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

HP ProDesk 405 G8 Desktop Mini PC*

Front

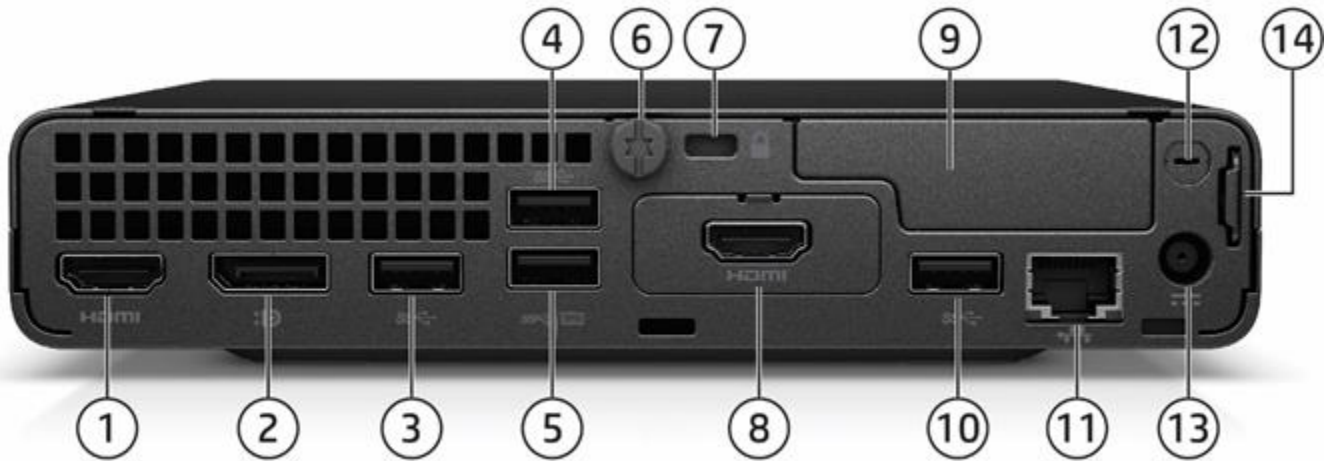### AMD Ryzen™ 5000 Series Processors Configuration

1. Type-C® SuperSpeed USB 10Gbps signaling rate port (charge support up to 5V/3A)

2. (2) Type-A SuperSpeed USB 10Gbps signaling rate port

3. Combo Audio Jack with CTIA

4. Dual-state power button

5. Hard drive activity light

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

Not all configuration components are available in all regions/countries.

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

HP ProDesk 405 G8 Desktop Mini PC*

Rear

### AMD Ryzen™ 5000 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™
   - VGA
   - HDMI 2.0b (shown here installed)
   - Serial[1]

   - Type-C® SuperSpeed USB 10Gbps signaling rate port w/ DisplayPort™ Alt Mode and power intake via USB Type-C® Power Delivery up to 100W

9. Flex Port 2[2] choice of:

   - 2x Type-A Hi-Speed USB 480Mbps signaling rate port
   - Serial
   - Second external antenna

10. Type-A SuperSpeed USB 5Gbps signaling rate port

11. RJ45 network connector

12. External WLAN antenna opening[2]

13. Power connector

14. Retractable Padlock loop

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

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

HP ProDesk 405 G8 Small Form Factor PC
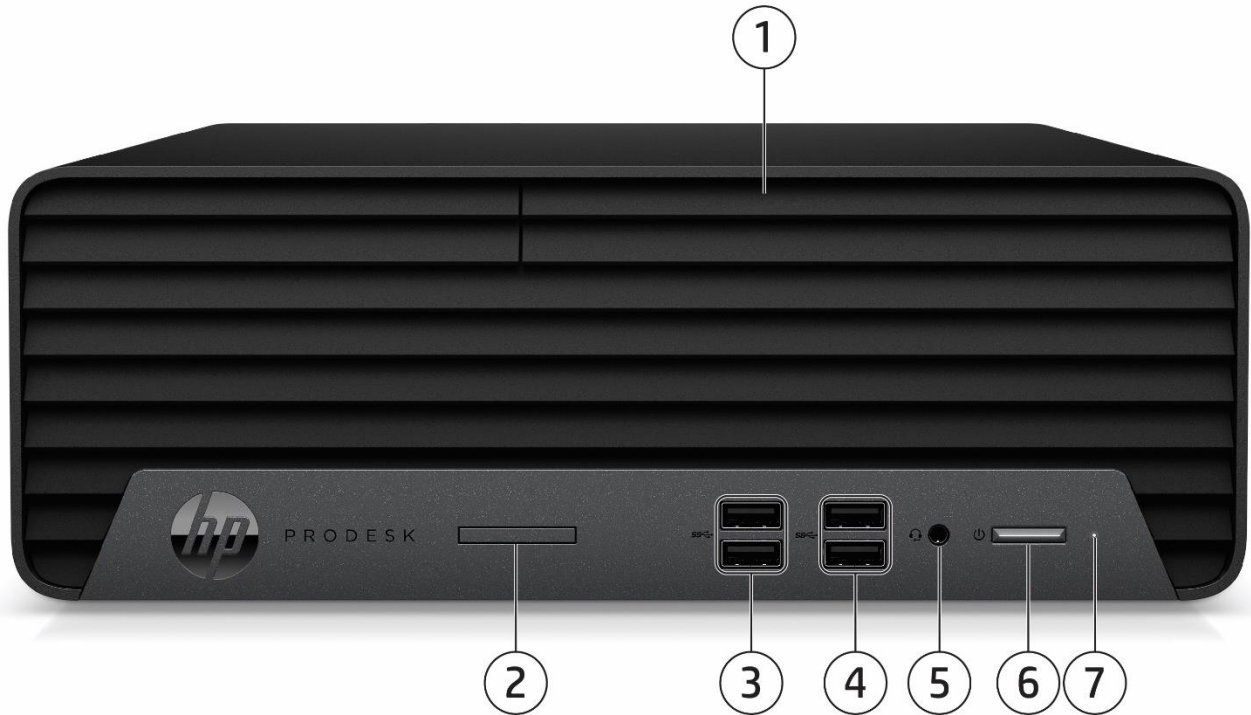
Front

1. Slim optical drive (optional)
2. SD card 4.0 reader (optional)
3. (2) Type-A SuperSpeed USB 10Gbps signaling rate port
4. (2) Type-A SuperSpeed USB 5Gbps signaling rate port

5. Combo Audio Jack with CTIA
6. Dual-state power button
7. Hard drive activity light

<u>**Not Shown**</u>

(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)

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)
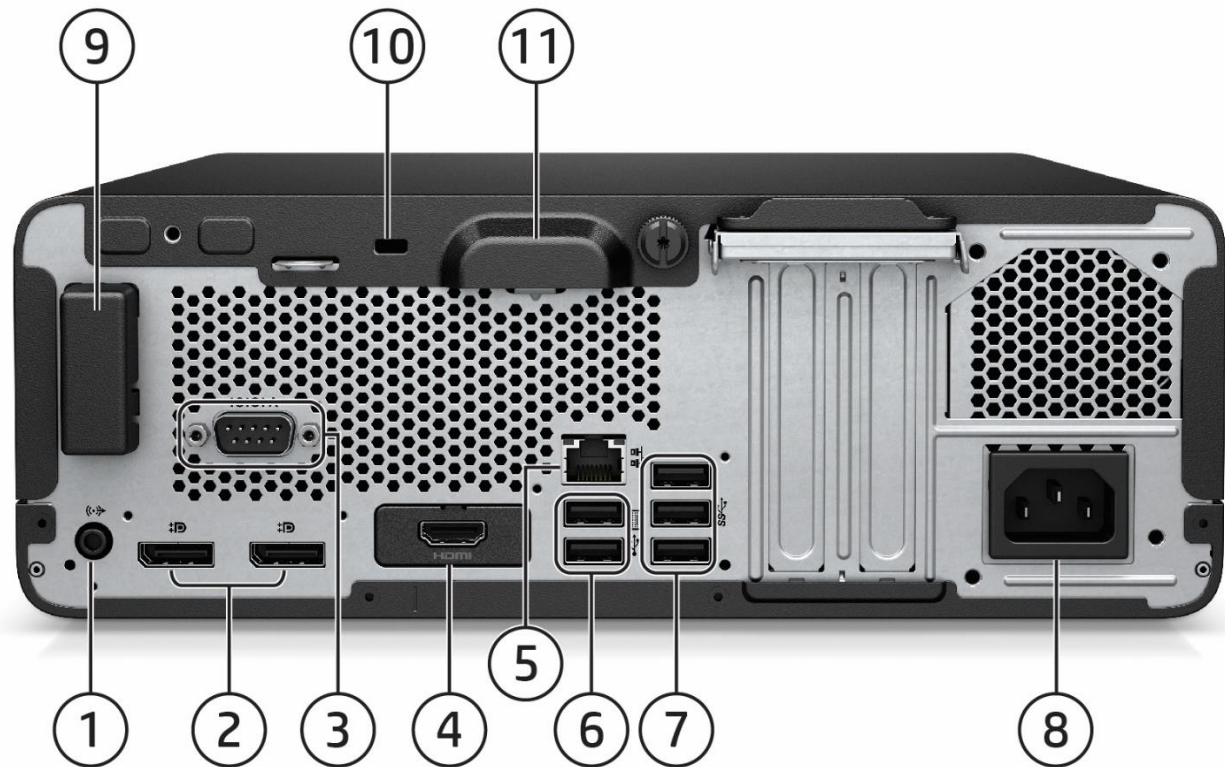
HP ProDesk 405 G8 Small Form Factor PC

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 2.0b (shown here installed)
   - 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[1] (connected with mainboard via flyer cable)

Optional parallel port[1]

Optional 4 serial port PCIe card[1]

Bay

(1) 9.5mm internal optical drive bay
(1) 3.5" internal storage drive bay or (2) 2.5" internal storage drive bays[2]

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)

Not all configuration components are available in all regions/countries.
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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 processors[1] with Radeon™ Graphics
- HP developed and engineered UEFI V2.7 BIOS supporting security, manageability and software image stability
- AMD Pro Manageability 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 SFF
- 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[2]
- HP BIOSphere Gen6
- HP Sure Click
- HP Sure Start
- HP Manageability Integration Kit
- HP Image Assistant Gen5
- HP Support Assistant
- High efficiency energy saving power supply
- ENERGY STAR® certified. EPEAT® registered[3]
- Low halogen[4]
- 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) / 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. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.
4. External power supplies, power cords, cables and peripherals are not low halogen. Service parts obtained after purchase may not be low halogen.

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

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

PRODUCT NAME

HP ProDesk 405 G8 Desktop Mini PC
HP ProDesk 405 G8 Small Form Factor PC

OPERATING SYSTEM

Preinstalled	Windows 11 Pro[1]
	Windows 11 Pro Education[1]
	Windows 11 Home - HP recommends Windows 11 Pro for business[1]
	Windows 11 Home Single Language- HP recommends Windows 11 Pro for business[1]
	Windows 11 Pro (Windows 11 Enterprise available with a Volume Licensing Agreement)[1]
	Windows 10 Pro[1,2]
	Windows 10 Pro Education[1,2]
	Windows 10 Home - HP recommends Windows 11 Pro for business[1,2]
	Windows 10 Home Single Language – HP recommends Windows 11 Pro for business[1,2]
	FreeDOS
Web Support	Windows 10 Pro (Windows 11 Enterprise available with a Volume Licensing Agreement)[1,3]

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 interneet 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

	DM	SFF
AMD® PRO 565	X	X

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

PROCESSORS

AMD® Ryzen™ 5000 Series Processors	DM	SFF
AMD® Ryzen™ 7 PRO 5750G 65W, 8 Cores, 16 threads 3.8 GHz base frequency, up to 4.6 GHz max. 384 KB L1 cache, 4 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2000MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 7 PRO 5750GE 35W, 8 Cores, 16 threads 3.2 GHz base frequency, up to 4.6 GHz max. 384 KB L1 cache, 4 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2000MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	
AMD® Ryzen™ 5 PRO 5650G 65W, 6 Cores, 12 threads 3.9 GHz base frequency, up to 4.4 GHz max. 384 KB L1 cache, 3 MB L2 cache,16 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 5 PRO 5650GE 35W, 6 Cores, 12threads 3.4 GHz base frequency, up to 4.4 GHz max. 384 KB L1 cache, 3 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	
AMD® Ryzen™ 3 PRO 5350G 65W, 4 Cores, 8 threads 4.0 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 2 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 3 PRO 5350GE 35W, 4 Cores, 8 threads 3.6 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 2 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	

NOTE: Multi-core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 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.

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

AMD® Ryzen™ 7 5700G 65W, 8 Cores, 16 threads 3.8 GHz base frequency, up to 4.6 GHz max. 384 KB L1 cache, 4 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2000MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 7 5700GE 35W, 8 Cores, 16 threads 3.2 GHz base frequency, up to 4.6 GHz max. 384 KB L1 cache, 4 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (8 Cores, 2000MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	
AMD® Ryzen™ 5 5600G 65W, 6 Cores, 12 threads 3.9 GHz base frequency, up to 4.4 GHz max. 384 KB L1 cache, 3 MB L2 cache,16 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 5 5600GE 35W, 6 Cores, 12threads 3.4 GHz base frequency, up to 4.4 GHz max. 384 KB L1 cache, 3 MB L2 cache, 16 MB L3 cache Integrated Radeon™ Graphics (7 Cores, 1900MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	
AMD® Ryzen™ 3 5300G 65W, 4 Cores, 8 threads 4.0 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 2 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate		X
AMD® Ryzen™ 3 5300GE 35W, 4 Cores, 8 threads 3.6 GHz base frequency, up to 4.2 GHz max. 384 KB L1 cache, 2 MB L2 cache, 8 MB L3 cache Integrated Radeon™ Graphics (6 Cores, 1700MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	

AMD® Athlon™ 4000 Series Processors	DM	SFF
AMD® Athlon™ Gold PRO 4150GE 35W, 4 Cores, 4 threads 3.3 GHz base frequency, up to 3.7 GHz max. Integrated Radeon™ Graphics (5 Cores, 1500MHz) Supports DDR4 memory up to 3200 MT/s data rate	X	

Not all configuration components are available in all regions/countries.
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HP ProDesk 405 G8 DM / SFF

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

GRAPHICS

Integrated Graphics	DM	SFF
AMD Radeon™ Graphics	X	X

Optional Discrete Graphics Solutions	DM	SFF
AMD® Radeon™ R7 430 2GB 2DP		X
AMD® Radeon™ R7 430 2GB DP+VGA		X
AMD® Radeon™ RX 550X 4GB DP+HDMI		X

Adapters and Cables	DM	SFF
HP DisplayPort™ Cable	X	X
HP DisplayPort™ to DVI-D Adapter	X	X
HP DisplayPort™ to HDMI True 4K Adapter	X	X
HP DisplayPort™ to VGA Adapter	X	X
HP USB to Serial Port Adapter	X	X

STORAGE

3.5inch SATA Hard Disk Drives (HDD)**	DM	SFF
500GB 7200RPM 3.5in SATA HDD		X
1TB 7200RPM 3.5in SATA HDD		X
2TB 7200RPM 3.5in SATA HDD		X

2.5inch SATA Hard Disk Drives (HDD)**	DM	SFF
500GB 7200RPM 2.5in SATA HDD	X	X
1TB 7200RPM 2.5in SATA HDD	X	X
1TB 5400RPM 2.5in SATA HDD	X	
2TB 5400RPM 2.5in SATA HDD	X	X
500GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD*	X	X

M.2 PCIe NMVe Solid State Drives (SSD)**	DM	SFF
256GB M.2 2280 PCIe NVMe SSD	X	X
512GB M.2 2280 PCIe NVMe SSD	X	X
256GB M.2 2280 PCIe NVMe Three Layer Cell SSD	X	X
512GB M.2 2280 PCIe NVMe Three Layer Cell SSD	X	X
1TB M.2 2280 PCIe NVMe Three Layer Cell SSD	X	X
2TB M.2 2280 PCIe NVMe Three Layer Cell SSD	X	X
256GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD*	X	X
512GB M.2 2280 PCIe NVMe Self Encrypted OPAL2 Three Layer Cell SSD*	X	X

NOTE* Storage DriveLock does not work with Self Encrypting 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.

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

Optical Disc Drives	DM	SFF
HP 9.5mm Slim DVD-ROM Drive[7]		X
HP 9.5mm Slim DVD Writer Drive[8]		X

7. 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.
8. Don't copy copyright-protected materials.

Media Card Reader	DM	SFF
SD 4.0 with 5-in-1 Interface (Supports SD, SDXC, SDHC, UHS-I, UHS-II)		X

MEMORY

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

Memory Configuration	DM	SFF
4 GB (4 GB x 1)	X	X
8 GB (4 GB x 2)	X	X
8 GB (8 GB x 1)	X	X
16 GB (8 GB x 2)	X	X
16 GB (16 GB x 1)	X	X
32 GB (16 GB x 2)	X	X
32 GB (32 GB x 1)	X	X
64 GB (32 GB x 2)	X	X

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: Actual transfer rate will vary and is determined by the system's configured processor. See processor specifications for supported memory data rate.
NOTE: All memory slots are customer accessible / upgradeable.

QuickSpecs

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

NETWORKING/COMMUNICATIONS

Ethernet (RJ-45)

	DM	SFF
Realtek RTL8111FPH-CG Gigabit Network Connection (standard)	X	X
Intel® I225-T1 PCIe x1 Gigabit Network Interface Card (optional)		X

Wireless[1]

	DM	SFF
Realtek 8852AE Wi-Fi 6 and Bluetooth® M.2 Combo Card[2]	X	
Realtek RTL8822CE 802.11ac 2x2 with Bluetooth® M.2 Combo Card	X	X
Realtek RTL8822CE 802.11ac 2x2 with Bluetooth® M.2 Combo Card with external antenna	X	
Realtek RTL8821CE 802.11ac 1x1 with Bluetooth® M.2 Combo Card	X	X

1. Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs.
2. Wi-Fi 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.

KEYBOARDS AND POINTING DEVICES

Keyboards

	DM	SFF
HP PS/2 Business Slim Standalone Wired Keyboard		X
HP Wired Desktop 320K Keyboard	X	X
HP USB Business Slim Wired SmartCard CCID Keyboard	X	X
HP 125 Wired Keyboard	X	X
HP 125 Antimicrobial Wired Keyboard	X	X

Keyboard & Mouse Combo

	DM	SFF
HP 225 Antimicrobial Wired Mouse and Keyboard Combo[10]	X	X
HP 225 Wired Mouse and Keyboard Combo	X	X

Mouse

	DM	SFF
HP PS/2 Mouse		X
HP Wired Desktop 320M Mouse	X	X
HP USB & PS/2 Washable Wired Mouse Standalone	X	X
HP USB Fingerprint Mouse	X	X
HP 125 Wired Mouse	X	X
HP 125 Antimicrobial Wired Mouse[1]	X	X
HP 128 Laser Wired Mouse	X	X

NOTE: Availability may vary by country.
1. Available in China Only.

QuickSpecs

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

SECURITY

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

QuickSpecs

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

PORTS

Internal Slots and Ports

	DM	SFF
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

	DM	SFF
9.5mm Slim Optical Disc Drive (ODD)		1
SD Card Reader		1
2.5" Internal Storage Drive	1	2[1]
3.5" Internal Storage Drive		1[1]

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

	DM	SFF
Type-A Hi-Speed USB 480Mbps signaling rate port		2 (rear)
Type-A SuperSpeed USB 5Gbps signaling rate port	2 (rear)	2 (front) 3 (rear)
Type-A SuperSpeed USB 10Gbps signaling rate port	2 (front) 2 (rear)	2 (front)
Type-C® SuperSpeed USB 10Gbps signaling rate port	1 (front)	
Video	1 DisplayPort™ 1.4 (rear) 1 HDMI 1.4 (rear)	2 DisplayPort™ 1.4 (rear)
Audio	1 Combo Audio Jack with CTIA	1 Combo Audio Jack with CTIA headset support (front)
Network Interface	1 RJ45 (rear)	1 RJ45 (rear)

QuickSpecs

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

Rear Configurable Non-PCIe/PCI Slot User Accessible Ports

Flexible Port 1, choice of one of the following:

	DM	SFF
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 or HDMI 2.0b or VGA	1 DisplayPort™ 1.4 or HDMI 2.0a or VGA
Serial (RS-232)	1[1]	1

1. Sold separately or as an optional feature

Flexible Port 2, choice of one of the following:

	DM	SFF
Type-A USB	2 Hi-Speed USB 480Mbps signaling rate[1]	
Serial (RS-232)	1[1]	1[1]

1. Must be configured at time of purchase

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

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

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

Preinstalled Software
HP BIOSphere Gen6[1]
HP Secure Erase[2]
Absolute Persistence Module[3]
HP Drive Lock & Automatic Drive Lock[4]
BIOS Update via Network
HP Wake on WLAN

Software
HP Desktop Support Utilities
HP Connection Optimizer[5]
myHP
HP Privacy Settings
Touchpoint Customizer for Commercial
HP Notifications
HP Support Assistant[6]
HP Noise Cancellation Software
HP QuickDrop[7]
Microsoft Defender
Buy Microsoft Office (sold separately)
Xerox® DocuShare® (30 days free trial offer)[8]
HP Smart Support[9]

Manageability Features
HP Driver Packs (download)[10]
HP Client Catalog (download)
HP Image Assistant (download)
HP Manageability Integration Kit for Microsoft System Center Configuration Management (download)[11]
Ivanti Management Suite (download)[12]
HP Cloud Recovery[13]
HP Client Management Script Library (download)

Security Management
HP Sure Sense[14]
HP Sure Click[15]
HP Sure Start Gen6[16]
TPM 2.0 Embedded Security Chip (Common Criteria EAL4+ Certified) (FIPS 140-2 Level 2 Certified)
HP Tamperlock

1. HP BIOSphere Gen6 requires Windows 10 and is available on select HP Pro and Elite PCs. Features may vary depending on the platform and configurations.
2. HP 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. Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
3. Drive Lock is not supported on NVMe drives
4. HP Connection Optimizer requires Windows 10.
5. HP Support Assistant requires Windows and Internet access.

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

6. HP Quick Drop requires Internet access and Windows 10 PC preinstalled with HP QuickDrop app and either an Android device (phone or tablet) running Android 7 or higher with the Android HP QuickDrop app, and /or an iOS device (phone or tablet) running iOS 12 or higher with the iOS HP QuickDrop app.

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 https://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.

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

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

12. Ivanti Management Suite subscription required.

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

14. HP Sure Sense is available on select HP PCs and is not available with Windows10 Home

15. HP Sure Click requires Windows 10. See https://bit.ly/2PrLT6A_SureClick for complete details.

16. HP Sure Start Gen6 is available on select HP PCs and requires Windows 10

Not all configuration components are available in all regions/countries.
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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[29] Non-Operating: -30° to 60° C
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)

29. 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.

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

ENVIRONMENTAL & INDUSTRY

HP ProDesk 405 G8 Desktop Mini 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:
	• IT ECO declaration
	• US ENERGY STAR®
	EPEAT® Gold registered in the United States. See http://www.epeat.net for registration status in your country*. Search keyword generator on HP's 3rd party option store for solar generator accessories at http://www.hp.com/go/options.
	• TCO Certified 8.0
	*Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. Status varies by country. Visit http://www.epeat.net for more information.
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)	7.50 W	7.65 W	7.25 W
Normal Operation (Long idle)	7.03 W	7.15 W	6.90 W
Sleep	0.71 W	0.75 W	0.70 W
Off	0.54 W	0.59 W	0.53 W

NOTE: Energy efficiency data listed is for an ENERGY STAR® certified product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are 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 www.hp.com/go/options

Heat Dissipation*	115VAC, 60Hz	230VAC, 50Hz	100VAC, 60Hz
Normal Operation (Short idle)	25.59 BTU/hr	26.11 BTU/hr	24.74 BTU/hr
Normal Operation (Long idle)	23.97 BTU/hr	24.40 BTU/hr	23.55 BTU/hr
Sleep	2.44 BTU/hr	2.58 BTU/hr	2.41 BTU/hr
Off	1.86 BTU/hr	2.02 BTU/hr	1.83 BTU/hr

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)	Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.2	23
Fixed Disk – Random writes	3.8	28
Optical Drive – Sequential reads	4.6	38

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

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.
Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: Mercury greater the1ppm by weight Cadmium greater than 20ppm by weight Battery size: Not Applicable Battery type: Not Applicable
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the <Gold> level, based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit http://www.epeat.net for more information. • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product contains 32.2% post-consumer recycled plastic (by wt.) • This product is 92.8% recycle-able when properly disposed of at end of life.

Packaging Materials	External:	PAPER/Corrugated	430 g
		PAPER/Molded Pulp	74 g
	Internal:	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.		

RoHS Compliance	HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam. We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products. We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve. To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.
Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf): • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics

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

	• Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Halogenated Diphenyl Methanes • Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging Usage	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.
HP Inc. Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html ISO 14001 certificates: http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842 and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

HP ProDesk 405 G8 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: • IT ECO declaration • US ENERGY STAR® • EPEAT® Gold registered in the United States. Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit http://www.epeat.net for more information.. • TCO Certified 8.0		
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)	13.45 W	13.43 W	13.67 W
Normal Operation (Long idle)	13.36 W	13.22 W	13.42 W
Sleep	0.76 W	0.77 W	0.76 W
Off	0.66 W	0.67 W	0.66 W
	NOTE: Energy efficiency data listed is for an ENERGY STAR® certified product if offered within the model family. HP computers marked with the ENERGY STAR® Logo are certified with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® certified configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.		
Heat Dissipation*	**115VAC, 60Hz**	**230VAC, 50Hz**	**100VAC, 60Hz**
Normal Operation (Short idle)	45.88 BTU/hr	45.82 BTU/hr	46.62 BTU/hr
Normal Operation (Long idle)	45.55 BTU/hr	45.09 BTU/hr	45.78 BTU/hr
Sleep	2.61 BTU/hr	2.62 BTU/hr	2.61 BTU/hr
Off	2.26 BTU/hr	2.28 BTU/hr	2.27 BTU/hr
	NOTE: Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.		
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)	Sound Power (L_{WAd}, bels)		Sound Pressure (L_{pAm}, decibels)
Typically Configured – Idle	3.3		24
Fixed Disk – Random writes	3.6		26
Optical Drive – Sequential reads	4.6		36
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: • 3 USB ports • 1 PC card slot (type I/II) • 1 ExpressCard/54 slot • 1 IEEE 1394 Port • 2 SODIMM memory slots • Optional expansion base docking station		

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

	• 1 multi-bay II storage port • Interchangeable HDD Spare parts are available throughout the warranty period and or for up to "5" years after the end of production.
Batteries	This battery(s) in this product comply with EU Directive 2006/66/EC Batteries used in the product do not contain: Mercury greater the1ppm by weight Cadmium greater than 20ppm by weight Battery size: Not Applilcable Battery type: Not Applilcable
Additional Information	This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). • This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the <Gold> level, based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit http://www.epeat.net for more information. • Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043. • This product contains 42.2% post-consumer recycled plastic (by wt.) • This product is 94.0% recycle-able when properly disposed of at end of life.

Packaging Materials (vary by country)	**External:**	PAPER/Paper	1019 g
	Internal:	PAPER/Molded Pulp	414 g
		PLASTIC/Polyethylene low density - LDPE	29 g
	The plastic packaging material contains at least 100% recycled content.		
	The corrugated paper packaging materials contains at least 90% recycled content.		

RoHS Compliance	HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam. We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances—including PVC, BFRs, and certain phthalates—in future RoHS legislation that pertains to electrical and electronics products. We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve. To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.
Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf): • Asbestos • Certain Azo Colorants • Certain Brominated Flame Retardants – may not be used as flame retardants in plastics • Cadmium • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Halogenated Diphenyl Methanes

Not all configuration components are available in all regions/countries.
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Standard Features and Configurable Components (availability may vary by country)

	• Lead carbonates and sulfates • Lead and Lead compounds • Mercuric Oxide Batteries • Nickel – finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Biphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging Usage	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
End-of-life Management and Recycling	HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment. Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www8.hp.com/us/en/hp-information/environment/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/PC_GBU_Product_Design_ISO_14K_Certificate.pdf and http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

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

SERVICE AND SUPPORT

On-site Warranty[30]: One-year (1-1-1) limited warranty delivers three years or one year of on-site, next business day[31] service for parts and labor and includes free support 24 x 7[32]. 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.[33]

30. Terms and conditions may vary by country. Certain restrictions and exclusions apply. Other warranty variations may be offered in your region.
31. 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.
32. 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.
33. Service levels and response times for HP Care Packs may vary depending on your geographic location. Service starts on date of hardware purchase. Restrictions and limitations apply. For details, visit www.hp.com/go/cpc. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

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Technical Specifications – Graphics

GRAPHICS

AMD Radeon™ Vega Graphics (integrated)

Graphics Controller	Integrated
DisplayPort™	Multimode capable; supports HDCP, Display Port Audio (2 streams), HBR2 link rates and Multi-Stream Technology for a maximum of 3 displays connected to any output controlled by AMD® Graphics
HDMI	Supports HDMI 2.0a features Supports HDCP 2.3 Supports audio over HDMI
VGA	VGA output
USB Type-C® DP Alt Mode	DisplayPort™ over the USB Type-C® module
Memory	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.
Maximum Color Depth	up to 10 bits/color
Graphics/Video API Support	VP9 10b Dec HW HDR Rec. 2020 DX12
Max. Resolution (VGA)	2048 x 1536@60Hz
Max. Resolution (HDMI)	4096 x 2160@60Hz
Max. Resolution (DP)	4096 x 2160@60Hz

AMD® Radeon™ RX 550X 4 GB FH 2DP+HDMI

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

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

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

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Technical Specifications – Graphics

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

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

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

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Technical Specifications – Storage

STORAGE

500GB 7200RPM 3.5in SATA HDD

Capacity	500GB
Rotational Speed	7,200 rpm
Interface	SATA 6.0 Gb/s
Buffer Size	32MB
Logical Blocks	976,773,168
Seek Time	11 ms (Average)
Height	1 in/2.54 cm
Width	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

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

1TB 7200RPM 3.5in SATA HDD

Capacity	1TB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	64MB
Logical Blocks	1,953,525,168
Seek Time	11 ms (Average)
Height	1 in/2.54 cm
Width (nominal)	Media diameter: 3.5 in/8.89 cm Physical size: 4 in/10.2 cm
Operating Temperature	41° to 131° F (5° to 55° C)

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

2TB 7200RPM 3.5in SATA HDD

Capacity	2TB
Rotational Speed	7,200 rpm
Interface	SATA 6 Gb/s
Buffer Size	64MB
Logical Blocks	3,907,029,168
Seek Time	11 ms (Average)
Height	1.028 in/26.11 mm
Width (nominal)	4.0 in/101.6 mm
Operating Temperature	41° to 131° F (5° to 55° C)

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

Not all configuration components are available in all regions/countries.
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Technical Specifications – Storage

500GB 7200RPM 2.5in SATA HDD

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

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

1TB 7200RPM 2.5in SATA HDD

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

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

1TB 5400RPM 2.5in SATA HDD

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

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

2TB 5400RPM 2.5in SATA HDD

Capacity	2TB
Rotational Speed	5,400 rpm
Interface	SATA 6 Gb/s
Buffer Size	128MB

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Technical Specifications – Storage

Logical Blocks	3,907,050,336
Seek Time	12 ms (Average)
Height	0.374 in/9.5 mm (Max.)
Width (nominal)	2.75 in/70 mm (nominal)
Operating Temperature	41° to 131° F (5° to 55° C)

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

500GB 7200RPM 2.5in Self Encrypted OPAL2 SATA HDD

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

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

256GB M.2 2280 PCIe NVMe SSD

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

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

512GB M.2 2280 PCIe NVMe SSD

Drive Weight	< 10g
Capacity	512GB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen3
Maximum Sequential Read	Up to 1600MB/s

Not all configuration components are available in all regions/countries.
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Maximum Sequential Write	Up to 860MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2

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

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

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

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

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

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

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

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

Drive Weight	< 10g
Capacity	1TB
Height	2.38mm
Length	80mm
Width	22mm
Interface	PCIE Gen3

Not all configuration components are available in all regions/countries.
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Maximum Sequential Read	Up to 3480MB/s
Maximum Sequential Write	Up to 3037MB/s
Logical Blocks	2,000,409,264
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	TRIM; ASPM L1.2

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

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

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

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

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

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

Drive Weight	< 10g
Capacity	512GB
Height	2.38mm
Length	80mm
Width	22mm

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Interface	PCIE Gen3
Maximum Sequential Read	Up to 2900MB/s
Maximum Sequential Write	Up to 1100MB/s
Logical Blocks	1,000,215,216
Operating Temperature	0° to 70°C (32° to 158°F) [ambient temp]
Features	APST; ASPM L1.2; NVME spec 1.2; TCG-OPAL2 security

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

OPTICAL DISC DRIVES

HP 9.5mm Slim DVD-ROM Drive

Height	9.5 mm height
Orientation	Either horizontal or vertical
Interface type	SATA/ATAPI
Dimensions (W x H x D)	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel
Weight (max)	Up to 0.31 lb (140g) without bezel
Read Speeds	DVD+R/-R/+RW/ -RW/+R DL /-R DL Up to 8X DVD-ROM Up to 8X CD-ROM, CD-R Up to 24X CD-RW Up to 24X
Access time (typical reads, including settling)	Random: DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) Full stroke: DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical)
Power	Source Slimline SATA DC power receptacle DC Power Requirement 5 VDC ± 5%-100 mV ripple p-p DC Current 5 VDC (< 1000 mA typical, 1600 mA maximum)
Environmental conditions (operating - non-condensing)	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)

NOTE: HD-DVD disks cannot be played on the DVD-ROM 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.

Not all configuration components are available in all regions/countries.
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HP 9.5mm Slim DVD Writer Drive

Height	9.5 mm height
Orientation	Either horizontal or vertical
Interface type	SATA/ATAPI
Disc recording capacity	Up to 8.5 GB DL or 4.7 GB standard
Dimensions (W x H x D)	5.04 x 0.37 x 5.0 in (128 x 9.5 x 127 mm) without bezel
Weight (max)	0.31 lb (140 g)
Write Speeds	DVD-R DL - Up to 6X DVD+R - Up to 8X DVD+RW - Up to 8X DVD+R DL - Up to 6X DVD-R - Up to 8X DVD-RW - Up to 6X CD-R - Up to 24X CD-RW - Up to 10X
Read Speeds	DVD-RW, DVD+RW - Up to 8X DVD-R DL, DVD+R DL - Up to 8X DVD+R, DVD-R - Up to 8X DVD-ROM DL, DVD-ROM - Up to 8X CD-ROM, CD-R - Up to 24X CD-RW - Up to 24X
Access time (typical reads, including settling)	Random DVD-ROM: 170 ms (typical), CD-ROM: 170 ms (typical) Full Stroke DVD-ROM: 320 ms (typical), CD-ROM: 320 ms (typical) Stop Time 6 seconds (typical)
Power	Source Slimline SATA DC power receptacle DC Power Requirement 5 VDC ± 5%-100 mV ripple p-p DC Current 5 VDC (< 1000 mA typical, 1600 mA maximum)
Environmental conditions (operating - non-condensing)	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)

NOTE: Don't copy copyright-protected materials.

Not all configuration components are available in all regions/countries.
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NETWORKING AND COMMUNICATIONS

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

Intel® I225-LM 2.5 Gigabit Network Connection LOM (non-vPro®)	
Connector	RJ-45
System Interface	PCI(Intel proprietary) + SMBus
Data rates supported	10 Mbit/s operation (10BASE-T; IEEE 802.3i; IEEE 802.3 clauses 13-14) 100 Mbit/s operation (100BASE-TX; IEEE 802.3u; IEEE 802.3 clauses 21-30) 1000 Mbit/s operation (1000BASE-T; IEEE 802.3ab; IEEE 8023 clauses 40) Auto-Negotiation (Automatic Speed Selection) Full Duplex Operation at all Speeds, Half Duplex operation at 10 and 100 Mbit/s
IEEE Compliance	IEEE 802.1p QoS (Quality of Service) Support IEEE 802.1q VLAN support IEEE 802.3x Flow Control (IEEE 802.3 clauses 31-32; configurable) IEEE 802.3az EEE (Energy Efficient Ethernet) IEEE 802.3i 10BASE-T IEEE 802.3u 100BASE-TX IEEE 802.3ab 1000BAE-T IEEE 802.3bz 2.5GBASE-T

Technical Specifications – Networking

Performance	TCP/IP/UDP Checksum Offload (configurable) Protocol Offload (ARP & NS) Large send offload and Giant send offload Receiving Side Scaling Jumbo Frame 9K
Power consumption	Cable Disconnection: 25mW 100Mbps Full Run: 450mW 1000bp Full Run: 1000mW WoL Enable(S3/S4/S5): 50mW WoL Disable(S3/S4/S5): 25mW
Power Management	ACPI compliant – multiple power modes Situation-sensitive features reduce power consumption Advanced link down power saving for reducing link down power consumption
Management Interface	Auto MDI/MDIX Crossover cable detection
IT Manageability	Wake-on-LAN from standby and hibernation (Magic Packet and Microsoft Wake-Up Frame); Wake-on-LAN from off (Magic Packet only) PXE 2.1 Remote Boot Statistics Gathering (SNMP MIB II, Ethernet-like MIB, Ethernet MIB (802.3x, clause 30)) Comprehensive diagnostic and configuration software suite Virtual Cable Doctor for Ethernet cable status
Security & Manageability	Intel® non-vPro® support with appropriate Intel® chipset components

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.

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

Not all configuration components are available in all regions/countries.
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Technical Specifications – Networking

Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM, 1024QAM
Security[3]	• IEEE and Wi-Fi CERTIFIED™ 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 • WPA3 certification • IEEE 802.11i • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power[2]	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum • 802.11ax HT40(2.4GHz): +10dBm minimum • 802.11ax VHT160(5GHz): +10dBm minimum
Power Consumption	• Transmit mode: 2.5 W • Receive mode: 2 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[3]	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
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	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 14° to 158° F (−10° to 70° C) Non-operating −40° to 176° F (−40° to 80° C)

Not all configuration components are available in all regions/countries.

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Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON	

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

Technical Specifications – Networking

	LE Long Range

Realtek 802.11a/b/g/n/ac (1x1) Wi-Fi® and Bluetooth® 4.2 Combo	
Wireless LAN Standards	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
Interoperability	Wi-Fi CERTIFIED™ modules
Frequency Band	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
Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac : MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz & 80MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security	• IEEE and Wi-Fi CERTIFIED™ 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 • WPA3 certification • IEEE 802.11i • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)
Roaming	IEEE 802.11 compliant roaming between access points
Output Power	• 802.11b: +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

Not all configuration components are available in all regions/countries.
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	• 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	14° to 158° F (−10° to 70° C)
	Non-operating	−40° to 176° F (−40° to 80° C)
Humidity	Operating	10% to 90% (non-condensing)
	Non-operating	5% to 95% (non-condensing)
Altitude	Operating	0 to 10,000 ft (3,048 m)
	Non-operating	0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON	

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

Bluetooth® Specification	4.0/4.1/4.2 Compliant
Frequency Band	2402 to 2480 MHz
Number of Available Channels	Legacy: 0~79 (1 MHz/CH) BLE: 0~39 (2 MHz/CH)
Data Rates and Throughput	Legacy: 3 Mbps data rate; throughput up to 2.17 Mbps
	BLE: 1 Mbps data rate; throughput up to 0.2 Mbps
	Legacy: Synchronous Connection Oriented links up to 3, 64 kbps, voice channels Legacy: Asynchronous Connection Less links 2178.1 kbps/177.1 kbps asymmetric (3-DH5) or 864 kbps symmetric (3-EV5)
Transmit Power	The Bluetooth® component shall operate as a Class II Bluetooth® device with a maximum transmit power of +4 dBm for BR and EDR.
Power Consumption	Peak (Tx) 330 mW Peak (Rx) 230 mW Selective Suspend 17 mW
Electrical Interface	USB 2.0 compliant
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management **Certifications**	ETS 300 328, ETS 300 826 Low Voltage Directive IEC950 UL, CSA, and CE Mark
Bluetooth Profiles Supported	BT4.1-ESR 5/6/7 Compliance LE Link Layer Ping

Not all configuration components are available in all regions/countries.
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	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)

Realtek RTL8822CE 802.11ac 2x2 Wi-Fi® + BT5	
Wireless LAN Standards	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
Interoperability	Wi-Fi CERTIFIED™ modules
Frequency Band	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
Data Rates	• 802.11b: 1, 2, 5.5, 11 Mbps • 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps • 802.11n: MCS 0 ~ MCS 15, (20MHz, and 40MHz) • 802.11ac: MCS0 ~ MCS9, (1SS, and 2SS) (20MHz, 40MHz, and 80MHz)
Modulation	Direct Sequence Spread Spectrum BPSK, QPSK, CCK, 16-QAM, 64-QAM, 256-QAM
Security	• IEEE and WiFi certified 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 • WPA3 certification • IEEE 802.11i • WAPI
Network Architecture Models	Ad-hoc (Peer to Peer) Infrastructure (Access Point Required)

Not all configuration components are available in all regions/countries.
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Roaming	IEEE 802.11 compliant roaming between access points
Output Power	• 802.11b: +18.5dBm minimum • 802.11g: +17.5dBm minimum • 802.11a: +18.5dBm minimum • 802.11n HT20(2.4GHz): +15.5dBm minimum • 802.11n HT40(2.4GHz): +14.5dBm minimum • 802.11n HT20(5GHz): +15.5dBm minimum • 802.11n HT40(5GHz): +14.5dBm minimum • 802.11ac VHT80(5GHz): +11.5dBm minimum
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	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 14° to 158° F (−10° to 70° C) Non-operating −40° to 176° F (−40° to 80° C)
Humidity	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
Altitude	Operating 0 to 10,000 ft (3,048 m) Non-operating 0 to 50,000 ft (15,240 m)
LED Activity	LED Amber – Radio OFF; LED Off – Radio ON

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.

Not all configuration components are available in all regions/countries.
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Technical Specifications – Networking

Power Consumption	Peak (Tx): 330 mW Peak (Rx): 230 mW Selective Suspend: 17 mW
Bluetooth® Software Supported Link Topology	Microsoft Windows Bluetooth® Software
Power Management	Microsoft Windows ACPI, and USB Bus Support
Certifications	FCC (47 CFR) Part 15C, Section 15.247 & 15.249
Power Management Certifications	ETS 300 328, ETS 300 826 Low Voltage Directive 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)

Not all configuration components are available in all regions/countries.
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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	

Technical Specifications – Input/Output Devices

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

HP USB & PS/2 Washable Standalone Wired Keyboard		
Physical Characteristics	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 x31.2 mm)
	Weight	1.57 lb (710g)
Electrical	Operating voltage	5V +- 5%

Not all configuration components are available in all regions/countries.
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Technical Specifications – Input/Output Devices

	Power consumption	50mA
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Low-profile design
	Switch actuation	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)
Environmental	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
Approvals	UL, cUL, FCC, CE, TUV GS, VCCI, BSMI, RCM, KCC, USB-IF, WHQL, EN/IEC 60601-1, IP66/NEMA4X	
Ergonomic compliance	ANSI HFS 100, ISO 9241-4, and TUVGS	

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

Not all configuration components are available in all regions/countries.
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Technical Specifications – Input/Output Devices

	Switch life	20 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
Environmental	Acoustics	43-dBA maximum sound pressure level
	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	CUL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC	
Ergonomic compliance	TUVGS	

HP Universal USB Wired Keyboard		
Physical Characteristics	Keys	104, 105 layout (depending upon country)
	Dimensions (L x W x H)	18.15 x 6.02 x 1.08 in (461 x 153 x 27.4 mm)
	Weight	1.32 lb (600g) min
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption	50mA Max (All LED on)
	System interface	USB Type A plug connector
	ESD	Contact Discharge: 8 KV Air Discharge: 15 KV
	EMI - RFI	Conforms to FCC rules for a Class B computing device
Mechanical	Keycaps	Mid-profile design
	Switch actuation	60±10g nominal peak force with tactile feedback
	Switch life	10 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Microsoft PC 99 - 2001	Mid-profile design
Environmental	Acoustics	43-dBA maximum sound pressure level

Technical Specifications – Input/Output Devices

	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
	Drop (out of box)	26 in (66 cm) on carpet, six-drop sequence
	Drop (in box)	30 in (76.2 cm) on concrete, 16-drop sequence
Approvals	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC	
Ergonomic compliance	TUVGS	

HP Universal USB Wired Mouse		
Dimensions (H x L x W)	4.53 x 2.50 x 1.40 in (115 x 63.46 x 35.48 mm)	
Weight	0.18lb (80g)	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	50mA Max
	Resolution	1,000 DPI
	Sensor	Pixart PAN3606DL
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	9G(max), 1G=9.8m/s2
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

HP Optical Mouse	
Dimensions (H x L x W)	4.53 x 2.48 x1.46 in (115.2x 63 x37 mm)
Weight	0.22lb (101.6g)

Not all configuration components are available in all regions/countries.
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Technical Specifications – Input/Output Devices

Environmental	Operating temperature	41° to 122° F (5° to 50° C)
	Non-operating temperature	(-4° to 140° F)(-20° to 60° C)
	Operating humidity	10% to 85% (non-condensing at ambient)
	Non-operating humidity	5% to 95% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s2
	System interface	USB or PS/2
Mechanical	Switch actuation	60±15g nominal peak force with tactile feedback
	Switch life	3 million keystrokes (Life tester)
	Switch type	Contamination-resistant switch membrane
	Key-leveling mechanisms	For all double-wide and greater-length keys
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC

HP USB 1000dpi Laser Mouse		
Dimensions (H x L x W)	115 x 62.9 x 37 mm (L x W x H)	
Weight	0.22lb (101.6g)	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	100mA
	Resolution	1,000 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s2
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black

Not all configuration components are available in all regions/countries.
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Technical Specifications – Input/Output Devices

Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

HP USB Fingerprint Mouse		
Dimensions (H x L x W)	107 x 67 x 38.7 mm	
Weight	85 g	
Environmental	Operating temperature	50° to 122° F (10° to 50° C)
	Non-operating temperature	-22° to 140° F (-30° to 60° C)
	Operating humidity	10% to 90% (non-condensing at ambient)
	Non-operating humidity	20% to 80% (non-condensing at ambient)
	Operating shock	40 g, six surfaces
	Non-operating shock	80 g, six surfaces
	Operating vibration	2-g peak acceleration
	Non-operating vibration	4-g peak acceleration
Electrical	Operating voltage	5 VDC, +/-5%
	Power consumption (typical)	130mA
	Resolution	1,200 DPI
	Sensor	PixArt vendor Laser USB mouse sensor
	Tracking speed	30 inch/sec (max)
	Tracking acceleration	8G(max), 1G=9.8m/s2
Mechanical	Connector	USB 2.0
	Cable length	6 ft (1.8 m)
	Color	Jack Black
Regulatory approvals	Compliant	UL, FCC, CE Mark, TUV GS, VCCI, BSMI, RCM, KCC, EAC

Not all configuration components are available in all regions/countries.
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Technical Specifications – Audio/Multimedia

AUDIO/MULTIMEDIA

HP ProDesk 405 G8 Desktop Mini PC

Type	Integrated
HD Stereo Codec	Realtek ALC3867
Audio I/O Ports	Front: Headset connector supports a CTIA style headset and is retaskable as a Line-in, Line-out, Microphone-in or Headphone-out port
Internal Speaker Amplifier	2W class D mono amplifier for the internal speaker only. External speakers must be powered
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker.
Sampling	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 192 kHz for DAC and 44.1 kHz to 96 kHz for ADC
Wavetable Syntheses	Yes - Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes

HP ProDesk 405 G8 Small Form Factor PC

Type	Integrated
HD Stereo Codec	Realtek ALC3867
Audio I/O Ports	Front: Headset connector supports a CTIA 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
Internal Speaker Amplifier	2W class D mono amplifier for the internal speaker only. External speakers must be powered
Multi-streaming Capable	Playback multi-streaming can be enabled in the audio control panel to allow independent audio streams to be sent to/from the front and rear jacks or integrated speaker.
Sampling	Independent sampling rates for DAC's and ADC's; supports resolutions from 16 to 24-bit; 44.1 kHz to 192 kHz for DAC and 44.1 kHz to 96 kHz for ADC
Wavetable Syntheses	Yes - Uses OS soft wavetable
Analog Audio	Yes
# of Channels on Line-Out	Stereo (Left & Right channels)
Internal Speaker	Yes

Technical Specifications – Power

POWER

	DM	SFF
External Power Supplies	65W EPS, 88% average efficiency at 115V & 89% at 230Vac	N/A
80 PLUS Gold	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)
80 PLUS Platinum	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)
Operating Voltage Range	90Vac~264Vac	90Vac~264Vac
Rated Voltage Range	100Vac~240Vac	100Vac~240Vac
Rated Line Frequency	50HZ~60HZ	50HZ~60HZ
Operating Line Frequency	47HZ~63HZ	47HZ~63HZ
Rated Input Current with Energy Efficient* Power Supply	65W $\leqq$ 1.6A	180W Gold $\leqq$ 2.3A 210W Platinum $\leqq$ 2.8A
DC Output	+19.5V	+12V
Current Leakage (NFPA 99: 2012)	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.
Power Supply Fan	N/A	50 mm variable speed

Not all configuration components are available in all regions/countries.
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Technical Specifications – Power

Power cord length	6.0 ft. (1.83 m)	6.0 ft. (1.83 m)
Dimensions	65W: 102 x 55 x 30 mm	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

QuickSpecs

Miscellaneous Features

WEIGHTS & DIMENSIONS[1]

	DM	**SFF**
Chassis (W x D x H)	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
System Volume	64 cu in 1.05 L	474 cu in 7.8 L
System Weight[2]	2.74 lbs 1.25 kg	8.6 lbs 3.9 kg
Max Supported Weight (desktop orientation)	N/A	77 lbs 35 kg
Packaging Dimension W X D		15.52 x 8.07 x 19.65 in (394 x 205 x 499 mm)
	MPP: 19.61 x 9.25 x 5.20 in (498 x 235 x 132 mm)	**MPP**: 15.52 x 8.07 x 19.65 in (394 x 205 x 499 mm)
Shipping Weight	6.52 lbs (2.97 kg)	14.45 lbs (6.56 kg)
	MPP: 7.50 lbs (3.40 kg)	**MPP**: 14.98 lbs (6.8 kg)
Palletization Profile	10-units per layer 11, 15, or 18 layers max depending on details of freight 110 units per air freight pallet 46.26 x 39.21 x 62.87 in 1175 x 996 x 1597 mm (include pallet), or 150 units per standard ground or sea freight pallet 46.26 x 39.21 x 83.86 in 1175 x 996 x 2130 mm (include pallet), or 170 units per ground freight or high-cube sea pallet 46.26 x 39.21 x 94.06 in 1175 x 996 x 2389 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)
Palletization Profile (Molded Pulp)	10-units per layer 10 to 19 layers max depending on details of freight 100 or 190 units per pallet depending on details of freight 46.26 x 39.21 x 103.74 in, 1175 x 996 x 2635 mm (including pallet)	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

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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 Software5
- 1 Aux Power LED on System mainboard
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Single 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	Description
Product Orientation	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

QuickSpecs

After Market Options

AFTER MARKET OPTIONS

Graphics Solutions	DM	SFF	Part Number
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 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	DM	SFF	Part Number
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	DM	SFF	Part Number
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

QuickSpecs

After Market Options

Input Devices	DM	SFF	Part Number
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 Wireless Business Slim Keyboard and Mouse	X	X	N3R88AA
HP 125 Wired Keyboard	X	X	266C9AA
HP225 Antimicrobial Wired Mouse and Keyboard Combo	X	X	286K3AA
HP 225 Wired Mouse and Keyboard Combo	X	X	286J4AA
HP Wired Desktop 320M Mouse	X	X	9VA80AA
HP PS/2 Mouse		X	QY775AA
HP USB Fingerprint Mouse	X	X	4TS44AA
HP 125 Wired Mouse	X	X	265A9AA
HP 128 Laser Wired Mouse	X	X	265D9AA

System Memory	DM	SFF	Part Number
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

Not all configuration components are available in all regions/countries.
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After Market Options

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

Communication Devices	DM	SFF	Part Number
Intel® Ethernet I210-T1 GbE NIC		X	E0X95AA

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

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

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

NOTE: For more detail on HP I/O Devices please refer to the HP FLEX IO Option Cards QuickSpecs. 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
June 16, 2021	From v1 to v2	Removal	HP Workwell from Software section
July 6, 2021	From v2 to v3	Removal	Intel® Wi-Fi 6 AX200 802.11ax 2x2 with Bluetooth® M.2 Combo Card
July 23,2021	From v3 to v4	Update	AMO, Service and support and At a glance sections updated; OMTP support removed from DM and SFF features, DM call outs, call outs image and Storage section updated / Windows 10, version 1809 to 1909
July 26, 2021	From v4 to v5	Update	1TB 5400RPM added to storage index / Rated input and dimensions in Power section updated / HP Tamperlock added to software section
August 6, 2021	From v5 to v6	Update	System memory in AMO section updated
August 13, 2021	From v6 to v7	Update	Environmental tables updated
August 26, 2021	From v7 to v8	Addition	Realtek 8852AE to Network section
December 9, 2021	From v8 to v9	Update	Wi-fi 6 disclaimers updated
December 15, 2021	From v9 to v10	Update	Windows 11 update