

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

## HP ProDesk 405 G6 Desktop Mini PC\*



### Front

#### **AMD Ryzen™ 4000 Series Processors Configuration**

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

#### **AMD Ryzen™ & Athlon™ 3000 Series Processors Configuration**

2. (2) Type-A SuperSpeed USB 5Gbps signaling rate port

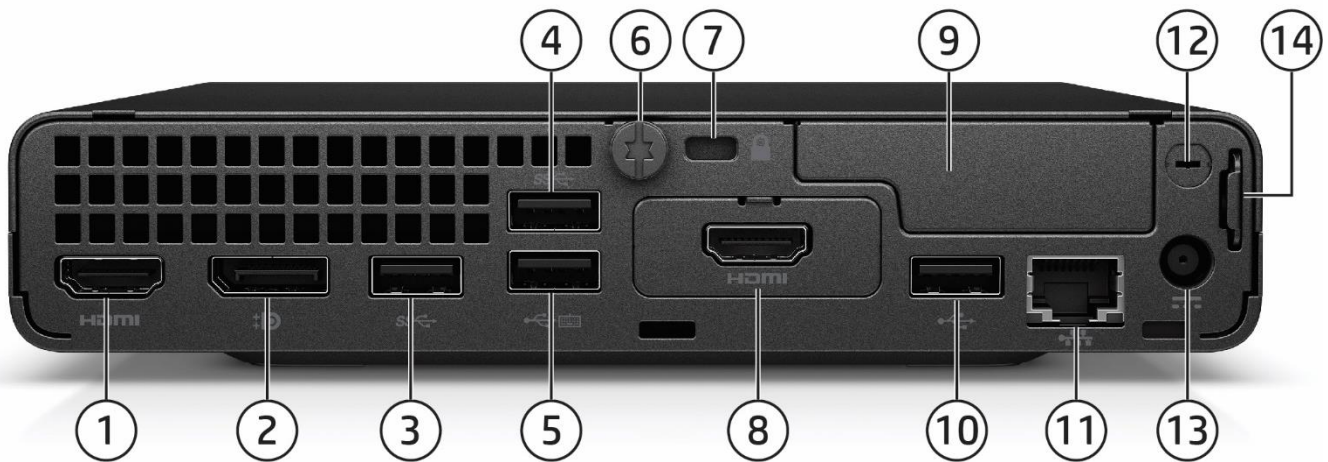
#### **Not Shown**

- (2) M.2 (1 as M.2 2230 socket for WLAN/BT and 1 as M.2 2280 socket for storage)  
(1) 2.5" internal storage drive bay

**\*NOTE:** Both series processors have the same general front call outs configuration, except by the call outs #2 and #3

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

## HP ProDesk 405 G6 Desktop Mini PC\*



### Rear

#### AMD Ryzen™ 4000 Series Processors Configuration

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

#### AMD Ryzen™ & Athlon™ 3000 Series Processors Configuration

4. Type-A SuperSpeed USB 5Gbps signaling rate port  
(Supporting wake from S4 with keyboard/mouse connected and enabled in BIOS)
5. Type-A SuperSpeed USB 5Gbps signaling rate port  
(Supporting wake from S4/S5 with keyboard/mouse connected and enabled in BIOS)

**\*NOTE:** Both series processors have the same general rear call outs configuration, except by the call outs #4 and #5

1. Sold separately or as an optional feature.

2. Must be configured at time of purchase.

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

## HP ProDesk 405 G6 Small Form Factor PC



### Front

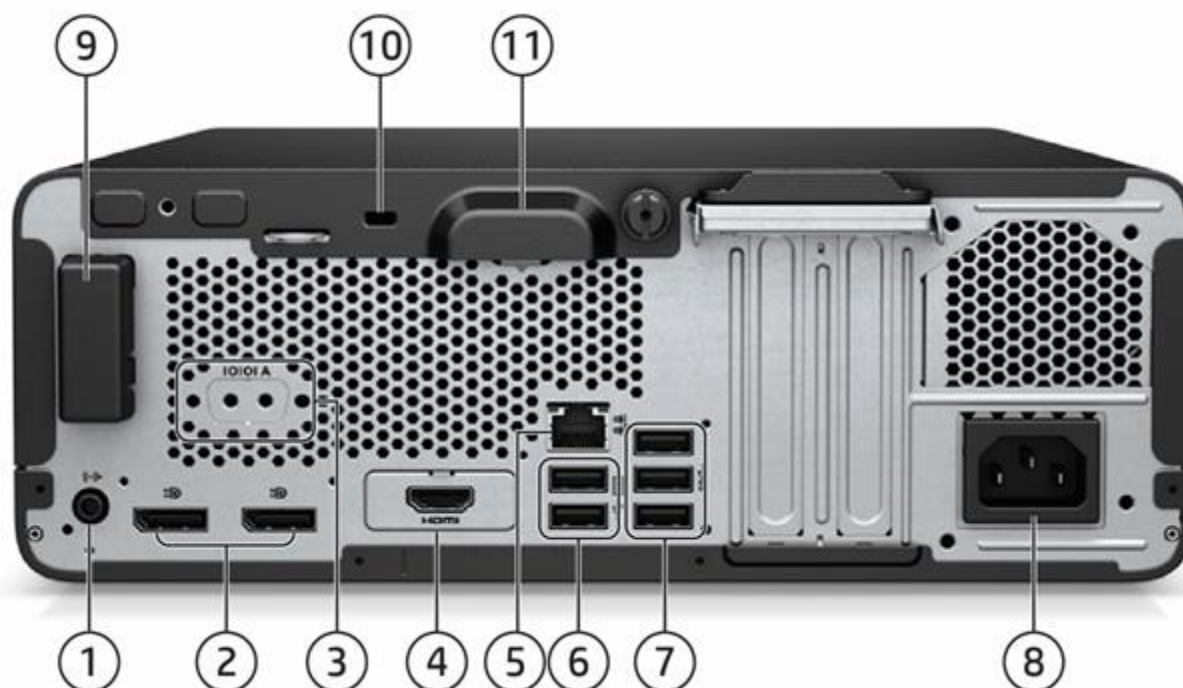
- |  |   |
|--|---|
| 1. Slim optical drive (optional)                       | 4. Combo Audio Jack with CTIA and headset support |
| 2. SD card 4.0 reader (optional)                       | 5. Dual-state power button                        |
| 3. (4) Type-A SuperSpeed USB 5Gbps signaling rate port | 6. Hard drive activity light                      |

### **Not Shown**

- (1) PCI Express x16
- (1) PCI Express x1
- (2) M.2 (1 as M.2 2230 socket for WLAN/BT and 1 as M.2 2280 socket for storage)

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

## HP ProDesk 405 G6 Small Form Factor PC



### Rear

1. Audio-out connector
2. (2) Dual-Mode DisplayPort™ 1.4 (DP++)
3. Serial Port (Optional)
4. Flex Port, choice of:
  - DisplayPort™ 1.4      • VGA
  - HDMI 2.0a          • Serial
  - Dual Type-A SuperSpeed USB 5Gbps signaling rate
  - Type-C™ SuperSpeed USB 10Gbps signaling rate with DisplayPort™ Alt mode
5. RJ45 network connector
6. (2) Type-A Hi-Speed USB 480Mbps signaling rate port (Supporting wake from S4 with keyboard/mouse connected and enabled in BIOS)
7. (3) Type-A SuperSpeed USB 5Gbps signaling rate port
8. Power cord connector
9. Internal WLAN antenna cover (optional)
10. Standard cable lock slot
11. Integrated accessory cable lock

### Not Shown

#### Port

Optional PS/2 (2 ports) & serial port card<sup>1</sup> (connected with mainboard via flyer cable)

Optional parallel port<sup>1</sup>

Optional 4 serial port PCIe card<sup>1</sup>

#### Bay

(1) 9.5mm internal optical drive bay

(1) 3.5" internal storage drive bay or (2) 2.5" internal storage drive bays<sup>2</sup>

1. Each of the legacy options will occupy one rear slot.

2. SFF can be configured with either (1) 3.5" or (2) 2.5" internal storage drive (2.5-inch drive needs adapter that can only be purchased when configuring the PC from factory with a 2.5" drive)

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

## AT A GLANCE

- Choice of Small Form Factor and Desktop Mini form factors
- Latest AMD® Ryzen™ PRO and Athlon PRO processors<sup>1</sup> with Radeon™ Vega Graphics
- HP developed and engineered UEFI V2.7 BIOS supporting security, manageability and software image stability
- DASH KVM is available for both SFF and DM
- Choice of Windows 10 Professional, Windows 10 Home, and FreeDOS
- Integrated 10/100/1000 Ethernet Controller, with optional Wi-Fi 6 (802.11ax) and Wi-Fi 5 (802.11ac) and Bluetooth®
- Up to 64GB of DDR4 Synchronous Dynamic Random Access Memory (SDRAM)
- Support for up to three video outputs via two standard video connectors and an optional third video port connector which provides the following choices: DisplayPort™, HDMI™, VGA, or USB Type-C® with DisplayPort™ Output
- Reduce clutter on DM with single cable connection for power and video through USB Type-C® enabled displays with the optional USB Type-C® port w/ DisplayPort Alt Mode and power intake via USB Type-C® Power Delivery up to 100W; reduce desktop footprint with the DM mounted behind a USB Type-C® enabled display or enable a “All-in-One” experience by docking into HP Mini-in-One 24 Display
- Optional Serial port available on all form factors
- Multiple HDD data drives set up in a SATA RAID array for MT/SFF and support RAID 1 configured from factory.
- Optimized chassis design for SFF enabling dual 2.5" internal storage drives
- Integrated accessory cable lock helps secure cabled mouse and keyboard on SFF
- Trusted Platform Module (TPM) 2.0<sup>2</sup>
- HP BIOSphere Gen6
- HP Client Security Manager Gen6
- HP Sure Click
- HP Manageability Integration Kit Gen4
- HP Image Assistant Gen5
- HP Support Assistant
- High efficiency energy saving power supply
- ENERGY STAR® certified. EPEAT ® 2019 registered where applicable. EPEAT ® registration varies by country. See <http://www.epeat.net> for registration status by country.<sup>4</sup>
- Low halogen<sup>3</sup>
- Dust filter available
- Protected by HP Services, including limited warranties up to 3-3-3 (terms and conditions vary by country; certain restrictions and exclusions apply); Care Packs available with up to 5 years Next Business Day Onsite Hardware Support
- Compliance with CE (Class B) / FCC (Class B) / UL (UL60950-1 / UL62368-1) / CSA (CSA C22.2 No.60950-1-07 / CSA C22.2 No. 62368-1-14) / ICES-003 / CCC / VCCI (Class B) / KCC (Class B)

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

2. In some scenarios, machines pre-configured with Windows OS might ship with TPM turned off

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

4. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit <http://www.epeat.net> for more information.

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

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

PRODUCT NAME

HP ProDesk 405 G6 Desktop Mini PC  
HP ProDesk 405 G6 Small Form Factor PC

OPERATING SYSTEM

Preinstalled	Windows 11 Pro <sup>1</sup>
	Windows 11 Pro Education <sup>1</sup>
	Windows 11 Home - HP recommends Windows 11 Pro for business <sup>1</sup>
	Windows 10 Pro <sup>1,2</sup>
	Windows 10 Pro Education <sup>1,2</sup>
	Windows 10 Home - HP recommends Windows 11 Pro for business <sup>1,2</sup>
Web Support	FreeDOS
	Windows 10 Pro (Windows 10 Enterprise available with a Volume Licensing Agreement) <sup>1</sup>

1. Device comes with Windows 10 and a free Windows 11 upgrade or may be preloaded with Windows 11. Upgrade timing may vary by device. Features and app availability may vary by region. Certain features require specific hardware (see Windows 11 Specifications).
2. 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 is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees apply and additional requirements may apply over time for updates. See <http://www.windows.com>.
3. This system is preinstalled with Windows 10 Pro software and also comes with a license for Windows 11 Pro software and provision for recovery 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.
- NOTE:** HP tested Windows 10, version 1909 on this platform. For testing information on newer versions of Windows 10, please see <https://support.hp.com/document/c05195282>.

CHIPSET

	<u>DM</u>	<u>SFF</u>
AMD® PRO 565	X	X

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

## PROCESSORS

AMD® Ryzen™ 4000 Series Processors	DM	SFF
<b>AMD® Ryzen™ 7 PRO 4750G</b> 65W, 8 Cores, 16 threads 3.6 GHz base frequency, up to 4.4 GHz max. 384 KB L1 cache, 4 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2100MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
<b>AMD® Ryzen™ 7 PRO 4750GE</b> 35W, 8 Cores, 16 threads 3.1 GHz base frequency, up to 4.3 GHz max. 384 KB L1 cache, 4 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2100MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	
<b>AMD® Ryzen™ 7 4700G</b> 65W, 8 Cores, 16 threads 3.6 GHz base frequency, up to 4.4 GHz max. 512 KB L1 cache, 4 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2100MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
<b>AMD® Ryzen™ 7 4700GE</b> 35W, 8 Cores, 16 threads 3.1 GHz base frequency, up to 4.3 GHz max. 512 KB L1 cache, 4 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2100MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	
<b>AMD® Ryzen™ 5 PRO 4650G</b> 65W, 6 Cores, 12 threads 3.7 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 3 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
<b>AMD® Ryzen™ 5 PRO 4650GE</b> 35W, 6 Cores, 12 threads 3.3 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 3 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	
<b>AMD® Ryzen™ 5 4600G</b> 65W, 6 Cores, 12 threads 3.7 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 3 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
<b>AMD® Ryzen™ 5 4600GE</b> 35W, 6 Cores, 12 threads 3.5 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 3 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	

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

AMD® Ryzen™ 3 PRO 4350G 65W, 4 Cores, 8 threads 3.8 GHz base frequency, up to 4.0 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
AMD® Ryzen™ 3 PRO 4350GE 35W, 4 Cores, 8 threads 3.5 GHz base frequency, up to 4.0 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	
AMD® Ryzen™ 3 4300G 65W, 4 Cores, 8 threads 3.8 GHz base frequency, up to 4.0 GHz max. 256 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate		<b>X</b>
AMD® Ryzen™ 3 4300GE 35W, 4 Cores, 8 threads 3.5 GHz base frequency, up to 4.0 GHz max. 256 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate	<b>X</b>	

## AMD® Ryzen™ 3000 Series Processors

	<b><u>DM</u></b>	<b><u>SFF</u></b>
APU AMD Ryzen™ 5 PRO 3400G 65W, 4 Cores, 8 threads 3.7 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Vega 11 Graphics Supports DDR4 memory up to 2933 MT/s data rate		<b>X</b>
APU AMD Ryzen™ 5 PRO 3400GE 35W, 4 Cores, 8 threads 3.3 GHz base frequency, up to 4.0 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Vega 11 Graphics Supports DDR4 memory up to 2933 MT/s data rate	<b>X</b>	
APU AMD Ryzen™ 5 PRO 3350G 65W, 4 Cores, 8 threads 3.6 GHz base frequency, up to 4.0 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics Supports DDR4 memory up to 2933 MT/s data rate		<b>X</b>
APU AMD Ryzen™ 5 PRO 3350GE 35W, 4 Cores, 8 threads 3.3 GHz base frequency, up to 3.9 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics Supports DDR4 memory up to 2933 MT/s data rate	<b>X</b>	

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

<b>APU AMD Ryzen™ 3 PRO 3200G</b> 65W, 4 Cores, 4 threads 3.6 GHz base frequency, up to 4.0 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Vega 8 Graphics Supports DDR4 memory up to 2933 MT/s data rate		<b>X</b>
<b>APU AMD Ryzen™ 3 PRO 3200GE</b> 35W, 4 Cores, 4 threads 3.3 GHz base frequency, up to 3.8 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Vega 8 Graphics Supports DDR4 memory up to 2933 MT/s data rate	<b>X</b>	

## AMD® Athlon™ 3000 Series Processors

	<b><u>DM</u></b>	<b><u>SFF</u></b>
<b>APU AMD Athlon™ Gold PRO 3150G</b> 65W, 4 Cores, 4 threads 3.5 GHz base frequency, up to 3.9 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics Supports DDR4 memory up to 2933 MT/s data rate		<b>X</b>
<b>APU AMD Athlon™ Gold PRO 3150GE</b> 35W, 4 Cores, 4 threads 3.3 GHz base frequency, up to 3.8 GHz max. 384 KB L1 cache, 2 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics Supports DDR4 memory up to 2933 MT/s data rate	<b>X</b>	
<b>APU AMD Athlon™ Silver PRO 3125GE</b> 35W, 2 Cores, 4 threads 3.4 GHz base frequency 384 KB L1 cache, 1 MB L2 cache, 4 MB L3 cache Integrated Radeon™ Graphics Supports DDR4 memory up to 2666 MT/s data rate	<b>X</b>	

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

**NOTE:** Memory speed 2400, 2666, 2933 and 3200 MT/s can be achieved via two DIMMs per channel (2DPC) when populated with the same part number.

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

## GRAPHICS

### Integrated Graphics

	<b>DM</b>	<b>SFF</b>
AMD Radeon™ Graphics	<b>X</b>	<b>X</b>

### Optional Discrete Graphics Solutions

	<b>DM</b>	<b>SFF</b>
AMD® Radeon™ R7 430 2GB 2DP		<b>X</b>
AMD® Radeon™ R7 430 2GB DP+VGA		<b>X</b>
AMD® Radeon™ RX 550X 4GB DP+HDMI		<b>X</b>

### Adapters and Cables

	<b>DM</b>	<b>SFF</b>
HP DisplayPort™ Cable	<b>X</b>	<b>X</b>
HP DisplayPort™ to DVI-D Adapter	<b>X</b>	<b>X</b>
HP DisplayPort™ to HDMI True 4K Adapter	<b>X</b>	<b>X</b>
HP DisplayPort™ to VGA Adapter	<b>X</b>	<b>X</b>
HP USB to Serial Port Adapter	<b>X</b>	<b>X</b>

## STORAGE

### 3.5 inch SATA Hard Disk Drives (HDD)\*

	<b>DM</b>	<b>SFF</b>
500GB 7200RPM 3.5in SATA HDD		<b>X</b>
1TB 7200RPM 3.5in SATA HDD		<b>X</b>
2TB 7200RPM 3.5in SATA HDD		<b>X</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.

### 2.5 inch SATA Hard Disk Drives (HDD)\*

	<b>DM</b>	<b>SFF</b>
500GB 7200RPM 2.5in SATA HDD	<b>X</b>	<b>X</b>
1TB 7200RPM 2.5in SATA HDD	<b>X</b>	<b>X</b>
1TB 5400RPM 2.5in SATA HDD	<b>X</b>	<b>X</b>
2TB 5400RPM 2.5in SATA HDD	<b>X</b>	<b>X</b>
500GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD	<b>X</b>	<b>X</b>
500GB 7200RPM 2.5in Self Encrypted Federal Information Processing Standard SATA HDD	<b>X</b>	<b>X</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.

### M.2 PCIe NVMe Solid State Drives (SSD)\*

	<b>DM</b>	<b>SFF</b>
256GB M.2 2280 PCIe NVMe SSD	<b>X</b>	<b>X</b>
512GB M.2 2280 PCIe NVMe SSD	<b>X</b>	<b>X</b>
128GB M.2 2280 PCIe NVMe Three Layer Cell SSD	<b>X</b>	<b>X</b>
256GB M.2 2280 PCIe NVMe Three Layer Cell SSD	<b>X</b>	<b>X</b>
512GB M.2 2280 PCIe NVMe Three Layer Cell SSD	<b>X</b>	<b>X</b>
1TB M.2 2280 PCIe NVMe Three Layer Cell SSD	<b>X</b>	<b>X</b>
2 TB M.2 2280 PCIe NVMe Three Layer Cell SSD	<b>X</b>	<b>X</b>

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

256GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD	<b>X</b>	<b>X</b>
512GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD	<b>X</b>	<b>X</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.

## Optical Disc Drives

	<b>DM</b>	<b>SFF</b>
HP 9.5mm Slim DVD-ROM Drive <sup>1</sup>		<b>X</b>
HP 9.5mm Slim DVD Writer Drive <sup>2</sup>		<b>X</b>
HP 9.5mm Slim Blu-Ray Writer Drive <sup>3</sup>		<b>X</b>

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

2. Don't copy copyright-protected materials.

3. With Blu-Ray, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this Desktop PC.

## Media Card Reader

	<b>DM</b>	<b>SFF</b>
SD 4.0 with 5-in-1 Interface (Supports SD, SDXC, SDHC, UHS-I, UHS-II)		<b>X</b>

## MEMORY

	<b>DM</b>	<b>SFF</b>
DDR4-2666 (Transfer rates up to 2666 MT/s), 64 GB, 2 SODIMM	<b>X</b>	
DDR4-2666 (Transfer rates up to 2666 MT/s), 64 GB, 2 DIMM		<b>X</b>
DDR4-3200 (Transfer rates up to 3200 MT/s), 64 GB, 2 SODIMM	<b>X</b>	
DDR4-3200 (Transfer rates up to 3200 MT/s), 64 GB, 2 DIMM		<b>X</b>

## Memory Configuration

	<b>DM</b>	<b>SFF</b>
4 GB (4 GB x 1)	<b>X</b>	<b>X</b>
8 GB (4 GB x 2)	<b>X</b>	<b>X</b>
8 GB (8 GB x 1)	<b>X</b>	<b>X</b>
16 GB (8 GB x 2)	<b>X</b>	<b>X</b>
16 GB (16 GB x 1)	<b>X</b>	<b>X</b>
32 GB (16 GB x 2)	<b>X</b>	<b>X</b>
32 GB (32 GB x 1)	<b>X</b>	<b>X</b>
64 GB (32 GB x 2)	<b>X</b>	<b>X</b>

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

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

**NOTE:** All memory slots are customer accessible / upgradeable.

**NOTE:** Memory speed 2400, 2666, 2933 and 3200 MT/s can be achieved via two DIMMs per channel (2DPC) when populated with the same part number.

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## NETWORKING/COMMUNICATIONS

### Ethernet (RJ-45)

	<b>DM</b>	<b>SFF</b>
Realtek RTL8111FPH-CG Gigabit Network Connection (standard)	<b>X</b>	<b>X</b>
Intel® I210-T1 PCIe x1 Gigabit Network Interface Card (optional)		<b>X</b>

### Wireless<sup>1</sup>

Realtek 8852AE Wi-Fi 6 and Bluetooth® M.2 Combo Card <sup>2</sup>	<b>X</b>	
Realtek RTL8822CE 802.11ac 2x2 with Bluetooth® M.2 Combo Card	<b>X</b>	<b>X</b>
Realtek RTL8821CE 802.11ac 1x1 with Bluetooth® M.2 Combo Card	<b>X</b>	<b>X</b>

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

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

## KEYBOARDS AND POINTING DEVICES

### Keyboards

	<b>DM</b>	<b>SFF</b>
HP PS/2 Business Slim Standalone Wired Keyboard		<b>X</b>
HP Wired Desktop 320K Keyboard	<b>X</b>	<b>X</b>
HP USB Business Slim Wired SmartCard CCID Keyboard	<b>X</b>	<b>X</b>
HP USB & PS/2 Washable Standalone Wired Keyboard	<b>X</b>	<b>X</b>
HP USB Wired Keyboard	<b>X</b>	<b>X</b>
HP Universal USB Wired Keyboard	<b>X</b>	<b>X</b>

### Keyboard & Mouse Combo

	<b>DM</b>	<b>SFF</b>
HP Business Slim Wireless Keyboard and Mouse	<b>X</b>	<b>X</b>
HP USB PS/2 Washable Keyboard and Mouse Wired	<b>X</b>	<b>X</b>

### Mouse

	<b>DM</b>	<b>SFF</b>
HP PS/2 Mouse		<b>X</b>
HP Wired Desktop 320M Mouse	<b>X</b>	<b>X</b>
HP USB Optical Wired Mouse	<b>X</b>	<b>X</b>
HP USB Hardened Optical Wired Mouse	<b>X</b>	<b>X</b>
HP USB 1000dpi Laser Mouse	<b>X</b>	<b>X</b>
HP USB & PS/2 Washable Wired Mouse Standalone	<b>X</b>	<b>X</b>
HP USB Fingerprint Mouse	<b>X</b>	<b>X</b>

**NOTE:** Availability may vary by country

## SECURITY

	<b>DM</b>	<b>SFF</b>
TPM 2.0 (FW: 7.85) endpoint security controller (Infineon SLB9670) shipped with Windows 10. Common Criteria EAL4+ Certified. FIPS 140-2 Level 2 Certified.	<b>X</b>	<b>X</b>
Intrusion Sensor (Optional)		<b>X</b>

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

Intrusion Sensor (integrated in the system board, can be enabled/disabled through BIOS)	<b>X</b>	
Support for chassis cable lock devices	<b>X</b> (10 mm barrel or smaller)	<b>X</b>
Support for chassis padlocks devices	<b>X</b>	<b>X</b>
SATA port disablement (via BIOS)	<b>X</b>	<b>X</b>
Serial, USB enable/disable (via BIOS)	<b>X</b>	<b>X</b>
Removable media write/boot control	<b>X</b>	<b>X</b>
Power-on password (via BIOS)	<b>X</b>	<b>X</b>
Setup password (via BIOS)	<b>X</b>	<b>X</b>

## PORTS

### Internal Slots and Ports

	<b>DM</b>	<b>SFF</b>
M.2 PCIe	(1) M.2 PCIe x1 2230 (for WLAN) (1) M.2 PCIe x4 2280 (for storage)	(1) M.2 PCIe x1 2230 (for WLAN) (1) M.2 PCIe x4 2280 (for storage)
PCI Express v3.0 x1		1
PCI Express v3.0 x16		1
SATA port		3
Integrated SATA storage connector	1	

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

### Bays

	<b>DM</b>	<b>SFF</b>
9.5mm Slim Optical Disc Drive (ODD)		1
SD Card Reader		1
2.5" Internal Storage Drive	1	2 <sup>1</sup>
3.5" Internal Storage Drive		1 <sup>1</sup>

1. SFF can be configured with either (1) 3.5" or (2) 2.5" internal storage drive (2.5-inch drive needs adapter that can only be purchased when configuring the PC from factory with a 2.5" drive.)

### Standard User Accessible Ports

	<b>DM</b>		<b>SFF</b>
	<b>4000 Series Processor</b>	<b>3000 Series Processor</b>	
Type-A Hi-Speed USB 480Mbps signaling rate port			2 (rear)
Type-A SuperSpeed USB 5Gbps signaling rate port	2 (rear)	2 (front) 4 (rear)	4 (front) 3 (rear)
Type-A SuperSpeed USB 10Gbps signaling rate port	2 (front) 2 (rear)		
Type-C® SuperSpeed USB 10Gbps signaling rate port	1 (front)	1 (front)	

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

Video	1 DisplayPort™ 1.4 (rear) 1 HDMI 1.4 (rear)	2 DisplayPort™ 1.4 (rear)
Audio	1 Combo Audio Jack with CTIA and headset support (front)	1 Combo Audio Jack with CTIA and headset support (front)
Network Interface	1 RJ45 (rear)	1 RJ45 (rear)

## Rear Configurable Non-PCIe/PCI Slot User Accessible Ports

Flexible Port 1, choice of one of the following:

	<u>DM</u>	<u>SFF</u>
Type-A USB		2 Type-A SuperSpeed USB 5Gbps signaling rate port
Type-C® USB	1 SuperSpeed USB 10Gbps signaling rate port w/ DisplayPort™ Alt Mode and power intake via USB Type-C® Power Delivery up to 100W	1 SuperSpeed USB 10Gbps signaling rate port w/ DisplayPort™ Alt Mode
Video	1 DisplayPort™ 1.4 <u>or</u> HDMI 2.0a <u>or</u> VGA	1 DisplayPort™ 1.4 <u>or</u> HDMI 2.0a <u>or</u> VGA
Serial (RS-232)	1 <sup>1</sup>	1

1. Sold separately or as an optional feature

Flexible Port 2, choice of one of the following:

	<u>DM</u>	<u>SFF</u>
Type-A USB	2 Hi-Speed USB 480Mbps signaling rate <sup>1</sup>	
Serial (RS-232)	1 <sup>1</sup>	1 <sup>1</sup>

1. Must be configured at time of purchase

## USB SPECIFICATION AND MARKETING NAME MAPPING TABLE

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

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

## SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

### Preinstalled Software

HP BIOSphere Gen6<sup>1</sup>  
HP Secure Erase<sup>2</sup>  
HP DriveLock & Automatic DriveLock<sup>3</sup>  
BIOS Update via Network  
Absolute Persistence Module<sup>4</sup>  
Pre-boot Authentication

### Software

HP Desktop Support Utilities  
HP JumpStarts  
HP Notifications  
HP Privacy Settings  
HP Setup Integrated OOBE  
HP Support Assistant<sup>5</sup>  
HP Connection Optimizer<sup>6</sup>  
HP PC Hardware Diagnostics Windows  
Touchpoint Customizer for Commercial  
HP Noise Cancellation Software  
Buy Office (sold separately)  
Xerox® DocuShare® (30 day free trial offer)<sup>7</sup>  
HP Smart Support<sup>8</sup>

### Manageability Features

HP Driver Packs (download)<sup>9</sup>  
HP System Software Manager (SSM) (download)  
HP BIOS Config Utility (BCU) (download)  
HP Client Catalog (download)  
HP Manageability Integration Kit for Microsoft System Center Configuration Management Gen5 (download)<sup>10</sup>  
HP Image Assistant Gen5 (download)  
Ivanti Management Suite (download)<sup>11</sup>

### Client Security Software

HP Client Security Manager Gen6<sup>12</sup>  
HP Power On Authentication  
Windows Defender<sup>13</sup>

### Security Management

Trusted Platform Module TPM 2.0 Embedded Security Chip shipped with Windows 10. (Common Criteria EAL4+ Certified)  
Serial, USB enable/disable (via BIOS)  
Power-on password (via BIOS)  
Setup password (via BIOS)  
HP Sure Sense<sup>14</sup>  
HP Sure Click<sup>15</sup>

1. HP BIOSphere Gen6 is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations.
2. Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88. "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.
3. Storage DriveLock does not work with Self Encrypting or Optane based storage
4. Absolute firmware module is shipped turned off and can only be activated with the purchase a license subscription and full activation of the software agent. License subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. Certain conditions apply. For full details visit: <https://www.absolute.com/about/legal/agreements/absolute/>
5. HP Support Assistant requires Windows and Internet access.
6. HP Connection Optimizer requires Windows 10.

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

7. Simply sign up and start using Xerox® DocuShare® Go. No credit card. No obligation. Data will become unavailable unless a subscription is entered before the end of the 30 day free trial period. See visit <http://www.xerox.com/docusharego> for details.
8. HP Smart Support is available to commercial customers through your HP Service Representative and HP Factory Configuration Services; or it can be downloaded at: <http://www.hp.com/smart-support>. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights.
9. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
10. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>
11. Ivanti Management Suite subscription required.
12. HP Client Security Manager Gen6 requires Windows and is available on the select HP Elite and Pro PCs.
13. Windows Defender Opt in and internet connection required for updates.
14. HP Sure Sense requires Windows 10 Pro or Enterprise.
15. HP Sure Click requires Windows 10 and supports Microsoft Internet Explorer, Google Chrome™, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.

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

## UNIT ENVIRONMENT AND OPERATING CONDITIONS

### General Unit Operating Guidelines

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

Temperature Range	Operating: 5° to 35° C <sup>1</sup> Non-Operating: -30° to 60° C <sup>1</sup>
Relative Humidity	Operating: 5% to 90% (non-condensing at ambient) Non-operating: 5% to 90% (non-condensing at ambient)
Maximum Altitude (unpressurized)	Operating: 5000m Non-operating: 50000ft (15240 m)

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

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

## ENVIRONMENTAL & INDUSTRY

### HP ProDesk 405 G6 Desktop Mini PC

<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>• US Federal Energy Management Program (FEMP)</li> <li>• EPEAT® Gold registered in the United States. See <a href="http://www.epeat.net">http://www.epeat.net</a> for registration status in your country.</li> <li>• TCO Certified</li> <li>• China Energy Conservation Program (CECP)</li> <li>• China State Environmental Protection Administration (SEPA)</li> <li>• Taiwan Green Mark</li> <li>• Korea Eco-label</li> <li>• Japan PC Green label</li> <li>• Commission Regulation (EC) No 617/2013 (ErP Lot 3)</li> </ul>		
<b>Sustainable Impact Specifications</b>	<ul style="list-style-type: none"> <li>• Low halogen<sup>1</sup></li> <li>• Ocean-Bound Plastic in speaker enclosure<sup>2</sup></li> <li>• Outside Box and corrugated cushions are 100% sustainably sourced and recyclable<sup>3</sup></li> <li>• 75% post-consumer recycled plastic<sup>4</sup></li> <li>• Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable<sup>5</sup></li> </ul> <p>1. External power supplies, WWAN modules, power cords, cables and peripherals excluded. Service parts obtained after purchase may not be Low Halogen.</p> <p>2. Percentage of ocean-bound plastic contained in each component varies by product</p> <p>3. 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.</p> <p>4. Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.</p> <p>5. Molded pulp cushions are made from 100% recycled wood fiber and organic materials.</p>		
<b>System Configuration</b>	The configuration used for the Energy Consumption and Declared Noise Emissions data for the Desktop model is based on a "Typically Configured Desktop".		
<b>Energy Consumption (in accordance with US ENERGY STAR® test method)</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	9.27 W	9.35 W	9.11 W
Normal Operation (Long idle)	8.57 W	8.65 W	8.41 W
Sleep	0.65 W	0.67 W	0.62 W
Off	0.52 W	0.55 W	0.49 W
	<p><b>NOTE:</b> Energy efficiency data listed is for an ENERGY STAR® certified product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® certified configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system. Search keyword generator on HP's 3rd party option store for solar generator accessories at <a href="http://www.hp.com/go/options">www.hp.com/go/options</a></p>		
<b>Heat Dissipation*</b>	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 60Hz</b>
Normal Operation (Short idle)	31.61 BTU/hr	31.88 BTU/hr	31.07 BTU/hr

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

Normal Operation (Long idle)	29.22 BTU/hr	29.50 BTU/hr	28.68 BTU/hr
Sleep	2.22 BTU/hr	2.29 BTU/hr	2.11 BTU/hr
Off	1.77 BTU/hr	1.88 BTU/hr	1.67 BTU/hr
	<b>NOTE:</b> Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		
<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	3.1	18	
Fixed Disk – Random writes	2.9	18	
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:  Spare parts are available throughout the warranty period and or for up to 5 years after the end of production.		
<b>Batteries</b>	This battery(s) in this product comply with EU Directive 2006/66/EC  Batteries used in the product do not contain: Mercury greater the 1ppm by weight Cadmium greater than 20ppm by weight  Battery size: Not Applilcable Battery type: Not Applilcable		
<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 1680.1 (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 32.2% 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	450 g
		PAPER/Molded Pulp	74 g
	<b>Internal:</b>	PLASTIC/Polyethylene low density - LDPE	5 g
	The plastic packaging material contains at least 50% recycled content.		
	The corrugated paper packaging materials contains at least 70% 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></ul>		

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

	<ul style="list-style-type: none"> <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>
<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>HP Inc. 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>HP Inc. 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://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842">http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842</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>

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

## HP ProDesk 405 G6 Small Form Factor PC

Eco-Label Certifications & declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: <ul style="list-style-type: none"><li>IT ECO declaration</li><li>US ENERGY STAR®</li><li>US Federal Energy Management Program (FEMP)</li><li>EPEAT<sup>®</sup> Gold registered in the United States. See <a href="http://www.epeat.net">http://www.epeat.net</a> for registration status in your country.</li><li>TCO Certified</li><li>China Energy Conservation Program (CECP)</li><li>China State Environmental Protection Administration (SEPA)</li><li>Taiwan Green Mark</li><li>Korea Eco-label</li><li>Japan PC Green label</li><li>Commission Regulation (EC) No 617/2013 (ErP Lot 3)</li></ul>		
System Configuration	The configuration used for the Energy Consumption and Declared Noise Emissions data for the Desktop model is based on a Typically Configured Desktop.		
Energy Consumption (in accordance with US ENERGY STAR® test method)	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	12.6 W	12.2 W	12.7 W
Normal Operation (Long idle)	12.3 W	12 W	12.4 W
Sleep	0.8 W	0.8 W	0.8 W
Off	0.7 W	0.7 W	0.7 W
	<b>NOTE:</b> Energy efficiency data listed is for an ENERGY STAR® certified product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are certified with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® certified configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.		
Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	42.81 BTU/hr	41.7 BTU/hr	43.27BTU/hr
Normal Operation (Long idle)	41.78 BTU/hr	41 BTU/hr	42.4 BTU/hr
Sleep	2.7 BTU/hr	2.7 BTU/hr	2.7 BTU/hr
Off	2.4 BTU/hr	2.4 BTU/hr	2.4 BTU/hr
	<b>NOTE:</b> Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L <sub>WAd</sub> , bels)	Sound Pressure (L <sub>pAm</sub> , decibels)	
Typically Configured – Idle	3.2	24	
Fixed Disk – Random writes	3.3	25	
Longevity and Upgrading	This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the product may include:		

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

	<ul style="list-style-type: none"> <li>• 3 USB ports</li> <li>• 1 PC card slot (type I/II)</li> <li>• 1 ExpressCard/54 slot</li> <li>• 1 IEEE 1394 Port</li> <li>• 2 SODIMM memory slots</li> <li>• Optional expansion base docking station</li> <li>• 1 multi-bay II storage port</li> <li>• Interchangeable HDD</li> </ul> <p>Spare parts are available throughout the warranty period and or for up to “5” years after the end of production.</p>		
Batteries	<p>This battery(s) in this product comply with EU Directive 2006/66/EC</p> <p>Batteries used in the product do not contain:</p> <p>Mercury greater the 1ppm by weight</p> <p>Cadmium greater than 20ppm by weight</p> <p>Battery size: Not Applilcable</p> <p>Battery type: Not Applilcable</p>		
<b>Additional Information</b>	<p>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.</p> <ul style="list-style-type: none"> <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 1680.1 (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 42.2% post-consumer recycled plastic (by wt.)</li> <li>• This product is 94.0% recycle-able when properly disposed of at end of life.</li> </ul>		
<b>Packaging Materials</b> (vary by country)	<b>External:</b>	PAPER/Paper	1019 g
	<b>Internal:</b>	PAPER/Molded Pulp	414 g
		PLASTIC/Polyethylene low density - LDPE	29 g
<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> </ul>		

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

	<ul style="list-style-type: none"> <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>
<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>HP Inc. 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> <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>

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

## SERVICE AND SUPPORT

On-site Warranty<sup>1</sup>: Three-year (3-3-3) or one-year (1-1-1) limited warranty delivers three years or one year of on-site, next business day<sup>2</sup> service for parts and labor and includes free support 24 x 7<sup>3</sup>. Three-year onsite and labor are not available in all countries. Service offers terms up to 5 years by choosing an optional HP Care Pack. To choose the right level of service for your HP product, visit HP Care Pack Central: <http://www.hp.com/go/cpc>.<sup>4</sup>

1. Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.
2. On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
3. Technical telephone support applies only to HP-configured and third-party HP qualified hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.
4. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit [www.hp.com/go/cpc](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.

## Technical Specifications – Graphics

### GRAPHICS

#### AMD Radeon™ Vega Graphics (integrated)

<b>Graphics Controller</b>	Integrated
<b>DisplayPort™</b>	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays connected to any output controlled by AMD® Graphics
<b>HDMI</b>	Supports HDMI 2.0a features Supports HDCP 2.3 Supports audio over HDMI
<b>VGA</b>	VGA output
<b>USB Type-C® DP Alt Mode</b>	DisplayPort™ over the USB Type-C® module
<b>Memory</b>	The actual amount of maximum graphics memory can be >4GB. System memory is allocated for graphics as needed, to provide an optimal balance between graphics and system memory use.
<b>Maximum Color Depth</b>	up to 10 bits/color
<b>Graphics/Video API Support</b>	VP9 10b Dec HW HDR Rec. 2020 DX12
<b>Max. Resolution (VGA)</b>	2048 x 1536@60Hz
<b>Max. Resolution (HDMI)</b>	4096 x 2160@60Hz
<b>Max. Resolution (DP)</b>	4096 x 2160@60Hz

#### AMD® Radeon™ RX 550X 4 GB FH 2DP+HDMI

<b>Engine Clock</b>	1183MHz
<b>Memory Clock</b>	6 Gbps
<b>Memory Size (width)</b>	4 GB (128-bit)
<b>Memory Type</b>	GDDR5
<b>Max. Resolution (HDMI)</b>	4096x2160 @ 60Hz
<b>Max. Resolution (DP)</b>	5120x2880 @ 60Hz
<b>Multi Display Support</b>	2 displays
<b>HDCP Compliance</b>	Yes
<b>Rear I/O connectors (bracket)</b>	HDMI, DP
<b>Cooling (active/passive)</b>	Active fan-sink (Active cooling with dynamic speed)
<b>Total power consumption (W)</b>	<50W
<b>PCB form-factor with bracket</b>	LP (low profile) PCB with FH/LP bracket

#### AMD® Radeon™ R7 430 2GB VGA+DP 64bit Graphics Card

<b>Engine Clock</b>	780 MHz
<b>Memory Clock</b>	1100 MHz
<b>Memory Size (width)</b>	2 GB (64-bit)
<b>Memory Type</b>	256M x 32 GDDR5
<b>Max. Resolution (HDMI)</b>	2048x1536
<b>Max. Resolution (DP)</b>	4096x2160@60Hz
<b>Multi Display Support</b>	2 displays

## Technical Specifications – Graphics

<b>HDCP Compliance</b>	Yes
<b>Rear I/O connectors (bracket)</b>	VGA+DP
<b>Cooling (active/passive)</b>	Active fan-sink (Active cooling with dynamic speed)
<b>Total power consumption (W)</b>	<50W
<b>PCB form-factor with bracket</b>	LP PCB with FH/LP bracket

### **AMD® Radeon™ R7 430 2GB GDDR5 2DP 64 bit Graphics Card**

<b>Engine Clock</b>	780 MHz
<b>Memory Clock</b>	1100 MHz
<b>Memory Size (width)</b>	2 GB (64-bit)
<b>Memory Type</b>	256M x 32 GDDR5
<b>Max. Resolution (DP)</b>	4096x2160@60Hz
<b>Multi Display Support</b>	2 displays
<b>HDCP Compliance</b>	yes
<b>Rear I/O connectors (bracket)</b>	DPx2
<b>Cooling (active/passive)</b>	Active fan-sink (Active cooling with dynamic speed)
<b>Total power consumption (W)</b>	<50W
<b>PCB form-factor with bracket</b>	LP PCB with FH/LP bracket

## Technical Specifications – Storage

### STORAGE

#### 500GB 7200RPM 3.5in SATA HDD

<b>Capacity</b>	500GB
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	SATA 6.0 Gb/s
<b>Buffer Size</b>	32MB
<b>Logical Blocks</b>	976,773,168
<b>Seek Time</b>	11 ms (Average)
<b>Height</b>	1in/2.54cm
<b>Width</b>	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)

**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.

#### 1TB 7200RPM 3.5in SATA HDD

<b>Capacity</b>	1TB
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	SATA 6 Gb/s
<b>Buffer Size</b>	64MB
<b>Logical Blocks</b>	1,953,525,168
<b>Seek Time</b>	11 ms (Average)
<b>Height</b>	1in/2.54cm
<b>Width (nominal)</b>	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)

**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.

#### 2TB 7200RPM 3.5in SATA HDD

<b>Capacity</b>	2TB
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	SATA 6 Gb/s
<b>Buffer Size</b>	64MB
<b>Logical Blocks</b>	3,907,029,168
<b>Seek Time</b>	11 ms (Average)
<b>Height</b>	1.028in/26.11mm
<b>Width (nominal)</b>	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)

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

## Technical Specifications – Storage

### 500GB 7200RPM 2.5in SATA HDD

<b>Capacity</b>	500GB
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	SATA 6 Gb/s
<b>Buffer Size</b>	Up to 128MB
<b>Logical Blocks</b>	976,773,168
<b>Seek Time</b>	12 ms (Average)
<b>Height</b>	0.283in/7.2mm (Max)
<b>Width (nominal)</b>	2.75in/70mm (nominal)
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

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

### 1TB 7200RPM 2.5in SATA HDD

<b>Capacity</b>	1TB
<b>Rotational Speed</b>	7,200 rpm
<b>Interface</b>	SATA 6 Gb/s
<b>Buffer Size</b>	Up to 128MB
<b>Logical Blocks</b>	1,953,525,168
<b>Seek Time</b>	12 ms (Average)
<b>Height</b>	0.283in/7.2 mm (Max)
<b>Width (nominal)</b>	2.75in/70mm (nominal)
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

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

### 1TB 5400RPM 2.5in SATA HDD

<b>Capacity</b>	1TB
<b>Rotational Speed</b>	5,400 rpm
<b>Interface</b>	SATA 6 Gb/s
<b>Buffer Size</b>	Up to 128MB
<b>Logical Blocks</b>	1,953,525,168
<b>Seek Time</b>	12ms (Average)
<b>Height</b>	0.283in/7.2mm (Max.)
<b>Width (nominal)</b>	2.75in/70mm (nominal)
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

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

## Technical Specifications – Storage

### 2TB 5400RPM 2.5in SATA HDD

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

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

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

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

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

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

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

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

## Technical Specifications – Storage

### 256GB M.2 2280 PCIe NVMe SSD

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

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

### 512GB M.2 2280 PCIe NVMe SSD

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

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

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

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

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

## Technical Specifications – Storage

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

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

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

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

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

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

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

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

## Technical Specifications – Storage

**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.

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

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

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

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

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

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

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

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

## Technical Specifications – Storage

**Features** APST; ASPM L1.2; NVME spec 1.2; TCG-OPAL2 security

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

### HP 9.5mm Slim DVD-ROM Drive

<b>Height</b>	9.5 mm height
<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 (typical reads, including settling)</b>	Random: DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) Full stroke: DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) 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>Power</b>	Temperature 41° to 122° F (5° to 50° C)
<b>Environmental conditions (operating - non-condensing)</b>	Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)

## Technical Specifications – Storage

### HP 9.5mm Slim DVD Writer Drive

<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)
<b>Write Speeds</b>	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
<b>Read Speeds</b>	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>Access time (typical reads, including settling)</b>	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 (operating - non-condensing)</b>	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)

### HP 9.5mm Slim Blu-Ray Writer Drive

<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 128 GB QL, 100 GB TL, 50 GB DL or 25 GB standard SL
<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>	0.29 lb (132 g)
<b>Write Speeds</b>	BD-R SL/DL Up to 6X BD-R TL/QL Up to 4X BD-RE Up to 2X DVD-R Up to 8X DVD-R DL - Up to 6X DVD-RW Up to 6X DVD+R Up to 8X DVD+R DL - Up to 6X DVD+RW Up to 8X DVD-RAM Up to 5X CD-R Up to 24X

Technical Specifications – Storage

<b>Read Speeds</b>	CD-RW Up to 10X
	BD-ROM Up to 6X
	BD-R Up to 6X
	BD-RE SL/DL Up to 6X
	BD-RE TL Up to 4X
	DVD-ROM Up to 8X
	DVD-R SL/DL Up to 8X
	DVD-R Up to 8X
	DVD-RW Up to 8X
	DVD+R SL/DL Up to 8X
	DVD+R Up to 8X
	DVD+RW Up to 8X
	BDMV (AACs Compliant Disc)
	Up to 6x/2x (Read/Play)
	DVD-RAM Up to 5x
	DVD-Video (CSS Compliant Disc)
	Up to 8x/4x (Read/Play)
	CD-R/RW/ROM Up to 24x
	CD-DA (DAE) Up to 24X/10X (Read/Play)
<b>Access time (typical reads, including settling)</b>	Random BD-ROM: 205 ms (typical), DVD-ROM: 185 ms (typical), CD-ROM: 165 ms (typical)
	Full Stroke BD-ROM: 350 ms (typical), DVD-ROM: 345 ms (typical), CD-ROM: 340 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 -1200 mA typical, 2000 mA maximum
<b>Environmental conditions (operating - non-condensing)</b>	Temperature 41° to 122° F (5° to 50° C)
	Relative Humidity 10% to 80%
	Maximum Wet Bulb Temperature 84° F (29° C)

## Technical Specifications – Networking

### NETWORKING AND COMMUNICATIONS

<b>Realtek RTK8111FP 10/100/1000 Integrated NIC</b>	
<b>Connector</b>	RJ-45
<b>System Interface</b>	PCIe + SMBus
<b>Data rates supported</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
<b>IEEE Compliance</b>	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
<b>Performance</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
<b>Power consumption</b>	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
<b>Management Interface</b>	Auto MDI/MDIX Crossover cable detection
<b>IT Manageability</b>	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
<b>Security &amp; Manageability</b>	Support DASH 1.2 compliant

<b>Intel® Ethernet Controller I210-AT Add-On Card</b>	
<b>Connector</b>	RJ-45
<b>System Interface</b>	PCI + SMBus
<b>Data rates supported</b>	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
<b>IEEE Compliance</b>	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet)
<b>Performance</b>	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K

## Technical Specifications – Networking

<b>Power consumption</b>	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
<b>Power Management</b>	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
<b>Management Interface</b>	Auto MDI/MDIX Crossover cable detection
<b>IT Manageability</b>	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status

### Realtek RTL8852AE 802.11ax 2x2 Wi-Fi® + BT5.2 (802.11ax 2x2, supporting gigabit data rate)

**NOTE:** Wi-Fi 5 or 6 is designed to support gigabit data rate when transferring files between two devices connected to the same router. Requires a wireless router, sold separately, that supports 80MHz and higher channels.

<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11ax IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
<b>Interoperability</b>	Wi-Fi CERTIFIED™ modules
<b>Frequency Band</b>	802.11b/g/n/ax • 2.402 – 2.482 GHz 802.11a/n/ac/ax • 4.9 – 4.95 GHz (Japan) • 5.15 – 5.25 GHz • 5.25 – 5.35 GHz • 5.47 – 5.725 GHz • 5.825 – 5.850 GHz
<b>Data Rates</b>	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz & 80MHz) • 802.11ax: MCS0 ~ MCS11, (1SS and 2SS) (20MHz, 40MHz, ,80MHz)
<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM

## Technical Specifications – Networking

<b>Security<sup>3</sup></b>	<ul style="list-style-type: none"> <li>• IEEE and Wi-Fi CERTIFIED™ 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>• WPA3 certification</li> <li>• IEEE 802.11i</li> <li>• WAPI</li> </ul>	
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
<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: +18.5dBm minimum</li> <li>• 802.11g: +17.5dBm minimum</li> <li>• 802.11a: +18.5dBm minimum</li> <li>• 802.11n HT20(2.4GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(2.4GHz): +14.5dBm minimum</li> <li>• 802.11n HT20(5GHz): +15.5dBm minimum</li> <li>• 802.11n HT40(5GHz): +14.5dBm minimum</li> <li>• 802.11ac VHT80(5GHz): +11.5dBm minimum</li> <li>• 802.11ax HT40(2.4GHz): +10dBm minimum</li> <li>• 802.11ax VHT160(5GHz): +10dBm minimum</li> </ul>	
<b>Power Consumption</b>	<ul style="list-style-type: none"> <li>• Transmit mode: 2.5 W</li> <li>• Receive mode: 2 W</li> <li>• Idle mode: (PSP) 180 mW (WLAN Associated)</li> <li>• Idle mode: 50 mW (WLAN unassociated)</li> <li>• Connected Standby/Modern Standby: 10mW</li> <li>• Radio disabled: 8 mW</li> </ul>	
<b>Power Management</b>	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
<b>Receiver Sensitivity<sup>3</sup></b>	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum 802.11ax, MCS11(HE40): -57dBm maximum 802.11ax, MCS11(HE80): -54dBm 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>	1. Type 2230: 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm	
<b>Weight</b>	1. Type 2230: 2.8g 2. Type 126: 1.3g	
<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)

## Technical Specifications – Networking

Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON	
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology		
Bluetooth® Specification	4.0/4.1/4.2/5.0 Compliant	
Frequency Band	2402 to 2480 MHz	
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)	
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps	
	BLE: 1 Mbps data rate; throughput up to 0.2 Mbps	
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels	
	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
Transmit Power	The Bluetooth® component shall operate as a Class II Bluetooth device with a maximum transmit power of + 9.5 dBm for BR and EDR.	
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW	
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software	
Power Management	Microsoft Windows ACPI, and USB Bus Support	
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249	
Power Management	ETS 300 328, ETS 300 826	
Certifications	Low Voltage Directive IEC950 UL, CSA, and CE Mark	
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP) BT5.1 ESR9/10 Compliance LE Advertisement Extensions Channel Selection Algo Limited High Duty Cycle Non-Connectable Advertising 2Mbps LE LE Long Range	

## Technical Specifications – Networking

<b>Realtek RTL8822CE 802.11ac 2x2 Wi-Fi + BT5</b>	
<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
<b>Interoperability</b>	Wi-Fi® CERTIFIED™
<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
<b>Data Rates</b>	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)
<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
<b>Security</b>	• IEEE and Wi-Fi® compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification • IEEE 802.11i • WAPI
<b>Network Architecture Models</b>	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
<b>Roaming</b>	IEEE 802.11 compliant roaming between access points
<b>Output Power</b>	• 802.11b: +14dBm minimum • 802.11g: +12dBm minimum • 802.11a: +12dBm minimum • 802.11n HT20(2.4GHz): +12dBm minimum • 802.11n HT40(2.4GHz): +12dBm minimum • 802.11n HT20(5GHz): +10dBm minimum • 802.11n HT40(5GHz): +10dBm minimum • 802.11ac VHT80(5GHz): +10dBm minimum
<b>Power Consumption</b>	• Transmit mode 2.0 W • Receive mode 1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode 50 mW (WLAN unassociated) • Connected Standby 10mW • Radio disabled 8 mW

## Technical Specifications – Networking

Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity	802.11b, 1Mbps: -93.5dBm maximum 802.11b, 11Mbps: -84dBm maximum 802.11a/g, 6Mbps: -86dBm maximum 802.11a/g, 54Mbps: -72dBm maximum 802.11n, MCS07: -67dBm maximum 802.11n, MCS15: -64dBm maximum 802.11ac, MCS0: -84dBm maximum 802.11ac, MCS9: -59dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard with CNVi Interface	
Dimensions	1. Type 2230 : 2.3 x 22.0 x 30.0 mm 2. Type 1216: 1.67 x 12.0 x 16.0 mm	
Weight	1. Type 2230 : 2.8g 2. Type 126: 1.3g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON	
HP Integrated Module with Bluetooth 4.0/4.1/4.2/5.0 Wireless Technology		
Bluetooth® Specification	4.0/4.1/4.2/5.0 Compliant	
Frequency Band	2402 to 2480 MHz	
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)	
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)	
Transmit Power	The Bluetooth component shall operate as a Class II Bluetooth device with a maximum transmit power of + 4 dBm for BR and EDR.	
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW	
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software	
Power Management	ETS 300 328, ETS 300 826	
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249	
Power Management Certifications	ETS 300 328, ETS 300 826	

## Technical Specifications – Networking

	Low Voltage Directive IEC950 UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

<b>Realtek 802.11a/b/g/n/ac (1x1) WiFi® and Bluetooth® 4.2 Combo</b>	
<b>Wireless LAN Standards</b>	IEEE 802.11a IEEE 802.11b IEEE 802.11g IEEE 802.11n IEEE 802.11ac IEEE 802.11d IEEE 802.11e IEEE 802.11h IEEE 802.11i IEEE 802.11k IEEE 802.11r IEEE 802.11v
<b>Interoperability</b>	Wi-Fi® CERTIFIED™
<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
<b>Data Rates</b>	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz & 80MHz)
<b>Modulation</b>	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
<b>Security</b>	• IEEE and Wi-Fi® compliant 64 / 128 bit WEP encryption for a/b/g mode only • AES-CCMP: 128 bit in hardware • 802.1x authentication • WPA, WPA2: 802.1x. WPA-PSK, WPA2-PSK, TKIP, and AES. • WPA2 certification



## Technical Specifications – Networking

	• IEEE 802.11i • WAPI	
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)	
Roaming	IEEE 802.11 compliant roaming between access points	
Output Power	• 802.11b : +14dBm minimum • 802.11g : +12dBm minimum • 802.11a : +12dBm minimum • 802.11n HT20(2.4GHz) : +12dBm minimum • 802.11n HT40(2.4GHz) : +12dBm minimum • 802.11n HT20(5GHz) : +10dBm minimum • 802.11n HT40(5GHz) : +10dBm minimum • 802.11ac VHT80(5GHz) : +10dBm minimum	
Power Consumption	• Transmit mode :2.0 W • Receive mode :1.6 W • Idle mode (PSP) 180 mW (WLAN Associated) • Idle mode :50 mW (WLAN unassociated) • Connected Standby/Modern Standby: 10mW • Radio disabled: 8 mW	
Power Management	ACPI and PCI Express compliant power management 802.11 compliant power saving mode	
Receiver Sensitivity	802.11b, 1Mbps : -93.5dBm maximum 802.11b, 11Mbps : -84dBm maximum 802.11a/g, 6Mbps : -86dBm maximum 802.11a/g, 54Mbps : -72dBm maximum 802.11n, MCS07 : -67dBm maximum 802.11n, MCS15 : -64dBm maximum 802.11ac, MCS0 : -84dBm maximum 802.11ac, MCS9 : -59dBm maximum	
Antenna type	High efficiency antenna with spatial diversity, mounted in the display enclosure  Two embedded dual band 2.4/5 GHz antennas are provided to the card to support WLAN MIMO communications and Bluetooth communications	
Form Factor	PCI-Express M.2 MiniCard	
Dimensions	Type 2230 : 2.3 x 22.0 x 30.0 mm	
Weight	Type 2230 : 2.8g	
Operating Voltage	3.3v +/- 9%	
Temperature	Operating Non-operating	14° to 158° F (–10° to 70° C) –40° to 176° F (–40° to 80° C)
Humidity	Operating Non-operating	10% to 90% (non-condensing) 5% to 95% (non-condensing)
Altitude	Operating Non-operating	0 to 10,000 ft (3,048 m) 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON	
HP Integrated Module with Bluetooth 4.0/4.1/4.2 Wireless Technology		
Bluetooth® Specification	4.0/4.1/4.2 Compliant	
Frequency Band	2402 to 2480 MHz	
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)	
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps BLE: 1 Mbps data rate; throughput up to 0.2 Mbps Legacy: Synchronous Connection Oriented links up to 3. 64 kbps. voice channels	

## Technical Specifications – Networking

	Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
<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>Power Consumption</b>	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
<b>Electrical Interface</b>	USB 2.0 compliant
<b>Bluetooth® Software Supported Link Topology</b>	Microsoft Windows Bluetooth® Software
<b>Power Management</b>	Microsoft Windows ACPI, and USB Bus Support
<b>Certifications</b>	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
<b>Power Management</b>	ETS 300 328, ETS 300 826
<b>Certifications</b>	Low Voltage Directive IEC950  UL, CSA, and CE Mark
<b>Bluetooth Profiles Supported</b>	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping LE Dual Mode LE Link Layer LE Low Duty Cycle Directed Advertising LE L2CAP Connection Oriented Channels Train Nudging & Interlaced Scan BT4.2 ESR08 Compliance LE Secure Connection- Basic/Full LE Privacy 1.2 –Link Layer Privacy LE Privacy 1.2 –Extended Scanner Filter Policies LE Data Packet Length Extension FAX Profile (FAX) Basic Imaging Profile (BIP)2 Headset Profile (HSP) Hands Free Profile (HFP) Advanced Audio Distribution Profile (A2DP)

## Technical Specifications – Input/Output Devices

### I/O DEVICES

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

HP USB Business Slim Wired SmartCard CCID Keyboard		
Physical Characteristics	Keys	104, 105, 109 layout (depending upon country)

## Technical Specifications – Input/Output Devices

	Dimensions (L x W x H)	17.34 x 5.68 x 0.78in (440.6 x 144.5 x 1.98 cm)
	Weight	1.32 lb (598g)
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption	100mA (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 12.5 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Keycaps	Low-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
<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>	CE Marking, TUV, EAC, FCC, cULus/CSAus, ICES, RCM, VCCI, KCC, BSMI	
<b>Ergonomic compliance</b>	ISO 9241-4, TUVGS	

<b>HP USB &amp; PS/2 Washable Standalone Wired Keyboard</b>		
<b>Physical Characteristics</b>	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	17.68 x 6.68 x 1.22 in (449.18 x 169.66 x 31.2 mm)
	Weight	1.57 lb (710g)
<b>Electrical</b>	Operating voltage	5V +- 5%
	Power consumption	50mA
	System interface	USB Type A plug connector

## Technical Specifications – Input/Output Devices

	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Keycaps	Low-profile design
	Switch actuation	55±10g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	ft (2.2 m)
<b>Environmental</b>	Acoustics	43-dBA maximum sound pressure level
	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)	30 in (76.2 cm) on concrete, 16-drop sequence
<b>Approvals</b>	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, RCM, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	

### HP USB Wired Keyboard

<b>Physical Characteristics</b>	Keys	104, 105, 106, 108, 109 layouts
	Dimensions (L x W x H)	18.12 x 6.47 x 1.10 in (460.28 x 164.31 x 27.88 mm)
	Weight	1.98 lb (900g) min
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption	50mA Max (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Keycaps	Low-profile design
	Switch actuation	60±14g nominal peak force with tactile feedback
	Switch life	20 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane

## Technical Specifications – Input/Output Devices

<b>Environmental</b>	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	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>	CUL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC	
<b>Ergonomic compliance</b>	TUVGS	

<b>HP Universal USB Wired Keyboard</b>		
<b>Physical Characteristics</b>	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	18.15 x 6.02 x 1.08 in (461 x 153 x 27.4 mm)
	Weight	1.32 lb (600g) min
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption	50mA Max (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
<b>Mechanical</b>	Keycaps	Mid-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mid-profile design
<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)

## Technical Specifications – Input/Output Devices

	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 GS, VCCI, BSMI, RCM, KCC, EAC	
<b>Ergonomic compliance</b>	TUVGS	

### HP Universal USB Wired Mouse

<b>Dimensions (H x L x W)</b>	4.53 x 2.50 x 1.40 in (115 x 63.46 x 35.48 mm)	
<b>Weight</b>	0.18lb (80g)	
<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
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	50mA Max
	Resolution	1,000 DPI
	Sensor	Pixart PAN3606DL
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	9G(max), 1G=9.8m/s2
<b>Mechanical</b>	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
<b>Regulatory approvals</b>	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

### HP Optical Mouse

<b>Dimensions (H x L x W)</b>	4.53 x 2.48 x 1.46 in (115.2x 63 x37 mm)	
<b>Weight</b>	0.22lb (101.6g)	
<b>Environmental</b>	Operating temperature	41° to 122° F (5° to 50° C)
	Non-operating temperature	(-4° to 140° F)(-20° to 60° C)

## Technical Specifications – Input/Output Devices

	Operating humidity	10% to 85% (non-condensing at ambient)
	Non-operating humidity	5% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
<b>Electrical</b>	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s <sup>2</sup>
	System interface	USB or PS/2
<b>Mechanical</b>	Switch actuation	60±15g nominal peak force with tactile feedback
	Switch life	3 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Color	Jack Black
<b>Regulatory approvals</b>	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC

### HP USB 1000dpi Laser Mouse

<b>Dimensions (H x L x W)</b>	115 x 62.9 x 37 mm (L x W x H)	
<b>Weight</b>	0.22lb (101.6g)	
<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
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	100mA
	Resolution	1,000 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s <sup>2</sup>
<b>Mechanical</b>	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
<b>Regulatory approvals</b>	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

## Technical Specifications – Input/Output Devices

<b>HP USB Fingerprint Mouse</b>		
<b>Dimensions (H x L x W)</b>	107 x 67 x 38.7 mm	
<b>Weight</b>	85 g	
<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
<b>Electrical</b>	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	130mA
	Resolution	1,200 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s <sup>2</sup>
<b>Mechanical</b>	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
<b>Regulatory approvals</b>	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

## Technical Specifications – Audio/Multimedia

### AUDIO/MULTIMEDIA

#### HP ProDesk 405 G6 Desktop Mini PC

<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek ALC3205 / Realtek ALC 3867
<b>Audio I/O Ports</b>	Front: Headset connector supports a CTIA and style headset and is retaskable as a Line-in, Line-out, Microphone-in or Headphone-out port
<b>Internal Speaker Amplifier</b>	2W class D mono amplifier for the internal speaker only. External speakers must be powered
<b>Multi-streaming Capable</b>	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker.
<b>Sampling</b>	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 192 kHz for DAC and 44.1 kHz to 96 kHz for ADC
<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

#### HP ProDesk 405 G6 Small Form Factor PC

<b>Type</b>	Integrated
<b>HD Stereo Codec</b>	Realtek ALC3205 / Realtek ALC 3867
<b>Audio I/O Ports</b>	Front: Headset connector supports a CTIA and style headset and is retaskable as a Line-in, Line-out, Microphone-in or Headphone-out port Rear: Line-out, port, 3.5mm and support stereo
<b>Internal Speaker Amplifier</b>	2W class D mono amplifier for the internal speaker only. External speakers must be powered
<b>Multi-streaming Capable</b>	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker.
<b>Sampling</b>	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 192 kHz for DAC and 44.1 kHz to 96 kHz for ADC
<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

## Technical Specifications – Power

### POWER

	<u>DM</u>	<u>SFF</u>
<b>External Power Supplies</b>	65W EPS, 88% average efficiency at 115V & 89% at 230Vac	N/A
<b>80 PLUS Gold</b>	N/A	180W active PFC / 80 PLUS Gold 87/90/87% efficient at 20/50/100% load (115V) 90/92/89% efficient at 20/50/100% load (230V)
<b>80 PLUS Platinum</b>	N/A	210W active PFC 90/92/89% efficient at 20/50/100% load (115V) 91/93/90% efficient at 20/50/100% load (230V)
<b>Operating Voltage Range</b>	90Vac~264Vac	90Vac~264Vac
<b>Rated Voltage Range</b>	100Vac~240Vac	100Vac~240Vac
<b>Rated Line Frequency</b>	50HZ~60HZ	50HZ~60HZ
<b>Operating Line Frequency</b>	47HZ~63HZ	47HZ~63HZ
<b>Rated Input Current with Energy Efficient* Power Supply</b>	65W $\leq$ 1.7A	180W Gold $\leq$ 2.3A 210W Platinum $\leq$ 2.5A
<b>DC Output</b>	+19.5V	+12V
<b>Current Leakage (NFPA 99: 2012)</b>	Less than 500 microamps of leakage current at 264 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. Less than 100 microamps of leakage current at 264 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.	Less than 500 microamps of leakage current at 264 Vac with the ground wire disconnected, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1. Less than 100 microamps of leakage current at 264 Vac with the ground wire intact with normal polarity, as required for Non-patient Electrical Appliances and Equipment used in a patient care facility or that contact patients in normal use. Per section 10.3.5.1.

## Technical Specifications – Power

<b>Power Supply Fan</b>	N/A	50 mm variable speed
<b>Power cord length</b>	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)
<b>Dimensions</b>	65W: 90 x 51 x 28.5mm & 102 x 55 x 30mm	200 x 85 x 53 mm

The power supply shall comply with harmonic input current requirements as detailed in EN61000-3-2 and JEIDA MITI standards.

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

Load Requirements: 50% and 100%

Input Voltage: 230Vac/50Hz.

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

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

## Miscellaneous Features

### WEIGHTS & DIMENSIONS<sup>1</sup>

	<b>DM</b>	<b>SFF</b>
<b>Chassis (W x D x H)</b>	6.97 x 6.89 x 1.35 in 177 x 175 x 34.2 mm	10.6 x 11.9 x 3.7 in 270 x 303 x 95 mm
<b>System Volume</b>	64 cu in 1.05 L	474 cu in 7.8 L
<b>System Weight<sup>1</sup></b>	2.74 lbs 1.25 kg	8.6 lbs 3.9 kg
<b>Max Supported Weight (desktop orientation)</b>	N/A	77 lbs 35 kg
<b>Packaging Dimension W x D</b>	19.57 x 5.04 x 8.78 in (497 x 128 x 223 mm) <b>MPP:</b> 19.61 x 9.25 x 5.20 in (498 x 235 x 132 mm)	15.52 x 8.07 x 19.65 in (394 x 205 x 499 mm) <b>MPP:</b> 15.52 x 8.07 x 19.65 in (394 x 205 x 499 mm)
<b>Shipping Weight</b>	6.52 lbs (2.97 kg) <b>MPP:</b> 7.50 lbs (3.40 kg)	15.37 lbs (6.97 kg) <b>MPP:</b> 15.86 lbs (7.2 kg)
<b>Palletization Profile</b>	18-units per layer 5 or 6 layers max depending on details of air freight 90 or 108 units per pallet depending on details of air freight 45.354 x 39.13 x 57.80 in, 1152 x 994 x 1468 mm (include pallet)	6-units per layer 11 layers max 66 per pallet 47.24 x 39.37 x 93.90 in, 1200 x 1000 x 2380 mm (including pallet)
<b>Palletization Profile (Molded Pulp)</b>	10-units per layer 10 to 19 layers max depending on details of freight 100 or 190 units per pallet depending on details of freight 46.26 x 39.21 x 103.74 in, 1175 x 996 x 2635 mm (including pallet)	6-units per layer 11 layers max 66 per pallet 47.24 x 39.37 x 93.90 in 1200 x 1000 x 2380 mm (including pallet)

1. Packaging material used will vary by country

2. Configured with 1 HDD & 1 ODD; DM configured with 1 HDD only

## Miscellaneous Features

### MISCELLANEOUS FEATURES

#### Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

#### Serviceability Features

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

## Miscellaneous Features

### Additional Features

#### Product Orientation

#### Description

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

#### Boot Sectors Protection

MBR and GPT sectors of the hard drive are critical to booting the operating system. By saving the MBR or GPT data (depending on the how the OS was installed), the BIOS will be able to monitor for changes and allow the user to override them with the backup copy at boot-up.

#### Drive Protection System

DPS Access through F10 Setup during Boot

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

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

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

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

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

#### SMART I - Drive Failure Prediction

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

#### SMART II - Off-Line Data Collection

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

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

IOEDC: I/O Error Detection Circuitry

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

Detects errors in Read/Write buffers on HDD cache RAM

## After Market Options

### AFTER MARKET OPTIONS

Graphics Solutions	<u>DM</u>	<u>SFF</u>	<u>Part Number</u>
AMD Radeon RX 550X 4GB DP Display Card		X	5LH79AA
AMD Radeon R7 430 2GB 2DP Card		X	3MQ82AA
AMD Radeon R7 430 2GB DP+VGA Card		X	5JW81AA
NVIDIA® GeForce® GT 730 2GB DP DVI Card		X	Z9H51AA
HP DisplayPort™ To HDMI True 4k Adapter	X	X	2JA63AA
HP DVI Cable Kit	X	X	DC198A
HP HDMI Standard Cable Kit	X	X	T6F94AA
HP DisplayPort™ Cable Kit	X	X	VN567AA
HP DisplayPort™ To VGA Adapter	X	X	AS615AA
HP DisplayPort™ To DVI-D Adapter	X	X	FH973AA

Desktop Mini Accessories	<u>DM</u>	<u>SFF</u>	<u>Part Number</u>
HP Desktop Mini Port Cover v2	X		13L69AA
HP Desktop Mini 2.5" SATA Drive Bay kit v2	X		13L70AA
HP Desktop Mini LockBox V2	X		3EJ57AA
HP Desktop Mini DVD-Writer ODD Expansion Module	X (Either one)		K9Q83AA
HP Desktop Mini I/O Expansion Module			K9Q84AA
HP Desktop Mini Security/Dual VESA Sleeve v3	X		13L67AA
HP Desktop Mini Security/Dual VESA Sleeve v3 With Power Supply Holder	X		13L68AA
HP B300 PC Mounting Bracket with Power Supply Holder	X		7DB37AA
HP Desktop Mini Vertical Chassis Stand	X		G1K23AA
HP DM Power Supply Holder Kit v2	X		7DB38AA

Data Storage Drives	<u>DM</u>	<u>SFF</u>	<u>Part Number</u>
HP PCIe NVME TLC 256GB SSD M.2 Drive	X	X	1CA51AA
HP PCIe NVME TLC 512GB SSD M.2 Drive	X	X	X8U75AA
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 9.5mm G3 8/6/4 SFF G4 400 SFF/MT DVD Writer		X	1CA53AA

## After Market Options

<b>Input Devices</b>	<b>DM</b>	<b>SFF</b>	<b>Part Number</b>
HP Wired Desktop 320K Keyboard	X	X	9SR37AA
HP USB Business Slim CCID SmartCard Keyboard	X	X	Z9H48AA
HP PS/2 Business Slim Keyboard		X	N3R86AA
HP Wired Desktop 320MK Mouse and Keyboard	X	X	9SR36AA
HP USB Keyboard	X	X	QY776AA
HP USB PS/2 Washable Keyboard & Mouse	X	X	BU207AA
HP Wireless Business Slim Keyboard and Mouse	X	X	N3R88AA
HP Wired Desktop 320M Mouse	X	X	9VA80AA
HP USB Grey v2 Mouse (EMEA only)	X	X	Z9H74AA
HP PS/2 Mouse		X	QY775AA
HP USB Fingerprint Mouse	X	X	4TS44AA
HP USB 1000dpi Laser Mouse	X	X	QY778AA
HP USB Mouse	X	X	QY777AA

<b>System Memory</b>	<b>DM</b>	<b>SFF</b>	<b>Part Number</b>
HP 32GB DDR4-2666 UDIMM		X	1C918AA
HP 4GB DDR4-3200 UDIMM		X	13L78AA
HP 8GB DDR4-3200 UDIMM		X	13L76AA
HP 16GB DDR4-3200 UDIMM		X	13L74AA
HP 32GB DDR4-3200 UDIMM		X	13L72AA
HP 4GB DDR4-3200 SODIMM	X		13L79AA
HP 8GB DDR4-3200 SODIMM	X		13L77AA
HP 16GB DDR4-3200 SODIMM	X		13L75AA
HP 32GB DDR4-3200 SODIMM	X		13L73AA

## After Market Options

<b>Multimedia Devices</b>	<b><u>DM</u></b>	<b><u>SFF</u></b>	<b><u>Part Number</u></b>
HP Business Headset v2	<b>X</b>	<b>X</b>	T4E61AA
HP S101 Speaker Bar	<b>X</b>	<b>X</b>	5UU40AA
HP UC Speaker Phone v2	<b>X</b>	<b>X</b>	4VW02AA

<b>Communication Devices</b>	<b><u>DM</u></b>	<b><u>SFF</u></b>	<b><u>Part Number</u></b>
Intel® Ethernet I210-T1 GbE NIC		<b>X</b>	E0X95AA

<b>Security Devices</b>	<b><u>DM</u></b>	<b><u>SFF</u></b>	<b><u>Part Number</u></b>
HP Business PC Security Lock v3 Kit		<b>X</b>	3XJ17AA
HP Dual Head Keyed Cable Lock	<b>X</b>	<b>X</b>	T1A64AA
HP Keyed Cable Lock 10mm	<b>X</b>	<b>X</b>	T1A62AA
HP Master Keyed Cable Lock 10mm	<b>X</b>	<b>X</b>	T1A63AA

<b>Stands and Accessories</b>	<b><u>DM</u></b>	<b><u>SFF</u></b>	<b><u>Part Number</u></b>
HP B250 PC Mounting Bracket	<b>X</b>		8RA46AA
HP B300 PC Mounting Bracket	<b>X</b>		2DW53AA
HP B500 PC Mounting Bracket	<b>X</b>		2DW52AA
HP Quick Release Bracket 2	<b>X</b>		6KD15AA

<b>I/O Devices</b>	<b><u>DM</u></b>	<b><u>SFF</u></b>	<b><u>Part Number</u></b>
HP DisplayPort Port Flex IO v2	<b>X</b>	<b>X</b>	13L54AA
HP HDMI Port Flex IO v2	<b>X</b>	<b>X</b>	13L55AA
HP Type-C USB 3.1 Gen2 Port Flex IO v2		<b>X</b>	13L59AA
HP Type-C USB 3.1 Gen2 Port with 100W PD Flex IO v2	<b>X</b>		13L60AA
HP VGA Port Flex IO v2	<b>X</b>	<b>X</b>	13L53AA
HP Serial Port Flex IO v2	<b>X</b>	<b>X</b>	13L56AA
HP Serial Port Flex IO 2nd	<b>X</b>		13L57AA
HP PCIe x1 Parallel Port Card		<b>X</b>	N1M40AA
HP 800/600/400 G3 Serial/ PS/2 Adapter		<b>X</b>	1VD82AA

**NOTE:** For more detail on HP I/O Devices please refer to the [HP FLEX IO Option Cards QuickSpecs](http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c06042607). URL is: <http://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c06042607>

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## Change Log

Date	Version History	Action	Description of Change
November 23, 2020	From v1 to v2	Addition	Environmental specs for DM
December 2, 2020	From v2 to v3	Update	HDMI versions to 2.0a in port flex sections
February 9, 2021	From v3 to v4	Addition	Sustainable Impact Specifications to Environmental & Industry section for DM
February 24, 2021	From v4 to v5	Update	RAID sentence in At a glance section
March 2, 2021	From v5 to v6	Update	Xerox specs and disclaimer updated in Software section
April 16, 2021	From v6 to v7	Correction	Typo in Power Supply section
May 4, 2021	From v7 to v8	Update	HP Smart Support and footnote added to software section
June 7, 2021	From v8 to v9	Addition	6 non PRO processors added to AMD Ryzen 4000 Series section
June 9, 2021	From v9 to v10	Update	Call outs and audio/multimedia settings updated
July 6, 2021	From v10 to v11	Removal	Intel® Wi-Fi 6 AX200 802.11ax 2x2 with Bluetooth® M.2 Combo Card
August 6, 2021	From v11 to v12	Update	System memory in AMO section updated
August 19, 2021	From v12 to v13	Update	Weights and dimensions, Power, Miscellaneous features, and Storage updated / 1TB 5400RPM 2.5in SATA HDD. added
August 26, 2021	From v13 to v14	Addition	Realtek 8852AE to Network section
September 27, 2021	From v14 to v15	Correction	3.5 GHz corrected to 3.3 GHz in AMD® Ryzen™ 5 PRO 4650GE
December 15, 2021	From v15 to v16	Update	Windows 11 update
May 2, 2022	From v16 to v17	Removal	HSA Fusion for Commercial and HSA Telemetry for Commercial removed
June 7, 2022	From v17 to v18	Removal	First 4 options in AMO for DM removed
June 16, 2022	From c18 to v19	Removal	Environmental tables certifications updated