typical Weight	37.4 g		
Bandwidth Performance	Sustained Sequential Read:	Up to 520 MB/s	
	Sustained Sequential Write:	Up to 460 MB/s	
Power	Power consumption:	Active: 3.891W; Idle: 0.085W	
Mean Time Between Failure (MTBF)	1,500,000 hours		
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock:		1,500 G/0.5 ms

Technical Specifications – Hard Disk and Solid State Storage

*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

512 GB SATA 2.5" TLC SED SSD Opal 2 Drive*		
Unformatted Capacity	512 GB 1,000,215,216 (User Addressable Sectors)	
Architecture	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group (TCG) OPAL 2.0 compliant encrypted solid state drive	
Interface	Serial ATA (6.0 Gb/s)	
Form Factor	2.5 inch	
Height	7 mm ± 0.20	
Width	69.85 mm ± 0.25	
Length	100.20 mm ± 0.25	
Typical Weight	37.4 g	
Bandwidth Performance	Sustained Sequential Read:	Up to 515 MB/s
	Sustained Sequential Write:	Up to 490 MB/s
Power	Power consumption:	Maximum active power: ≤4,400mW Average power: 70mW Slumber low power mode: 42mW – 52mW
Mean Time Between Failure (MTBF)	Up to 1,750,000 hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	0˚C to 70˚C (32˚F to 158˚F)
	Non-operating temperature and storage	-55˚C to +85˚C (-67˚F to 185˚F)
	Operating and non-operating shock	1,500 G/0.5 ms

*NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

Technical Specifications – Hard Disk and Solid State Storage

256GB Turbo Drive G2 TLC Solid State Drive			
Unformatted Capacity	256 GB		
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support		
Interface	PCI-E Gen3 x 4		
Form Factor	M.2 2280		
Height	3.73 mm		
Width	22.00 ± 0.15 mm		
Length	80.00 ± 0.15 mm		
Weight	Up to 8 g		
Bandwidth Performance	Sustained Sequential Read:	Up to 2600 MB/s	
	Sustained Sequential Write:	Up to 1000 MB/s	
Power	Power consumption:	Active: Typical 6.1W; Idle: Typical 80mW L1.2: Typical 5mW	
Mean Time Between Failure (MTBF)	1,500,000 hours		
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock:		1,500 G/0.5 ms

512GB Turbo Drive G2 TLC Solid State Drive

Technical Specifications – Hard Disk and Solid State Storage

Unformatted Capacity	512 GB	
Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support	
Interface	PCI-E Gen3 x 4	
Form Factor	M.2 2280	
Height	3.73 mm	
Width	22.00 ± 0.15 mm	
Length	80.00 ± 0.15 mm	
Weight	Up to 8 g	
Bandwidth Performance	Sustained Sequential Read:	Up to 2600 MB/s
	Sustained Sequential Write:	Up to 1200 MB/s
Power	Power consumption:	Active: Typical 6.1W; Idle: Typical 80mW L1.2: Typical 5mW
Mean Time Between Failure (MTBF)	1,500,000 hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

1TB Turbo Drive G2 TLC Solid State Drive	
Unformatted Capacity	1 TB

Technical Specifications – Hard Disk and Solid State Storage

Architecture	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support	
Interface	PCI-E Gen3 x 4	
Form Factor	M.2 2280	
Height	3.73 mm	
Width	22.00 ± 0.15 mm	
Length	80.00 ± 0.15 mm	
Weight	Up to 8 g	
Bandwidth Performance	Sustained Sequential Read:	Up to 2600 MB/s
	Sustained Sequential Write:	Up to 1400 MB/s
Power	Power consumption:	Active: Typical 6.1W; Idle: Typical 80mW L1.2: Typical 5mW
Mean Time Between Failure (MTBF)	1,500,000 hours	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

128GB SATA 2.5" Value (Non-SED) Solid State Drive	
Unformatted Capacity	128 GB
Architecture	TLC NAND Flash
Interface	SATA 3.2 (6.0 Gb/s)

Technical Specifications – Hard Disk and Solid State Storage

Form Factor	2.5 inch	
Dimensions (W x H x D)	6.98 x 0.7 x 10.05 cm	
Weight	31g	
Bandwidth Performance	Sustained Sequential Read:	Up to 510 MB/s
	Sustained Sequential Write:	Up to 330 MB/s
	Random Read:	Up to 38K IOPs
	Random Write:	Up to 70K IOPs
Power	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	50mW (active); 20mW (idle)
Useful Drive Life	72TB written, up to 40GB/day for 5 years	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms

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."

256GB SATA 2.5" Value (Non-SED) Solid State Drive

Unformatted Capacity	256 GB
Architecture	TLC NAND Flash
Interface	SATA 3.2 (6.0 Gb/s)
Form Factor	2.5 inch
Dimensions (W x H x D)	6.98 x 0.7 x 10.05 cm
Weight	31g

Technical Specifications – Hard Disk and Solid State Storage

Bandwidth Performance	Sustained Sequential Read:	Up to 510 MB/s
	Sustained Sequential Write:	Up to 330 MB/s
	Random Read:	Up to 38K IOPs
	Random Write:	Up to 70K IOPs
Power	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	50mW (active); 20mW (idle)
Useful Drive Life	72TB written, up to 40GB/day for 5 years	
Environmental (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock:	1,500 G/0.5 ms
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."		

256GB SATA 2.5" TLC Solid State Drive	
Formatted Capacity	256 GB
Architecture	Solid State Drive with SATA interface; ATA 8 Compliant and SATA 2.6 compliant
Interface	Serial ATA 3 (6.0 Gb/s)
Form Factor	2.5 inch
Height	7 mm ± 0.20
Width	69.85 mm ± 0.25
Length	100.2 mm ± 0.25
Weight (typical)	36.5 g (+2)

Technical Specifications – Hard Disk and Solid State Storage

Data Transfer Rate (128k Sequential)	Sequential Read	Up to 500 MB/s	
	Sequential Write	Up to 455 MB/s	
Power Watts	Power consumption (avg):	Read: 95 mW Write: 95 mW Standby: 70 mW DEVSLP: <7 mW	
Environmental (all conditions, non-condensing)	Operating Temperature:		32° to 158° F (0° to 70° C)
	Relative Humidity:		5% to 95%
	Shock (2 m Sec half-sine):		1500 G peak 0.5ms (operating)

512 GB SATA 2.5" TLC Solid State Drive*			
Formatted Capacity	512 GB		
Architecture	Solid State Drive with SATA interface; ATA 8 Compliant and SATA 2.6 compliant		
Interface	Serial ATA 3 (6.0 Gb/s)		
Form Factor	2.5 inch		
Height	7 mm ± 0.20		
Width	69.85 mm ± 0.25		
Length	100.2 mm ± 0.25		
Weight (typical)	36.5 g (+2)		
Data Transfer Rate (128k Sequential)	Sequential Read	Up to 500 MB/s	
	Sequential Write	Up to 455 MB/s	
Power Watts	Power consumption (avg):	Read: 95 mW Write: 95 mW Standby: 70 mW DEVSLP: <7 mW	
	Operating Temperature:		32° to 158° F (0° to 70° C)

Technical Specifications – Hard Disk and Solid State Storage

Environmental (all conditions, non-condensing)	Relative Humidity:	5% to 95%
	Shock (2 m Sec half-sine):	1500 G peak 0.5ms (operating)
*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 - Removable Storage

OPTICAL DRIVES

HP 9.5mm G3 800/600/400 SFF G4 400 SFF/MT DVD-Writer		
Height	12.7mm height	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard	
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	0.42 lb (190 g)	
Write speeds	DVD-R DL	Up to 6X
	DVD+R	Up to 8X
	DVD+RW	Up to 8X
	DVD+R DL	Up to 6X
	DVD-R	Up to 8X
	DVD-RW	Up to 6X
	CD-R	Up to 24X
	CD-RW	Up to 24X
Read speeds	DVD-RW, DVD+RW	Up to 8X
	DVD-R DL, DVD+R DL	Up to 8X
	DVD+R, DVD-R	Up to 8X
	DVD-ROM DL, DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
Access time (typical reads, including settling)	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
	Stop Time	6 seconds (typical)
	Source	Slimline SATA DC power receptacle
Power	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC (< 1000 mA typical, 1600 mA maximum)
	Temperature	41° to 122° F (5° to 50° C)
Environmental conditions (operating - non-condensing)	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)

Technical Specifications - Removable Storage

HP 9.5mm G3 800/600/400 SFF G4 400 SFF/MT DVD-ROM		
Height	12.7mm	
Orientation	Either horizontal or vertical	
Interface type	SATA/ATAPI	
Dimensions (W x H x D)	5.04 x 0.5 x 5.0 in (128 x 12.7 x 127 mm) without bezel	
Weight (max)	Up to 0.37 lb (170 g) without bezel	
Read speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL	Up to 8X
	DVD-ROM	Up to 8X
	CD-ROM, CD-R	Up to 24X
	CD-RW	Up to 24X
Access time (typical reads, including settling)	Random	DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical)
	Full Stroke	DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
Power	Source	Slimline SATA DC power receptacle
	DC Power Requirement	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum
Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature (operating)	84° F (29° C)

SYSTEM MEMORY SUPPORT

The HP ProDesk 400 Business PC supports the 6th &7th generation Intel® Core™ processor family. Based on a new PC micro-architecture, the processor is designed for a two-chip platform consisting of a processor and Platform Controller Hub (PCH). The 6th generation Intel® Core™ processor includes an Integrated Memory Controller (IMC). The IMC supports DDR4 protocols with two independent, 64-bit wide channels each accessing one or two DIMMs.

- Two channels of non-ECC DDR4 unbuffered dual in-line memory modules (DIMM) or DDR4 unbuffered small outline dual in-line memory modules (SO-DIMM) with a maximum of two DIMMs per channel
- Single-channel and dual-channel memory organization modes
- Data burst length of eight for all memory organization modes
- Memory data transfer rates of up to 2400 MT/s; actual supported data transfer rate determined by the configured processor.
- 64-bit wide channels
- DDR4 system memory I/O voltage of 1.2V

Platform Memory Support

- The Microtower (MT) and Small Form Factor (SFF) platform supports up to two (2) industry-standard DDR4-SDRAM DIMMs.
- The DM platform supports up to two (2) industry-standard DDR4-SDRAM SO-DIMMs.

CAUTION: You must shut down the computer and disconnect the power cord before adding or removing memory modules. Regardless of the power-on state, voltage is always supplied to the memory modules as long as the computer is plugged in to an active AC outlet. Adding or removing memory modules while voltage is present may cause irreparable damage to the memory modules or system board.

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.

NETWORKING

Realtek RTL8111HSH-CG GbE		
10/100/1000 NIC	**Ethernet Features**	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s 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) Jumbo Frame 9K Auto MDI/MDIX Crossover cable detection
	Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
	Performance Features	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling
	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
	Interface	PCI Express 1.1 x1 to fully support ASPM L0s/L1 and CLKREQ
	NIC Device Driver Name	PCIe GBE Ethernet Family Controller

Intel® Ethernet I210-T1 Gigabit Network Adapter	
Connector	RJ-45
System Interface	PCI Express x1
Controller	Intel® I210 Gigabit Ethernet Controller
Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers

Technical Specifications – Networking

Data rates supported	10/100/1000 Mbps	
IEEE Compliance	802.1P 802.1Q 802.2 802.3 802.3AB 802.3u 802.3x flow control	
Bus architecture	PCI-E 2.1	
Data path width	X1, 250 MB/s, Bi-directional interface	
Data transfer mode	Bus-master DMA	
Hardware certifications	FCC, B, CE, TUV-c, TUVus Mark Canada and United States, TUV-GS Mark for European Union	
Power requirement	Aux 3.3 V, 3.0 Watts in 1000 base-T and 1.0 Watts in 100 Base-T	
Boot ROM support	Yes 10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps	
Network transfer rate	10BASE-T (half-duplex) 10 Mbps	
	10BASE-T (full-duplex) 20 Mbps	
	100BASE-TX (half-duplex) 100 Mbps	
	100BASE-TX (full-duplex) 200 Mbps	
	1000BASE-T (full-duplex) 2000 Mbps (actual rate limited by PCI bus)	
Environmental	Operating Temperature:	32° to 132° F (0° to 55° C)
	Operating Humidity:	85% at 131° F (55° C)
Management	WOL, PXE, DMI, WFM 2.0	

Intel® 7265 802.11ac 2x2 DualBand Combo PCIe x1 Card		
	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

Technical Specifications – Networking

		• 2.402 – 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels. 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 Note: Indonesia no support this band)
	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, and 80MHz)
	Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
	Security[1]	• 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 Power[2]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +13dBm minimum • 802.11n HT40(2.4GHz) : +13dBm minimum • 802.11n HT20(5GHz) : +12dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum • 802.11ac 80MHz(5GHz) : +11dBm minimum
	Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 60 mW (WLAN unassociated) Radio disabled: 30 mW
	Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode
	Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum

Technical Specifications – Networking

		802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm 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 Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
	Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
	Operating Voltage	3.3v +/- 9%	
	Temperature	Operating Non-operating	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
	Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
	Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
	LED Activity	LED Amber – Radio OFF; LED White – Radio ON	

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

	HP Integrated Module with Bluetooth® 4.2 Wireless Technology	
	Bluetooth® Specification	4.2 Compliant
	Frequency Band	2402 to 2480 MHz
	Number of Available Channels	79 (1 MHz) available channels
	Data Rates and Throughput	3 Mbps data rate; throughput up to 2.17 Mbps
		Synchronous Connection Oriented links up to 3, 64 kbps, voice channels
		Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric or 1306.9 kbps symmetric
	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.
	Receiver Sensitivity	**Modulation** / **0.01% BER** / **0.001% BER** GFSK / -80 dBm / -70 dBm π/4-DQPSK / -80 dBm / -70 dBm 8DPSK / -80 dBm / -70 dBm
	Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
	Range	Up to 33 ft (10 m)
	Electrical Interface	USB 2.0 compliant

Technical Specifications – Networking

	Bluetooth® Software Supported	Microsoft Windows Bluetooth® Software
	Link Topology	Point to Point, Multipoint Pico Nets up to 7 slaves
	Electrical Interface	Full support of Bluetooth® Security Provisions
	Bluetooth® Software Supported	Microsoft Windows ACPI, and USB Bus Support
	Security	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
	Power Management	All necessary regulatory approvals for supported countries, including:
	Power Management	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
	Certifications	ETS 300 328, ETS 300 826
	Certifications	Low Voltage Directive IEC950
	Bluetooth® Profiles Supported	UL, CSA, and CE Mark
	Certifications	Serial Port Profile (SPP)[1] Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)[1,2] Generic Object Exchange Profile (GOEP)[1,2] Object Push Profile (OPP)[1,2] File Transfer Profile (FTP) Synchronization Profile (SYNC) Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] FAX Profile (FAX) Basic Imaging Profile (BIP)[2] Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
	Bluetooth® Profiles Supported	

Intel® 3168 802.11ac with PCIe x1 WLAN/ Bluetooth® Combo*		
Wireless LAN Standards	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac	
Interoperability	Wi-Fi certification	
Frequency Bands	802.11b/g/n	2.402 – 2.482 GHz Note: The FCC has declared as of January 1, 2015 products that utilize passive scanning on channel 12/13 and are capable of transmitting must fully comply with requirements of 15.247 or otherwise disable those channels.

Technical Specifications – Networking

	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 Note: Indonesia only supports 5.725 - 5.825 GHz (CH149 - CH161)
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 ~ MCS7, (1SS) (20MHz, 40MHz, and 80MHz)	
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM	
Security[1]	• 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	
	[1] Check latest software/driver release for updates on supported security features.	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	802.11r Fast Roaming	
Output Power[2]	• 802.11b : +16dBm minimum • 802.11g : +14dBm minimum • 802.11a : +14dBm minimum • 802.11n HT20(2.4GHz) : +14dBm minimum • 802.11n HT40(2.4GHz) : +12dBm minimum • 802.11n HT20(5GHz) : +14dBm minimum • 802.11n HT40(5GHz) : +12dBm minimum • 802.11ac 80MHz(5GHz) : +11dBm minimum	
	[2] Maximum output power may vary by country according to local regulations.	

Technical Specifications – Networking

Power Consumption	Transmit: 2.0 W (max) Receive: 1.6 W (max) Idle mode (PSP): 180 mW (WLAN Associated) Idle mode: 50 mW (WLAN unassociated) Connect Standby: 10 mW (WLAN+BT) Radio disabled: 5 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity[3]	802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -88dBm maximum 802.11a, 54Mbps : -74dBm maximum 802.11n, MCS07 : -69dBm maximum 802.11n, MCS15 : -66dBm maximum 802.11ac, 1SS, MCS-0 : -86dBm maximum 802.11ac, 1SS, MCS-9 : -61dBm maximum 802.11ac, 2SS, MCS-0 : -83dBm maximum 802.11ac, 2SS, MCS-9 : -58dBm maximum	
	[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).	
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 Factors	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm	
Weight	Type 2230 : 2.8g Or Type 1630 : 2g	
Operating Voltage	3.3v +/- 9%	
Temperature	**Operating:** **Non-operating:**	14° to 158° F (-10° to 70° C) -40° to 176° F (-40° to 80° C)
Humidity	**Operating:** **Non-operating:**	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	**Operating:** **Non-operating:**	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED White – Radio ON	

Technical Specifications – Networking

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

HP Integrated Module with Bluetooth® 4.0/4.1/4.2 Wireless Technology	
Bluetooth® Specification	4.0/4.1/4.2 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy : 0~79 (1 MHz/CH) BLE : 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy : 3 Mbps data rate; throughput up to 2.17 Mbps
	BLE : 1 Mbps data rate; throughput up to 0.2 Mbps 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.
Receiver Sensitivity Legacy	<table><tr><th>Modulation</th><th>0.01% BER</th><th>0.001% BER</th></tr><tr><td>GFSK</td><td>-80 dBm</td><td>-70 dBm</td></tr><tr><td>π/4-DQPSK</td><td>-80 dBm</td><td>-70 dBm</td></tr><tr><td>8DPSK</td><td>-80 dBm</td><td>-70 dBm</td></tr></table>
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)
Electrical Interface	USB 2.0 compliant
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software
Electrical Interface Bluetooth® Software Supported Security	Point to Point, Multipoint Pico Nets up to 7 slaves
	Full support of Bluetooth® Security Provisions

Technical Specifications – Networking

Power Management Certifications	Microsoft Windows ACPI, and USB Bus Support
	Self-configurable to optimize power conservation in all operating modes, including Standby, Hold, Park, and Sniff
Security	All necessary regulatory approvals for supported countries, including:
Certifications Bluetooth® Profiles Supported	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826
	Low Voltage Directive IEC950
Certifications Bluetooth® Profiles Supported	UL, CSA, and CE Mark
	Serial Port Profile (SPP)[1] Service Discovery Application Profile (SDAP) Dial-Up Networking (DUN)[1,2] Generic Object Exchange Profile (GOEP)[1,2] Object Push Profile (OPP)[1,2] Hard Copy Cable Replacement (HCRP)[1,2] Personal Area Networking Profile (PAN)[1,2] Human Interface Device Profile (HID)[1,2] Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)
	Audio Video Remote Control Profile (AVRCP)
Bluetooth® V4.1/V4.2 support feature	V4.1: ESR5/6/7 compliant
	V4.2: ESR8 compliant, LE Secure Connection – Basic.

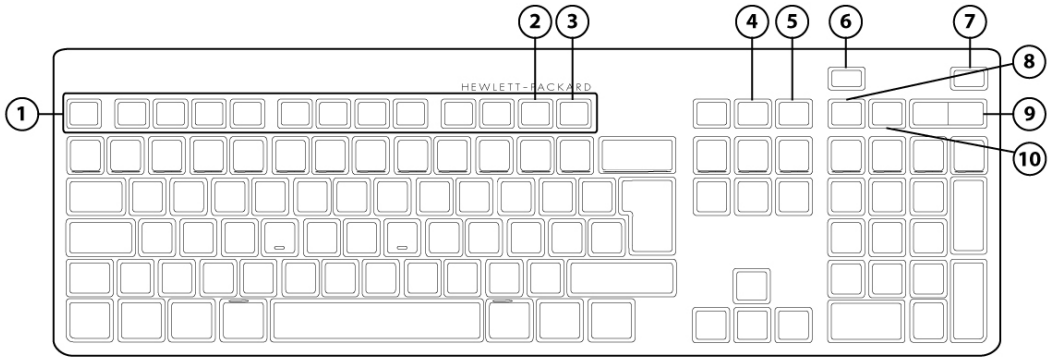
AUDIO

High Definition Audio – MT/SFF/DM

Type	Integrated
HD Stereo Codec	Conexant CX20632
Audio I/O Ports	Headset connector supports a CTIA style headset and is re-taskable as a Line-in, Line-out, Microphone-in or Headphone-out port
	Rear Line-In can be retasked to function as a microphone input
	Rear Line-Out
	Front Headphone-Out
	All ports are 3.5mm and support stereo (see above tables for system configurations)
Internal Speaker Amplifier	2W class D mono amplifier for the internal speaker only. External speakers must be powered externally.
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 Mono Speaker	Yes

INPUT/OUTPUT DEVICES

HP Conferencing Keyboard



1.	Function Keys	**6.**	End/Decline a Call
2.	F11 Lync or Skype for Business Contact list *	**7.**	Answer a Call
3.	F12 Lync or Skype for Business Calendar **	**8.**	Microphone Mute
4.	Share Screen	**9.**	Volume Up/Down
5.	Stop Webcam	**10.**	Audio Mute
*Microsoft Lync 2013, or Skype for Business, or Microsoft Outlook 2013 Contact list			
**Microsoft Lync 2013, or Skype for Business, or Microsoft Outlook 2013 Calendar			

Dimensions (H x L x W)	0.85 x 17.34 x 6.10 in (2.16 x 44.05 x 15.50 cm)
Weight	24.69 oz. (700 g)
Connectivity	USB cable
Keys	110 (US) Layout, 111 (EU) Layout – depending upon country
Feature Summary	Full-size ultra-quiet keyboard with numerical pad and 12 function keys One-touch simplicity for Microsoft Lync or Skype for Business calls with dedicated keys and LED light indicators
Illuminated keys	Incoming Call – Blinks Green Call in progress –Green Microphone Mute – Orange Audio Mute – Orange

	Screen Sharing – Orange Stop Webcam – Orange
Other Call control keys	End/Decline Call Volume up and down rocker key
Microsoft Lync/Outlook	Fn+F12 – Lync or Skype for Business Calendar will open. If Lync or Skype for Business is not available will bring Outlook Calendar * Fn+F11 – Lync or Skype for Business Contact will open. If Lync or Skype for Business is not available will bring Outlook Contact list * * Fn+11 and Fn+12 function keys are not supported in Microsoft Windows 8.x Metro mode
Functions Keys	Fn+F10 – System Settings Fn+F9 – Devices Fn+F8 – Search Fn+F7 – Blank Fn+F6 – Up Brightness Adjustment Fn+F5 – Down Brightness Adjustment Fn+F4 – Display Options Fn+F3 – File Explorer Fn+F2 – System Lock Fn+F1 – System Sleep
System requirements	Available USB port Windows 7, Windows 8.x, and Windows 10 Server: Microsoft Lync Server 2010 or 2013 and Skype for Business Server 2015 Client: Microsoft Lync 2013 version 15.0.46xx or newer or Skype for Business Notes: • Limited support for Microsoft Lync 2010, Microsoft Lync 2013 Basic and Microsoft Metro Mode • Screen brightness functions supported in select HP systems
Approvals **EMC** **Product Safety**	FCC; CE; ACA(C-tick); EAC UL, CE Mark

HP USB PS/2 Washable Keyboard		
Physical Characteristics	Keys	104 (US) Layout, 105 (EU) layout – depending upon country
	Dimensions (L x W x H)	17.67x 6.62 x 1.38 in (449 x 168 x 35 mm)
	Weight	1.7 lb (0.77 kg) minimum
Electrical	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)

Technical Specifications – Input/Output Devices

	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge
	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC 99 - 2001	Functionally compliant
Mechanical	Keycaps	Stepped -profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	7 ft (2.2 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	Acoustics	43-dBA maximum sound pressure level
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	4° to 149° F (-20° to 65° C)
	Operating humidity	10% to 95% (non-condensing at ambient)
	Non-operating humidity	0% 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
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	42 in (107 cm) on concrete, 16-drop sequence
Operating system support	Windows® 7, Windows Vista, Windows XP Professional	
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP USB Business Slim Smartcard Keyboard		
Physical Characteristics	Keys	104, 105, 109 layout (depending upon country
	Dimensions (H x W x D)	17.34 x 5.68 x 0.78 in (440.6 x 14.45 x 1.98 cm)
	Weight	1.32 lb (0.6± 0.1 kg)
Electrical	Operating voltage	5V
	Power consumption	200 mA
	System interface	USB Interface
	ESD	Air 12.5kV / Contact 8kV
	EMI - RFI	under 3dB
	Microsoft PC 99 - 2001	Conforms to FCC rules for a Class B computing device

Technical Specifications – Input/Output Devices

Mechanical	Keycaps	Low-profile design	
	Switch actuation	60±15g 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	
SmartCard Function	Support	All ISO 7816 smart cards	
	Interface	Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1)	
	Chipset	IDENTIVE CLOUD 2190 F	
	Standard APIs supported	PC/SC, EMV2000, CT-API	
	Power	USB Port	
		Short circuit detection (protects smart card and reader)	
		Power supply compliant with ISO7816 and EMV (5V, 60 mA)	
		Supports 3-V and 5-V cards	
	Power consumption	100-mA maximum draw	
	Communication	From card	9600 bps to 330,000 bps
		From computer	12 Mbps (USB transfer speed)
	Landing mechanism	Contact device	Friction contact
		Card insertions rating	Up to 100,000 insertion cycles
	Interface modes	CCID protocol	
	Reader performance interface	USB connection	
	Electro-magnetic standards	Europe	2004/108/EC
		USA	USAFCC part 15
Approvals	CE Marking; TUV; EAC; FCC; cULus/CSAus; ICES; RCM; VCCI; KCC; BSMI		
Ergonomic Compliance	ISO 9241-410, TUV GS		
Kit Contents	Keyboard, I/O Security and Documentation CD, warranty card		

HP USB Business Slim Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)

Technical Specifications – Input/Output Devices

	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 Type A plug connector
	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
	Microsoft® PC 99 - 2001	Functionally compliant
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)
	Microsoft PC 99 - 2001	Mechanically compliant
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, 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 PS/2 Business Slim 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 (600± 80 g)
Electrical	Operating voltage	+ 4.4 – 5.25VDC
	Power consumption	50-mA maximum (with 5 VDC power supplied and three LEDs ON)
	System interface	PS/2 6-pin mini din connector
	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
	Microsoft PC 99 - 2001	Functionally compliant
	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

Technical Specifications – Input/Output Devices

	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
	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	N/A
	Non-operating shock	65 inch 2.9 ms, six surface; 30g 266 inch/second; 50g 266 inch/second six surface
	Operating vibration	2-g peak acceleration
	Non-operating vibration	Starting at 5 Hz, vary the frequency of vibration from 5 to 500 Hz and back to 5 Hz at a Logarithmic sweep rate of 1 octave per minute.
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	29.93 in (76 cm) on concrete, 16-drop sequence
Approvals	UL, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

HP USB (Grey) Business Slim Keyboard

Physical characteristics	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	17.19 x 5.41 x 0.82 in (43.68±1.5 x 13.76±1.0 x 2.1 ±1.0 cm)
	Weight	1.32 lb (0.6± 0.08 kg)
Electrical	Operating voltage	+ 4.4 – 5.25VDC
	Power consumption	100-mA maximum (with 5 VDC power supplied and three LEDs ON)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 4, 6, 8 KV
	EMI – RFI	Air Discharge: 8, 10, 12 KV / 15 KV
	Microsoft PC 99 – 2001	Conforms to FCC rules for a Class B computing device; Functionally compliant
Mechanical	Keycaps	Low-profile design

Technical Specifications – Input/Output Devices

	Switch actuation	Rubber dome + membrane
	Switch life	10 million
	Switch type	Rubber dome
	Key-leveling mechanisms	Link bar
	Cable length	For all double-wide and greater-length keys
	Microsoft PC 99 – 2001	Yes
Environmental	Acoustics	55-dBA maximum sound pressure level
	Operating temperature	10°C to 50°
	Non-operating temperature	-30°C to 90°
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	60% 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	FCC; CE; VCCI; BSMI; KC; EAC; RCM; TUV-GS; UL; RoHS; WEEE	
Ergonomic compliance	ANSI HFS 100; ISO 9241-4; and TUVGS	

HP Wireless Business Slim Keyboard and Mouse

Keyboard	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 – Without Two AA Alkaline Batteries	1.23 lb (560± 80 g)
Mouse	Dimensions (H x L x W)	1.46 x 4.53 x 2.47 in (37 x 115 x 62.9 mm)
	Weight – Without Two AA Alkaline Batteries	0.15 lb (67 g)
Receiver	Dimensions (H x L x W)	0.33x 1.79 x 0.72 in (8.4 x 45.5 x 18.4 mm)
	Weight	0.21 oz (5.9 g)
	Cable Length – Minimum	6 ft (1.8 m)
	Range	32.8 ft (10 m)
System Requirements	Available USB port for the receiver CD-ROM Drive *This system may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.	
Approvals	Product Safety	UL; CSA /TUV (Europe only); CE Mark; CB Report
	Ergonomics	ANSI; ISO (Europe only); GS Mark (Germany only)

	EMC	FCC; CE; ACA (-tick); BSMI; KC ; VCCI
	CE Mark	EN 55022:2010; EN 55024; EN 301489-1; EN 61000
	Design Guidelines for PCs	PC 99 – connector overmold colors; PC 2001 – full functionality
	Telecom	All local telecom requirements and approvals for intended markets
	USA	FCC Title 47 CFR, Par 15, Subpart C; other local requirements
	Country Support	US, Belgium, Switzerland, Spain, Denmark, Netherlands, France, Germany, Italy, Portugal, Sweden, Norway, Finland, UK, Poland, Czech Republic, Turkey, Greece, Austria, Bulgaria, Cyprus, Estonia, Hungary, Ireland, Latvia, Lithuania, Luxemburg, Malta, Romania, Slovakia, Slovenia, Vietnam, HK, Australia, NZ, Malaysia, Singapore, Indonesia, Philippines, Thailand, Canada, China, Japan, Korea, Taiwan, India, Venezuela, Ecuador, Russia, Ukraine, Israel, Croatia, United Arab Emirates, Peru, Brazil, Chile, Argentina, Mexico, South Africa, and up to 193 countries worldwide.
Environmental	Keyboard contains 25% post-consumer recycled plastic material.	

HP PS/2 Mouse		
Dimensions (H x L x W)	1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm)	
Weight	3.53 oz (100g; +10g/- 5 g)	
Environmental	Operating temperature	-32° to 104°F (0° to 40° C)
	Non-operating temperature	-4° to 140°F (-20° to 60° C)
	Operating humidity	10% to 90% (non condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector

Technical Specifications – Input/Output Devices

	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft PC99 - 2001	Functionally compliant
Mechanical	Resolution	800 DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	±15%
	Switch actuation	65±20 gf
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	80 km
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
Scroll wheel	Width	6 mm
	Diameter	22.5 ± 0.2 mm
	Maximum rotation force	50 gf-cm
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory Approvals	UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick	

HP USB 1000dpi Laser Mouse

Dimensions (H x L x W)	1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm)	
Weight	3.360 oz (102g)	
Cable length	70.9 in (180 cm)	
System requirements	Available USB port	
Environmental	Operating Temperature	32° to 104° F (0° to 40° C)
	Non-operating Temperature	-4° to 140° F (-20° to 60° C)
	Operating Humidity	10% to 90% (non-condensing at ambient)
Mechanical	Resolution	1000dpi
	Tracking Speed	45 cm/sec
	Cable Length	70.9 in (180 cm)

HP USB PS/2 Washable Mouse

Dimensions (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
Weight	4.44 oz (126 g)	
Environmental	Operating temperature	–32° to 104°F (0° to 40° C)

Technical Specifications – Input/Output Devices

	Non-operating temperature	–4° to 140°F (–20° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	10% to 90% (non condensing at ambient)
	Operating shock	40 g, 6 surfaces
	Non-operating shock	80 g, 6 surfaces
	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
	Drop (out of box)	80 cm height onto asphalt tile over concrete or equivalent, 5-drop in 5 direction except the cable face
Electrical	Operating voltage	5 VDC ± 10%
	Power consumption	100mA
	System consumption	PS/2 mini-din connector
	ESD	CE level 4, 15 kV air discharge
	EMI-RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC99 – 2001	Functionally compliant
Mechanical	Resolution	400 ± 20% DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	100 in/s/s (2.54 m/s/s)
	Switch actuation	61 g nominal peak force
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	155 mi (250 km) at average speed of 10 in/s
	Cable length	6 ft (1.8 m)
	Microsoft PC99 – 2001	Mechanically compliant
Scroll wheel	Width	8 mm
	Diameter	1.01 in (25.6 mm)
	Maximum rotation speed	48 rats/sec
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
Regulatory approvals	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

HP USB Hardened Mouse	
Mouse Type	Wired optical mouse
Interface	USB 2.0
Dimensions (H x L x W)	114.97 x 62.92 x 37.3 mm (+/-0.3 mm) (11.49 x 6.29 x 1.46 in)

Technical Specifications – Input/Output Devices

Weight	92 g (+/-10 g) (3.2 oz)		
Cable length	1.8 M		
Tracking	X-Y Positioning	X-Y Wheel Resolution	1000 DPI
		Tracking Speed	Up to 30 in/sec in either X or Y direction
	Z Axis Wheel	Z Wheel Revolution	24 counts per revolution
		Tracking Speed	0 ~ 120 rpm
Environmental	Operating temperature	0° - 40°C	
	Non-operating temperature	-40° - 65°C	
	Operating humidity	90%	
	Agency Approvals	CE FCC RCM VCCI EMC EAC BSMI UL ICES-003 Class B KCC TUV/GS	
Electrical	Input Voltage & Current	4.4 ~ 5.25 VDC / 100 mA	
	Power Consumption	Under nominal 5 VDC power supplied, max current consumption is 100mA with tracking speed up to 30 in/sec	
Color	Black		
System requirements	Windows 10, Windows 8.1 32/64bit, Windows 7 32/64bit		

HP Grey V2 Mouse		
Dimensions (H x L x W)	1.46 x 4.53 x 2.48 in (3.72 x 11.5 x 6.29 cm) ±1 mm	
Weight	3.53 oz (100g; +10g/- 5 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, 6 surfaces
	Non-operating shock	80 g, 6 surfaces

Technical Specifications – Input/Output Devices

	Operating vibration	2 g peak acceleration
	Non-operating vibration	4 g peak acceleration
Electrical	Operating voltage	4.75~5.25 Vdc
	Power consumption (typical)	10mA
Mechanical	Connector	USB 2.0
	Type	3D mouse (3 keys and wheel)
	Resolution	800 DPI
	Sensor	PixArt vendor Optical USB mouse sensor. DIP
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s2
	Cable length	6 ft (1.8 m)
Color	Grey	
Regulatory Approvals	FCC, CE, ICES, C-TICK, VCCI, KCC, BSMI, ISO9241, Part 4, Computer Work Station Ergonomics compliance, IEC 801-2, IEC 1000-4-2, EN 55024:1998 + A1:2001 + A2:2003, European Standard EN 55022: 2006 Class B, CE Mark	

HP USB Mouse		
Dimensions (H x L x W)	2.5 x 4.5 x 1.5 in (63.5 x 114.3 x 38.1 mm)	
Weight	0.22 lb (99.79 g)	
Color	Black	
Connector	USB	
Mechanical	Resolution	800 DPI sensitivity
	Buttons	Two primary buttons and clickable scroll wheel

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 adapter 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:
  - 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 http://hp.com/go/techcenter/pcdiags
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- BIOS recovery files are maintained on the local OS drive when updating with HP BIOS Update and Recovery utility (HPBIOSUPDREC)
- 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
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- CD & Diskette Removal

- Tool icon for easy Identification

ADDITIONAL FEATURES

	Description
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.
Boot Sectors Protection	MBR or GPT boot sectors of the hard drive are critical to securely starting the operating system. By saving the MBR or GPT data (depending on the how the OS was installed), the BIOS will be able to monitor for changes and allow the user to override them with the backup copy at boot-up.
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
SMART Technology (Self-Monitoring, Analysis and Reporting Technology)	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 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 Detects errors in Read/Write buffers on HDD cache RAM
SMART IV - End-to-End CRC for hard drives	Interface in F10 setup provides confirmation of SMART IV support.

After-Market Options (availability may vary by region)

Business Monitors (sample list)*	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**	**Part Number**
HP ProDisplay P240va 23.8-inch Monitor	X	X	X	X	N3H14AA
HP ProDisplay P232 23-inch Monitor	X	X	X	X	K7X31AA
HP ProDisplay P222c 21.5-inch Video Conferencing Monitor	X	X	X	X	L4J08AA

*Additional models are available.

Communication Devices	**400 G3 DM**	**400 G4SFF**	**400 G4 MT**	**480 G4 MT**	**Part Number**
Intel® Ethernet I210 - T1 Gbe NIC		X	X	X	E0X95AA
Intel® 7265 802.11ac 2x2 DualBand Combo PCIe x1 Card		X	X	X	N4G85AA

Graphics Solutions	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**	**Part Number**
NVIDIA® GeForce® GT 730 2GB DP PCIe x8 Card		X	X	X	Z9H51AA
AMD® Radeon™ R7 450 4GB PCIe x16 Card			X	X	Z9H52AA
HP UHD USB Graphics Adapter	X	X	X	X	N2U81AA
HP DisplayPort™ Cable Kit	X	X	X	X	VN567AA
HP DisplayPort™ To DVI-D Adapter	X	X	X	X	FH973AA
HP DisplayPort™ To VGA Adapter	X	X	X	X	AS615AA
HP DisplayPort™ To HDMI 4k Adapter	X	X	X	X	K2K92AA
HP DVI to DVI Cable	X	X	X	X	DC198A
HP (Bulk) 700mm DisplayPort™ Cable Kit	X	X	X	X	V8Y77A6

Data Storage Drives	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**	**Part Number**
HP 500GB 7200PRM SATA 6.0Gb/s 3.5” Hard Drive		X	X	X	QK554AA
HP 1TB 7200rpm SATA 6Gb/s 3.5” Hard Drive		X	X	X	QK555AA
HP 256GB SATA TLC Solid State Drive	X	X	X	X	P1N68AA
HP 512GB Turbo Drive G2 TLC M.2 SSD Drive	X	X	X	X	X8U75AA
HP 9.5mm Slim Removable SATA 500GB		X	X	X	T7G14AA
HP 256GB SATA Non-SED Solid State Drive	X	X	X	X	W0U55AA
HP 9.5mm G3 8/4 SFF G4 400 SFF/MT DVD-Writer		X	X	X	1CA53AA

Input Devices	**400 G3 DM**	**400 G4 SFF**	**400 G4 MT**	**480 G4 MT**	**Part Number**
HP Conferencing Keyboard	X	X	X	X	K8P74AA
HP USB Business Slim Keyboard	X	X	X	X	N3R87AA
HP PS/2 Business Slim Keyboard	X	X	X	X	N3R86AA
HP Wireless Business Slim Keyboard and Mouse**	X	X	X	X	QY449AA
HP USB Business Slim Grey Keyboard (EMEA only)	X	X	X	X	Z9H49AA
HP USB Business Slim Smart Card CCID Keyboard	X	X	X	X	Z9H48AA
HP USB PS/2 Washable Keyboard and Mouse Kit**	X	X	X	X	BU207AA
HP USB Grey V2 Mouse (EMEA only)	X	X	X	X	Z9H74AA
HP USB Business Slim Keyboard and Mouse (China Only)	X	X	X	X	Z9H50AA

After-Market Options (availability may vary by region)

HP USB Hardened Mouse	X	X	X	X	P1N77AA
HP PS/2 Mouse (Expansion module required for use with DM)	X	X	X	X	QY775AA
HP USB Mouse	X	X	X	X	QY777AA
HP USB 1000dpi Laser Mouse	X	X	X	X	QY778AA

** Keyboard contains 25% post-consumer recycled plastic material

Desktop Mini Accessories	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT	Part Number
HP Desktop Mini DVD Super Multi-Writer ODD Expansion Module	X				K9Q83AA
HP Desktop Mini 500GB HDD/ I/O Expansion Module	X				K9Q82AA
HP Desktop Mini Rack Mount Tray Kit	X				G1K21AA
HP Desktop Mini Security/Dual VESA Sleeve	X				G1K22AA
HP Desktop Mini 65W Power Supply Kit	X				L2X04AA
HP Desktop Mini 90W Power Supply Kit	X				L4R65AA
HP Desktop Mini Vertical Chassis Stand	X				G1K23AA
HP Desktop Mini Lock Box	X				P1N78AA
HP Desktop Mini Port Cover Kit	X				P3R65AA
HP Desktop Mini I/O Expansion Module	X				K9Q84AA
HP Integrated Work Center Desktop Mini/Thin Clients	X				G1V61AA
HP Single Monitor Arm	X				BT861AA
HP Quick Release Bracket	X				EM870AA

System Memory	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT	Part Number
HP 4GB DDR4-2400 DIMM		X	X	X	Z9H59AA
HP 8GB DDR4-2400 DIMM		X	X	X	Z9H60AA
HP 16GB DDR4-2400 DIMM		X	X	X	Z9H57AA
HP 4GB DDR4-2400 SODIMM	X				Z9H55AA
HP 8GB DDR4-2400 SODIMM	X				Z9H56AA
HP 16GB DDR4-2400 SODIMM	X				Z9H53AA

Multimedia Devices	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT	Part Number
HP Business Headset v2	X	X	X	X	T4E61AA
HP USB Business Speakers v2	X	X	X	X	N3R89AA

Security Devices	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT	Part Number
HP Business PC Security Lock v2 Kit		X	X	X	N3R93AA
HP Keyed Cable Lock 10mm Kit	X	X	X	X	T1A62AA
HP Dual Head Keyed Cable Lock Kit	X	X	X	X	T1A64AA

Stands and Accessories	400 G3 DM	400 G4 SFF	400 G4 MT	480 G4 MT	Part Number

After-Market Options (availability may vary by region)

HP (10) 400 G4 600/800 G3 SFF G4 MT Bezel Support Kit		X	X		Z9H64A6
HP Single Monitor Arm	X	X	X	X	BT861AA

LANDesk Software (E-Delivery)*

*Optional and sold separately.

After-Market Options (availability may vary by region)

Change Log

Date of change:	Version History:	Action	Description of change:
January 25, 2017	Version 1 to 2	Launch	QS launched