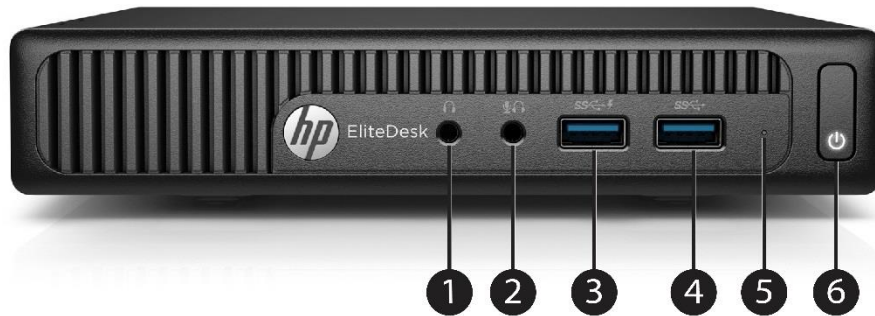


### Overview

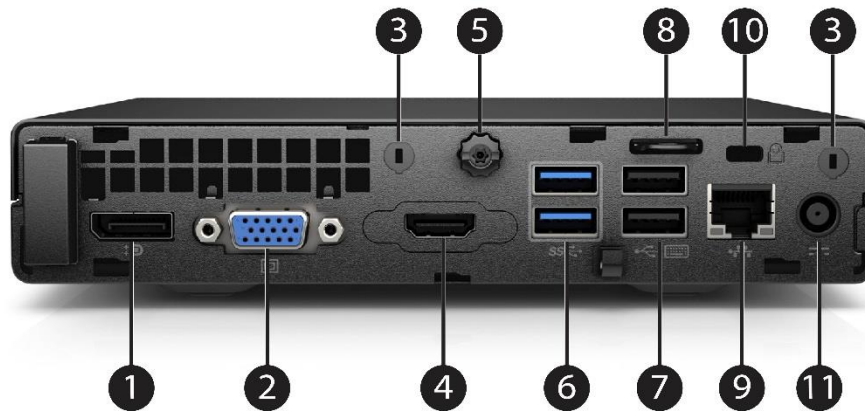
### HP EliteDesk 705 G3 Desktop Mini Business PC



- |  |                              |
|--|------------------------------|
| 1. Headphone connector   | 4. USB 3.1 Gen 1             |
| 2. Microphone or headphone connector (software selectable, default mode is microphone) | 5. Hard drive activity light |
| 3. USB 3.1 Gen 1 - charging  | 6. Dual-state power button   |

### Overview

### HP EliteDesk 705 G3 Desktop Mini Business PC



1. DisplayPort™ monitor connector
2. VGA monitor connector
3. (2) External antenna connector
4. Choice of DisplayPort™ (shown), HDMI, or Serial Connector
5. Thumbscrew (for serviceability)
6. (2) USB 3.1 Gen 1 ports (blue)
7. (2) USB 2.0 ports (black), allows for wake from S4 with keyboard/mouse when connected and enabled in BIOS.
8. Padlock loop
9. RJ-45 network connector
10. Cable lock slot
11. Power

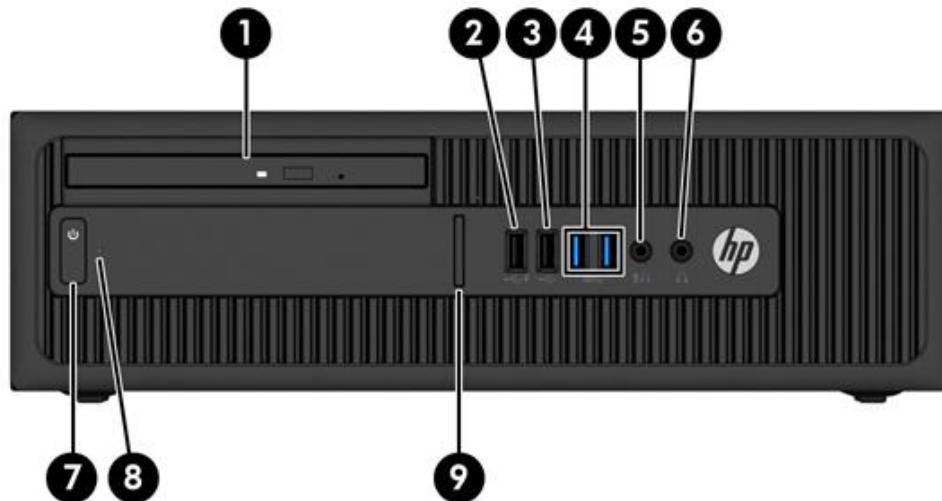
#### \*Optional

##### Not Shown

- Slots (1) internal M.2 PCIe x1 connector for optional wireless NIC  
(1) internal M.2 PCIe x4 connector for optional SSD drive
- Bays (1) 2.5" internal storage drive bay
- VESA Support for VESA 100 mounting system on bottom of PC chassis

### Overview

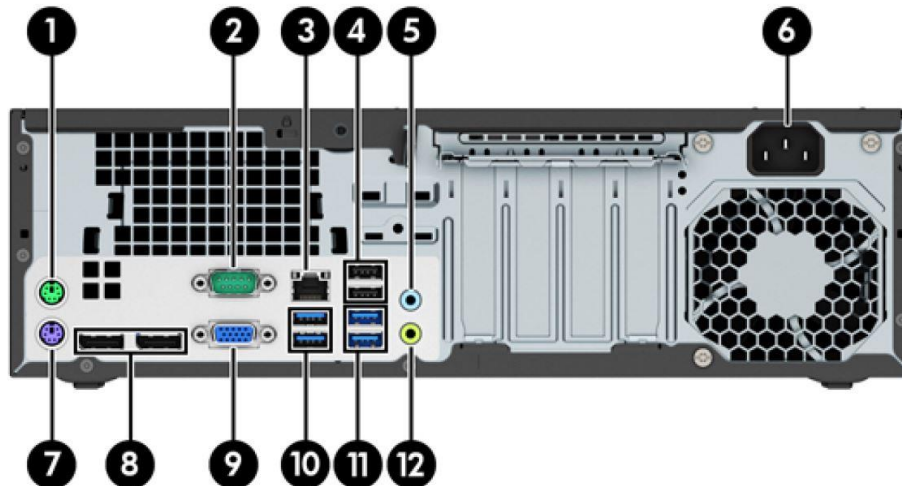
#### HP EliteDesk 705 G3 Small Form Factor Business PC



1. 9.5mm slim optical drive (optional)
2. USB 2.0 fast charging port (black)
3. USB 2.0 port (black)
4. (2) USB 3.1 Gen 1 ports (blue)
5. Microphone/headphone connector
6. Headphone connector
7. Dual-state power button
8. Hard drive activity light
9. SD 4 card reader (optional)

### Overview

### HP EliteDesk 705 G3 Small Form Factor Business PC



- |   |  |
|---|--|
| 1. PS/2 Mouse connector (green)   | 7. PS/2 Keyboard connector (purple)                      |
| 2. Serial port  | 8. (2) DisplayPort™ monitor connectors*                  |
| 3. RJ-45 network connector  | 9. VGA monitor connector*                                |
| 4. (2) USB 2.0 ports (black), allows for wake from S4 with keyboard/mouse when connected and enabled in BIOS. | 10. (2) USB 3.1 Gen 2 ports (blue)                       |
| 5. Line-in audio connector (blue)   | 11. (2) USB 3.1 Gen 1 ports (blue)                       |
| 6. Power cord connector   | 12. Line-out connector for powered audio devices (green) |

\*Two (2) DisplayPort monitor connectors and one (1) VGA monitor connector will not be functional when Ryzen PRO CPU is selected.

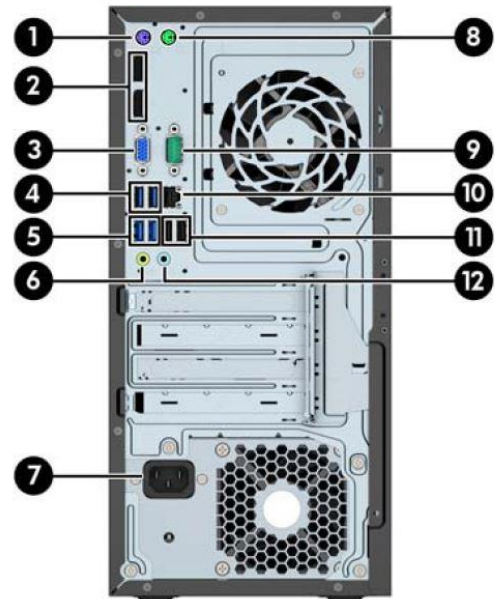
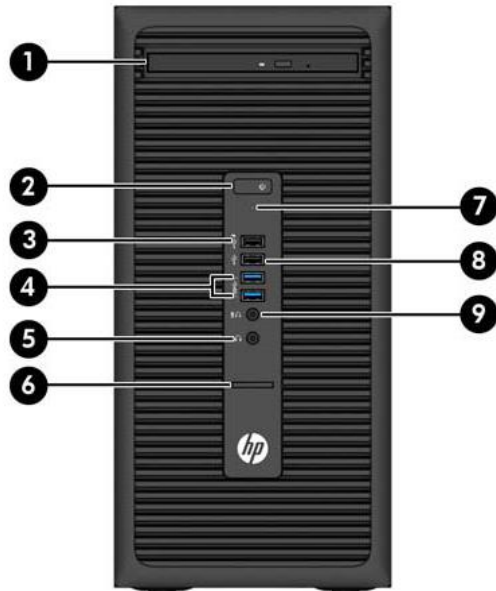
**NOTE:** An optional second serial port and an optional parallel port are available from HP.

#### Not Shown

- |       |  |
|-------|--|
| Slots | (2) PCI Express x16 graphics connectors; one wired as an x8; the other wired as an x4<br>(2) PCI Express x1 accessory connectors |
| Bays  | (1) 2.5" internal storage drive bay<br>(2) 3.5" internal storage drive bay   |

### Overview

#### HP EliteDesk 705 G3 Microtower Business PC



1. 9.5mm slim optical drive (optional)
2. Dual-state power button
3. USB 2.0 fast charging port (black)
4. (2) USB 3.1 Gen 1 ports (blue)
5. Headphone connector
6. SD 4 card reader (optional)
7. Hard drive activity light
8. USB 2.0 port (black)
9. Microphone/headphone connector

**NOTE:** An optional second serial port and an optional parallel port are available from HP.

1. PS/2 Keyboard connector (purple)
2. (2) DisplayPort™ Monitor connectors
3. VGA monitor connector
4. (2) USB 3.1 Gen 2 ports (blue)
5. (2) USB 3.1 Gen 1 ports (blue)
6. Line-out connector for powered audio devices (green)
7. Power cord connector
8. PS/2 Mouse connector (green)
9. Serial connector
10. RJ-45 network connector
11. (2) USB 2.0 ports (black), allows for wake from S4 with keyboard/mouse when connected and enabled in BIOS.
12. Line-in audio connector (blue)

#### Not Shown

- Slots** (2) PCI Express x16 graphics connectors; one wired as an x8; the other wired as an x4  
 (2) PCI Express x1 accessory connectors
- Bays** (2) 3.5" internal storage drive bays

Standard Features and Configurable Components (availability may vary by country)

### At A Glance

- Choice of form factors: Desktop Mini, Small Form Factor and Microtower
- Latest 7th generation of AMD Pro A-Series APU<sup>4</sup>
- 6th generation of AMD Pro A-Series APU<sup>4</sup> (MT/SFF)
- PC chassis and all internal components and modules are manufactured with low halogen content
- HP developed and engineered UEFI BIOS supporting security, manageability and software image stability
- DDR4 Synchronous Dynamic Random Access Memory (SDRAM)
- Processor support up to 65W (MT/SFF)
- Multi-independent monitor support via VGA, HDMI (DM only), and dual digital DisplayPort video interfaces with multi-stream<sup>1</sup>
- DTS Studio Sound™ audio management software<sup>2</sup>
- Standard and high efficiency energy saving power supply options
- SFF and MT models can be configured with dual data drives in a RAID (limited configurations)
- ENERGY STAR® certified and certified EPEAT® Gold models
- Low halogen<sup>3</sup>
- Arsenic-free
- Lengthy purchase lifecycles and image stability

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

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

2. For DTS patents, see <http://patents.dts.com>. Manufactured under license from DTS Licensing Limited. DTS, the Symbol, & DTS and the Symbol together are registered trademarks, and DTS Studio Sound is a trademark of DTS, Inc. © DTS, Inc. All Rights Reserved.

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

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

Standard Features and Configurable Components (availability may vary by country)

### OPERATING SYSTEMS

#### Preinstalled

Windows 10 Pro 64<sup>1</sup>

Windows 10 Pro 64 (National Academic License)<sup>3</sup>

Windows 10 Home 64<sup>1</sup>

Windows 10 Home Single Language 64<sup>1</sup>

Windows 7 Professional 64 (available through downgrade rights from Windows 10 Pro) (not available with 7<sup>th</sup> generation of AMD Pro A-Series APU) and Ryzen Pro Series<sup>2,4</sup>

#### Pre-installed (Other)

FreeDOS 2.0

#### Web-supported

Windows 10 Enterprise 64<sup>1</sup>

Windows 7 Enterprise 64<sup>4</sup>

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 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 Carrizo DDR4 (AMD) processors and Skylake (Intel) processors.

### CHIPSET

AMD® B350 FCH (MT/SFF)

AMD® B300 FCH (DM)

Standard Features and Configurable Components (availability may vary by country)

### PROCESSORS – AMD® Ryzen™ \*, \*\*, \*\*\*

#### AMD® Ryzen™ 7 PRO 1700X Processor\*, \*\*, \*\*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® Ryzen™ 7 PRO 1700X Eight-Core CPU 95W Up to 3.8 GHz Max Boost Frequency (3.4 GHz base frequency) 4MB L2 Cache / 16MB L3 Cache, 8 cores, 16 Threads Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

#### MT & SFF

#### DM

#### AMD® Ryzen™ 5 PRO 1600 Processor\*, \*\*, \*\*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® Ryzen™ 5 PRO 1600 Six-Core CPU 65W Up to 3.6 GHz Max Boost Frequency (3.2 GHz base frequency) 19 MB Cache 6 cores, 12 Threads Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

#### MT & SFF

#### DM

#### AMD® Ryzen™ 5 PRO 1500 Processor\*, \*\*, \*\*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® Ryzen™ 5 PRO 1500 Quad-Core CPU 65W Up to 3.7 GHz Max Boost Frequency (3.5 GHz base frequency) 2MB L2 Cache / 16MB L3 Cache, 4 cores, 8 Threads Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

#### MT & SFF

#### DM

#### AMD® Ryzen™ 3 PRO 1300 Processor\*, \*\*, \*\*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® Ryzen™ 3 PRO 1300 Quad-Core CPU 65W Up to 3.7 GHz Max Boost Frequency (3.5 GHz base frequency) 2MB L2 Cache / 8MB L3 Cache, 4 cores, 8 Threads Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

#### MT & SFF

#### DM

#### AMD® Ryzen™ 3 PRO 1200 Processor\*, \*\*, \*\*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® Ryzen™ 3 PRO 1200 Quad-Core CPU 65W Up to 3.4 GHz Max Boost Frequency (3.1 GHz base frequency) 2MB L2 Cache / 8MB L3 Cache, 4 cores, 4 Threads Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

### PROCESSORS – 7<sup>th</sup> generation of AMD® Pro A-Series APU\*, \*\*

#### AMD® PRO A12 APU with AMD® Radeon™ R7 HD Graphics\*, \*\*

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A12-9800 with AMD® Radeon™ R7 Graphics 65W Up to 4.2 GHz Max Boost Frequency (3.8 GHz base frequency) 2 MB L2 Cache, 4 cores, 8 Radeon™ Cores Discrete-Class Graphics	X	



### Standard Features and Configurable Components (availability may vary by country)

	<u>MT &amp; SFF</u>	<u>DM</u>
Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies		
<b>AMD® PRO A12-9800E with AMD® Radeon™ R7 Graphics</b> 35W Up to 3.8 GHz Max. Boost Frequency (3.1 GHz base frequency) 2 MB L2 Cache, 4 cores, 8 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies		X
<b>AMD® PRO A10 APU with AMD® Radeon™ R7 HD Graphics* **</b>	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A10-9700 Accelerated Processor with AMD® Radeon™ R7 Graphics 65W Up to 3.8 GHz Max Boost Frequency (3.5 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	
<b>AMD® PRO A10-9700E Accelerated Processor with AMD® Radeon™ R7 Graphics</b> 35W Up to 3.5 GHz Max Boost Frequency (3.0 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	<u>MT &amp; SFF</u>	<u>DM</u>
		X
<b>AMD® PRO A8 APU with AMD® Radeon™ R7 HD Graphics* **</b>	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A8-9600 with AMD® Radeon™ R7 Graphics 65W Up to 3.4 GHz Max Boost Frequency (3.1 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	
<b>AMD® PRO A6 APU with AMD® Radeon™ R5 HD Graphics* **</b>	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A6-9500 with AMD® Radeon™ R5 Graphics 65W Up to 3.8 GHz Max Boost Frequency (3.5 GHz base frequency) 1 MB L2 cache, 2 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	
<b>AMD® PRO A6-9500E with AMD® Radeon R5 Series</b> 35W Up to 3.4 GHz Max. Boost Frequency (3.0 GHz base frequency) 1 MB L2 Cache, 2 cores, 4 Radeon™ Cores	<u>MT &amp; SFF</u>	<u>DM</u>
		X

Standard Features and Configurable Components (availability may vary by country)

Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies		
--	--	--

### PROCESSORS - 6<sup>th</sup> generation of AMD® Pro A-Series APU\*, \*\*

AMD® PRO A12 APU with AMD® Radeon™ R7 HD Graphics*, **	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A12-8870 with AMD® Radeon™ R7 Graphics 65W Up to 4.2 GHz Max Boost Frequency (3.7 GHz base frequency) 2 MB L2 Cache, 4 cores, 8 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A12-8870E with AMD® Radeon™ R7 Graphics 35W Up to 3.8 GHz Max Boost Frequency (2.9 GHz base frequency) 2 MB L2 Cache, 4 cores, 8 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.1 Technologies		X

AMD® A10 PRO APU with AMD® Radeon™ R7 HD Graphics*, **	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A10-8770 with AMD® Radeon™ R7 Graphics 65W Up to 3.8 GHz Max Boost Frequency (3.5 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A10-8770E with AMD® Radeon™ R7 Graphics 35W Up to 3.5 GHz Max Boost Frequency (2.8 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.1 Technologies		X

AMD® PRO A8-8670E with AMD® Radeon™ R7 Graphics *, **	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A8-8670E with AMD® Radeon™ R7 Graphics 35W Up to 3.3 GHz Max Boost Frequency (2.8 GHz base frequency) 2 MB L2 cache, 4 cores, 6 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.1 Technologies		X

### Standard Features and Configurable Components (availability may vary by country)

#### AMD PRO A6-8580 APU with Radeon™ R5 Graphics

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD PRO A6-8580 APU with Radeon™ R5 Graphics 3.8 GHz base frequency, up to 4.0 GHz burst frequency, 1 MB cache, 2 cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.2 Technologies	X	

	<u>MT &amp; SFF</u>	<u>DM</u>
AMD® PRO A6-8570E with AMD® Radeon™ R5 Graphics 35W Up to 3.4 GHz Max Boost Frequency (3.0 GHz base frequency) 1 MB L2 cache, 2 cores, 4 Radeon™ Cores Discrete-Class Graphics Supports DDR4 memory up to 2400 MT/s data rate Supports AMD® DASH 1.1 Technologies		<u>X</u>

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

\*\*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>

\*\*\*AMD Ryzen PRO CPU requires discrete graphic card attached.

Standard Features and Configurable Components (availability may vary by country)

### MEMORY\*

Form Factor	Type	Maximum	# of Slots
Small Form Factor	DDR4-2400 (Transfer rates up to 2400 MT/s)	64 GB	4 DIMM
Microtower	DDR4-2400 (Transfer rates up to 2400 MT/s)	64 GB	4 DIMM
Desktop Mini	DDR4-2400 (Transfer rates up to 2400 MT/s)	32 GB	2 SODIMM

\* 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

	<u>SFF</u>	<u>MT</u>	<u>DM</u>
1TB SATA			X
500GB SATA			X
500GB SATA 2nd			X

#### 3.5" SATA 7.2k RPM Hard Disk Drives

	<u>SFF</u>	<u>MT</u>	<u>DM</u>
500GB 7200RPM 3.5in	X	X	
500GB 7200RPM 3.5in 2nd	X	X	
1TB 7200RPM 3.5in	X	X	
1TB 7200RPM 3.5in 2nd	X	X	
2TB 7200RPM 3.5in	X	X	
2TB 7200RPM 3.5in 2nd	X	X	

#### 2.5 inch Solid State Hybrid Drives (SSHD)

	<u>SFF</u>	<u>MT</u>	<u>DM</u>
1TB 5400RPM 2.5in 8GB Hybrid	X	X	X
1TB 5400RPM 2.5in 8GB Hybrid 2nd			X
500GB 5400RPM 2.5" 8GB Hybrid	X	X	X
500GB 5400RPM 2.5" 8GB Hybrid 2nd	X	X	X

#### 3.5 inch Solid State Hybrid Drives (SSHD)

	<u>SFF</u>	<u>MT</u>	<u>DM</u>
1TB 7200RPM 3.5in SSHD (SSHD)	X	X	
1TB 7200RPM 3.5in 2nd SSHD (SSHD)	X	X	

### Standard Features and Configurable Components (availability may vary by country)

#### 2.5 inch Self-encrypting Drives (SED)

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
500GB 5400RPM 2.5in Federal Information Processing Standard (FIPS) SED	X	X	
500GB 5400RPM 2.5in Federal Information Processing Standard (FIPS) SED 2nd	X	X	X
500GB 7200RPM 2.5in SED OPAL2	X	X	X
500GB 7200RPM 2.5in SED OPAL2 2nd	X	X	
256GB SED SSD Opal 2 Drive	X	X	
256GB SED SSD Opal 2 Drive 2nd	X	X	
512GB SED SSD Opal 2 Drive	X	X	X
512GB SED SSD Opal 2 Drive 2nd	X	X	X
Intel Pro 5400s 240GB SED Opal2 SSD drive	X	X	
Intel Pro 5400s 240GB SED Opal2 SSD drive 2nd	X	X	
512GB SATA SED SSD OPAL2 TLC			X

\*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.

\*\*NOTE: Desktop Mini 2nd HDD only available when 1ststorage drive is M2 drive.

#### HP Turbo Drive G2 SSD Drives

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP 128GB Turbo Drive G2 PCIe SSD Drive	X	X	
HP 256GB Turbo Drive G2 PCIe SSD Drive	X	X	
HP 512GB Turbo Drive G2 PCIe SSD Drive	X	X	
HP 256GB Turbo Drive G2 TLC SSD-PCIe Drive	X	X	
HP 512GB Turbo Drive G2 TLC SSD PCIe Drive	X	X	
HP 128GB Turbo Drive G2 SSD M.2 Drive			X
HP 256GB Turbo Drive G2 SSD M.2 Drive			X
HP 512GB Turbo Drive G2 SSD M.2 Drive			X
HP 256GB Turbo Drive G2 TLC SSD M.2 Drive			X
HP 512GB Turbo Drive G2 TLC SSD M.2 Drive			X

#### 2.5 SATA SSD Drives

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP Value 128GB SSD Drive	X	X	X
HP Value 128GB SSD Drive 2nd	X	X	X
HP Value 256GB SSD Drive	X	X	X
HP Value 256GB SSD Drive 2nd	X	X	X
Intel Pro 5400s 240GB SSD Drive	X	X	X
Intel Pro 5400s 240GB SSD Drive 2nd	X	X	X
HP 256GB TLC SSD Drive	X	X	X
HP 256GB TLC SSD Drive 2nd	X	X	X
HP 512GB TLC SSD Drive	X	X	
HP 512GB TLC SSD Drive 2nd	X	X	

### Standard Features and Configurable Components (availability may vary by country)

#### Optical Disc Drives

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP 9.5mm Slim DVD-ROM Drive	X	X	
HP 9.5mm Slim DVD Writer Drive	X	X	

#### Removable

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP 9.5mm Slim Removable SATA 500GB	X	X	

#### Media Card Reader (optional)\*

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
SD4 with 5-in-1 Interface from SD option to PCA is USB (Supports SD, SDXC, SDHC, UHS-I, UHS-II)	X	X	

\*Card sold separately

## GRAPHICS

#### System Integrated Graphics

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
AMD Radeon™ HD Graphics (integrated on processor)	X	X	X

#### Optional Discrete Graphics Solutions

(optional and must be configured at purchase)

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
NVIDIA® GeForce® GT 730 2GB PCIe x8	X	X	
NVIDIA® Quadro NVS 310 1GB PCIe x16	X	X	
NVIDIA® Quadro NVS 310 1GB PCIe x16 – 2nd	X	X	
AMD Radeon™ R9 350 2GB PCIe x16		X	
AMD Radeon™ RX 460 2GB PCIe x16		X	
AMD Radeon™ RX 480 4GB PCIe x16		X	
AMD Radeon™ R7 430 2GB LP 2DP PCIe x16 GF card	X	X	
AMD Radeon™ R7 430 2GB LP 2DP PCIe x16 GF card – 2nd	X	X	
AMD Radeon™ R7 430 2GB PCIe x16	X	X	
AMD Radeon™ R7 450 4GB PCIe x16	X	X	
NVIDIA® GeForce® GT730 1GB PCIe x8	X	X	
NVIDIA® GeForce® GT730 2GB PCIe x8	X	X	
AMD Radeon™ R5 420 1GB PCIe x16	X	X	

## AUDIO/MULTIMEDIA

- DTS Studio Sound™ with Realtek codec ALC221
- Microphone and headphone front ports (3.5mm)
- Line-out and Line-In rear Ports (3.5mm) (SFF/MT only)
- Internal mono speaker (standard)

\* The front microphone port is re-taskable as a Line-in, Microphone-in 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 Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks. This allows for different audio applications to use separate audio ports on the system. For example, the front jacks could be

### Standard Features and Configurable Components (availability may vary by country)

used with a headset for a communications application while the rear jacks are being used with external speakers and a multimedia application.

**Optional for Desktop Mini** (optional and must be configured at purchase)

HP UC Speaker Phone

HP UC Speaker Phone Mounting Bracket

Standard Features and Configurable Components (availability may vary by country)

### NETWORKING/COMMUNICATIONS

<b>Ethernet (RJ-45) Integrated</b>	<b>SFF</b>	<b>MT</b>	<b>DM</b>
Broadcom NetXtreme Gigabit Ethernet LOM BCM5762 - DASH compliant NIC	X	X	X
<b>Optional</b>			
Intel® Ethernet I210-T1 PCIe x1 Gb Network Interface Card	X	X	
<b>Wireless LAN (optional)*</b>			
Intel® 8260 802.11AC 2x2 DualBand PCIe x1 Combo Card	X	X	
Intel® 7265 802.11AC 2x2 DualBand PCIe x1 Combo Card	X	X	
Intel® 8260 802.11AC 2x2 DualBand M.2 Combo Card			X
Intel® 7265 802.11AC 2x2 DualBand M.2 Combo Card			X
Intel® 3165 802.11AC 1x1 SingleBand M.2 Combo Card			X

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

### SLOTS

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
PCI Express x1 (v2.0)	2 ea. 2.5" low profile 6.6" length 10W max. power	2 ea. 4.376" full height 6.6" length 10W max. power	N/A
PCI Express x16 (v2.0) (wired as a x4)	1 ea. 2.5" low profile 6.6" length 10W max. power	1 ea. 4.376" full height 6.6" length 10W max. power	N/A
PCI Express x16 (v3.0) (wired as a x16)	1 ea. 2.5" low profile 6.6" length 75W max. power	1 ea. 4.376" full height 6.6" length 75W max. power	N/A
Turbo Drive (M.2 PCIe)	N/A	N/A	1 ea. M.2 PCIe x1-2230 (for WLAN) 1 ea. M.2 PCIe x4-2280 (for storage)

### PORTS

#### I/O Ports - Standard

	<b>SFF &amp; MT</b>	<b>DM</b>
USB 2.0	2 - (front) – One is a fast charging port; 2 - (rear) two rear have USB 2.0 Ports	2 - (rear)
USB 3.1 Gen 1	2 - (front); 2 - (rear)	2 - (front); 2 - (rear)
USB 3.1 Gen 2	2- rear	N/A
Serial (RS-232)	1 – Serial connector	1 - (optional Serial)
PS/2	1 - Keyboard (purple) with Wake from S4/S5 1 - Mouse (green)	N/A



### Standard Features and Configurable Components (availability may vary by country)

Video	1 - VGA 2 - DisplayPort™	1 - VGA 1 - DisplayPort 1 - (2 <sup>nd</sup> DisplayPort, HDMI optional)* *N/A if Serial Connector selected
Audio	Front: 1 - Headphone/microphone 1 - Headphone connector Rear: 1 - Line in (3.5mm diameter) 1 - Line out (3.5mm diameter)	Front: 1 - Headphone/microphone 1 - Headphone connector
Network Interface	RJ-45 connector	RJ-45 connector

**NOTE:** DM video supports HDMI 1.4

#### I/O Ports - Optional

#### SFF & MT

#### DM

2nd Serial (RS-232)	1 - HP Serial Port Adapter	
Parallel	1 - HP Parallel Port PCIe x1 Card	
USB-Type C™	1 - HP SuperSpeed USB 3.1 Gen 2 PCIe x1 Card	

#### I/O Ports – Internal Ports

#### DM

#### SFF

#### MT

DM SATA storage connector	1	N/A	N/A
Internal SATA storage connector(s)	N/A	3	3

## BAYS

#### SFF

#### MT

#### DM

5.25" Half Height ODD	N/A	N/A	N/A
Slim ODD	1	1	N/A
Secure Digital (SD) 4 Reader	1	1	N/A
2.5" internal storage drive	1	N/A	1
3.5" internal storage drive	2	2	N/A

## KEYBOARDS AND POINTING DEVICES (optional and must be configured at purchase)

#### Keyboards

#### SFF

#### MT

#### DM

HP Conferencing Keyboard	X	X	X
HP USB PS/2 Washable Keyboard	X	X	
HP USB Smart Card (CCID) Keyboard	X	X	
HP USB Business Slim Keyboard	X	X	X
HP PS/2 Business Slim Keyboard	X	X	
HP USB Keyboard and Mouse (China only)	X	X	X
HP Grey USB Keyboard	X	X	X

### Standard Features and Configurable Components (availability may vary by country)

<b>Mice</b>	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP PS/2 Mouse	X	X	
HP USB 1000dpi Laser Mouse	X	X	X
HP Grey Mouse	X	X	X
HP USB Mouse	X	X	X
HP USB PS/2 Washable Mouse	X	X	
HP USB Mouse (China only)	X	X	X
HP USB Hardened Mouse	X	X	X
<b>Combo</b>	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP Wireless Business Slim Keyboard and Mouse*	X	X	X
<b>Other</b>	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP Mouse Pad	X	X	X

### ADAPTERS AND CABLES (optional and must be configured at purchase)

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
HP DisplayPort™ Cable	X	X	X
HP Display Port™ Cable 2nd	X	X	X
HP DisplayPort™ to DVI-D Adapter	X	X	X
HP DisplayPort™ to DVI-D Adapter 2nd	X	X	X
HP DisplayPort™ to HDMI 4K Adapter	X	X	X
HP DisplayPort™ to HDMI 4K Adapter 2nd	X	X	X
HP DisplayPort™ to VGA Adapter	X	X	X
HP DisplayPort™ to VGA Adapter 2nd	X	X	X
HP DVI Cable (with DisplayPort to DVI Adapter installed)	X	X	X
HP 700mm DisplayPort Cable Kit			X

#### BIOS

HP BIOSphere with Sure Start<sup>1</sup>  
HP DriveLock

#### HP BIOS Protection<sup>2</sup>

- BIOS Update via Network
- Master Boot Record Security
- Power On Authentication
- Pre-Boot Security
- Secure Erase<sup>3</sup>
- HP Spare Key
- Hybrid Boot
- Measured Boot

### Standard Features and Configurable Components (availability may vary by country)

- Secure Boot
- Absolute Persistence Module<sup>4</sup>
- Preboot Authentication

#### Multi Media

CyberLink Power Media Player

Native Miracast Support<sup>6</sup>

#### HP Value Add Software

HP ePrint Driver + JetAdvantage<sup>7</sup>

HP Recovery Manager

HP Recovery Disc Creator (Windows 7 only)

HP Support Assistant

HP JumpStart

#### 3<sup>rd</sup> Party

Foxit PhantomPDF Express for HP (Windows 7 only)

#### Microsoft Products

Bing Search

Skype for Business Certified<sup>8</sup>

#### Manageability

HP Driver Packs<sup>9</sup>

HP SoftPaq Download Manager (SDM)

HP System Software Manager (SSM)<sup>9</sup>

HP BIOS Config Utility (BCU)<sup>9</sup>

HP Client Catalog<sup>9</sup>

HP CIK for Microsoft SCCM<sup>9</sup>

LANDESK Management<sup>10</sup>

HP Image Assistant<sup>9</sup>

#### 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 Defender<sup>12</sup>

Microsoft Security Essentials<sup>12</sup> (Windows 7 only)

#### Standard

TPM 2.0 Embedded Security Chip (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>

### Standard Features and Configurable Components (availability may vary by country)

1 Available only on business PCs with HP BIOS.

2 May require a manual recovery step if all copies of BIOS are compromised or deleted

3 For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88.

4 Requires initial user setup

5 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.

6 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>

7 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](http://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.

8 Skype is not offered in China.

9 Not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>

10 Subscription required.

12 Opt in and internet connection required for updates.

## HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Elite 705 G3 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.
- 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 Business Desktop BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.
- Wake on LAN from S4/S5.
- Schedule power on (RTC wake) from S4/S5.
- PS2 KB from S4/S5.
- USB KB from S4.

Additional HP BIOS Features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.

### Standard Features and Configurable Components (availability may vary by country)

- 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 Elite 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

### Sure Start (not available on all systems)

- BIOS Integrity checking – Sure Start protection ensures that only trusted BIOS code is executed and not rootkits, viruses and malware. Verification is done upon boot up, shutdown and while On.
- Sure Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability.
- Protecting beyond BIOS – Integrity checking and repair is extended to other data that should be protected such as network configuration parameters (network name), platform specific information (i.e. system IDs) and other code the system needs to boot.
- Audit enabled – System Audit via Sure Start Event Logs capture data such as incident, repair date and time for troubleshooting and investigating.

## AMD DASH CAPABLE

The DASH standards are designed to assist in the remote management of common desktop infrastructure tasks, such as deploying new operating systems, monitoring of computer system health, power control and power state monitoring, and asset inventory collection. As new hardware technologies are introduced or additional requirements are placed on the IT infrastructure, DASH will continue to evolve to include new functionality.

DASH has been designed to solve many of the pitfalls and constraints of previous management standards by leveraging well-proven technologies from the Service Oriented Architecture domain, advancements in security standards, and extensive modeling of management components, configuration data and relationships first introduced in the server management domain.

DASH is a web services-based management protocol and relies on security and network routing concepts familiar to web site and web services administrators.

### Key Features

- Service availability without the requirement of an installed operating system and/or system power states
- Interoperability between various DASH-capable device implementations and management consoles
- Descriptive data model allowing for the discovery of iterative specification updates (new profiles) or vendor-specific extensions (custom profiles)
- Well understood transport level security (HTTPS basic and digest authentication models with optional TLS client/server certificate support)
- Secured setup with support for multiple DASH users and multiple access roles (administrator, operator, auditor)
- Forward POST logs to specified destination

### Standard Features and Configurable Components (availability may vary by country)

- Monitor and inventory the HW of the managed clients

#### Management Profiles

A management profile is a specification that defines a normative set of behaviors and characteristics for addressing a particular management domain.

A profile consists of the following information:

- A data model representing the problem domain that consists of objects, properties and methods exposed by the profile
- Use cases to be addressed by the profile
- Steps required to traverse the data model and derive results

When a substantive block of new profiles become available, or fundamental changes are introduced to the DASH ecosystem, the DASH Implementation Requirements document is updated to reflect a new version of the standard. Profiles are continually being developed by the DMTF and DASH is designed to support them as they become available.

#### AMD STANDARD MANAGEABILITY

- Boot Control
- HW Inventory
- SW Inventory
- Power State Management
- HW Alerting

Includes DASH 1.2 compliance plus:

- System Defense
- Agent Presence
- CISCO NAC/SDN support
- Host Based Configuration
- IPv6 Support

#### Feature

[DSP1058](#)  
[DSP1033](#)  
[DSP1039](#)  
[DSP1034](#)  
[DSP0226](#)  
[DSP0227](#)  
[DSP0230](#)  
[DSP1022](#)  
[DSP1027](#)  
[DSP1026](#)

#### DMTF Specification(s)

Base Desktop and Mobile Profile  
Profile Registration Profile  
Role Based Authorization Profile  
Simple Identity Management Profile  
WS-Management Specification  
WS-Management CIM Binding Spec  
WS-CIM Mapping Specification  
CPU Profile  
Power State Management Profile  
System Memory Profile

## SECURITY

Trusted Platform Module TPM 2.0 Embedded Security Chip (SLB9670 - Common Criteria EAL4+ Certified)  
SATA 0,1 port disablement (via BIOS)

### Standard Features and Configurable Components (availability may vary by country)

- Drive lock
- RAID configurations (MT/SFF only)
- Serial, USB enable/disable (via BIOS)
- Power-On password (via BIOS)
- Setup password (via BIOS)
- Solenoid Hood Lock / Intrusion Sensor
- Support for chassis padlocks and cable lock devices

Standard Features and Configurable Components (availability may vary by country)

### POWER SUPPLY

	SFF	MT	MT (for AMD® Radeon™ RX 460/RX 480)	DM (external)
Standard Efficiency	200W active PFC 70% efficient	280W active PFC 70% efficient	N/A	65W active PFC 89% average efficiency  90W active PFC 89% average efficiency
80 PLUS Bronze	200W active PFC  82/85/82% efficient at 20/50/100% load (115V)  82/85/82% efficient at 20/50/100% load (230V)	280W active PFC  82/85/82% efficient at 20/50/100% load (115V)  82/85/82% efficient at 20/50/100% load (230V)	N/A	N/A
80 PLUS Gold	N/A	N/A	N/A	N/A
80 PLUS Platinum	200W active PFC  90/92/89% efficient at 20/50/100% load (115V)  91/93/90% efficient at 20/50/100% load (230V)	280W active PFC  90/92/89% efficient at 20/50/100% load (115V)  91/93/90% efficient at 20/50/100% load (230V)	400W active PFC  90/92/89% efficient at 20/50/100% load (115V)  91/93/90% efficient at 20/50/100% load (230V)	N/A
Operating Voltage Range	90 - 264 VAC	90 - 264 VAC	90 - 264 VAC	90 - 264 VAC
Rated Voltage Range	100 - 240 VAC	100 - 240 VAC	100-240V AC	100 - 240 VAC
Rated Line Frequency	50/60 Hz	50/60 Hz	50/60 HZ	50/60 Hz
Operating Line Frequency	47 - 63 Hz	47 - 63 Hz	47 - 63 Hz	47 - 63 Hz
Rated Input Current	3.5A	4.4A	N/A	N/A
Rated Input Current with Energy Efficient* Power Supply	3A	3.6A	<5.2A	65W/1.7A 90W/1.4A
DC Output	12V	12V	_12.1V	19.5V
Current Leakage (NFPA 99)	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	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	Less than 300 microamps of leakage current at 120 Vac with the ground wire disconnected, as	Less than 500 micro amps of leakage current at 120 Vac with the ground wire disconnected, as required for Non-



### Standard Features and Configurable Components (availability may vary by country)

	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 facility or that contact patients in normal use. Per section 10.3.5.1.	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 facility or that contact patients in normal use. Per section 10.3.5.1.	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 of "National Fire Protection Association standard" NFPA99 2012 edition.	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 facility or that contact patients in normal use. Per section 10.3.5.1.
Power Supply Fan	70mm variable speed	80mm variable speed	70mm variable speed	N/A
Power cord length	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)	N/A	6.0 ft. (1.83 m)
Internal power supply/External Power Adapter	Internal power supply	Internal power supply	N/A	External power adapter

The harmonic input current requirements must be met under the following operating conditions:

Load Requirements: 50% and 100%

Input Voltage: 230Vac/50Hz.

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

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

Standard Features and Configurable Components (availability may vary by country)

### WEIGHTS & DIMENSIONS

#### Weights & Dimensions

(configured with 1 HDD & 1 ODD; DM configured with 1 HDD only)

	<b>SFF</b>	<b>MT</b>	<b>DM</b>
Chassis (W x D x H)	14.9 x 13.3 x 3.95 in 380 x 338 x 100 mm (Horizontal Desktop Orientation)	6.7 x 13.4 x 14.0 in 170 x 340 x 355 mm (Vertical Microtower Orientation)	7 x 6.9 x 1.3 in 177 x 175 x 34 mm (Horizontal Desktop Orientation)
System Volume	782.7 cu in 12.8 L	1252 cu in 20.5 L	62.79 cu in 1.05 L
System Weight*	14.6 lbs 6.6 kg	14.9 lbs 6.76 kg	2.9 lbs 1.3 kg
Max Supported Weight (desktop orientation)	77 lbs 35 kg	77 lbs 35 kg	N/A
Tower Stand (W x D x H)	7 x 7.9 x 1.1 in 178 x 200 x 29 mm	N/A	4.6 x 6.3 x .77 in 117 x 160 x 19.5 mm
Packaging (W x D x H)	9.02 x 19.65 x 20.79 in 229 x 499 x 528 mm	11.7 x 20.3 x 18.8 in 299 x 517 x 478 mm	7.8 x 11.4 x 19.7 in 198 x 290 x 500 mm
Multi-Unit Packaging (10 units)			23.58 x 19.65 x 27.64 in 599 x 499 x 702 mm
Shipping Weight			108 lbs /49 kg
Shipping Weight (fully loaded)	21.95 lbs 9.95 kg	21.58 lbs 9.78 kg	9.0 lbs 4.1 kg
Palletization Profile	4-units per layer 10-layer max. 40-units per pallet	8-units per layer 4-layer max. 32-units per pallet	8-units per layer 10/12 layer max 80/96 per pallet 47.126 x 39.291 x 99.252 in (including pallet)
			Dependent on 40-Ft Std. Sea Container or 40-Ft High-cube Sea Container is used)

### ENVIRONMENTAL & INDUSTRY

ENERGY STAR® certified models available

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

Low halogen (chassis, all internal components and modules)\*

TAA compliant models available

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

### UNIT ENVIRONMENT AND OPERATING CONDITIONS

General Unit Operating Guidelines

### Standard Features and Configurable Components (availability may vary by country)

- 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 <sup>1</sup>: Three-year (3-3-3) limited warranty delivers three years of on-site, next business day <sup>2</sup> service for parts and labor and complimentary limited technical support. 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.<sup>4</sup> To choose the right level of service for your HP product, visit HP Care Pack Central: [www.hp.com/go/cpc](http://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](http://www.hp.com/go/cpc). HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

## COUNTRY OF ORIGIN

China

AMS region products Mexico and USA

### Technical Specifications – Graphics

## GRAPHICS

### Integrated AMD HD Graphics

#### VGA Controller Integrated

##### DisplayPort

- DP++
- DisplayPort audio:
  - Linear PCM, Dolby Digital (AC-3), Dolby® TrueHD, DTS Studio Sound™
  - LPCM at sample rates: 32 kHz, 44.1 kHz, 48 kHz, 88.2 kHz, 96 kHz, 176.4 kHz, and 192 kHz, Bits per sample: 16, 20, and 24
  - Supports up to 8 channels
- 4, 2, or 1-lane transmission
- 5.4 Gbps (HBR2), 2.7 Gbps (HBR), and 1.62 Gbps (RBR) link bit rates
- DisplayPort Multi-Stream Transport (MST) for up to three independent video and audio streams on one DisplayPort connector. . The total number of supported displays is also limited by the bandwidth required by the attached DisplayPort capable displays. For example only one 3840 x 2160 or 4096 x 2160 display can be connected to a DisplayPort output.
- Supports HDCP2.1
- Supports stereoscopic 3D gaming, Blu-ray 3D, and stereoscopic 3D video for 120-Hz frame sequential monitors

##### HDMI (Optional)

- Supports HDMI 1.4b features
- Supports HDCP 2.1
- Supports HDR (High Definition Rendering) and Rec 2020

##### Memory

Allocated at system startup and configurable using F10 setup with values of 128MB, 256MB, 512MB and 1024MB. Additional memory that is not in use by the host will be dynamically allocated and will vary depending on the total installed system memory.

##### Maximum Color Depth

32 bits/pixel, 8-bits per color component

##### Graphics/Video AMD Eyefinity

AMD Eyefinity support for up to four displays when at least two displays are operating with DisplayPort 1.2 multi-streaming.

#### Power Management

- AMD PowerPlay™ power management technology
  - Dynamic power gating for GPU, UVD, VCE, GFX, DCE, and Graphics Memory Controller (GMC)
- Dynamic refresh rate supported with digital panels that support this feature
- Frame Buffer Compression

#### 3D Acceleration Features

DirectX® 12 compliant, including full speed 32-bit floating point per component operations:

- Shader Model 5 geometry and pixel support in a unified shader architecture
  - Graphics Core Next (GCN) architecture
  - Advanced shader instructions, including flexible flow control with CPU-level flexibility on branching
  - Read/Write caching system, replacing texture cache with a unified read-write two-level cache
  - Vertex, pixel, geometry, compute, domain, and hull shaders
  - 32-bit and 64-bit floating point processing per component
  - High performance dynamic branching and flow control

### Technical Specifications – Graphics

- Shader instruction store, using an advanced caching system
- Advanced shader design, with ultra-threading sequencer for high efficiency operations
- Advanced, high performance branching support, including static and dynamic branching
- High dynamic range rendering with floating point blending, texture filtering, and anti-aliasing support
- 16-bit and 32-bit floating point components for high dynamic range computations
- Full anti-aliasing on render surfaces up to and including 128-bit floating point formats
- Support for OpenCL™ 1.2, DirectCompute 11 and Microsoft C++ AMP
- Support for OpenGL 4.1/4.1+

#### Motion Video Acceleration Features

- Supports DVD, Blu-ray, and SDTV/HDTV content playback with low CPU usage
- Supports stereoscopic 3D Blu-ray
- Video compression engine:
  - Dedicated hardware (VCE 2.0) assisted encoding of HD video streams to H.264 (main profile)
  - Support H.264 SVC temporal scalability
  - Real-time transcoding by encoding the output from UVD with reduction of CPU utilization and power consumption
- Motion video decode acceleration technology:
  - Dedicated hardware (UVD) for H.264, MPEG4, VC-1, MVC, and MPEG2 decode:
    - H.264 implementation based on the ISO/IEC 14496-10 specification
    - MPEG6 implementation based on the ISO/IEC 14496-2 specification
    - VC-1 implementation based on the SMPTE 421M specification
    - MPEG2 implementation based on the ISO 13818-2 specification
    - Multi View Coding (MVC) for Blu-ray 3D content
    - WMV-9 implementation
  - Real time high-definition and standard definition stream decode
  - Real time dual high-definition stream decode

#### 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

Supported Display Resolutions and Refresh Rates				
<b>Note:</b> other resolutions may be available but are not recommended as they may not have been tested and qualified by HP				
Resolution	Max Refresh Rate (Hz) <sup>1</sup>	VGA	DisplayPort	HDMI
640 x 480	85	X	X	X
720 x 400	70	X	X	X
800 x 600	85	X	X	X
1024 x 768	85	X	X	X

### Technical Specifications – Graphics

1152 x 864	85	X	X	X
1280 x 720	85	X	X	X
1280 x 768	85	X	X	X
1280 x 800	85	X	X	X
1280 x 960	85	X	X	X
1280 x 1024	85	X	X	X
1366 x 768	60	X	X	X
1440 x 900	60	X	X	X
1600 x 900	85	X	X	X
1680 x 1050	75	X	X	X
1920 x 1080	60	X	X	X
1920 x 1200	85	X	X	X
1600 x 1200	85	X	X	X
1920 x 1440	85	X	X	X
2048 x 1536	75	X	X	X
2560 x 1440	59.951		X	X
2560 x 1600	60		X	X
3840 x 2160	60		X	X
4096 x 2160	60		X	X
Note				
1: >60 refresh rates are only for analog (VGA) signaling				

### AMD Radeon™ R9 350 2GB PCIe x16

**Memory**

2GB 128-bit wide frame buffer operating at 1150MHz.

**Controller Clock Speed**

AMD® Radeon™ R9 350 GPU operating at 925 MHz

**Multidisplay 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, 2x DisplayPort; Includes DVI to VGA adapter

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

### Technical Specifications – Graphics

1024 x 768	60, 75, 85	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	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	CVT 3.69M9-R
2560 x 1600	60, 60RB		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	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	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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M

### Technical Specifications – Graphics

720 x 480	60	X	MHL (CEA-770.2)
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\* >60 refresh rates only for analog (VGA) signaling

### AMD Radeon™ RX 460 2GB PCIe x16

<b>Memory</b>	2GB 128-bit wide frame buffer operating at 1750MHz.
<b>Controller Clock Speed</b>	AMD® Radeon™ RX 460 GPU operating at 1.2 GHz
<b>Multidisplay Support</b>	A maximum of 4 displays are supported by the card.
<b>Graphics /API support</b>	DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3
<b>Output Connectors</b>	1 x Dual-Link DVI-D, 1x DisplayPort, 1x HDMI

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



### Technical Specifications – Graphics

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	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	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	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	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

### AMD Radeon™ RX 480 4GB PCIe x16

<b>Memory</b>	4GB 256-bit wide frame buffer operating at 1266MHz.
<b>Controller Clock Speed</b>	AMD® Radeon™ RX 480 GPU operating at 2000 MHz
<b>Multidisplay Support</b>	A maximum of 6 displays are supported by the card.
<b>Graphics /API support</b>	DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3
<b>Output Connectors</b>	3x DisplayPort, 1x HDMI;

Resolution	Refresh Rate*	DisplayPort	Standard
640 x 480	60, 75, 85	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	IBM VGA
800 x 600	60, 75, 85	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	VESA DMT, CVT 0.83MA

### Technical Specifications – Graphics

1280 x 720	60, 75, 85	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	VESA DMT
1280 x 960	60, 75, 85	X	VESA DMT
1280 x 1024	60, 75, 85	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	VESA DMT
1440 x 900	60, 60RB	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	CVT 3.15M3
2560 x 1440	59.951	X	CVT 3.69M9-R
2560 x 1600	60, 60RB	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	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	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	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	VESA (SMPTE 274M)
1920 x 1080	50	X	SMPTE 274M
1920 x 1080	30	X	SMPTE 274M
1920 x 1080	24	X	SMPTE 274M
1280 x 720	60	X	VESA (CEA-770.3)
1280 x 720	50	X	SMPTE 296M
720 x 480	60	X	MHL (CEA-770.2)

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



### Technical Specifications – Graphics

#### AMD Radeon™ R7 430 2GB LP 2DP PCIe x16 GF card

<b>Memory</b>	1GB/2GB GDDR5 or 2GB/4GB DDR3
<b>Controller Clock Speed</b>	AMD® Radeon™ R7 430 GPU operating up to 780Mhz
<b>Multidisplay Support</b>	A maximum of 2 displays are supported by the card.
<b>Graphics /API support</b>	DIRECTX® 12, Mantle, OpenGL 4.4, Vulkan™
<b>Output Connectors</b>	2x DisplayPort

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

### Technical Specifications – Graphics

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	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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M
720 x 480	60		X	MHL (CEA-770.2)

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

### AMD Radeon™ R7 430 2GB PCIe x8

<b>Memory</b>	2GB 128-bit wide frame buffer operating at 1100MHz.
<b>Controller Clock Speed</b>	AMD® Radeon™ R7 430 GPU operating at 780 MHz
<b>Multidisplay Support</b>	A maximum of 2 displays are supported by the card.
<b>Graphics /API support</b>	DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3
<b>Output Connectors</b>	1x DisplayPort, 1xVGA

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

### Technical Specifications – Graphics

1280 x 960	60, 75, 85	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	VESA DMT
1440 x 900	60, 60RB	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	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	CVT 3.69M9-R
2560 x 1600	60, 60RB		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	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	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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M
720 x 480	60		X	MHL (CEA-770.2)

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

### AMD Radeon™ R7 450 4GB PCIe x16



### Technical Specifications – Graphics

<b>Memory</b>	4GB 128-bit wide frame buffer operating at 1125MHz.
<b>Controller Clock Speed</b>	AMD® Radeon™ R7 450 GPU operating at 925 MHz
<b>Multidisplay Support</b>	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)
<b>Graphics /API support</b>	DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3
<b>Output Connectors</b>	1 x Dual-Link DVI-I, 1x Display Port, 1x HDMI; Includes DVI to VGA adapter

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

### Technical Specifications – Graphics

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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M
720 x 480	60		X	MHL (CEA-770.2)

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

### Technical Specifications – Graphics

#### AMD Radeon™ R5 420 1GB PCIe x8

<b>Memory</b>	1GB 64-bit wide frame buffer operating at 900MHz.
<b>Controller Clock Speed</b>	AMD® Radeon™ R5 420 GPU operating at 700 MHz
<b>Multidisplay Support</b>	A maximum of 2 displays are supported by the card.
<b>Graphics /API support</b>	DIRECTX 12, Open GL 4.3, Open CL1.2, UVD 3
<b>Output Connectors</b>	1x DisplayPort, 1x VGA

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



### Technical Specifications – Graphics

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	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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M
720 x 480	60		X	MHL (CEA-770.2)

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

## NVIDIA® GeForce® GT 730 1GB 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

1GB GDDR5 64-bit wide frame buffer operating at 1250 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 HDMI, 1x VGA(via dongle) ; Includes DVI to VGA adapter  
Display Port output is multi-mode capable, support Audio, HBR2 and MST

### 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)	Standard
640 x 480	60, 75, 85	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	IBM VGA

### Technical Specifications – Graphics

800 x 600	60, 75, 85	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	VESA DMT
1280 x 960	60, 75, 85	X	VESA DMT
1280 x 1024	60, 75, 85	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	VESA DMT
1440 x 900	60, 60RB	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	X	VESA DMT, 1.92M3
1920 x 1440	60, 75, 85	X	VESA DMT, CVT 2.76M3
2048 x 1536	60,75	X	CVT 3.15M3
2560 x 1440	59.951		CVT 3.69M9-R
2560 x 1600	60, 60RB		VESA DMT, CVT 4.10MA/4.10MA-R
3840 x 2160	24		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	25		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	30		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
3840 x 2160	60		CVT-RBv1/v2 (8.29M9-R), SMPTE 274M
4096 x 2160	24		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	25		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	30		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
4096 x 2160	60		CVT-RBv1/v2 (8.85M-R), SMPTE 274M
1920 x 1080	60		VESA (SMPTE 274M)
1920 x 1080	50		SMPTE 274M
1920 x 1080	30		SMPTE 274M
1920 x 1080	24		SMPTE 274M
1280 x 720	60		VESA (CEA-770.3)
1280 x 720	50		SMPTE 296M

### Technical Specifications – Graphics

720 x 480	60		MHL (CEA-770.2)
720 x 576	50		ITU-R BT.1358
640 x 480	60		CEA (VESA DMT)

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

### NVIDIA® GeForce® GT 730 2GB PCIe x8 Graphics Card

<b>Introduction</b>	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.
<b>Memory</b>	2GB GDDR5 64-bit wide frame buffer operating at 1250 MHz
<b>Controller Clock Speed</b>	NVIDIA® Kepler™ GPU operating at 902 MHz
<b>Multi-display Support</b>	A maximum of 4 displays are supported by the card.
<b>Graphics /API support</b>	Supports Microsoft DirectX 12, OpenGL 4.4 and OpenCL 2 APIs, Shade Model 5, UVD 4.2, VCE 2.0, and DirectCompute 11
<b>Output Connectors</b>	1 x Dual-Link DVI-I, 1x DisplayPort, 1x VGA(via dongle) ; Includes DVI to VGA adapter Display Port output is multi-mode capable, support Audio, HBR2 and MST

### 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)	DisplayPort	Standard
640 x 480	60, 75, 85	X	X	VESA DMT, CVT 0.31M3
720 x 400	70	X	X	IBM VGA
800 x 600	60, 75, 85	X	X	VESA DMT, CVT0.48M3
1024 x 768	60, 75, 85	X	X	VESA DMT, CVT 0.79M3
1152 x 864	60, 75, 85	X	X	VESA DMT, CVT 0.83MA
1280 x 720	60, 75, 85	X	X	VESA DMT, CVT 0.92M9, CEA-770.3
1280 x 768	60, 60RB, 75, 85	X	X	VESA DMT, CVT 0.98M9/0.98M9-R
1280 x 800	60, 75, 85	X	X	VESA DMT
1280 x 960	60, 75, 85	X	X	VESA DMT
1280 x 1024	60, 75, 85	X	X	VESA DMT, CVT 1.31M4
1366 x 768	60, 60RB	X	X	VESA DMT

### Technical Specifications – Graphics

1440 x 900	60, 60RB	X	X	VESA DMT
1600 x 900	60, 60RB, 75, 85	X	X	VESA DMT
1680 x 1050	60, 60RB, 75	X	X	VESA DMT, CVT 1.76MA/1.76MA-R
1920 x 1080	60	X	X	VESA DMT, CVT 2.07M9, SMPTE 274M
1920 x 1200	60, 60RB, 75, 85	X	X	DMT, CVT 2.30MA/2.30MA-R
1600 x 1200	60, 75, 85	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	CVT 3.69M9-R
2560 x 1600	60, 60RB		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	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	VESA (SMPTE 274M)
1920 x 1080	50		X	SMPTE 274M
1920 x 1080	30		X	SMPTE 274M
1920 x 1080	24		X	SMPTE 274M
1280 x 720	60		X	VESA (CEA-770.3)
1280 x 720	50		X	SMPTE 296M
720 x 480	60		X	MHL (CEA-770.2)
720 x 576	50		X	ITU-R BT.1358
640 x 480	60		X	CEA (VESA DMT)

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

### Technical Specifications – Graphics

<b>NVIDIA® NVS™ 310 Graphics Card</b>							
<b>Introduction</b>	<p>The NVIDIA® NVS™ 310 Graphics Card is a PCI Express low profile form factor graphics add-in card targeted as an active low cost graphics solution for the corporate business and enterprise markets.</p> <p>The NVIDIA® NVS™ 310 graphics card is an ideal solution for customers requiring a small form factor graphics add-in card for either standard or small form factor PC designs.</p>						
<b>Performance and Features</b>	<p>The NVIDIA® NVS™ 310 Graphics Card offers 1GB of ultrafast DDR3 memory and is capable of supporting up to 2 displays.</p> <p>DisplayPort connector supports multimode technology to support connection to DVI-D, VGA and HDMI monitors with optional adapters in kits NR078AA, FH973AT, BP937AA, AS615AA.</p> <p>For a DisplayPort to DisplayPort connections use the optional DisplayPort Cable Kit VN567AA.</p>						
<b>Form Factor</b>	Low Profile: 2.713 × 6.15 in						
<b>Graphics Controller</b>	NVIDIA® NVS™ 310						
<b>Memory Clock</b>	875MHz						
<b>Memory Size</b>	1GB DDR3						
<b>Memory Bandwidth</b>	14 GB/s						
<b>Max. Power</b>	19.5W						
<b>Display Max. Resolution</b>	Up to 2560 x 1600 (digital display) per display						
<b>Display Output</b>	Up to 2 displays in the following configurations						
	<table border="1"> <tr> <td>DisplayPort output:</td> <td> <ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.</li> </ul> </td> </tr> <tr> <td>DVI-D output:</td> <td> <ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul> </td> </tr> <tr> <td>HDMI output:</td> <td> <ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul> </td> </tr> </table>	DisplayPort output:	<ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.</li> </ul>	DVI-D output:	<ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul>	HDMI output:	<ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul>
DisplayPort output:	<ul style="list-style-type: none"> <li>• Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card</li> <li>• Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort Multi-Stream topology technology.</li> </ul>						
DVI-D output:	<ul style="list-style-type: none"> <li>• Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors</li> <li>• Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors</li> </ul>						
HDMI output:	<ul style="list-style-type: none"> <li>• NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors</li> </ul>						

### Technical Specifications – Graphics

	VGA display output:	<ul style="list-style-type: none"> <li>Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors</li> </ul>		
<b>Supported Display Resolutions and Refresh Rates</b> <b>Note:</b> other resolutions may be available but are not recommended as they may not have been tested and qualified by HP				
Resolution	Maximum Refresh Rates (Hz) by Connection			
	DisplayPort to VGA	DisplayPort to DVI-D	DisplayPort to HDMI	DisplayPort
640 x 480	85	60	60	60
800 x 600	85	60	60	60
1024 x 768	85	60	60	60
1280 x 720	85	60	60	60
1280 x 1024	85	60	60	60
1440 x 900	75	60	60	60
1600 x 1200	60	60	60	60
1680 x 1050	60	60	60	60
1920 x 1080	60-R	60-R	60	60
1920 x 1200	60-R	60-R		60
1920 x 1440				60
2048 x 1536				60

### Technical Specifications – Hard Disk and Solid State Storage

## HARD DISK AND SOLID STATE STORAGE

### Redundant Array of Independent Drives (RAID) – Support RAID 0 and 1

Flexible implementation:

- RAID 0 (Striping)
- RAID 1 (Mirroring)
- Configurable email alerts
- RAID management software
- DPS Self-Test can be executed on physical hard drives while in RAID mode.
- The RAID Setup Utility (accessed through CTRL-R) can be protected by the F10 Setup password.

#### NOTE:

- HP tests and supports RAID 0.
- RAID 1 is the only RAID configuration offered via factory configurations. The pre-configured systems:
  - Are only available on the SFF and TWR form factors. The DM form factors do not support RAID as they do not allow for multiple common storage drives.
  - Are complete RAID systems and have both drives installed.
  - Have the necessary Option ROM configuration.
  - Include a preinstalled operating system that is mirrored mode out of the box.
  - HP tests and supports RAID 0.
  - RAID function is not supported under Windows 7.

### Technical Specifications – Hard Disk and Solid State Storage

<b>HP 2TB 5400 RPM SATA 6Gb/s 2.5” Hard Disk Drive*</b>		
<b>Unformatted Capacity</b>	2TB	
<b>Rotational Speed</b>	5,400RPM	
<b>Interface</b>	SATA 6 Gb/s	
<b>Cache, Multisegmented (MB)</b>	32MB	
<b>Seek Time (average)</b>	Read	Read
	Write	Write
<b>Height</b>	0.374 in / 9.5 mm	
<b>Width</b>	2.75 in / 70 mm	
<b>Depth</b>	3.94 in / 100mm	
<b>Weight</b>	0.29 lb / 130 g	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<p>*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.</p>		

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



### Technical Specifications – Hard Disk and Solid State Storage

	Physical size: 2.75 in/70 mm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)
<p>*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.</p>	

<b>HP 500 GB 7.2K SATA 6.0Gb/s 2.5" Hard Disk Drive*</b>		
<b>Capacity</b>	500,107,862,016 bytes	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	SATA 6 Gb/s	
<b>Buffer Size</b>	16 MB	
<b>Logical Blocks</b>	976,773,168	
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	Single Track:	2.0 ms
	Average:	12 ms
	Full-Stroke:	25 ms
<b>Height</b> (nominal)	0.267 in/6.8 mm	
<b>Width</b> (nominal)	Media diameter: 2.5 in/63.5 mm	
	Physical size: 2.75 in/70 mm	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<p>*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.</p>		

<b>500GB* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive</b>	
<b>Formatted Capacity</b>	500,107,862,016 bytes
<b>Spindle Speed</b>	7,200 rpm
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Buffer Size</b>	16 MB
<b>Logical Blocks</b>	976,773,168

### Technical Specifications – Hard Disk and Solid State Storage

<b>Seek Time</b> (average)	Single Track:	2.0 ms
	Average:	11 ms
	Full-Stroke:	21 ms
<b>Height</b> (nominal)	1 in/2.54 cm	
<b>Width</b> (nominal)	Media diameter: 3.5 in/8.89 cm	
	Physical size: 4 in/10.2 cm	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<p>*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.</p>		

#### HP 1 TB\* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive\*

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

#### HP 2 TB\* 7.2K rpm SATA 6.0Gb/s 3.5" Hard Disk Drive\*

<b>Formatted Capacity</b>	2 TB	
<b>Rotational Speed</b>	7,200 rpm	
<b>Interface</b>	SATA 6Gb/s NCQ	

### Technical Specifications – Hard Disk and Solid State Storage

<b>Cache, Multisegmented (MB)</b>	64 MB	
<b>Seek Time (average)</b>	Read	<8.5 ms
	Write	<9.5 ms
<b>Height</b>	1.028 in/26.11 mm	
<b>Width</b>	4.0 in/101.6 mm	
<b>Depth</b>	5.787 in/146.99 mm	
<b>Weight</b>	1.38 lb/626 g	
<b>Operating Temperature</b>	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.

### HP 500 GB SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)\*

<b>Formatted Capacity</b>	500 GB	
<b>Spindle Speed</b>	5,400 rpm +/- 0.2%	
<b>Drive Type</b>	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
<b>Interface</b>	SATA 6 Gb/s	
<b>Cache Buffer</b>	64 MB	
<b>NAND Flash Commercial Multilevel Cell (cMLC)</b>	8 GB	
<b>Number of Sectors</b>	976,773,168	
<b>Seek Time (typical reads)</b>	Single Track:	2.0 ms
	Average:	12 ms
<b>Height</b>	0.268 +/- .008 in (6.8 +/- 0.2 mm)	
<b>Width</b>	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
<b>Length</b>	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
<b>Weight</b>	0.209 lb/95 g (max)	
<b>Operating Temperature</b>	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.

#### HP 1 TB\* SATA 6G 2.5" 8GB Solid State Hybrid Drive (SSHD)\*

<b>Formatted Capacity</b>	1 TB	
<b>Spindle Speed</b>	5,400 rpm +/- 0.2%	
<b>Drive Type</b>	Solid State Hybrid Drive (SSHD) technology with NAND Flash	
<b>Interface</b>	SATA 6 Gb/s	
<b>Cache Buffer</b>	64 MB	
<b>NAND Flash Commercial Multilevel Cell (cMLC)</b>	8 GB	
<b>Number of Sectors</b>	976,773,168	
<b>Seek Time (typical reads)</b>	Single Track:	2.0 ms
	Average:	12 ms
<b>Height</b>	0.374 +/- .008 in (9.5 +/- 0.2 mm)	
<b>Width</b>	2.750 +/- 0.010 in (69.85 +/- 0.25 mm)	
<b>Length</b>	3.951 +0.008 / -0.010 in (100.35 +0.20 / -0.25 mm)	
<b>Weight</b>	0.254 lb/115 g (max)	
<b>Operating Temperature</b>	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 1-TB SATA 6G 3.5" 8GB Solid State Hybrid Drive (SSHD)\*

<b>Formatted Capacity</b>	1 TB
<b>Spindle Speed</b>	7,200 rpm
<b>Drive Type</b>	Solid State Hybrid Drive (SSHD) technology with NAND Flash
<b>Interface</b>	Serial ATA (SATA)
<b>Cache Buffer</b>	64 MB
<b>NAND Flash Commercial Multilevel Cell (cMLC)</b>	8 GB

### Technical Specifications – Hard Disk and Solid State Storage

<b>Number of Sectors</b>	1,953,525,168	
<b>Seek Time</b> (typical reads)	Single Track:	2.0 ms
	Average:	11 ms
<b>Height</b>	0.783 in / 2.01 cm	
<b>Width</b>	4 in / 10.2 cm	
<b>Length</b>	5.79 in / 14.7 cm	
<b>Weight</b>	0.88 lb/400 g	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<p>*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.</p>		

<b>500GB* 2.5" FIPS 140-2 SED Solid State Drive*</b>		
<b>Formatted Capacity</b>	500 GB	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with SATA interface.	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Height</b>	6.80 mm ± 0.20	
<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.35 mm ± 0.25/0.20	
<b>Weight (typical)</b>	<95 g (0.209 lb)	
<b>Bandwidth Performance</b>	Sustained data transfer rate OD	100 MB/s max
	I/O data-transfer rate	600 MB/s max
<b>Power</b>	Power consumption:	Spinup (max): 1.00A
		Idle, active: 0.70W
		Sleep 0.18W

### Technical Specifications – Hard Disk and Solid State Storage

<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 140° F (0° to 60° C)
	Relative Humidity:	5% to 95%
	Shock:	Maximum 400 G/2 ms
<p><b>*NOTE:</b> 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.</p>		

### 500 GB\* SATA 2.5" Self-Encrypting (SED) Opal 2 Solid State Drive\*

<b>Unformatted Capacity</b>	500GB	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with 25nm MLC NAND Flash and SATA interface	
<b>Interface</b>	Serial ATA 2.0 (3.0 Gb/s)	
<b>NAND Flash</b>	25nm MLC NAND Flash	
<b>Height</b>	.275 in/7mm	
<b>Width</b>	2.75 in/69.85 mm	
<b>Length</b>	3.95 in/100.5 mm	
<b>Weight</b>	0.161 lb (73 g)	
<b>Bandwidth Performance</b>	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
<b>Latency</b>	Read:	55 µs
	Write:	55 µs
<b>Power</b>	SATA power consumption:	160 mW (active average); <85 mW (idle average)

### Technical Specifications – Hard Disk and Solid State Storage

<b>Useful Drive Life</b>	72TB written, up to 40GB/day for 5 years	
	Operating Temperature:	32° to 158° F (0° to 70° C)
<b>Environmental</b> (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" Opal2 SED Solid State Drive\*

<b>Unformatted Capacity</b>	256 GB 500,118,192 (User Addressable Sectors)	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group(TCG) OPAL compliant encrypted solid state drive	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Height</b>	6.80 mm ± 0.20	
<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.20 mm ± 0.25	
<b>Weight</b>	Up to 73 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 520 MB/s
	Sustained Sequential Write:	Up to 460 MB/s
<b>Power</b>	Power consumption:	Active: 3.891W; Idle: 0.085W
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%

### Technical Specifications – Hard Disk and Solid State Storage

	Shock:	1,500 G/0.5 ms
<p>*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.</p>		

#### 512 GB SATA 2.5” Opal2 SED Solid State Drive\*

<b>Unformatted Capacity</b>	512 GB	
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group(TCG) OPAL compliant encrypted solid state drive	
<b>Interface</b>	Serial ATA (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Height</b>	6.80 mm ± 0.20	
<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.20 mm ± 0.25	
<b>Weight</b>	Up to 73 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 520 MB/s
	Sustained Sequential Write:	Up to 460 MB/s
<b>Power</b>	Power consumption:	Active: 3.891W; Idle: 0.085W
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (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 16 GB (for Windows 7) and 36 GB (for Windows 8.1/10) of system disk is reserved for the system recovery software.

#### 512GB SATA 2.5” Opal2 SED Solid State Drive



### Technical Specifications – Hard Disk and Solid State Storage

<b>Unformatted Capacity</b>	512 GB		
<b>Architecture</b>	Self-Encrypting (SED) Solid State Drive with NAND Flash and SATA interface. Trusted Computing Group(TCG) OPAL compliant encrypted solid state drive		
<b>Interface</b>	Serial ATA (6.0 Gb/s)		
<b>Form Factor</b>	2.5 inch		
<b>Height</b>	6.80 mm ± 0.20		
<b>Width</b>	69.85 mm ± 0.25		
<b>Length</b>	100.20 mm ± 0.25		
<b>Weight</b>	Up to 55 g		
<b>Bandwidth Performance</b>	Sustained Read:	Sequential	Up to 520 MB/s
	Sustained Write:	Sequential	Up to 500 MB/s
<b>Power</b>	Power consumption:	Active: 0.78A / 3.891W; Idle: 0.005A / 0.026W	
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours		
<b>Environmental</b> (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	

### 500GB 7200 RPM SATA 2.5” Self-Encrypting (SED) Hard Disk Drive

<b>Capacity</b>	500,107,862,016 bytes
<b>Rotational Speed</b>	7,200 rpm
<b>Drive Type</b>	Self-Encrypting Drive (SED) with SATA interface
<b>Interface</b>	SATA 6 Gb/s

### Technical Specifications – Hard Disk and Solid State Storage

<b>Segmented Buffer with write cache</b>	32768 KB - A portion of buffer capacity used for firmware	
<b>Number of Sectors</b>	976,773,168	
<b>Seek Time</b> (typical reads)	Single Track:	1.0 ms
	Average:	13 ms
	Full-Stroke:	25 ms
<b>Media Diameter</b>	2.5 in/63.5 mm	
<b>Height</b>	0.267 in/6.8 mm, ±0.2mm	
<b>Width</b>	2.75 in/69.85 mm, ±0.25mm	
<b>Length</b>	3.945 in/100.2 mm, ±0.25mm	
<b>Weight</b>	3.35 oz/95 g (max)	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

### 240GB SATA 2.5" Opal2 SED Solid State Drive (Pro 5400S)

<b>Unformatted Capacity</b>	240 GB
<b>Architecture</b>	<p>Solid State Drive with TLC NAND Flash and SATA interface.</p> <p>Fully complies with ATA/ATAPI-7 Standard (Partially Complies with ATA/ATAPI-8)</p> <p>Power Saving Modes: DIPM (Partial / Slumber mode)</p> <p>Support NCQ : Up to 32 depth</p> <p>Synchronous Signal Recovery</p> <p>Support TCG Storage Architecture Core Specification 2.0</p>
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Form Factor</b>	2.5 inch
<b>Height</b>	7mm height
<b>Width</b>	69.85 mm ± 0.25

### Technical Specifications – Hard Disk and Solid State Storage

<b>Length</b>	100.45 mm max	
<b>Weight</b>	Up to 65 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 540 MB/s
	Sustained Sequential Write:	Up to 110 MB/s (Burst up to 460 MB/s)
<b>Power</b>	Power consumption:	Active : typical 100mW; Idle : typical 60mW;
<b>Environmental</b> (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

### HP 128 GB Turbo Drive SSD - M.2 PCIe Drive\*

<b>Unformatted Capacity</b>	128 GB*	
<b>Interface</b>	M.2 PCIe x4 Gen 2	
<b>Architecture</b>	Solid State Drive M.2 PCIe Gen 2 x4 AHCI; NCQ Command Set	
<b>Form Factor</b>	M.2 2280	
<b>Dimensions</b> (Width x Length x Thickness)	.899 x 3.149 x .146 in (22 x 80 x 3.73 mm)	
<b>Weight</b>	0.017 lb (8 g) Max	
<b>Bandwidth Performance -</b> Performance measured using IOMeter 2008 on Windows 8 64bit. Actual performance may vary depending on use conditions and environment.	Sustained Sequential Read (128KB):	Up to 920 MB/ss
	Sustained Sequential Write (128KB):	Up to 430 MB/s
	Random Read (4KB):	up to 8500 IOPs
	Random Write (4KB):	up to 32000 IOPs
<b>Power</b>	Allowable voltage	3.3V ± 5%
	Total power consumption:	5.8 W (Active) ; 80 mW; (Idle)
<b>MTBF</b>	1.5 M hours	

### Technical Specifications – Hard Disk and Solid State Storage

<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity (operating):	5% to 95%
	Shock:	1,500 G
<b>Regulations</b>	Safety TUV UL CB c-UL-us	TUV
		UL CB
		c-UL-us
		TUV
	EMC/EMI	CE (EU)
		BSMI (Taiwan)
		KCC (South Korea)
		VCCI (Japan)
		C-Tick (Australia)
		FCC (USA)
<p><b>*NOTE:</b> 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.</p>		

### HP 256 GB Turbo Drive SSD - M.2 PCIe Drive\*

<b>Formatted Capacity</b>	256 GB
<b>Architecture</b>	Solid State Drive M.2 PCIe Gen 2 x4 AHCI; NCQ Command Set
<b>Interface</b>	M.2 PCIe Gen 2 x4
<b>Form Factor</b>	M.2 2280
<b>Height</b>	7 mm ± 0.20
<b>Width</b>	.8 mm ± 0.08
<b>Length</b>	50 mm ± 0.15
<b>Weight (typical)</b>	Up to 10 g

### Technical Specifications – Hard Disk and Solid State Storage

<b>Data Transfer Rate (128k Sequential)</b>	Sequential Read	Up to 2150 MB/s
	Sequential Write	Up to 1200 MB/s
<b>Power Watts</b>	Power consumption (avg):	Power-Up: N/A Read: 4 W Write: 5.1 W Standby: 700 mW Idle: 70 mW
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock (Linear 2 m/Sec half-sine):	1000 G peak (operating)
<p><b>*NOTE:</b> 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.</p>		

### HP 512GB Turbo Drive G2 SSD - M.2 PCIe Drive\*

<b>Formatted Capacity</b>	512,288 MB	
<b>Architecture</b>	Solid State Drive M.2 PCIe Gen 3 x4 NVMe; NVMe 1.1a Compliant	
<b>Interface</b>	M.2 PCIe Gen 3 x4 NVMe	
<b>Form Factor</b>	M.2 2280 DS	
<b>Height</b>	22 mm ± 0.16	
<b>Width</b>	.8 mm ± 0.08	
<b>Length</b>	50 mm ± 0.15	
<b>Weight (typical)</b>	Up to 10 g	
<b>Data Transfer Rate (128k Sequential)</b>	Sequential Read	Up to 2150 MB/s
	Sequential Write	Up to 1550 MB/s
<b>Power Watts</b>	Power consumption (avg):	Power-Up: N/A Read: 4.3 W

### Technical Specifications – Hard Disk and Solid State Storage

		Write: 6.5 W Standby: 700 mW Idle: 70 mW
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%
	Shock (Linear 2 m/Sec half-sine):	1000 G peak (operating)
<p><b>*NOTE:</b> 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.</p>		

### 256GB Turbo Drive G2 TLC Non-SED Solid State Drive

<b>Unformatted Capacity</b>	256 GB	
<b>Architecture</b>	Solid State Drive with TLC NAND Flash and PCIE interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support	
<b>Interface</b>	PCI-E Gen3 x 4	
<b>Form Factor</b>	M.2 2280	
<b>Height</b>	3.73 mm	
<b>Width</b>	22.00 ± 0.15 mm	
<b>Length</b>	80.00 ± 0.15 mm	
<b>Weight</b>	Up to 8 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 1580 MB/s
	Sustained Sequential Write:	Up to 300 MB/s
<b>Power</b>	Power consumption:	Active: Typical 4.5W; Idle: Typical 1.7W

### Technical Specifications – Hard Disk and Solid State Storage

		L1.2: Typical 2.5mW
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (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

### 256GB Turbo Drive G2 TLC OPAL2.0 SED Solid State Drive

<b>Unformatted Capacity</b>	256 GB	
<b>Architecture</b>	Solid State Drive with TLC NAND Flash and PCIe interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support TCG OPAL2.0 compliance	
<b>Interface</b>	PCI-E Gen3 x 4	
<b>Form Factor</b>	M.2 2280	
<b>Height</b>	3.73 mm	
<b>Width</b>	22.00 ± 0.15 mm	
<b>Length</b>	80.00 ± 0.15 mm	
<b>Weight</b>	Up to 8 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 2200 MB/s
	Sustained Sequential Write:	Up to 1000 MB/s
<b>Power</b>	Power consumption:	Active: Typical 6.1W; Idle: Typical 40mW L1.2: Typical 5mW
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	

### Technical Specifications – Hard Disk and Solid State Storage

<b>Environmental</b> (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 OPAL2.0 SED Solid State Drive

<b>Unformatted Capacity</b>	512 GB	
<b>Architecture</b>	Solid State Drive with TLC NAND Flash and PCIe interface. Complies with NVMe Standard Power Saving Modes: L1 substates support Multi Queue support TCG OPAL2.0 compliance	
<b>Interface</b>	PCI-E Gen3 x 4	
<b>Form Factor</b>	M.2 2280	
<b>Height</b>	3.73 mm	
<b>Width</b>	22.00 ± 0.15 mm	
<b>Length</b>	80.00 ± 0.15 mm	
<b>Weight</b>	Up to 8 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 2200 MB/s
	Sustained Sequential Write:	Up to 1000 MB/s
<b>Power</b>	Power consumption:	Active: Typical 6.1W; Idle: Typical 40mW L1.2: Typical 5mW
<b>Mean Time Between Failure (MTBF)</b>	1,500,000 hours	
<b>Environmental</b> (all conditions, non-condensing)	Operating Temperature:	32° to 158° F (0° to 70° C)
	Relative Humidity:	5% to 95%



### Technical Specifications – Hard Disk and Solid State Storage

	Shock:	1,500 G/0.5 ms
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#### 128GB SATA 2.5" Value (Non-SED) Solid State Drive

<b>Unformatted Capacity</b>	128 GB	
<b>Architecture</b>	TLC NAND Flash	
<b>Interface</b>	SATA 3.2 (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Dimensions (W x H x D)</b>	6.98 x 0.7 x 10.05 cm	
<b>Weight</b>	31g	
<b>Bandwidth Performance</b>	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
<b>Power</b>	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	50mW (active); 20mW (idle)
<b>Useful Drive Life</b>	72TB written, up to 40GB/day for 5 years	
<b>Environmental</b> (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

<b>Unformatted Capacity</b>	256 GB	
<b>Architecture</b>	TLC NAND Flash	

### Technical Specifications – Hard Disk and Solid State Storage

<b>Interface</b>	SATA 3.2 (6.0 Gb/s)	
<b>Form Factor</b>	2.5 inch	
<b>Dimensions (W x H x D)</b>	6.98 x 0.7 x 10.05 cm	
<b>Weight</b>	31g	
<b>Bandwidth Performance</b>	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
<b>Power</b>	DC power requirement:	5 VDC 5%-100 mV ripple p-p
	Total power consumption:	50mW (active); 20mW (idle)
<b>Useful Drive Life</b>	72TB written, up to 40GB/day for 5 years	
<b>Environmental</b> (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
<p><b>NOTE:</b> "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."</p>		

### 240 GB SATA 2.5 TLC Non-SED SSD (Pro5400S)

<b>Unformatted Capacity</b>	240 GB
<b>Architecture</b>	Triple-Level Cell (TLC) NAND
<b>Interface</b>	Serial ATA 3.0 (6.0 Gb/s)
<b>Form Factor</b>	2.5 inch
<b>Height</b>	7mm height

### Technical Specifications – Hard Disk and Solid State Storage

<b>Width</b>	69.85 mm ± 0.25	
<b>Length</b>	100.45 mm max	
<b>Weight</b>	Up to 65 g	
<b>Bandwidth Performance</b>	Sustained Sequential Read:	Up to 540 MB/s
	Sustained Sequential Write:	Up to 110 MB/s (Burst up to 460 MB/s)
<b>Power</b>	Power consumption:	Active : typical 100mW; Idle : typical 60mW;
<b>Environmental</b> (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 – Optical Disk Drives

<b>HP 9.5mm Desktop G2 Slim DVD Writer Drive</b>		
<b>Height</b>	9.5 mm height	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Disc recording capacity</b>	Up to 8.5 GB DL or 4.7 GB standard	
<b>Dimensions (W x H x D)</b>	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
<b>Weight (max)</b>	0.31 lb (140 g)	
	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 10X
	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	
<b>Other Media</b>	M disc	DVD media for storage preservation
<b>Access time</b> (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)
	Stop Time	6 seconds (typical)
<b>Power</b>	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)
<b>Environmental conditions</b> (operating - non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%

### Technical Specifications – Optical Disk Drives

	Maximum Wet Bulb Temperature	84° F (29° C)
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<b>HP 9.5mm Desktop G2 Slim DVD-ROM Drive</b>		
<b>Height</b>	9.5mm	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Dimensions (W x H x D)</b>	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel	
<b>Weight (max)</b>	Up to 0.31 lb (140g) without bezel	
<b>Read speeds</b>	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
<b>Access time</b> (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)
<b>Power</b>	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
<b>Environmental</b> (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)

### Technical Specifications – Memory

#### System Memory Support

The HP EliteDesk 705 G3 Business PC 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 (UDIMM) 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
- Theoretical maximum memory bandwidth of:
  - 34 GB/s in dual-channel mode assuming 2400 MT/s

#### Platform Memory Support

- The Small Form Factor (SFF) and Microtower (MT) platforms support up to four (4) industry-standard DDR4-SDRAM 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.

### Technical Specifications - Networking and Communications

#### NETWORKING AND COMMUNICATIONS

<b>Broadcom NetXtreme Gigabit Ethernet Plus</b> (integrated)	
<b>Connector</b>	RJ-45
<b>System Interface</b>	Integrated on PCA
<b>Controller</b>	Broadcom BCM5762 GbE
<b>Memory</b>	24 KB FIFO packet buffer memory Two Queues (Tx & Rx)
<b>Data rates supported</b>	10/100/1000 Mbps
<b>IEEE Compliance</b>	802.1P 802.1Q 802.1as/1588 802.3 802.3ab 802.3az 802.3u
<b>Bus architecture</b>	PCI Express and SMBus
<b>Data transfer mode</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
<b>Power requirement</b>	Requires 3.3Vdc with integrated regulators Thermal Design Power (TDP) 0.535 Watts
<b>Boot ROM support</b>	Yes
<b>Network transfer mode</b>	Full-duplex Half-duplex (not supported for the 1000BASE-T transceiver)
<b>Network transfer rate</b>	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
<b>Environmental</b>	Operating Temperature: 0° to 85° C Operating Humidity: 60% RH
<b>Management</b>	WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostic, Smart speed operation
<b>Alerting</b>	ASF 2.0 support; DASH support

### Technical Specifications - Networking and Communications

<b>Intel® Ethernet I210-T1 Gigabit Network Card</b>	
<b>Connector</b>	RJ-45
<b>System Interface</b>	PCI Express x1
<b>Controller</b>	Intel® I210 Gigabit Ethernet Controller
<b>Memory</b>	Integrated Dual 48K configurable transmit receive FIFO Buffers
<b>Data rates supported</b>	10/100/1000 Mbps
<b>IEEE Compliance</b>	802.1P 802.1Q 802.2 802.3 802.3AB 802.3u 802.3x flow control
<b>Bus architecture</b>	PCI-E 2.1
<b>Data path width</b>	X1, 250 MB/s, Bi-directional interface
<b>Data transfer mode</b>	Bus-master DMA
<b>Hardware certifications</b>	FCC, B, CE, TUV-c, TUVus Mark Canada and United States, TUV-GS Mark for European Union
<b>Power requirement</b>	Aux 3.3 V, 3.0 Watts in 1000 base-T and 1.0 Watts in 100 Base-T
<b>Boot ROM support</b>	Yes
<b>Network Transfer Rate</b>	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)
<b>Environmental</b>	Operating Temperature: 32° to 131°F (0° to 55° C)
	Operating Humidity: 85% at 131° F (55° C)
<b>Management</b>	WOL, PXE, DMI, WFM 2.0

<b>Intel® 7265 802.11ac 2x2 DualBand Combo PCIe x1 Card*</b>		
	<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac
	<b>Interoperability</b>	Wi-Fi certified
	<b>Frequency Band</b>	802.11b/g/n • 2.402 – 2.482 GHz Note:



### Technical Specifications - Networking and Communications

		<p>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.</p> <p>802.11a/n</p> <ul style="list-style-type: none"> <li>4.9 – 4.95 GHz (Japan)</li> <li>5.15 – 5.25 GHz</li> <li>5.25 – 5.35 GHz</li> <li>5.47 – 5.725 GHz</li> <li>5.825 – 5.850 GHz</li> </ul> <p>Note: Indonesia no support this band)</p>
	<b>Data Rates</b>	<ul style="list-style-type: none"> <li>802.11b: 1, 2, 5.5, 11 Mbps</li> <li>802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz)</li> <li>802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)</li> </ul>
	<b>Modulation</b>	<p>Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM</p>
	<b>Security<sup>1</sup></b>	<ul style="list-style-type: none"> <li>IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>AES-CCMP: 128 bit in hardware</li> <li>802.1x authentication</li> <li>WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>WPA2 certification</li> <li>IEEE 802.11i</li> <li>Cisco Certified Extensions, all versions through CCX4 and CCX Lite</li> <li>WAPI</li> </ul>
	<b>Network Architecture Models</b>	<p>Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)</p>
	<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
	<b>Output Power<sup>2</sup></b>	<ul style="list-style-type: none"> <li>802.11b : +16dBm minimum</li> <li>802.11g : +14dBm minimum</li> <li>802.11a : +14dBm minimum</li> <li>802.11n HT20(2.4GHz) : +13dBm minimum</li> <li>802.11n HT40(2.4GHz) : +13dBm minimum</li> <li>802.11n HT20(5GHz) : +12dBm minimum</li> <li>802.11n HT40(5GHz) : +12dBm minimum</li> <li>802.11ac 80MHz(5GHz) : +11dBm minimum</li> </ul>
	<b>Power Consumption</b>	<p>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</p>
	<b>Power Management</b>	<p>ACPI and PCI Express compliant power management 802.11 compliant power saving mode</p>
	<b>Receiver Sensitivity<sup>3</sup></b>	<p>802.11b, 1Mbps : -94dBm maximum 802.11b, 11Mbps : -86dBm maximum 802.11g, 6Mbps : -88dBm maximum 802.11g, 54Mbps : -74dBm maximum 802.11a, 6Mbps : -86dBm maximum 802.11a, 54Mbps : -72dBm maximum</p>

### Technical Specifications - Networking and Communications

	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		
<b>Antenna type</b>	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		
<b>Form Factor</b>	PCI-Express M.2 MiniCard		
<b>Dimensions</b>	Type 2230 : 2.3 x 22.0 x 30.0 mm Or Type 1630 : 2.3 x 16.0 x 30.0 mm		
<b>Weight</b>	Type 2230 : 2.8g Or Type 1630 : 2g		
<b>Operating Voltage</b>	3.3v +/- 9%		
<b>Temperature</b>	Operating	14° to 158° F (-10° to 70° C)	
	Non-operating	-40° to 176° F (-40° to 80° C)	
<b>Humidity</b>	Operating	10% to 90% (non-condensing)	
	Non-operating	5% to 95% (non-condensing)	
<b>Altitude</b>	Operating	0 to 10,000 ft (3,048 m)	
	Non-operating	0 to 50,000 ft (15,240 m)	
<b>LED Activity</b>	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).		
<b>HP Integrated Module with Bluetooth® 4.0+EDR Wireless Technology</b>			
<b>Bluetooth Specification</b>	4.0+EDR Compliant		
<b>Frequency Band</b>	2402 to 2480 MHz		
<b>Number of Available Channels</b>	79 (1 MHz) available channels		
<b>Data Rates and Throughput</b>	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		
<b>Transmit Power</b>	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of +4 dBm for BR and EDR.		
<b>Receiver Sensitivity</b>	<b>Modulation</b>	<b>0.01% BER</b>	<b>0.001% BER</b>
	GFSK	-80 dBm	-70 dBm
	π/4-DQPSK	-80 dBm	-70 dBm
	8DPSK	-80 dBm	-70 dBm
<b>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW		
<b>Range</b>	Up to 33 ft (10 m)		
<b>Electrical Interface</b>	USB 2.0 compliant		
<b>Bluetooth Software Supported Link Topology</b>	Microsoft Windows Bluetooth Software		
<b>Electrical Interface</b>	Point to Point, Multipoint Pico Nets up to 7 slaves		

### Technical Specifications - Networking and Communications

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

\*Wireless access point and internet access required. Availability of public wireless access points limited. The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.

<b>Intel® 8260 2x2 Dual Band 802.11ac WLAN/ Bluetooth® Combo*</b>		
<b>Wireless LAN Standards</b>	IEEE 802.11 ac/a/b/g/n	
<b>Interoperability</b>	Wi-Fi certification	
	WLAN + Bluetooth® Combo M.2 Card device shall meet all of the requirements to support Bluetooth® 4.1 and backwards compatible with 2.1 with EDR	
<b>Frequency Band</b>	802.11b/g/n	2.402-2.482 GHz
	802.11a/n/ac	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 does not support this band)
<b>Antenna Interface</b>	With antennas installed in the system, the antenna peak gain is less than +3dBi in the 2.4GHz band and less than +4dBi in the 5GHz band to allow the device to meet regulatory limits.	

### Technical Specifications - Networking and Communications

<b>Data Rates</b>	<ul style="list-style-type: none"> <li>• 802.11b: 1, 2, 5.5, 11 Mbps</li> <li>• 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps</li> <li>• 802.11n: card will support rates for NSS=1 and NSS=2 for RX and TX for 20 and 40 MHz channels. Short and long guard interval shall be supported.</li> <li>• 802.11ac: card will support rates for NSS=1 and NSS=2 for RX and TX for 80 MHz channels. 433Mbps for 1x1 and 867Mbps for 2x2.</li> </ul>						
<b>Security</b>	<ul style="list-style-type: none"> <li>• IEEE and WiFi compliant 64 / 128 bit WEP encryption for a/b/g mode only</li> <li>• AES-CCMP: 128 bit in hardware</li> <li>• 802.1x authentication</li> <li>• WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES.</li> <li>• WPA2 certification</li> <li>• IEEE 802.11i</li> <li>• Cisco Certified Extensions, all versions through V5</li> <li>• WAPI</li> </ul> <p>Note: Check latest software/driver release for updates on supported security features.</p>						
<b>Roaming</b>	802.11r Fast Roaming						
<b>Output Power (Transmitting)</b>	<ul style="list-style-type: none"> <li>• 802.11b: +16dBm minimum</li> <li>• 802.11g: +14dBm minimum</li> <li>• 802.11a: +14dBm minimum</li> <li>• 802.11n HT20 (2.4GHz) : +14dBm minimum</li> <li>• 802.11n HT40 (2.4GHz) : +12dBm minimum</li> <li>• 802.11n HT20 (5GHz) : +14dBm minimum</li> <li>• 802.11n HT40 (5GHz) : +12dBm minimum</li> <li>• 802.11ac 80MHz (5GHz) : +12dBm minimum</li> </ul> <p>Notes:                      1. RF Tx power have to meet minimum criteria and with +1.5dBm tolerance but -1.5dBm.                      2. RF Parameter will be verified by R&amp;S CMW500 via link mode. .</p>						
<b>Power Consumption</b>	<table border="1"> <tr> <td>Transmit: 2.0 Watts</td> </tr> <tr> <td>Receive: 1.6 Watts</td> </tr> <tr> <td>Idle mode (PSP): 180 mW (WLAN associated)</td> </tr> <tr> <td>Idle mode: 50 mW (WLAN unassociated)</td> </tr> <tr> <td>Connect Standby 10mW (WLAN+BT)</td> </tr> <tr> <td>Radio off: 5 mW</td> </tr> </table>	Transmit: 2.0 Watts	Receive: 1.6 Watts	Idle mode (PSP): 180 mW (WLAN associated)	Idle mode: 50 mW (WLAN unassociated)	Connect Standby 10mW (WLAN+BT)	Radio off: 5 mW
Transmit: 2.0 Watts							
Receive: 1.6 Watts							
Idle mode (PSP): 180 mW (WLAN associated)							
Idle mode: 50 mW (WLAN unassociated)							
Connect Standby 10mW (WLAN+BT)							
Radio off: 5 mW							
<b>Bluetooth® Power Consumption</b>	<table border="1"> <tr> <td>Peak operating: 330 mW</td> </tr> <tr> <td>Receive: 230 mW</td> </tr> </table>	Peak operating: 330 mW	Receive: 230 mW				
Peak operating: 330 mW							
Receive: 230 mW							

### Technical Specifications - Networking and Communications

	USB selective suspend: 17 mW	
<b>Power Management</b>	<p>The product conforms to the ACPI and PCI Express M.2 bus methods to manage power of the WLAN components.</p> <p>Supports all 802.11 compliant power-save modes. These include the basic Power Save Polling (PSP) in 802.11 and Automatic Power Save Delivery (APSD) defined in 802.11e.</p>	
<b>Receiver Sensitivity for FER &lt;10%</b>	<p>802.11b, 1Mbps: -94dBm maximum              802.11b, 11Mbps: -86dBm maximum              802.11a/g, 6Mbps: -88dBm maximum              802.11a/g, 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</p> <p>Note:              1. Rx sensitivity have to meet maximum criteria and with -1.5dBm tolerance but +1.5dBm.              2. Note: RF Parameter will be verified by R&amp;S CMW500 via link mode.</p>	
<b>Form Factors</b>	PCI Express M.2 form factor	
<b>Operating Voltage</b>	The card will be powered by a 3.3V, ± 9% supply from the host system.	
<b>Temperature</b>	<b>Operating:</b>	14° to 158° F (-10° to 70° C)
	<b>Non-operating:</b>	-40° to 176° F (-40° to 80° C)
<b>Humidity</b>	<b>Operating:</b>	10% to 90% (non-condensing)
	<b>Non-operating:</b>	5% to 95% (non-condensing)
<b>Altitude</b>	<b>Operating:</b>	0 to 10,000 ft (3,048 m)
	<b>Non-operating:</b>	0 to 50,000 ft (15,240 m)

\* Wireless access point and Internet service required and not included. Availability of public wireless access points limited. **The specifications for the 802.11ac WLAN are draft specifications and are not final. If the final specifications differ from the draft specifications, it may affect the ability of the notebook to communicate with other 802.11ac WLAN devices.**

### Technical Specifications - Audio

## AUDIO

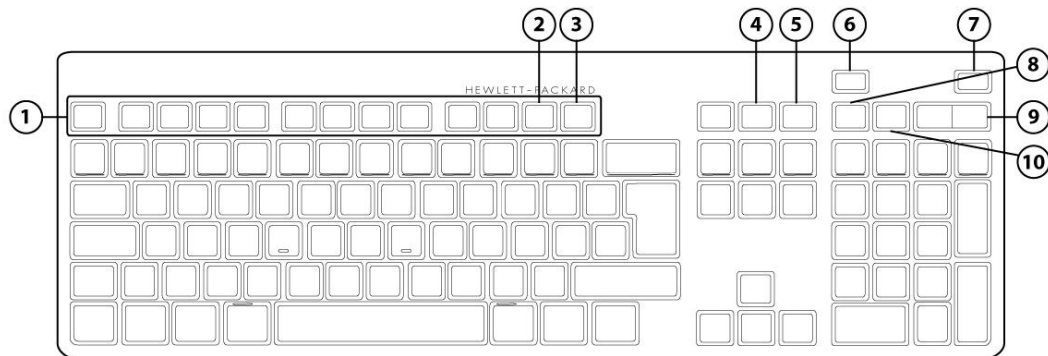
### High Definition Audio

<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek 2-channel ALC221 codec
<b>Audio I/O Ports</b>	Front microphone-In (150-K ohm Input Impedance) Rear Line-In/Microphone input (150-K ohm Input Impedance, function is configurable by audio driver) Front Headphone-Out (0.5 Ohm Output Impedance, expects at least a 32 ohm load) Front Microphone/Headphone jack is re-task able to provide Microphone input, line-in or Headphone output to support connecting two headphones to the front of the system. When configured as a second front headphone output, both front headphone outputs are always driven with the same signal. All ports are 3.5 mm
<b>Internal Speaker Amplifier</b>	1.5W amplifier for the internal speaker only. External speakers must be powered externally. Rear Line-in audio port is re-taskable as either Line-in or Microphone-In.
<b>Multi-streaming Capable</b>	Multi-streaming can be enabled in the Realtek control panel to allow independent audio streams to be sent to/from the front and rear jacks.
<b>Sampling</b>	8 kHz - 192 kHz
<b>Wavetable Syntheses</b>	Yes - Uses OS soft wavetable
<b>Analog Audio</b>	Yes
<b># of Channels on Line-Out</b>	Stereo (Left & Right channels)
<b>Internal Speaker</b>	Yes
<b>External Speaker Jack</b>	Yes

### Technical Specifications – Input/Output Devices

## Input/Output Devices

### HP Conferencing Keyboard



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

<b>Dimensions (H x L x W)</b>	0.85 x 17.34 x 6.10 in (2.16 x 44.05 x 15.50 cm)
<b>Weight</b>	24.69 oz. ( 700 g)
<b>Connectivity</b>	USB cable
<b>Keys</b>	110 (US) Layout, 111 (EU) Layout – depending upon country
<b>Feature Summary</b>	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
<b>Illuminated keys</b>	Incoming Call – Blinks Green Call in progress –Green Microphone Mute – Orange Audio Mute – Orange Screen Sharing – Orange

### Technical Specifications – Input/Output Devices

	Stop Webcam – Orange
<b>Other Call control keys</b>	End/Decline Call Volume up and down rocker key
<b>Microsoft Lync/Outlook</b>	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
<b>Functions Keys</b>	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
<b>System requirements</b>	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: <ul style="list-style-type: none"> <li>Limited support for Microsoft Lync 2010, Microsoft Lync 2013 Basic and Microsoft Metro Mode</li> <li>Screen brightness functions supported in select HP systems</li> </ul>
<b>Approvals EMC Product Safety</b>	FCC; CE; ACA(C-tick); EAC UL, CE Mark

<b>HP USB PS/2 Washable Keyboard</b>		
<b>Physical Characteristics</b>	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
<b>Electrical</b>	Operating voltage	+ 5VDC ±5%
	Power consumption	50-mA maximum (with three LEDs ON)
	System interface	USB Type A plug connector
	ESD	CE level 4, 15-kV air discharge



### Technical Specifications – Input/Output Devices

	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
<b>Mechanical</b>	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
<b>Environmental</b>	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
<b>Approvals</b>	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, C-Tick, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	

### HP USB Smart Card (CCID) Keyboard

#### Introduction:

Boost your security, simplify access procedures and reduce the costs associated with managing networks by preventing unauthorized access to your computers and networks using smartcard technology with the HP Smart Card (CCID) Keyboard.

The USB Smart Card (CCID) Keyboard is a full-sized keyboard that takes advantage of digital signatures and certificates to secure the environment for transactions performed on both public and private networks. The USB Smart Card (CCID) Keyboard works with all smart cards that comply with ISO standard 7816.

Smart cards are easy-to-use credit card-sized devices which require multiple forms of information to be validated before you gain access to your accounts or resources. Used worldwide, smart cards strengthen access to a network or other resource using dual-factor authentication. Implementing a two-factor authentication (or multi-factor authentication) process reduces the risk of unauthorized access by verifying and validating your identity in one of the following ways:

- Something you know – a combination of username and password or PIN

### Technical Specifications – Input/Output Devices

- Something you have – a smart card or security token.

Something you have (smart card) plus something you know (PIN), improves user-access security within corporate network environments. Smart cards are used in government agencies, healthcare companies and the finance industry.

HP ProtectTools Smart Card Manager provides authentication software for the smart card. The Smart Card Reader module works with the HP ProtectTools Security Manager and enables the user to setup, use, and manage the smart card. This allows strengthened security with HP patented technology.

<b>Key Benefits:</b>	<ul style="list-style-type: none"> <li>• Protects against unauthorized access with smart card technology</li> <li>• Delivers even greater security when combined with a HP ProtectTools smart card and the HP ProtectTools Security Software</li> <li>• Combination of username and password or pin with a smart card or security token</li> <li>• Secures online transactions using digital signatures and certificates</li> <li>• Conforms to industry standards for ease of setup and use</li> <li>• Delivers long product life and quiet operation with high-impact materials and lubricated keys</li> <li>• Spill drain feature</li> </ul>										
	<b>Physical Characteristics</b>	<table border="1"> <tr> <td>Keys</td> <td>104, 105, 106, 107, 109 layout (depending upon country)</td> </tr> <tr> <td>Form factor</td> <td>USB basic smart card keyboard</td> </tr> <tr> <td>Colors</td> <td>Carbonite/Silver</td> </tr> <tr> <td>Dimensions (H x W x D)</td> <td>18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)</td> </tr> <tr> <td>Weight</td> <td>2 lb (0.9 kg) minimum</td> </tr> </table>	Keys	104, 105, 106, 107, 109 layout (depending upon country)	Form factor	USB basic smart card keyboard	Colors	Carbonite/Silver	Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)	Weight
Keys	104, 105, 106, 107, 109 layout (depending upon country)										
Form factor	USB basic smart card keyboard										
Colors	Carbonite/Silver										
Dimensions (H x W x D)	18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)										
Weight	2 lb (0.9 kg) minimum										
<b>Electrical</b>	Operating voltage	+ 5VDC ± 5%									
	Power consumption	100-mA maximum (with four LEDs ON)									
	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									
<b>Mechanical</b>	Languages	30+ available									
	Keycaps	Standard design									
	Switch actuation	55 g nominal peak force with tactile feedback									
	Switch life	20 million keystrokes (using Hasco modified tester)									
	Switch type	Contamination-resistant 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									
	Acoustics	43-dBA maximum sound pressure level									
<b>Environmental</b>	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									

### Technical Specifications – Input/Output Devices

	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		
<b>SmartCard Function</b>	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	SCM STCIII		
	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		
<b>Approvals</b>	CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, EMV2000, USB-IF			
<b>Ergonomic Compliance</b>	ISO 9241-4, TUVGS			
<b>Kit Contents</b>	Keyboard, I/O Security and Documentation CD, warranty card			

### HP USB Business Slim Keyboard

<b>Physical characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	171.97 x 68.35 x 8.27 in (436.8± 1.5 x 137.6± 1.0 x 21.0± 1.0 cm)
	Weight	1.32 lb (0.6± 0.08 kg)
<b>Electrical</b>	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:
Air Discharge:		2, 4, 8, 10, 12.5KV

### Technical Specifications – Input/Output Devices

	EMI - RFI	Conforms to FCC rules for a Class B computing device
	Microsoft® PC 99 - 2001	Functionally compliant
<b>Mechanical</b>	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
<b>Environmental</b>	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	
<b>Approvals</b>	UL, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
<b>Kit contents</b>	Keyboard	Installation Guide
	Warranty Card	Safety and Comfort Guide

### Technical Specifications – Input/Output Devices

<b>HP PS/2 Business Slim Keyboard</b>		
<b>Physical Characteristics</b>	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)
<b>Electrical</b>	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
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mechanically compliant
	<b>Environmental</b>	Acoustics
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)

### Technical Specifications – Input/Output Devices

	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
<b>Approvals</b>	UL, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, KC	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	

### HP USB Grey Keyboard

<b>Physical characteristics</b>	Keys	104, 105, 106, 107, 109 layout (depending upon country)
	Dimensions (L x W x H)	18.0 x 6.4 x 0.98 in (45.8 x 16.3 x 2.5 cm)
	Weight	2 lb (0.9 kg) minimum
<b>Electrical</b>	Operating voltage	+ 5VDC ± 5%
	Power consumption	50-mA maximum (with three LEDs ON)
	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
<b>Mechanical</b>	Keycaps	Low-profile design
	Switch actuation	55-g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (using Hasco modified 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
	Acoustics	43-dBA maximum sound pressure level
<b>Environmental</b>	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	–22° to 140° F (–30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces

### Technical Specifications – Input/Output Devices

	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	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
<b>Operating system support</b>	Windows 2000 and Windows XP	
<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, BG Prufzert Mark	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
<b>Kit contents</b>	Keyboard, installation guide, warranty card, safety and comfort guide	

<b>HP Wireless Business Slim Keyboard and Mouse</b>		
<b>Keyboard</b>	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)
<b>Mouse</b>	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)
<b>Receiver</b>	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)
<b>System Requirements</b>	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 <a href="http://www.microsoft.com/windows/windows-7/">http://www.microsoft.com/windows/windows-7/</a> for details.	
<b>Approvals</b>	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

### Technical Specifications – Input/Output Devices

	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.
<b>Environmental</b>	Keyboard contains 25% post-consumer recycled plastic material.	

<b>HP PS/2 Mouse</b>		
<b>Dimensions</b> (H x L x W)	1.46 x 2.48 x 4.53 in (3.70 x 6.29 x 11.50 cm)	
<b>Weight</b>	3.53 oz (100g; +10g/- 5 g)	
<b>Environmental</b>	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
<b>Electrical</b>	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
<b>Mechanical</b>	Resolution	800 DPI
	Tracking speed	10 in/s (25.4 cm/s) maximum
	Acceleration	±15%



### Technical Specifications – Input/Output Devices

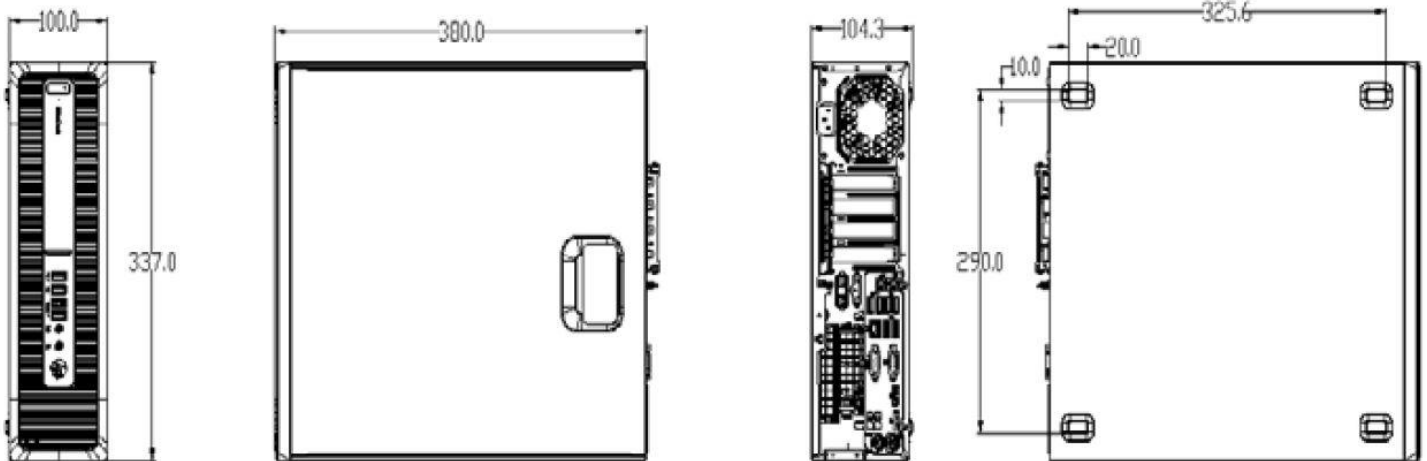
	Switch actuation	65±20 gf
	Switch life	3,000,000 operations (using Hasco modified tester)
	Switch type	Low force micro-switches
	Tracking mechanism life	80 km
	Cable length	6 ft (1.8 m)
	Microsoft PC99 - 2001	Mechanically compliant
<b>Scroll wheel</b>	Width	6 mm
	Diameter	22.5 ± 0.2 mm
	Maximum rotation force	50 gf-cm
	Switch type	Light force micro-switch
	Switch life	1 million operations
	Mechanical life	Minimum 200,000 revolutions
<b>Regulatory Approvals</b>	UL/cUL, FCC, CE Mark, TUV/GS, VCCI, KCC, BSMI, C-Tick	
<b>HP USB 1000dpi Laser Mouse</b>		
<b>Dimensions</b> (H x L x W)	1.47 x 4.53 x 2.47 in (37.3 x 114.97 x 62.86 mm)	
<b>Weight</b>	3.360 oz (102g)	
<b>Cable length</b>	70.9 in (180 cm)	
<b>System requirements</b>	Available USB port	
<b>Environmental</b>	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)
<b>Mechanical</b>	Resolution	1000dpi
	Tracking Speed	45 cm/sec
	Cable Length	70.9 in (180 cm)
<b>HP USB PS/2 Washable Mouse</b>		
<b>Dimensions</b> (H x L x W)	1.56 x 2.44 x 4.61 in (3.95 x 6.21 x 11.7 cm)	
<b>Weight</b>	4.44 oz (126 g)	
<b>Environmental</b>	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

### Technical Specifications – Input/Output Devices

	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
<b>Electrical</b>	Operating voltage	5 VDC $\pm$ 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
<b>Mechanical</b>	Resolution	400 $\pm$ 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
<b>Scroll wheel</b>	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
<b>Regulatory approvals</b>	Compliant	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC

### Technical Specifications – Weights & Dimensions

#### SMALL FORM FACTOR DIMENSIONS

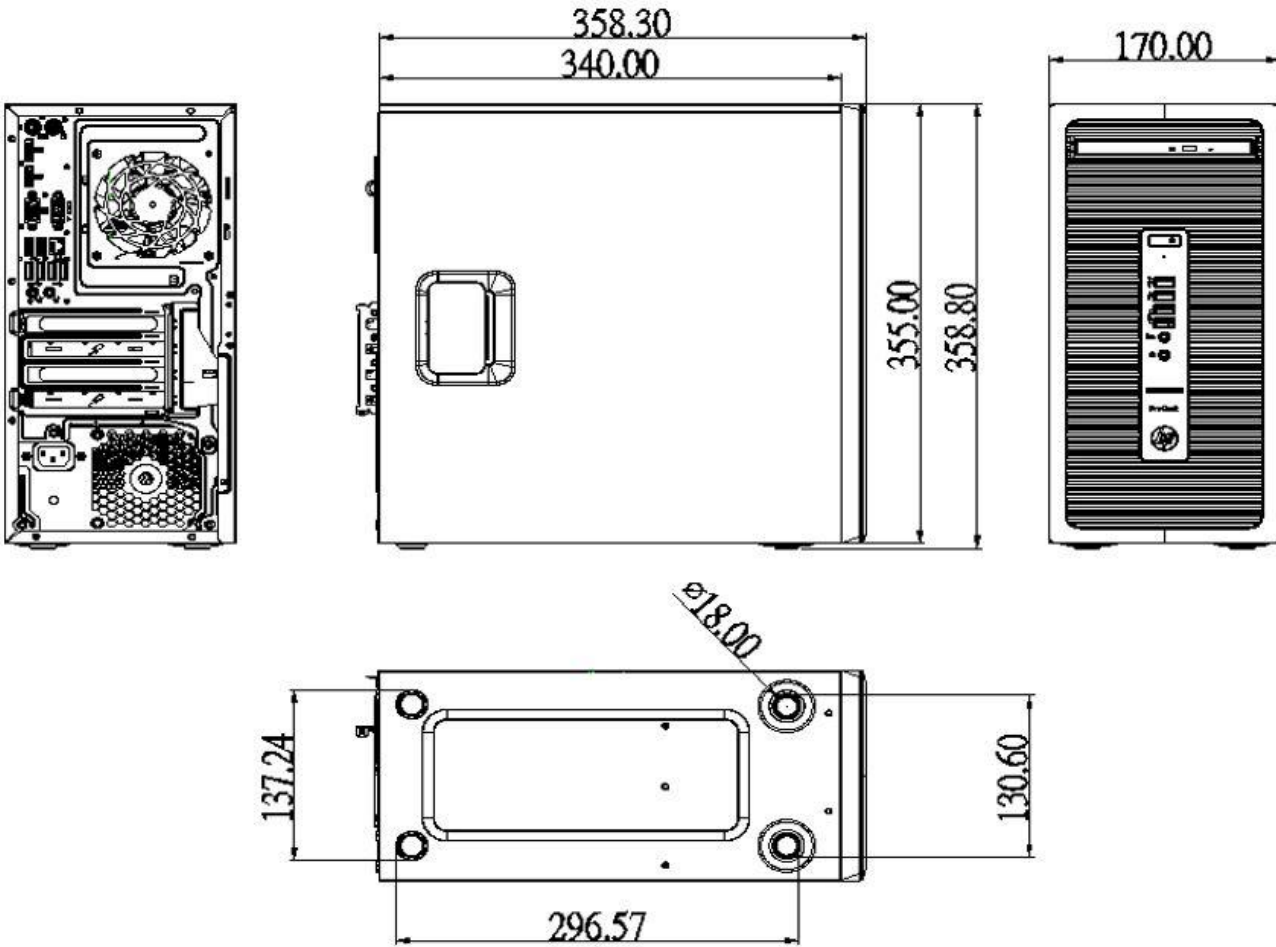


#### MICROTOWER DIMENSIONS

# QuickSpecs

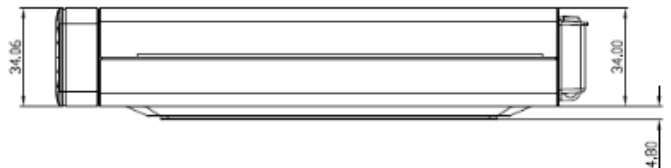
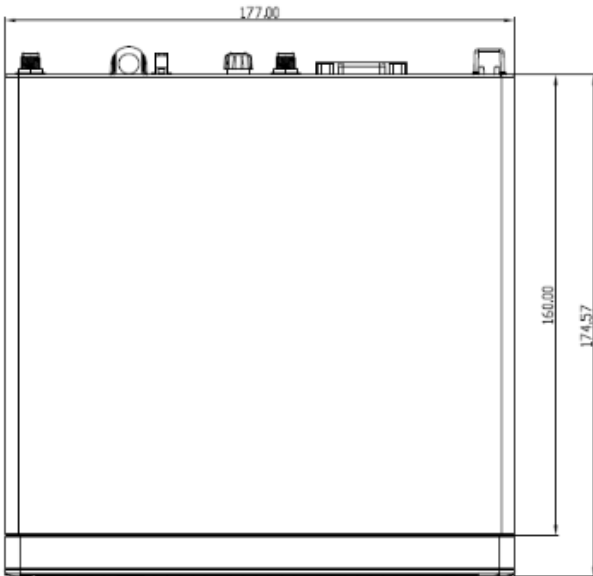
## HP Elite 705 G3 Business Desktop Business PCs

### Technical Specifications – Weights & Dimensions



### Technical Specifications – Weights & Dimensions

#### DESKTOP MINI DIMENSIONS



### Technical Specifications – Environmental Data

## Environmental Data

### 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.
- 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:
  - Number of 1-second red LED blinks followed by a 2-second pause, then repeats:
    - 2 - processor thermal protection activated
    - 3 - processor not installed
    - 4 - power supply failure
    - 5 -- memory error
    - 6 - video error
    - 7 - PCA failure (ROM detected failure prior to video)
    - 8 - invalid ROM, boot block recovery mode
    - 9 - system not fetching code
    - 10 - system hang while loading an option ROM
- HP PC Hardware Diagnostics UEFI:
  - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Dual Color Power and HD LED - To Indicate Normal Operations and Fault Conditions
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Green Pull Tabs (SFF), and Quick Release Latches for easy Identification

### Additional Features

#### Description

#### Tower Orientation

Product can be oriented as either a desktop (horizontal) or a tower (vertical)

#### SFF only Drive Lock

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

#### Drive Protection System

DPS Access through F10 Setup during Boot

### Technical Specifications – Environmental Data

A diagnostic hard drive self- test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user

Running independently of the operating system, it can be accessed through a Windows-based diagnostics utility or through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced

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

**SMART Technology (Self-Monitoring, Analysis and Reporting Technology)** Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted

**SMART I - Drive Failure Prediction**

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

**SMART II - Off-Line Data Collection**

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

**SMART III - Off-Line Read Scanning with Defect Reallocation**

IOEDC: I/O Error Detection Circuitry

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

Detects errors in Read/Write buffers on HDD cache RAM

Interface in F10 setup provides confirmation of SMART IV support.

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

**Eco-Label Certifications & declarations**

- IT ECO declaration
- US ENERGY STAR®
- EPEAT <Gold> registered in the United States. See <http://www.epeat.net> for registration status in your country.

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

### System Configuration

#### HP Elite 705 G3 Business Desktop Microtower Business PC

Energy Consumption (in accordance with US ENERGY STAR® test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	25.04 W	23.55 W	26.95 W
Normal Operation (Long idle)	23.96 W	22.32 W	25.98 W
Sleep	1.33 W	1.51 W	1.31 W
Off	0.95 W	0.12 W	0.94 W

### Technical Specifications – Environmental Data

	<p><b>Note:</b> Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p>		
<b>Heat Dissipation*</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	86 BTU/hr	81 BTU/hr	92 BTU/hr
Normal Operation (Long idle)	82 BTU/hr	76 BTU/hr	89 BTU/hr
Sleep	5 BTU/hr	5 BTU/hr	4 BTU/hr
Off	3 BTU/hr	0.4 BTU/hr	3 BTU/hr
	<p>*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>		
<b>Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)</b>	Sound Power (L <sub>WAd</sub> , bels)		Sound Pressure (L <sub>pAm</sub> , decibels)
Typically Configured – Idle	3.3		23
Fixed Disk – Random writes	3.5		24
<b>Longevity and Upgrading</b>	<p>This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:</p> <ul style="list-style-type: none"> <li>• 10 USB ports</li> <li>• 4 memory slots</li> <li>• 1 PCIe 3.0, x16 slot</li> <li>• 1 PCIe 3.0, x4 slot using x16 conector</li> <li>• 2 PCIe 3.0, x1 slot</li> <li>• 1 external bay supporting one slim ODD or removable drive</li> <li>• 2 internal 3.5" bays supporting up to two 3.5" hard drives</li> <li>• (HDD/SSD/SED/SSHD)</li> <li>• 1external SD 4.0 Reader</li> </ul> <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>		
<b>Batteries</b>	<p>This battery(s) in this product comply with EU Directive 2006/66/EC</p> <p>Batteries used in the product do not contain:            Mercury greater the1ppm by weight            Cadmium greater than 20ppm by weight</p>		



### Technical Specifications – Environmental Data

	Battery size: CR2032 (coin cell) Battery type: Lithium		
<b>Additional Information</b>	<ul style="list-style-type: none"> <li>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.</li> <li>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.</li> <li>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).</li> <li>This product is in compliance with the IEEE 1680 (EPEAT) standard at the &lt;gold&gt; level, see <a href="http://www.epeat.net">www.epeat.net</a></li> <li>Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.</li> <li>This product contains 20.3% post-consumer recycled plastic (by wt.)</li> <li>This product is 92.8% recycle-able when properly disposed of at end of life.</li> </ul>		
<b>Packaging Materials</b>	<b>External:</b>	PAPER/Corrugated	1180 g
	<b>Internal:</b>	PLASTIC/Plast. Other	103 g
		PLASTIC/Polyethylene low density	56 g
		PLASTIC/Polystyrene	15 g
	The EPE foam packaging material is made from 75% recycled content.		
The corrugated paper packaging materials contains at least 32% recycled content.			
<b>Material Usage</b>	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf</a> ): <ul style="list-style-type: none"> <li>Asbestos</li> <li>Certain Azo Colorants</li> <li>Certain Brominated Flame Retardants – may not be used as flame retardants in plastics</li> <li>Cadmium</li> <li>Chlorinated Hydrocarbons</li> <li>Chlorinated Paraffins</li> <li>Formaldehyde</li> <li>Halogenated Diphenyl Methanes</li> <li>Lead carbonates and sulfates</li> <li>Lead and Lead compounds</li> <li>Mercuric Oxide Batteries</li> <li>Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li> <li>Ozone Depleting Substances</li> <li>Polybrominated Biphenyls (PBBs)</li> <li>Polybrominated Biphenyl Ethers (PBBEs)</li> <li>Polybrominated Biphenyl Oxides (PBBOs)</li> <li>Polychlorinated Biphenyl (PCB)</li> <li>Polychlorinated Terphenyls (PCT)</li> <li>Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.</li> <li>Radioactive Substances</li> <li>Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>		

### Technical Specifications – Environmental Data

<b>Packaging Usage</b>	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.</li> <li>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>• Design packaging materials for ease of disassembly.</li> <li>• Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>• Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>• Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>		
<b>End-of-life Management and Recycling</b>	<p>Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/go/reuse-recycle">http://www.hp.com/go/reuse-recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <a href="http://www.hp.com/go/recyclers">http://www.hp.com/go/recyclers</a>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>		
<b>Hewlett-Packard Corporate Environmental Information</b>	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report  <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a>  Eco-label certifications  <a href="http://www8.hp.com/us/en/hp-information/environment/ecolabels.html">http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</a>  ISO 14001 certificates:  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf</a>  and  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</a></p>		
<b>HP Elite 705 G3 Business Desktop Mini Business PC</b>			
<b>Eco-Label Certifications &amp; declarations</b>	<p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> <li>• IT ECO declaration</li> <li>• US ENERGY STAR®</li> <li>• EPEAT &lt;Gold&gt; registered in the United States. See <a href="http://www.epeat.net">http://www.epeat.net</a> for registration status in your country.</li> </ul>		
<b>System Configuration</b>	<p>The configuration used for the Energy Consumption and Declared Noise Emissions data for the Ultra-slim Desktop model is based on a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p>		
<b>Energy Consumption (in accordance with US ENERGY STAR® test method)</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>

### Technical Specifications – Environmental Data

Normal Operation (Short idle)	10.22 W	10.40 W	10.08 W
Normal Operation (Long idle)	9.82 W	9.87 W	9.71 W
Sleep	1.06 W	1.08 W	1.06 W
Off	1.09 W	1.11 W	1.08 W
	<p><b>Note:</b> Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.</p>		
<b>Heat Dissipation*</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	35 BTU/hr	36 BTU/hr	34 BTU/hr
Normal Operation (Long idle)	34 BTU/hr	34 BTU/hr	33 BTU/hr
Sleep	4 BTU/hr	4 BTU/hr	4 BTU/hr
Off	4 BTU/hr	4 BTU/hr	4 BTU/hr
	<p>*NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>		
<b>Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)</b>	Sound Power (L <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)	
Typically Configured – Idle	2.9	19	
Fixed Disk – Random writes	2.9	19	
<b>Longevity and Upgrading</b>	<p>This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:</p> <ul style="list-style-type: none"> <li>• 6 USB ports</li> <li>• 2 memory slots</li> <li>• 2 M.2 PCIe slots</li> <li>• 1 internal 2.5" bay supporting a 2.5" hard drives (HDD/SSD/SED/SSHD)</li> </ul> <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>		
<b>Batteries</b>	<p>This battery(s) in this product comply with EU Directive 2006/66/EC</p> <p>Batteries used in the product do not contain: Mercury greater the 1ppm by weight</p>		

### Technical Specifications – Environmental Data

	Cadmium greater than 20ppm by weight		
	Battery size: CR2032 (coin cell) Battery type: Lithium		
<b>Additional Information</b>	<ul style="list-style-type: none"> <li>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.</li> <li>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.</li> <li>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).</li> <li>This product is in compliance with the IEEE 1680 (EPEAT) standard at the &lt;gold&gt; level, see <a href="http://www.epeat.net">www.epeat.net</a></li> <li>Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.</li> <li>This product contains 0% post-consumer recycled plastic (by wt.)</li> <li>This product is 93.1% recycle-able when properly disposed of at end of life.</li> </ul>		
<b>Packaging Materials</b>	<b>External:</b>	PAPER/Corrugated	566 g
	<b>Internal:</b>	PLASTIC/EPE-Expanded Polyethylene	57.8 g
		PLASTIC/Polyethylene low density	7 g
	The EPE foam packaging material is made from 0% recycled content.		
	The corrugated paper packaging materials contains at least 0% recycled content.		
<b>Material Usage</b>	<p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf</a>):</p> <ul style="list-style-type: none"> <li>Asbestos</li> <li>Certain Azo Colorants</li> <li>Certain Brominated Flame Retardants – may not be used as flame retardants in plastics</li> <li>Cadmium</li> <li>Chlorinated Hydrocarbons</li> <li>Chlorinated Paraffins</li> <li>Formaldehyde</li> <li>Halogenated Diphenyl Methanes</li> <li>Lead carbonates and sulfates</li> <li>Lead and Lead compounds</li> <li>Mercuric Oxide Batteries</li> <li>Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li> <li>Ozone Depleting Substances</li> <li>Polybrominated Biphenyls (PBBs)</li> <li>Polybrominated Biphenyl Ethers (PBBEs)</li> <li>Polybrominated Biphenyl Oxides (PBBOs)</li> <li>Polychlorinated Biphenyl (PCB)</li> <li>Polychlorinated Terphenyls (PCT)</li> <li>Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.</li> <li>Radioactive Substances</li> <li>Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>		

### Technical Specifications – Environmental Data

<b>Packaging Usage</b>	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.</li> <li>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>• Design packaging materials for ease of disassembly.</li> <li>• Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>• Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>• Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
<b>End-of-life Management and Recycling</b>	<p>Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/go/reuse-recycle">http://www.hp.com/go/reuse-recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p> <p>The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <a href="http://www.hp.com/go/recyclers">http://www.hp.com/go/recyclers</a>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.</p>
<b>Hewlett-Packard Corporate Environmental Information</b>	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report  <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a></p> <p>Eco-label certifications  <a href="http://www8.hp.com/us/en/hp-information/environment/ecolabels.html">http://www8.hp.com/us/en/hp-information/environment/ecolabels.html</a></p> <p>ISO 14001 certificates:  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf</a>          and  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf">http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf</a></p>

After-Market Options (availability may vary by region)

### After Market Options

#### Business Monitors

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP EliteDisplay E272q 27-inch QHD Monitor	X	X	M1P04AA-
HP EliteDisplay E240c 23.8-inch Video Conferencing Monitor	X	X	M1P00AA
HP EliteDisplay E242 24-inch Monitor	X	X	M1P02AA

#### Communication Devices

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
Intel® Ethernet I210 - T1 Gbe NIC	X		E0X95AA
Intel® 7265 802.11ac 2x2 DualBand Combo PCIe x1 Card	X		N4G85AA

#### Graphics Solutions

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
NVIDIA® GeForce® GT 730 2GB PCIe x8 Card	X		N3R90AA
NVIDIA® GeForce® GT 720 2GB PCIe x16 Card (China only)	MT Only		T4E57AA
NVIDIA® Quadro® NVS 310 1GB PCIe x16 Card	X		M6V51AA
AMD® Radeon™ R9 350 2GB DH PCIe x16 Card	MT Only		N3R91AA
HP UHD USB Graphics Adapter	X	X	N2U81AA
HP DisplayPort Cable Kit	X	X	VN567AA
HP DisplayPort To DVI-D Adapter	X	X	FH973AA
HP DisplayPort To VGA Adapter	X	X	AS615AA
HP DisplayPort To HDMI 4k Adapter	X	X	K2K92AA
HP DVI to DVI Cable	X	X	DC198A
HP (Bulk) 700mm DisplayPort Cable Kit		X	V8Y77A6

#### Data Storage Drives

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP 500GB 7200PRM SATA 6.0Gb/s 3.5" Hard Drive	X		QK554AA
HP 1TB 7200rpm SATA 6Gb/s 3.5" Hard Drive	X		QK555AA
HP 256GB SATA TLC Solid State Drive	X	X	P1N68AA
HP 128GB SATA Solid State Drive	X	X	QV063AA
HP 128Gb SED Opal 2 Solid State Drive Desktop	X	X	G1K24AA
Intel Pro 2500 180GB SATA SED Opal2 Solid State Drive	X	X	P3X90AA
HP 256GB Turbo Drive G2 M.2 SSD Drive		X	J5V07AA
HP 256GB Turbo Drive G2 PCIe SSD Drive	X		T7W25AA
HP 9.5mm Slim Removable SATA 500GB	X		T7G14AA
HP 256GB SATA Value Non-SED Solid State Drive	X	X	W0U55AA
HP 256GB SATA TLC Non-SED Solid State Drive	X	X	P1N68AA

#### Input Devices

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP Conferencing Keyboard	X	X	K8P74AA

### After-Market Options (availability may vary by region)

HP USB Business Slim Keyboard	X	X	N3R87AA
HP PS/2 Business Slim Keyboard	X		N3R86AA
HP Wireless Business Slim Keyboard and Mouse**	X	X	QY449AA
HP USB Grey Keyboard (EMEA only)	X	X	B6B64AA
HP USB Smart Card (CCID) Keyboard	X	X	BV813AA
HP USB Keyboard and Mouse Kit	X	X	B1T09AA
HP USB Washable Keyboard**	X	X	VF097AA
HP USB PS/2 Washable Mouse**	X	X	BM866AA
HP USB PS/2 Washable Keyboard and Mouse Kit**	X	X	BU207AA
HP USB Grey Mouse (EMEA only)	X	X	K7W54AA
HP USB Keyboard and Mouse (China Only)	X	X	K7X25AA
HP USB Hardened Mouse	X	X	P1N77AA
HP PS/2 Mouse	X		QY775AA
HP PS/2 Keyboard	X		DT527AA
HP USB Mouse	X	X	QY777AA
HP USB 1000dpi Laser Mouse	X	X	QY778AA
** Keyboard contains 25% post-consumer recycled plastic material			

### Desktop Mini Accessories

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP Desktop Mini DVD DVD-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 Vertical Chassis Stand		X	G1K23AA
HP Desktop Mini LockBox		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

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP 4GB DDR4-2400 DIMM	X		Z9H59AA
HP 8GB DDR4-2400 DIMM	X		Z9H60AA
HP 16GB DDR4-2400 DIMM	X		Z9H57AA
HP 4GB DDR4-2400 SoDIMM		X	Z9H55AA
HP 8GB DDR4-2400 SoDIMM		X	Z9H56AA
HP 16GB DDR4-2400 SoDIMM		X	Z9H53AA

After-Market Options (availability may vary by region)

### Multimedia Devices

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP 9.5mm Desktop G2 Slim DVD-ROM Drive	X		N1M41AA
HP 9.5mm Desktop G2 Slim DVD Writer Drive	X		N1M42AA
HP 9.5mm Desktop G2 Slim SATA BDXL Blu-Ray Writer	X		N1M43AA
HP Business Headset v2	X	X	T4E61AA
HP USB Business Speakers v2	X	X	N3R89AA

### Security Devices

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP 2014 Solenoid Lock and Hood Sensor (SFF only)	SFF only		J6L43AA
HP 2014 Solenoid Lock and Hood Sensor (MT only)	MT only		J6L42AA
HP SFF Wall Mount/Security Sleeve	SFF only		VN570AA
HP Business PC Security Lock v2 Kit	X		N3R93AA
HP Keyed Cable Lock 10mm Kit	X	X	T1A62AA
HP Dual Head Keyed Cable Lock Kit	X	X	T1A64AA

### Stands and Accessories

	<u>SFF/MT</u>	<u>DM</u>	<u>Part Number</u>
HP Integrated Work Center Stand v3 (SFF)	SFF only		F2P06AA
HP SFF Tower Stand	SFF only		VN569AA
HP (10 Sets) 400/600/705 G2 MicroTower Bezel Support Kit	MT only		N1M44AA
HP (10 Sets) 600/705/800 G2 SFF Bezel Support Kit	SFF only		N7H10AA
HP Serial Port Adapter (RS-232 compatible)	X		PA716A
HP Type-C™ to USB 3 Adapter		X	N2Z63AA
HP PCIe x1 Parallel Port Card	X		N1M40AA
HP SuperSpeed USB 3.1 Gen 2 PCIe x1 Card	X		P1N75AA
HP Single Monitor Arm	X	X	BT861AA

### LANDESK Software (e-delivery)

	<u>Part Number</u>
Contact your HP representative for available options.	N/A



### After-Market Options (availability may vary by region)

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### Change Log

Date	Version History	Action	Description of Change
September 20, 2016	Version 1 to 2	Changed	Operating systems
September 21, 2016	Version 2 to 3	Added	Environmental data
September 26, 2016	Version 3 to 4	Changed	Maximum Memory Bandwidth
November 29, 2016	Version 4 to 5	Updated	At a glance, Operating Systems and Processors section were updated.
December 5, 2016	Version 5 to 6	Updated	SuperMulti references deleted
February 7, 2017	Version 6 to 7	Update	Processor section - For all processors 'Supports AMD® DASH 1.2 Technologies' instead of 1.1 AMD Standard Manageability section – “Includes DASH 1.2 compliance plus:” instead of 1.1
March 9, 2017	Version 7 to 8	Update	Technical Specifications Section updated (Graphics)
March 16, 2017	Version 8 to 9	Added	Processor added in Operating System section
March 31, 2017	Version 9 to 10	Update	OS and software components updated
May 11, 2017	Version 10 to 11	Update	Graphics section updated, HDMI 2.0a for 1.4b. Processor Section updated
June 14, 2017	Version 11 to 12	Update	Processor disclaimer added
June 29, 2017	Version 12 to 13	Update	Processor refresh and graphic card additions.
July 13, 2017	Version 13 to 14	Update	Operating System section updated; Processors AMD® Ryzen section updated.
July 21, 2017	Version 14 to 15	Update	Overview disclaimer added Slots section updated
July 26, 2017	Version 15 to 16	Update	HP BIOS section updated
July 26, 2017	Version 16 to 17	Update	HP Touchpoint Manager mention deleted from "Manageability" features on the SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS section
August 17, 2017	Version 17 to 18	Update	HP Fingerprint Sensor feature removed from client security software section
August 24, 2017	Version 18 to 19	Update	AMD® PRO A8-8670E with AMD® Radeon™ R7 Graphics specs added to processors section
August 28, 2017	Version 19 to 20	Update	RAM DDR4 transfer rate changed to 2400 on SFF, MT and MD
August 29, 2017	Version 20 to 21	Update	Ryzen 7 Pro processor information added and “Discrete-class graphics” deleted from Ryzen 5 and 3 sections
September 5, 2017	Version 21 to 22	Update	Max Boost Frequency changed to 3.3 on AMD® PRO A8-8670E with AMD® Radeon™ R7 Graphics specs on processors section
September 15, 2017	Version 22 to 23	Update	Typo corrected on AMD Ryzen 7 PRO 1700X Processor (X added) on processors section
September 19, 2017	Version 23 to 24	Update	Up to 3.9 GHz Max. Boost Frequency (3.2 GHz base frequency) Changed to Up to <b>3.4</b> GHz Max. Boost Frequency ( <b>3.0</b> GHz base frequency) on PRO A6-9500E, processors section
September 25, 2017	Version 24 to 25	Update	1 x Dual-Link DVI-I, 2x Display Port, changed to 1 x Dual-Link DVI-I, 1x Display Port, 1x HDMI on output connector 's section for AMD Radeon™ R7 450 4GB PCIe x16 processor
October 2, 2017	Version 25 to 26	Update	AMD Ryzen™ 3 PRO 1300 Processor added
October 5, 2017	Version 26 to 27	Update	Cache info updated on AMD® Ryzen™ processors
October 16, 2017	Version 27 to 28	Update	“Multi-unit packaging” and “Shipping weight” added to Weights and dimensions table
October 30, 2017	Version 28 to 29	Update	USB Callouts updated
November 9, 2017	Version 29 to 30	Update	AMD Ryzen™ Typo corrected
December 18, 2017	Version 30 to 31	Update	AMD® Ryzen™ 5 PRO 1600 Processor added

### Change Log

January 3, 2018	Version 31 to 32	Update	Power factor information table added to Power supply section
January 29, 2018	Version 32 to 33	Update	Memory AMO kits updated
March 8, 2018	Version 33 to 34	Update	Footnote added to Ports -Standard section
March 12, 2018	Version 34 to 35	Update	GT 730 2GB graphic card graphics memory spec fixed to be 64-bit.
March 23, 2018	Version 35 to 36	Update	Qty for rear USB 2.0 ports changed to 2
April 12, 2018	Version 36 to 37	Update	Standard Section
April 13, 20	Version 37 to 38	Update	AMD Radeon™ R7 430 2GB LP 2DP PCIe x16 GF card specs added to MT and SFF
April 18, 2018	Version 38 to 39	Update	AMD Radeon™ R7 430 2GB LP 2DP PCIe x16 GF card specs updated
June 7, 2018	Version 39 to 40	Update	Processors
June 12, 2018	Version 40 to 41	Update	Processors section
July 11, 2018	Version 41 to 42	Update	Note added to RAID specs in HDD section