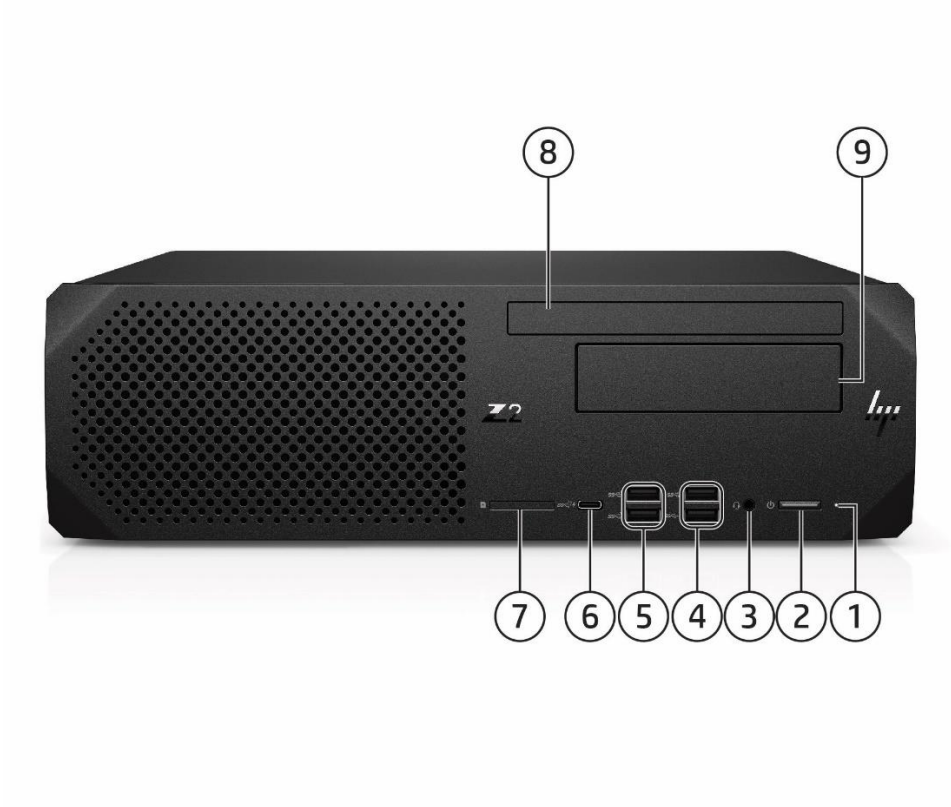
Overview

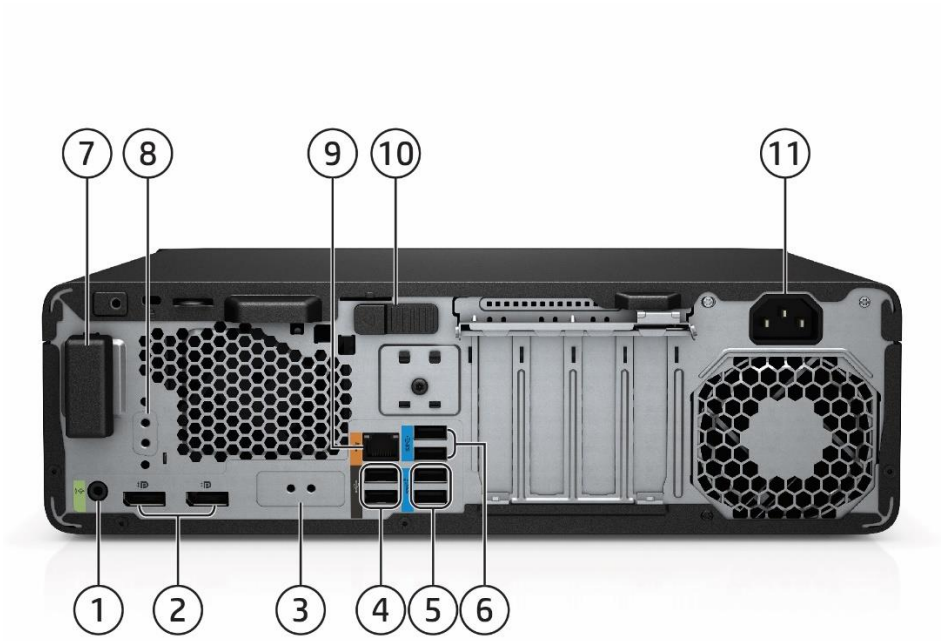
HP Z2 Small Form Factor G5 Workstation



Front View

1. HDD Activity LED & Power button LED
2. Power button
3. Universal audio jack (with CTIA & OMTP headset support)
4. 2 Type-A SuperSpeed USB 5Gbps signaling rate port (1 charge supports up to 5V/2.1A)
5. 2 Type-A SuperSpeed USB 10Gbps signaling rate port
6. 1 Type-C® SuperSpeed USB 10Gbps signaling rate port (charge supports up to 5V/3A)
7. Media Card Reader 4.0 (optional)
8. Slim ODD bay
9. External/internal shared 3.5" bay

Overview



Rear View

1. 1 Audio line out
2. 2 DisplayPort™ 1.4[1]
3. Flex I/O module: choose one from the following: VGA, HDMI 2.0b, DisplayPort™ 1.4[1], Type-C® SuperSpeed USB 10Gbps signaling rate port (Alt mode), Dual Type-A SuperSpeed USB 5Gbps signaling rate port, 2nd 1GbE LAN, Thunderbolt™ 3 (cabled to PCIe AIC)
4. 2 High-speed USB 480Mbps signaling rate port
5. 2 Type-A SuperSpeed USB 10Gbps signaling rate port
6. 2 Type-A SuperSpeed USB 5Gbps signaling rate port
7. WLAN Antenna (optional)
8. Serial port (optional)
9. RJ-45
10. Release latch
11. Power connector

[1] All DisplayPort™ support DP1.4/HBR2 when video output is via Intel Graphics.

Overview

Form Factor Small Form Factor

Operating Systems

Preinstalled:

- Windows 11 Pro[2]
- Windows 11 Pro for Workstations[2]
- Windows 11 Home - HP recommends Windows 11 Pro for business[2]
- Windows 10 Pro[1,2]
- Windows 10 Pro for Workstations[1,2]
- Windows 10 Home - HP recommends Windows 11 Pro for business[1,2]
- Ubuntu 20.04 LTS[3]
- Linux®-ready[4]
- Red Hat® Enterprise Linux® Desktop Workstation (Paper license with 1-year support; no preinstalled OS)

Web-supported only:

- Windows 10 Enterprise 64[2]

Supported Version:

- HP tested Windows 10, version 1809 on this platform. For testing information on newer versions of Windows 10, please see: https://support.hp.com/document/c05195282.
- Red Hat® Enterprise Linux® Workstation 8
- SUSE Linux® Enterprise Desktop 15

[1] Device comes with Windows 10 and a free Windows 11 upgrade or may be preloaded with Windows 11. Upgrade timing may vary by device. Features and app availability may vary by region. Certain features require specific hardware (see Windows 11 Specifications).

[2] Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com.

NOTE: Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel® and AMD® 7th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on http://www.support.hp.com. A full list of HP products and the Windows 10 versions tested is available on the HP support website. https://support.hp.com/us-en/document/c05195282

[3] Not all features are available in all editions or versions of Ubuntu. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS to take full advantage of Ubuntu functionality. Ubuntu may be automatically updated. ISP fees may apply, and additional requirements may apply over time for updates.

[4] For detailed Linux® OS/hardware support information, see: http://www.hp.com/support/linux_hardware_matrix

NOTE: In accordance with Microsoft's support policy, HP does not support the Windows® 7 operating system on products configured with Intel® 7th Generation and forward processors.

Processors*

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Intel® Turbo Boost Technology[3]	Featuring Intel® vPro™ Technology[4]	16GB Intel® Optane™ memory[2]	TDP (W)
Intel® Core™ i9-10900K Processor	10	3.7	20	2933	Y	Intel® UHD Graphics 630	5.2	Y	Y	125

Overview

Intel® Core™ i9-10900 Processor	10	2.8	20	2933	Y	Intel® UHD Graphics 630	5.1	Y	Y	65
Intel® Core™ i9-10900F Processor[5]	10	2.8	20	2933	Y	N/A	5.1	N/A	Y	65
Intel® Core™ i9-10850K Processor	10	3.6	20	2933	Y	Intel® UHD Graphics 630	5.2	N/A	Y	125
Intel® Core™ i7-10700K Processor	8	3.8	16	2933	Y	Intel® UHD Graphics 630	5.1	Y	Y	125
Intel® Core™ i7-10700 processor	8	2.9	16	2933	Y	Intel® UHD Graphics 630	4.8	Y	Y	65
Intel® Core™ i5-10600K processor	6	4.1	12	2666	Y	Intel® UHD Graphics 630	4.8	Y	Y	125
Intel® Core™ i5-10600 processor	6	3.3	12	2666	Y	Intel® UHD Graphics 630	4.8	Y	Y	65
Intel® Core™ i5-10500 processor	6	3.1	12	2666	Y	Intel® UHD Graphics 630	4.5	Y	Y	65
Intel® Core™ i5-10400 processor	6	2.9	12	2666	Y	Intel® UHD Graphics 630	4.3	N/A	Y	65
Intel® Core™ i5-10400F Processor[5]	6	2.9	12	2666	Y	N/A	4.3	N/A	Y	65
Intel® Core™ i3-10320 processor[5]	4	3.8	8	2666	Y	Intel® UHD Graphics 630	4.6	N/A	Y	65
Intel® Core™ i3-10300 processor[5]	4	3.7	8	2666	Y	Intel® UHD Graphics 630	4.4	N/A	Y	65
Intel® Core™ i3-10100 processor	4	3.60	6	2666	Y	Intel® UHD Graphics 630	4.3	N/A	Y	65
Intel® Xeon® W-1290P processor	10	3.7	20	2933	Y	Intel® UHD Graphics P630	5.2	Y	Y	125
Intel® Xeon® W-1290 processor[5]	10	3.2	20	2933	Y	Intel® UHD Graphics P630	5.1	Y	Y	80
Intel® Xeon® W-1270P processor[5]	8	3.8	16	2933	Y	Intel® UHD Graphics P630	5.1	Y	Y	125
Intel® Xeon® W-1270 processor	8	3.4	16	2933	Y	Intel® UHD Graphics P630	5.0	Y	Y	80
Intel® Xeon® W-1250P processor	6	4.1	12	2666	Y	Intel® UHD Graphics P630	4.8	Y	Y	125
Intel® Xeon® W-1250 processor	6	3.3	12	2666	Y	Intel® UHD Graphics P630	4.7	Y	Y	80

Overview

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

[2]Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system.

[3]The specifications shown in the Intel® Turbo Boost Technology column represent the maximum turbo frequency with one core active. Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information.

[4]For full Intel® vPro™ functionality, Windows 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See http://intel.com/vpro

[5]Available in Q4, 2020

Color	Black
Convertibility	The SFF can either be placed flat on the desktop or made to stand on the desk with the optional tower stand.
Expansion Slots (see system board section for more details)[1]	PCIe Gen3 x16 PCIe Gen3 x1[1] PCIe Gen3 x1[1] PCIe Gen3 x4 - with x16 Connector 2 80mm M.2 Storage slot (PCIe Gen3 x4) 1 30mm M.2 WLAN slot (PCIe Gen3 x1 / Intel CNVI) – for WLAN/BT M.2 modules only **NOTE:** The PCIe Gen 3 x16 slot is meant for HP qualified cards, configured or after market. HP does not provide warranty support for 3rd party cards. [1]The PCIe x1 connectors above are open ended, allowing a PCIe x16 card to be seated in the slot.
Expansion Bays (see storage section for more details)	1 shared internal/external 3.5" bay 1 internal 3.5" bay 1 internal 2.5" bay (for SSD only) 1 dedicated 9.5mm slim optical disk drive bay
Front I/O	2 Type-A SuperSpeed USB 5Gbps signaling rate port, 2 Type-A SuperSpeed USB 10Gbps signaling rate port, 1 Type-C® SuperSpeed USB 10Gbps signaling rate port, 1 SD card reader (optional), 1 universal audio jack
Internal I/O	1 Hi-Speed USB 480Mbps signaling rate port
Rear I/O	2 DisplayPort™ 1.4[1], 1 Audio Line out, 1 RJ-45, 2 Hi-Speed USB 480Mbps signaling rate port, 2 Type-A SuperSpeed USB 10Gbps signaling rate port, 2 Type-A SuperSpeed USB 5Gbps signaling rate port, 1 serial (optional), 1 Flex I/O port (choice of VGA, HDMI 2.0b, DisplayPort™1.4, Type-C® SuperSpeed USB 10Gbps signaling rate port (Alt mode), Dual Type-A SuperSpeed USB 5Gbps signaling rate port, 2nd 1GbE LAN, Thunderbolt™ 3 (40Gbs signaling rate port, cabled to PCIe AIC)), 1 serial and PS/2 combo(optional). **NOTE:** All DisplayPort™ support DP1.4/HBR2 when video output is via Intel Graphics.
Interfaces Supported	SD card reader (optional)

Overview

On-board RAID Support	RAID 0 RAID 1
Chassis Dimensions (H x W x D)	H: 3.95" [100mm] W: 13.3" [338mm] D: 12.1" [308mm] (Standard desktop orientation)
Packaged Dimensions	H: 8.98" (228mm) W: 15.71" (399mm) D: 19.65" (499mm)
Weight	Exact weights depend upon configuration (System weight only). Starting at 5.4kg (11.9lbs.)
Temperature	Operating: 5° to 35° C (40° to 95° F) Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation Non-operating: -40° to 60° C (-40° to 140° F) Maximum rate of change: 10°C/hr
Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
Maximum Altitude (non-pressurized)	Operating (with Rotational Hard Drives): 3,048 m (10,000 feet) Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Temperature for details.
Power Supply	450W wide-ranging, active Power Factor Correction, 90% Efficiency. 260W wide-ranging, active Power Factor Correction, 92% Efficiency. **NOTE:** The Power Supply Efficiency Report for the 450W 90% Efficiency and 260W 92% Efficiency Power Supply may be found at the following links: 450W PSU: The power delivery system does not include graphics power cables. https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2 260W PSU: The power delivery system does not include graphics power cables. https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2
Workstation ISV Certifications	See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit http://www.hp.com/go/connect
Chipset	Intel® W480 chipset
Memory	4 DIMM slots, supporting up to 128GB ECC/non-ECC, DDR4 2933 MT/s speed depending on the CPU selection

Supported Components

Processors		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	10th Generation Intel Core Processors[1]				
	Intel® Core™ i9 10900K Processor	Y	N		
	Intel® Core™ i9 10900 Processor	Y	N		
	Intel® Core™ i9 10900F Processor	Y	N		1
	Intel® Core™ i9 10850K Processor	Y	N		
	Intel® Core™ i7 10700K Processor	Y	N		
	Intel® Core™ i7 10700 processor	Y	N		
	Intel® Core™ i5 10600K processor	Y	N		
	Intel® Core™ i5 10600 processor	Y	N		
	Intel® Core™ i5 10500 processor	Y	N		
	Intel® Core™ i5 10400 processor	Y	N		
	Intel® Core™ i9 10400F Processor	Y	N		1
	Intel® Core™ i3 10320 processor	Y	N		2
	Intel® Core™ i3 10300 processor	Y	N		2
	Intel® Core™ i3 10100 processor	Y	N		
	Intel Xeon W Processors				
	Intel Xeon W-1290P processor	Y	N		
	Intel Xeon W-1290 processor	Y	N		2
	Intel Xeon W-1270P processor	Y	N		2
	Intel Xeon W-1270 processor	Y	N		
	Intel Xeon W-1250P processor	Y	N		
	Intel Xeon W-1250 processor	Y	N		

[1]These processors support only non-ECC memory

NOTE 1: No integrated graphics. A discrete graphics card must be purchased at the same time. Available in Q4, 2020

NOTE 2: Available in Q4, 2020

Storage / Hard Drives		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	SATA Hard Drives				
	500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA	
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	W0R10AA	
	2TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	2Z274AA	
	4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	K4T76AA	
	8TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	2Z273AA	
	500GB SATA 7.2K SED SFF HDD	Y	Y	D8N29AA	
	HP 6TB Enterprise SATA 7200 HDD	Y	Y	3DH90AA	
	SATA Solid State Drives				
	HP 256GB SATA 6Gb/s SSD	Y		A3D26AA	
	HP 512GB SATA 6Gb/s SSD	Y		D8F30AA	
	HP 1TB SATA 6Gb/s SSD	Y	Y	F3C96AA	

Supported Components

HP 2TB SATA 6Gb/s SSD	Y	Y	Y6P08AA/AT
HP 256GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	G7U67AA
HP 512GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	N8T26AA
PCIe Solid State Drives			
HP ZTurbo 1TB TLC Z2 G5 TWR/SFF SSDKit	Y	Y	141L5AA/AT
HP ZTurbo 256GB SED Z2 G5 TWR/SFF SSDKit	Y	Y	141L8AA/AT
HP ZTurbo 256GB TLC Z2 G5 TWR/SFF SSDKit	Y	Y	141L7AA/AT
HP ZTurbo 2TB TLC Z2 G5 TWR/SFF SSDKit	Y	Y	141M1AA/AT
HP ZTurbo 512GB SED Z2 G5 TWR/SFF SSDKit	Y	Y	141M3AA/AT
HP ZTurbo 512GB TLC Z2 G5 TWR/SFF SSDKit	Y	Y	141M5AA/AT
HP 2TB PCIe NVME TLC M.2 Z2 G5 TWR/SFF SSD	Y	Y	35F73AA

NOTE1: SATA hardware-assisted RAID is not supported on Linux® systems. The Linux® kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-assisted RAID. All drives must be identical in type and capacity. Boot volume/RAID array must be less than 2 TB
NOTE2: Requires identical drives (speeds, capacity, and interface).
NOTE3: The HP Z2 Tower G5 Workstation is capable of configuring up to 2 Z Turbo Drives. By default, the Z Turbo Drive configured will be installed in the M.2 storage slot on the system's motherboard.
NOTE4: SATA HDDs installed in a 3.5" external/internal bay are only supported with a 65W CPU cooler.

For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows 10) of system disk is reserved for system recovery software.

Hard Drive Controllers	Factory Configured	Option Kit
Integrated SATA Controller (Z2 G5)		
Integrated SATA Controller, RAID 0,1 supported: 4x 6 Gb/s ports	Y	
Factory integrated RAID on motherboard for SATA drives		
RAID 0 Data Configuration	Y	
RAID 1 Data Configuration	Y	
Factory integrated RAID on motherboard for Z Turbo Drive		
RAID 0 Boot or Data Configuration	Y	
RAID 1 Boot or Data Configuration	Y	

NOTE: SATA hardware RAID is not supported on Linux® systems. The Linux® kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. All drives must be identical in type and capacity. Boot volume/RAID array must be less than 2 TB

Graphics	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards
Graphics Cable Adapters					
HP DisplayPort To HDMI True 4k Adapter	Y	Y	2JA63AA		
HP Single miniDP-to-DP Adapter Cable	Y	Y	2MY05AA		
HP DisplayPort To DVI-D Adapter	Y	Y	FH973AA		
HP DisplayPort To VGA Adapter	Y	Y	AS615AA		

Supported Components

HP USB-C to DisplayPort Adapter	Y	Y	4SH08AA	
HP USB-C to HDMI Adapter	Y	Y	4SH07AA	
HP USB-C to VGA Adapter	Y	Y	4SH06AA	
Entry 3D				
NVIDIA® Quadro® P400 2GB Graphics Kit, w/2 mDP-to-DP Adapters Included	Y	Y	1ME43AA/AT	2
NVIDIA® T400 4 GB 3mDP Graphics	Y	Y	5Z7E0AA/AT	2
NVIDIA® Quadro® P620 2GB Graphics Kit, w/2 mDP-to-DP Adapters Included	Y	Y	3ME25AA/AT	2
NVIDIA T600 4 GB GDDR6 LP Blower Fan 4mDP PCIe x16 Graphics	Y	Y	340K9AA	2
AMD Radeon™ Pro WX 3200 4GB (4)mDP GFX, w/2 mDP-to-DP adapters included	Y	Y	6YT68AA/AT	2
Mid-range 3D				
NVIDIA® Quadro® P1000 4GB Graphics Kit, w/2 mDP-to-DP Adapters Included	Y	Y	1ME01AA/AT	2
NVIDIA® Quadro® T1000 4 GB 4mDP Graphics	Y	Y	20X22AA/AT	1
NVIDIA® Quadro® T2000 4GB MXM Graphics	Y	N		1
NVIDIA® Quadro® RTX 3000 6GB MXM Graphics	Y	N		1

Memory	**Factory Configured**	**Option Kit**	**Option Kit Part Number**	**Support Notes**
HP 4GB (1x4GB) DDR4-3200 nECC UDIMM	Y			2, 3
HP 8GB (2x4GB) DDR4-3200 nECC UDIMM	Y			3
HP 8GB (1x8GB) DDR4-3200 nECC UDIMM	Y			2, 3
HP 8GB (1x8GB) DDR4-3200 ECC UDIMM	Y			1, 2, 3, 4
HP 16GB (2x8GB) DDR4-3200 nECC UDIMM	Y			3
HP 16GB (2x8GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 16GB (1x16GB) DDR4-3200 nECC UDIMM	Y			2, 3
HP 16GB (1x16GB) DDR4-3200 ECC UDIMM	Y			1, 2, 3, 4
HP 24GB (3x8GB) DDR4-3200 nECC UDIMM	Y			3
HP 24GB (3x8GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 32GB (4x8GB) DDR4-3200 nECC UDIMM	Y			3
HP 32GB (4x8GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 32GB (2x16GB) DDR4-3200 nECC UDIMM	Y			3
HP 32GB (2x16GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 32GB (1x32GB) DDR4-3200 nECC UDIMM	Y			2, 3
HP 32GB (1x32GB) DDR4-3200 ECC UDIMM	Y			1, 2, 3, 4
HP 64GB (4x16GB) DDR4-3200 nECC UDIMM	Y			3
HP 64GB (4x16GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 64GB (2x32GB) DDR4-3200 nECC UDIMM	Y			3
HP 64GB (2x32GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4
HP 128GB (4x32GB) DDR4-3200 nECC UDIMM	Y			3
HP 128GB (4x32GB) DDR4-3200 ECC UDIMM	Y			1, 3, 4

Supported Components

AMO				
HP 4GB (1x4GB) DDR4-3200 nECC UDIMM	Y	Y	141J1AA/AT	
HP 8GB (1x8GB) DDR4-3200 nECC UDIMM	Y	Y	141J4AA/AT	
HP 8GB (1x8GB) DDR4-3200 ECC UDIMM	Y	Y	141J3AA/AT	1, 4
HP 16GB (1x16GB) DDR4-3200 nECC UDIMM	Y	Y	141H3AA/AT	
HP 16GB (1x16GB) DDR4-3200 ECC UDIMM	Y	Y	141H2AA/AT	1, 4
HP 32GB (1x32GB) DDR4-3200 nECC UDIMM	Y	Y	141H9AA/AT	
HP 32GB (1x32GB) DDR4-3200 ECC UDIMM	Y	Y	141H7AA/AT	1, 4

NOTE 1: Intel® Xeon® W processors can support either ECC or non-ECC memory; Intel® Core™ i3/i5/i9 processors only support non-ECC memory.
NOTE 2: Two channels of DDR4 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.
NOTE 3: The CPUs determine the speed at which the memory is clocked. If a 2666 MHz capable CPU is used in the system, the maximum speed the memory will run at is 2666 MHz regardless of the specified speed of the memory.
NOTE 4: The 125W systems support ECC or nECC memory. The 65W systems can only support non-ECC memory.

Optical and Removable Storage	**Factory Configured**	**Option Kit**	**Option Kit Part Number**
HP SD card reader Z2 SFF	Y	Y	16U37AA/AT
HP 9.5mm Slim DVD Writer	Y	Y	4L5J9AA
HP DP25 Removable 2.5" HDD Frame/Carrier	Y	Y	W3J84AA
HP 9.5mm Slim BDXL Blu-Ray Writer	Y	N	
HP 9.5mm Slim DVD-ROM Drive	Y	Y	4L5J8AA

NOTE: With Blu-ray, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
NOTE: HD-DVD disks cannot be played on the DVD-ROM Drive. No support for DVD RAM.
NOTE: When assembled correctly, the Slim ODD is not flush with the Z2 G5 SFF bezel. It is indented by approximately 7.2mm.
NOTE: SATA HDDs installed in a removeable Frame/Carrier are only supported with a 65W CPU cooler.

Networking and Communications	**Factory Configured**	**Option Kit**	**Option Kit Part Number**
Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro® with Intel® AMT 12.0)	Y	N	
Aquantia AQN-108 1-Port 5GbE NIC	Y	Y	1PM63AA
HP 10GbE SFP+ SR Transceiver	Y	Y	C3N53AA
Intel Ethernet I350-T4 4-Port 1Gb NIC	N	Y	W8X25AA
Intel X550 10GBASE-T Dual Port NIC	Y	Y	1QL46AA
Intel X710-DA2 10GbE SFP+ DP NIC	Y	Y	1QL47AA
Intel Ethernet I350-T2 2-Port 1Gb NIC	Y	Y	V4A91AA
Intel® AX201 802.11 a/b/g/n/ac/ax WLAN + Bluetooth 5.0 M.2 NIC	Y	N	

Supported Components

HP Flex 1GbE Fiber LC Single Port	Y	Y	20J15AA
Intel I210-T1 Single Port x1 PCIe NIC	Y	Y	E0X95AA

NOTE 1: The integrated network connection is required to support Intel® vPro™ Technology.
NOTE 2: If AMT is provisioned, then network teaming with the integrated LAN port is not possible.
NOTE 3: "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number
HP Solenoid Hood Lock	N	Y	9FX19AV

Input Devices	Factory Configured	Option Kit	Option Kit Part Number
HP Premium Wireless Keyboard	Y	Y	Z9N41AA/AT
HP USB 320K Keyboard	Y	Y	9SR37AA
HP USB Business Slim Wired SmartCard CCID Keyboard	Y	N	
HP USB Premium Wired Keyboard PROMO	Y	Y	Z9N40AT
HP 320M Wired Mouse	Y	Y	9VA80AA
HP USB Premium Mouse	Y	Y	1JR32AA
HP Wireless Premium Mouse	Y	Y	1JR31AA
HP Promo PS/2 Mouse	N	Y	QY775AT
HP Wired Desktop 320MK Mouse and Keyboard	N	Y	9SR36AA
HP Creator 935 Black Wireless Mouse	N	Y	1D0K8AA

Other Hardware	Factory Configured	Option Kit	Option Kit Part Number
HP Thunderbolt 3 Flex Port 2020	Y	Y	141K5AA
HP Z2 Internal Serial Port and PS/2 Port	Y	Y	141K9AA/AT
HP Z2 Power Cord Kit	Y	Y	1N1D5AA
HP Z2 2nd serial port adapter	Y	Y	141K8AA/AT
HP Z2 SFF Dust Filter	Y	Y	141L0AA/AT
HP Z2 SFF Dust Filter and bezel	Y	Y	141L1AA/AT
HP PCIe x1 Parallel Port Card	N	Y	N1M40AA
HP DP Flex Port 2020	Y	Y	141J7AA/AT
HP Dual USB-A 3.2 Gen1 Flex 2020	Y	Y	141J8AA/AT
HP HDMI Flex Port 2020	Y	Y	141K1AA/AT
HP USB-C 3.2 Gen2 Alt Flex Port 2020	Y	Y	141K6AA/AT
HP VGA Flex Port 2020	Y	Y	141K7AA/AT
HP 1GbE LAN Flex Port 2020	Y	Y	141J6AA/AT

Supported Components

Software	Factory Configured	Option Kit	Support Notes
HP Performance Advisor	Y	N	1
HP PC Hardware Diagnostics UEFI (Windows OS only)	Y	N	2
HP PC Hardware Diagnostics Windows	Y	N	
HP Sure Sense	Y	N	
HP Notifications	Y	N	
HP Desktop Support Utility	Y	N	
HP Documentation	Y	N	
HP Image Assistant	N	N	
HP Support Assistant	N	N	

NOTE 1: Supports and preinstalled with Windows 10 and Windows 11 only. Also available as a free download from http://www.hp.com/go/performanceadvisor
NOTE 2: Windows OS only

Application Software	Factory Configured	Option Kit	Support Notes
Sobey Video Editing SW	Y	N	China only
HP Zcentral Remote Boost	N	N	
Data Science Stack	Y	N	1,2
WSL2/Ubuntu Data Science Stack	Y	N	1,3

*Not all Application Software for Z Desktop Workstations is included with purchase.
Note 1: Only available with NVIDIA graphics cards selections.
Note 2: Only available with Ubuntu 20.04 LTS preinstall.
Note 3: Only available with Windows 10 Pro/Pro for Workstations or Windows 11 Pro/Pro for Workstations.

Operating Systems

Windows 11 Pro[2]
Windows 11 Pro for Workstations[2]
Windows 11 Home – HP recommends Windows 11 Pro for business [2]
Windows 10 Pro[1,2]
Windows 10 Pro for Workstations[1,2]
Windows 10 Home – HP recommends Windows 11 Pro for business [1,2]
Ubuntu 20.04 LTS
Linux-Ready
Red Hat Enterprise Linux(RHEL) Workstation – Paper license (1 yr)

NOTE 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).

NOTE 2: Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com.

NOTE: Windows 11 Pro/Pro for Workstations and Windows 10 Pro/Pro for Workstations is available with Windows Subsystem for Linux® (WSL 2).

NOTE: For detailed QS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix

HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Z2 G4 Workstation into the enterprise, such as PXE, remote recovery, remote configuration, remote control, and BIOS (F10) Setup support for 15 languages.
- Network firmware updates – Update your BIOS via the cloud or standardize on a BIOS version hosted on an Enterprise network.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- Class 3 UEFI specification version 2.7
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Workstation computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Workstation computers, including BIOS updates from within Windows (HP Firmware Update and Recovery), HP Client Manager, and fail-safe recovery. In addition, the HP BIOS Configuration Utility enables replication of BIOS settings within Windows while the Replicated Setup feature provides the same capability within BIOS (F10) Setup. The BIOS Configuration Utility is available from the HP support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

Additional HP BIOS Features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the BIOS Setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS cannot be updated and changes cannot be made to BIOS settings using BIOS Setup or under the OS.
- S4/S5 Maximum Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 0.5W in S4/S5 (when turned off). When S4/S5 Maximum Power Savings feature is enabled below features are turned off:
  -Power to expansion connectors / slots
  -Wake events other than power buttons (such as wake on LAN)
  -USB charging ports

HP Sure Start Gen6

- BIOS Integrity checking – Sure Start protection ensures that only trusted BIOS code is executed and not rootkits, viruses and malware. Verification is done upon boot up, shutdown and while the system is on.

- Sure Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability. Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability.
- Protecting beyond BIOS – Integrity checking and repair is extended to other data that should be protected such as network configuration parameters, platform specific information (i.e. system IDs), secure boot credentials, and other code the system needs to boot.
- Audit enabled – System Audit via Sure Start Event Logs capture data such as incident, repair date and time for troubleshooting and investigating.

NOTE: HP Sure Start Gen6 is available on select HP PCs and requires Windows 10 or Windows 11.

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

BIOS
HP BIOSphere Gen6[10]
BIOS Update via Network
HP Secure Erase[11]
Absolute Persistence Module[12]
Pre-boot Authentication
HP Wake on WLAN
HP DriveLock & Automatic DriveLock [13]

Software
HP Support Assistant
HP Image Assistant
HP Desktop Support Utility
HP Documentation
HP Notifications
HP PC Hardware Diagnostics UEFI
HP PC Hardware Diagnostics Windows
HP Performance Advisor[15]
Zcentral Remote Boost[16]

Manageability Features
HP Driver Packs[1]
HP System Software Manager (SSM)
HP BIOS Config Utility (BCU)
HP Manageability Integration Kit Gen4[2]
HP Smart Support[18]

Client Security Software
HP Client Security Manager Gen6[3] including:
(including Credential Manager, HP Password Manager[4], HP Spare Key)
HP Sure Run Gen3[7]
HP Power On Authentication
Microsoft Defender[5]

Security Management
HP Sure Click[9]
HP Sure Start Gen6
HP Sure Sense [17]
HP Sure Recover Gen3[8]

Supported Components

1. HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.
2. HP Manageability Integration Kit can be downloaded from http://www8.hp.com/us/en/ads/clientmanagement/overview.html
3. HP Client Security Manager Gen6 requires Windows and is available on the select HP Elite and Pro PCs.
4. HP Password Manager requires Internet Explorer or Chrome or FireFox. Some websites and applications may not be supported. User may need to enable or allow the add-on / extension in the internet browser.. Some websites and applications may not be supported. User may need to enable or allow the add-on / extension in the internet browser.
5. Microsoft Defender Opt in and internet connection required for updates. In and internet connection required for updates.
7. HP Sure Run is available on HP Workstation products equipped with 8th generation Intel® or AMD® processors.
8. HP Sure Recover Gen3 is available on select HP PCs and requires an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data.
9. HP Sure Click requires Windows 10/11 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.
10. HP BIOSphere Gen6 Features may vary depending on the platform and configurations.
11. 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™.
12. 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.
13. Storage Drivelock does not work with Self Encrypting or Optane based storage.
14. Custom MXM graphics are designed using mobile GPUs for space-constrained systems and are only available as factory-configured option
15. HP Performance Advisor Software – HP Performance Advisor is ready and waiting to help you get the most out of your HP Workstation from day one—and every day after. Learn more or download at: https://www8.hp.com/us/en/workstations/performance-advisor.html
16. HP Zcentral Remote Boost Sender does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase through 2022. With non-Z sender devices, purchase of perpetual individual license or perpetual floating license per simultaneously executing versions and purchase of Zcentral Remote Boost Software Support is required. Zcentral Remote Boost Sender for non-Z Hardware requires a license and Windows 10, RHEL/CentOS (7 or 8), or UBUNTU 18.04 or 20.04 LTS operating systems. macOS (10.14 or newer) operating system and ThinPro 7.2 are only supported on the receiver side. Requires network access. The software is available for download at hp.com/ZcentralRemoteBoost.
17. HP Sure Sense requires Windows 10/11 Pro or Enterprise. See product specifications for availability.
18. 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.

System Technical Specifications

System Board

System Board Form Factor	Customized PCB 30.124 x 24.38 mm (11.86 x 9.6 inches)
Processor Socket	Single LGA-1200
CPU Bus Speed	DMI
Chipset	Intel® PCH W480
Super I/O Controller	Nuvoton SIO18
Memory Expansion Slots	4 DDR4 memory slots
Memory Type Supported	DDR4, UDIMM (Unbuffered), ECC& non-ECC
Memory Modes	Non-Interleaved for single channel. Interleaved when both channels are populated.
Memory Speed Supported	2933MT/s DDR4
Memory Protection	ECC available on data
Maximum Memory	128GB
Memory Configuration (Supported)	4GB, 8GB 16GB and 32GB non-ECC/8GB, 16GB and 32GB ECC unbuffered DIMMs are supported. **NOTE**: Maximum memory capacities assume 64-bit operating systems, such as Genuine Windows® 10 Professional 64 bit, Red Hat Linux 64-bit. 32-bit Windows Operating Systems support up to 4 GB.
PCI Express Connectors	• 1 PCI Express Gen3 slot x16 mechanical/ x16 electrical (LP, half-length) • 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half-length) • 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half-length) • 1 PCI Express Gen3 slot x16 mechanical/ x4 electrical (LP, half-length) • 2 M.2 2280 Storage (PCIe Gen3 x4) • 1 M.2 2230 WLAN (PCIe Gen3 x1+ Intel CNVi) In the PCIe Gen3 (x16 electrical/x16 mechanical) slot, it intent to supported HP certified added in card. **NOTE:** M.2 storage supports compatible devices up to 80mm
Supported Drive Interfaces	**SATA**: Integrated (4) Serial ATA interfaces (6Gb/s SATA). **Serial Attached SCSI**: None **Integrated Graphics**: Intel® UHD Graphics 630 (on Core i3/i5/i7/i9-10xxx processors); Intel® Integrated Graphics P630 for Xeon processors Based on Unified Memory Architecture (UMA) – a region of system memory is reserved and dedicated to the graphics display. Support for Microsoft DirectX 12, OpenGL 4.5 and OpenCL 2.1 on Intel® UHD Graphics P630; Based on Unified Memory Architecture (UMA) – a region of system memory is reserved and dedicated to the graphics display. Support for Microsoft DirectX 12, OpenGL 4.5 and OpenCL 2.1 on Intel® UHD Graphics P630; 3 DP 1.4 graphics ports integrated in motherboard; Supports up to three simultaneous displays across DisplayPort™*/HDMI*/DVI outputs.

System Technical Specifications

		Max. resolution supported on DP 1.4 ports: 4096x2304 @ 60Hz, 24bpp
	Network Controller	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 12
	External SATA (eSATA)	None
	IDE connector	None
	Floppy connector	None
	Serial	Yes- requires optional Serial Port Adapter Kit
	2nd Serial	Yes- requires optional Serial Port Adapter Kit
	HD Integrated Audio	Yes
USB Connector(s)	**Front**	2 Type-A SuperSpeed USB 5Gbps signaling rate port (1 charge supports up to 5V/2.1A); 2 Type-A SuperSpeed USB 10Gbps signaling rate port; 1 Type-C® SuperSpeed USB 10Gbps signaling rate port (charge supports up to 5V/3A)
	Rear	2 High-speed USB 480Mbps signaling rate port; 2 Type-A SuperSpeed USB 5Gbps signaling rate port; 2 Type-A SuperSpeed USB 10Gbps signaling rate port; 1 Type-C® SuperSpeed USB 10Gbps signaling rate Alt mode port (optional via Flex)
	Internal	1 High-speed USB 480Mbps signaling rate port
HD Integrated Audio	Yes	
Flash ROM	Yes	
CPU Fan Header	Yes	
Memory Fan Header	None	
Chassis Fan Header	1 Rear System Chassis Fan Header, 1 Graphic chassis Fan Header.	
Front PCI Fan Header	None	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder – Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 2.0 Convertible to FIPS 140-2 Certified mode through firmware v7.85 The TPM module disabled where restricted by law, i.e. Russia.	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	None	
Keyboard/Mouse	USB or PS/2 Mouse (option)	
Power Supply	260W EPA92 and 450W EPA90	
Operating Voltage Range	90-269 VAC	
Rated Voltage Range	100–240 VAC	
Rated Line Frequency	50-60 Hz	
Operating Line Frequency Range	47–66 Hz	
Rated Input Current	3.1A@100-240V (260W PSU)	

System Technical Specifications

	6A@100-240V (450W PSU)
Heat Dissipation	Typical: 444 btu/hr (112 kcal/hr) Maximum: 1484 btu/hr (374 kcal/hr)
ENERGY STAR® certified (Config Dependent)	Yes
CECP Compliant @ 220V	Yes
FEMP Standby Power Compliant	Yes, with Wake-on-LAN disabled: <2W in S5- Power Off
Built-in Self Test (BIST) LED	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes

System Configurations

Z2 Small Form Factor G5 Configuration #1	Processor Info	CPU Intel® Core™ i5-10400 2.9GHz 6C 65W
	Memory Info	8GB (1x 8GB) 2666 MHz DDR4 non-ECC
ENERGY STAR CERTIFIED	Graphics Info	Intel® UHD Integrated Graphics 630
	Disks/Optical/Floppy	1x SATA 1 TB 7.2k rpm / 1x 9.5mm Slim ODD
	Power Supply	260W

Energy Consumption (Watts)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	12.958		13.659		13.564	
Windows short Idle (S0)	14.403		15.047		14.261	
Windows Busy Typ(S0)	100.99		98.05		102.69	
Windows Busy Max (S0)	118.564		121.123		119.023	
Sleep (S3)	0.99	0.843	0.954	0.869	0.932	0.856
Off (S5)	0.667	0.664	0.661	0.66	0.665	0.597
Zero Power Mode (ErP)	0.255		0.256		0.264	

Heat Dissipation (Btu/hr)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Enabled	LAN Enabled
Windows long Idle (S0)	44.212		46.604		46.28	
Windows short Idle (S0)	49.143		51.34		48.685	
Windows Busy Typ(S0)	344.577		334.546		350.378	
Windows Busy Max (S0)	404.541		413.272		406.106	
Sleep (S3)	3.377	2.876	3.255	2.965	3.179	2.92
Off (S5)	2.275	2.265	2.255	2.251	2.268	2.036
Zero Power Mode (ErP)	0.87		0.873		0.9	

	Processor Info	CPU Intel® Core™ i7-10700 2.9GHz 8C 65W
	Memory Info	16GB (2x 8GB) 2666 MHz DDR4 non-ECC

System Technical Specifications

Z2 Small Form Factor G5 Configuration #2

Graphics Info	P620 Graphics
Disks/Optical/Floppy	1x SATA 256GB SSD / 1x9.5mm Slim ODD
Power Supply	450W

Energy Consumption (Watts)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	16.95		16.619		16.856	
Windows short Idle (S0)	17.955		20.143		18.325	
Windows Busy Typ(S0)	149.08		159.623		153.69	
Windows Busy Max (S0)	176.21		171.456		180.412	
Sleep (S3)	0.951	0.976	0.976	0.941	0.956	0.942
Off (S5)	0.665	0.658	0.664	0.627	0.641	0.62
Zero Power Mode (ErP)	0.251		0.225		0.255	

Heat Dissipation (Btu/hr)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Enabled	LAN Enabled
Windows long Idle (S0)	57.833		65.374		57.512	
Windows short Idle (S0)	61.262		68.728		62.524	
Windows Busy Typ(S0)	538.66		524.634		526.39	
Windows Busy Max (S0)	601.228		585.007		615.565	
Sleep (S3)	3.244	3.33	3.33	3.21	3.261	3.214
Off (S5)	2.268	2.245	2.265	2.139	2.187	2.115
Zero Power Mode (ErP)	0.856		0.767		0.87	

Z2 Small Form Factor G5 Configuration #3
ENERGY STAR CERTIFIED

Processor Info	CPU Intel® Core™ i9-10900K 3.7GHz 10C 125W
Memory Info	64GB (2x32GB) 2666 MHz DDR4 ECC
Graphics Info	P1000 Graphics
Disks/Optical/Floppy	1x SATA 512GB SSD
Power Supply	450W

Energy Consumption (Watts)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	16.956		16.627		16.875	
Windows short Idle (S0)	18.437		17.711		17.965	
Windows Busy Typ(S0)	254.32		247.99		257.36	
Windows Busy Max (S0)	281.71		273.79		280.23	
Sleep (S3)	1.495	1.532	1.487	1.515	1.496	1.532
Off (S5)	0.679	0.661	0.664	0.663	0.646	0.662
Zero Power Mode (ErP)	0.238		0.243		0.245	

Heat Dissipation (Btu/hr)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	57.853		56.731		57.577	
Windows short Idle (S0)	62.907		60.429		61.296	
Windows Busy Typ(S0)	869.739		846.141		878.112	
Windows Busy Max (S0)	961.194		934.171		956.144	
Sleep (S3)	5.1	5.227	5.073	5.169	5.104	5.227
Off (S5)	2.316	2.255	2.265	2.262	2.204	2.258
Zero Power Mode (ErP)	0.812		0.829		0.835	

System Technical Specifications

Z2 Small Form Factor G5 Configuration #4
ENERGY STAR CERTIFIED

Processor Info	CPU Intel® Xeon® W-1270P 3.8GHz 8C 125W
Memory Info	64GB (2x32GB) 2666 MHz DDR4 ECC
Graphics Info	P1000 Graphics
Disks/Optical/Floppy	1x SATA 1TB SSD Z Turbo
Power Supply	450W

Energy Consumption (Watts)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	17.03		15.666		16.674	
Windows short Idle (S0)	18.294		16.76		17.865	
Windows Busy Typ(S0)	197.88		193.41		199.63	
Windows Busy Max (S0)	229.47		221.546		222.49	
Sleep (S3)	1.613	1.509	1.586	1.516	1.623	1.629
Off (S5)	0.675	0.667	0.695	0.658	0.686	0.625
Zero Power Mode (ErP)	0.252		0.256		0.228	

Heat Dissipation (Btu/hr)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	58.106		53.452		56.891	
Windows short Idle (S0)	62.419		57.185		60.955	
Windows Busy Typ(S0)	675.166		659.914		681.137	
Windows Busy Max (S0)	782.952		755.915		759.135	
Sleep (S3)	5.503	5.148	5.411	5.172	5.537	5.558
Off (S5)	2.303	2.275	2.371	2.245	2.34	2.132
Zero Power Mode (ErP)	0.859		0.873		0.777	

Z2 Small Form Factor G5 Configuration #5
ENERGY STAR CERTIFIED

Processor Info	CPU Intel® Xeon® W-1250 3.3GHz 6C 80W
Memory Info	16GB (2x8GB) 2666 MHz DDR4 ECC
Graphics Info	P1000 Graphics
Disks/Optical/Floppy	1x SATA 1TB SSD Z Turbo
Power Supply	450W

Energy Consumption (Watts)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	16.214		16.343		16.336	
Windows short Idle (S0)	17.538		17.731		17.632	
Windows Busy Typ(S0)	138.39		139.31		134.26	
Windows Busy Max (S0)	156.452		150.56		151.26	
Sleep (S3)	0.999	0.917	0.998	0.907	0.996	0.902
Off (S5)	0.668	0.665	0.667	0.663	0.666	0.662
Zero Power Mode (ErP)	0.259		0.264		0.265	

Heat Dissipation (Btu/hr)

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows long Idle (S0)	55.322		55.762		55.738	
Windows short Idle (S0)	59.839		60.498		60.16	
Windows Busy Typ(S0)	472.186		475.325		458.095	
Windows Busy Max (S0)	533.814		513.711		516.099	
Sleep (S3)	3.408	3.128	3.405	3.094	3.398	3.077
Off (S5)	2.279	2.268	2.275	2.262	2.272	2.258

System Technical Specifications

Zero Power Mode (ErP)	0.883	0.9	0.904
NOTE: The Power Supply Efficiency report may be found at the following links: https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2			

Declared Noise Emissions

System Configuration (Mid-level)	**Processor Info**	Intel i9-10900K COMET LAKE WS P-1 10c LGA 3.7GHz 125W P2K Vpro QUBQ,	
	Memory Info	4*Micron 32GB	
	Graphics Info	Nvidia Quadro P1000	
	Disks/Optical/Floppy	4*Micron 32GB	
	Power Supply	Delta HP Z2 SFF 450W PSU	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.33	25.1
	Hard drive Operating (random reads)	3.57	27.5
	Hard drive Operating (active mode)	4.27	33.8
System Configuration (High-end)	**Processor Info**	Intel W-1290 COMET LAKE WS P-1 10c 3.2G LGA 80W WE3 Vpro QSK QS QUBT	
	Memory Info	4*Micron 32GB	
	Graphics Info	Nvidia P1000	
	Disks/Optical/Floppy	2*WD 2TB 7200RPM SATA HSS	
	Power Supply	Delta HP Z2 SFF 450W PSU	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.57	25.7
	Hard drive Operating (random reads)	3.67	27.4
	Hard drive Operating (active mode)	4.08	32.4
System Configuration (High-end)	**Processor Info**	Intel W-1250 COMET LAKE WS G-0 6c LGA 80W WE1 Vpro QS QTMD	
	Memory Info	4*Micron 32GB	
	Graphics Info	Nvidia P1000	
	Disks/Optical/Floppy	2*WD 2TB 7200RPM SATA HSS	
	Power Supply	Delta HP Z2 SFF 450W PSU	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.52	25.6
	Hard drive Operating (random reads)	3.72	29.7
	Hard drive Operating (active mode)	4.0	30.6

System Technical Specifications

System Configuration (High-end)	**Processor Info**	Intel i9-10900 COMET LAKE WS P-1 10c LGA 2.8GHz 65W P2 Vpro QUBN	
	Memory Info	1*Micron 32GB	
	Graphics Info	Nvidia Quadro P1000	
	Disks/Optical/Floppy	Samsung PM871b 1TB 6Gb/s SSD	
	Power Supply	Delta HP Z2 SFF 450W PSU	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	2.99	10.7
	Hard drive Operating (random reads)	3.13	15.7
	Hard drive Operating (active mode)	3.1	15.5
System Configuration (High-end)	**Processor Info**	Intel i5-10600 COMET LAKE G-0 6c 65W MS2 Vpro QS QTLR	
	Memory Info	1*Micron 32GB	
	Graphics Info	Nvidia Quadro P1000	
	Disks/Optical/Floppy	Samsung PM871b 1TB 6Gb/s SSD	
	Power Supply	Delta HP Z2 SFF 450W PSU	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	2.99	11.4
	Hard drive Operating (random reads)	3.13	16.3
	Hard drive Operating (active mode)	3.1	16.4

Environmental Requirements	**Temperature**	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F) Maximum rate of change: 10°C/hr
	Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
	Maximum Altitude	Operating (with Rotational Hard Drives): 3,048 m (10,000 feet) Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Cooling for details.
	Dynamic	Shock Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g Vibration Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz
	Cooling	Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation, up to 3048 m (10,000 feet)

System Technical Specifications

Physical Security and Serviceability

Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less, except for Screw-In carrier
Hard Drives	Tool-less, except for internal/external and 2.5” bay
Expansion Cards	Tool-less
Processor Socket	Tool-less, except for the processor heatsink
Blue User Touch Points	Yes, on tool-less internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed.
Keyboard/Mouse/Video Cable Lock	Yes, locks rear IO cables to prevent cable theft
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Internal Speaker	Yes
Power Supply Fans	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
Access Panel Key Lock	No
Integrated Chassis Handles	No
Power Supply	Requires T15 Torx or flat blade screwdriver
PCI Card Retention	Yes, rear (all), middle (none), front (none)

Service, Support, and Warranty

On-site Warranty and Service[1]: Three-years, limited warranty and service offering delivers on-site, next business-day[2] service for parts and labor and includes free telephone support[3] 8am – 5pm. Global coverage[2] ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. 24/7 operation will not void the HP warranty.

System Technical Specifications

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.
HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Service levels and response times for HP Care Packs may vary depending on your geographic location.

Social and Environmental Responsibility

Eco-Label Certifications & Declarations

This product is low halogen except for power cords, cables and peripherals. Service parts obtained after purchase may not be Low Halogen.

- ENERGY STAR® (energy-saving features available on select configurations –Windows® only)
- US Federal Energy Management Program (FEMP)
- China Energy Conservation Program (CECP)
- IT ECO declaration
- TCO Certified configurations available

Batteries

The battery in this product complies with EU Directive 2006/66/EC
Battery size: CR2032 (coin cell)
Battery type: Lithium Metal

The battery in this product does not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 40ppm by weight

Restricted Material Usage

This product meets the material restrictions specified in HP's General Specification for the Environment. http ://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf
HP Inc. Is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis.

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/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life.

HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:
Living Progress Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html

Eco-label certifications
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html

ISO 14001 certificates:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Additional Information

- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.
- Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product is >90% recycle-able when properly disposed of at end of life
- EPEAT®2019 Gold registered in the United States*

*Based on US EPEAT® registration according to IEEE 1680.1-2018 EPEAT®. EPEAT® status varies by country. Visit www.epeat.net for more information.

Packaging

HP Workstation product packaging meets the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/society/gen_specifications.html

- Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment
- Does not contain ozone-depleting substances (ODS)
- Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed
- Maximizes the use of post-consumer recycled content materials in packaging materials
- All packaging material is recyclable
- All packaging material is designed for ease of disassembly
- Reduced size and weight of packages to improve transportation fuel efficiency
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting

Packaging Materials	
Internal	Cushions made from fabricated recycled expanded-polyethylene (EPE) or recycled expanded-polypropylene (EPP). May also be made from recycled molded paper-pulp (MPP).
External	Carton made from corrugated fiberboard with at least 35% recycled content.

Manageability

Remote Manageability Software Solutions	The HP Z2 G5 Workstation is supported on the following remote manageability software consoles: • LANDesk Management Suite (HP recommended solution) • Microsoft System Center Configuration Manager For questions or support for manageability needs, please visit http://www.hp.com/go/clientmanagement
HP Image Assistant	Visit: http://ftp.hp.com/pub/caps-softpaq/cmit/HPIA.html
System Software Manager	For questions or support for SSM, please visit: http://www.hp.com/go/ssm

Stable & Consistent Offerings

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.

HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost, no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	Product #	Offering
		Intel® Core™ i3-10100 3.6 4C 65W processor
		Intel® Core™ i5-10500 3.1 6C 65W processor
		Intel® Core™ i5-10600 3.3 6C 65W processor
		Intel® Core™ i7-10700 2.9 8C 65W processor
		Intel® Xeon® W-1250 3.3 6C 80W processor
		Intel® Xeon® W-1250P 4.1 6C 125W processor

Hard Drives	Product #	Offering
		1TB 7200RPM SATA 3.5in HDD

Graphics	Product #	Offering
		AMD Radeon™ Pro WX 3200 4GB

Technical Specifications - Processors

10th Generation Intel® Core™ Processors

Intel® Core™ i9-10900K Processor
Intel® Core™ i9-10900 Processor
Intel® Core™ i9-10900F Processor[1,2]
Intel® Core™ i9-10850K Processor
Intel® Core™ i7-10700K Processor
Intel® Core™ i7-10700 processor
Intel® Core™ i5-10600K processor
Intel® Core™ i5-10600 processor
Intel® Core™ i5-10500 processor
Intel® Core™ i5-10400 processor
Intel® Core™ i5-10400F Processor[1,2]
Intel® Core™ i3-10320 processor[1]
Intel® Core™ i3-10300 processor[1]
Intel® Core™ i3-10100 processor

Intel® Xeon® W Processors

Intel® Xeon® W-1290P processor
Intel® Xeon® W-1290 processor[1]
Intel® Xeon® W-1270P processor[1]
Intel® Xeon® W-1270 processor
Intel® Xeon® W-1250P processor
Intel® Xeon® W-1250 processor

NOTE 1: Available in Q4, 2020
NOTE 2: No integrated graphics. A discrete graphics card must be purchased at the same time.

Technical Specifications - Hard Drives

SATA Hard Drives for HP Workstations	**500GB SATA 7200 rpm 6Gb/s 2.5” HDD**	**Capacity**	500GB	
		Protocol	SATA	
		Form Factor	3.5”	
		Controller	AHCI	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
		Buffer	32MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms *
			Average	11 ms *
			Full Stroke	21 ms *
		Rotational Speed	7,200 rpm	
		Logical Blocks	976773168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary.		
	1TB SATA 7200 rpm 6Gb/s 3.5” HDD	**Capacity**	1TB	
		Protocol	SATA	
		Form Factor	3.5”	
		Controller	AHCI	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms *
			Average	11 ms *
			Full Stroke	21 ms *
		Rotational Speed	7,200 rpm	
		Logical Blocks	1,953,525,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary.		
	2TB SATA 7200 rpm 6Gb/s 3.5” HDD	**Capacity**	2TB	
		Protocol	SATA	
		Form Factor	3.5”	
		Controller	AHCI	
		NAND Type	3D TLC	

Technical Specifications - Hard Drives

	Endurance	400TBW (TB Written)	
	Reliability	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Rated for 24/7/365 operation	YES	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms *
		Average	11 ms *
		Full Stroke	21 ms *
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	*Actual performance may vary.		
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	128 MB	
	Cache	Adaptive	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.32ms*
		Average	7.45ms*
		Full Stroke	14.2ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*

	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		
2TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	2TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	128 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		
4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	4TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	256MB	
	Seek Time (typical reads, includes controller	**Single Track**	0.7ms*
		Average	8.5ms*

	overhead, including settling)	**Full Stroke**	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		
8TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	8TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	256MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		
500GB SATA 7.2K SED 2.5"" HDD	**Capacity**	500GB	
	Protocol	SATA	
	Form Factor	2.5"	
	Height	0.275 in; 0.7 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	64MB	
		Single Track	1ms*

Technical Specifications - Hard Drives

	Seek Time (typical reads, includes controller overhead, including settling)	**Average**	4.2ms*
		Full Stroke	25ms (Typical)*
	Rotational Speed	7,200 rpm	
	Operating Temperature	32° to 131° F (0° to 60° C)	
	Self-Encrypting Drive Support	Yes	
	*Actual performance may vary.		
HP 256GB SATA 6Gb/s SSD	**Capacity**	256GB	
	Protocol	SATA	
	Form Factor	2.5”	
	Height	0.275 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 131° F (0° to 60° C)	
	*Actual performance may vary.		
HP 512GB SATA 6Gb/s SSD	**Capacity**	512GB	
	Protocol	SATA	
	Form Factor	2.5”	
	Height	0.28 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	*Actual performance may vary.		
HP 1TB SATA 6Gb/s SSD	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	2.5”	
	Height	0.28 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	*Actual performance may vary.		
HP 2TB SATA 6Gb/s SSD	**Capacity**	2TB	
	Protocol	SATA	
	Form Factor	2.5”	
	Height	0.28 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP 256GB SATA 6Gb/s SED Opal 2 SSD	**Capacity**	256GB	
	Protocol	SATA	
	Form Factor	2.5”	
	Height	0.28 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Self-Encrypting Drive Support	OPAL2	
	*Actual performance may vary.		
HP 512GB SATA 6Gb/s SED Opal 2 SSD	**Capacity**	512GB	
	Protocol	SATA	
	Form Factor	2.5”	
	Endurance	400TBW (TB Written)	
	Reliability	1.5M Hours	
	Height	0.28 in; 0.7 cm	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Self-Encrypting Drive Support	OPAL2	
	*Actual performance may vary.		
HP Z Turbo Drv 256GB TLC PCIe SSD (Z2G5)	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	75TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800MB/s*
		Sequential Write	1100MB/s*
		Random Read	250K IOPS*
		Random Write	180K IOPS*
	*Actual performance may vary.		
HP Z Turbo Drv 512GB TLC PCIe SSD (Z2G5)	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	

	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800MB/s*
		Sequential Write	1600MB/s*
		Random Read	260K IOPS*
		Random Write	260K IOPS*

*Actual performance may vary.

HP Z Turbo Drv 1TB TLC PCIe SSD (Z2G5)	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000MB/s*
		Sequential Write	1700MB/s*
		Random Read	360K IOPS*
		Random Write	330K IOPS*

*Actual performance may vary.

HP Z Turbo Drv 2TB TLC PCIe SSD (Z2G5)	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000MB/s*
		Sequential Write	2100MB/s*
		Random Read	320K IOPS*
		Random Write	265K IOPS*

*Actual performance may vary.

HP Z Turbo Drv 256GB TLC PCIe SED OPAL2 (Z2G5)	**Capacity**	256GB
	Protocol	PCIe
	Form Factor	M.2 in native Slot on motherboard
	Controller	NVMe
	NAND Type	3D TLC
	Endurance	75TBW (TB Written)

	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800MB/s*
		Sequential Write	1100MB/s*
		Random Read	250K IOPS*
		Random Write	180K IOPS*
	Self-Encrypting Drive Support	OPAL2	
	*Actual performance may vary.		
HP Z Turbo Drv 512GB TLC PCIe SED OPAL2 (Z2G5)	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800MB/s*
		Sequential Write	1600MB/s*
		Random Read	260K IOPS*
		Random Write	260K IOPS*
	Self-Encrypting Drive Support	OPAL2	
	*Actual performance may vary.		
HP Z Turbo Drv 1TB TLC PCIe SED OPAL2 (Z2G5)	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000MB/s*
		Sequential Write	1700MB/s*
		Random Read	360K IOPS*
		Random Write	330K IOPS*
	Self-Encrypting Drive Support	OPAL2	
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP Z Turbo Drv 2TB TLC PCIe SED OPAL2 (Z2G5)	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	Reliability (MTBF)	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000MB/s*
		Sequential Write	2100MB/s*
		Random Read	320K IOPS*
		Random Write	265K IOPS*
	Self-Encrypting Drive Support	OPAL2	

*Actual performance may vary.

Technical Specifications - Graphics

Integrated Intel® UHD Graphics (Z2 G5)	**Form Factor**	Integrated in select Intel® Xeon® W, Intel® Core™ i7, and Intel® Core™ i5 processors. Check specific platform specifications for selections.
	Graphics Controller	Intel® UHD Graphics
	Memory	Unified Memory Architecture (UMA) frame buffer. Graphics memory is shared with system memory. Size selectable between 64 MB to 1024 MB via BIOS setting. Default size is 64 MB. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (Intel® DVMT 5.0), to provide an optimal balance between graphics and system memory use.
	Connectors	Check system platform specifications where Intel® UHD Graphics are available.
	Maximum Resolution	Display Port™: 4096 x 2160 HDMI: 4096 x 2160 DVI: 1920x1200 VGA: 2048x1536 **NOTE:** For HDMI, DVI and VGA outputs, separate adapters may be required.
	Shading Architecture	Shader Model 6 compiler support
	Supported Graphics APIs	OpenGL 4.54 DirectX 12
	Available Graphics Drivers	Windows 11 Windows 10
AMD Radeon™ Pro WX 3200 4GB Graphics	**Form Factor**	Low-Profile Single Slot
	Graphics Controller	Radeon™ Pro WX 3200 Power: 56 Watts Cooling Solution: Active fan heatsink
	Memory	4GB GDDR5 memory
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 4096 x 2160 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Display Outputs	4 mDP (Mini DisplayPort™) 1.4 Connectors
	Supported Graphics APIs	DirectX® 12 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 11 Windows 10 (Windows 7 64-bit available from AMD) Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Technical Specifications - Graphics

NVIDIA® T400 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot, Low Profile Weight: 124g
	Graphics Controller	NVIDIA® T400 Graphics Card GPU: 384 CUDA cores Power: 30 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR6 Memory Interface: 64-bit Memory Bandwidth: 80 GB/s
	Connectors	3x mDP
	Maximum Resolution	3x 5120 x 2880 x 24 bpp @ 60Hz
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	Available Graphics Drivers	Windows 11 Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

NVIDIA® Quadro® P620 2GB Graphics	**Form Factor**	Single slot, Low Profile
	Graphics Controller	NVIDIA® Quadro® P620 Max. Power: 40W Cooling Solution: Active fan heatsink
	Bus Type	PCI Express x16
	Memory	Size: 2GB DDR5
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Display Outputs	4 mDP (Mini DisplayPort™) 1.4 Connectors
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	Available Graphics Drivers	Windows 11 Windows 10 Linux® 64-bit (selected Enterprise distributions)

Technical Specifications - Graphics

		HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® T600 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile
	Graphics Controller	NVIDIA® T600 Graphics Card GPU: 640 CUDA cores Power: 40 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR6 Memory Interface: 128-bit Memory Bandwidth: 160 GB/s
	Connectors	4x mDP
	Maximum Resolution	7680 x 432- @ 60Hz
	Display Output	4x mDP
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Windows 11 Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® Quadro® P1000 4GB Graphics	**Form Factor**	Single Slot, Low Profile Cooling: Active
	Graphics Controller	NVIDIA® Quadro® P1000 47 Watts Cooling Solution: Active Fan Heatsink
	Bus Type	PCI Express 3.0 x16
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Display Output	4 mDP 1.4 Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x

Technical Specifications - Graphics

	Available Graphics Drivers	Windows 11 Windows 10 Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® T1000 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot Weight: xx
	Graphics Controller	NVIDIA® T1000 Graphics Card Power: 50W Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4GB GDDR6 Memory Bandwidth: Up to 160 GB/s Memory Width: 128-bit
	Connectors	4x mini DisplayPort™ 1.4a
	Maximum Resolution	7680 x 4320 @ 120Hz
	Display Output	Maximum number of displays: 4 displays
	Architecture	NVIDIA® Turing™
	Supported Graphics APIs	DirectX®12.1 OpenGL® 4.6 OpenCL™ 1.2 Vulkan™ 1.2
	Available Graphics Drivers	Windows 11 Windows 10 Windows 8.1 Microsoft Windows 7 Professional 64bit Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Nvidia® Quadro® T2000 4GB Graphics	**Form Factor**	Single Slot, Low Profile
	Power	60W
	Bus Type	PCI Express 3.0 x16
	Memory	4GB GDDR6
	Connectors	4x mDP (Mini DisplayPort™) 1.4 Connectors
	Maximum Resolution	5120 x 3200 @ 60Hz
	Supported Graphics APIs	DirectX®12.1 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 11 Windows 10 Linux® 64-bit (selected Enterprise distributions)

		HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Nvidia® Quadro® RTX 3000 6GB Graphics	**Form Factor**	Single Slot, Low Profile
	Power	60W
	Bus Type	PCI Express 3.0 x16
	Memory	6GB GDDR6
	Connectors	3x mDP (Mini DisplayPort™) 1.4 Connectors
	Maximum Resolution	5120 x 3200 @ 60Hz
	Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 11 Windows 10 Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Notes

*P400, P620, P1000, T2000, and RTX 3000 only have mini-DisplayPort™ (mDP) video ports. AMO kits for P400, P620, P1000 and Adapters

- Two mDP-to-DP Adapters are included in the P400, P620 and P1000 AMO kits.
- If mDP-to-DP Adapters are needed, Adapters can be ordered separately:
  - 2KW87A6 – HP (Bulk 12) miniDP-to-DP Adapter Cables

Technical Specifications - Optical and Removable Storage

HP 9.5mm Slim DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard
	Access Times	**Full Stroke DVD**	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 11, Windows 10, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Linux® No driver is required for this device. Native support is provided by the operating system.	
	Kit Contents	HP SATA DVD Writer drive, installation guide.	
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT	

Technical Specifications - Optical and Removable Storage

HP 9.5mm Slim DVD-ROM Drive	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA / ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Disc Capacity	**DVD-ROM**	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	**DVD-ROM Single Layer**	< 110 ms (typical)
		CD-ROM Mode 1	< 110 ms (typical)
		Full Stroke DVD	< 230 ms (typical)
		Full Stroke CD	< 220 ms (typical)
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC – <800mA typical, < 1600 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 11, Windows 10, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Linux® No driver is required for this device. Native support is provided by the operating system.	
	Kit Contents	9.5mm Slim DVD-ROM Drive, slim SATA data/power cable, installation guide	
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT	

HP 9.5mm Slim BDXL Blu-Ray Writer	**Description**	9.5mm height, tray-load
	Mounting Orientation	Either horizontal or vertical
	Interface Type	SATA/ATAPI
	Dimensions (WxHxD)	128 x 9.5 x 127mm
	Supported Media Types	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW

Technical Specifications - Optical and Removable Storage

Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard
	Blu-ray	25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
Access Times	**Full Stroke DVD**	< 230 ms (seek)
	Full Stroke CD	< 220 ms (seek)
	Blu-ray	< 230 ms (seek) (Full Stroke Blu-ray)
	Startup Time	(Time to drive ready from tray loading) BD-ROM (SL/DL) 25S / 28S BD-R (SL/DL) 25S / 28S BD-RE (SL/DL) 25S / 28S DVD-ROM (SL/DL) 18S / 18S DVD-R (SL/DL) 25S / 25S DVD-RW 25S DVD+R (SL/DL) 25S / 25S DVD+RW 25S DVD-RAM 45S CD-ROM 15S
Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	DVD ROM Read	DVD-RAM Up to 8X DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Blu-ray	BD-ROM Up to 6X BD-ROM DL Up to 6X BD-R Up to 6X BD-R DL Up to 6X BD-R Up to 6X BD-RE SL/DL Up to 6X
Power	**Source**	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC -900 mA typical, 2000mA maximum
Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
Operating Systems Supported	Windows 8.1, Windows 8 32-bit and 64-bit, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Linux®	

Technical Specifications - Optical and Removable Storage

		No driver is required for this device. Native support is provided by the operating system.
	Kit Contents	9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT
	NOTES	As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
HP SD Media Card Reader	**Description**	USB3.0-SD4.0 NOTE: actual throughput is USB2.0.
	Interface Type	• Support USB 2.0 LPM function • Support USB 3.0 U1/U2/U3 Power saving mode • Support USB 3.0 LTM function.
	Dimensions (WxHxD)	Dedicated slot in front bezel (orderable option)
	Supported Media Types	i. Secure Digital Card (SD) ii. Secure Digital Support up to 2TB iii. Secure Digital HC (SDHC) iv. Secure Digital XC (SDXC) v. Support SD USH50 mode vi. miniSD *1 vii. miniSDHC*1 viii. MicroSD*1 ix. MicroSDHC*1 x. MicroSDXC*1 Note: "*1" means Adapter Needed
	Operating Systems Supported	No driver is required for this device. Native support is provided by the operating system. 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, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See http://www.microsoft.com. See http://www.microsoft.com/windows/windows-7/ for details.

Technical Specifications - Networking and Communications

Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro® with Intel® AMT 12.0)	**Connector**	RJ-45
	Controller	Intel® I219LM GbE platform LAN connect networking controller
	Memory	3 KB Tx and 3KB Rx FIFO packet buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i, 802.3u, 802.3z
	Bus Architecture	PCI Express and SMBus
	Data Transfer Mode	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
	Power Requirement	Requires 3.3V (integrated regulators for core Vdc)
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex; Half-duplex (not supported for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Management Capabilities	vPro, WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, ACPI, Advanced cable diagnostic, loopback modes, AMT 12.0 support, Circuit Breaker, VLAN, Multicast Listener Discovery (MLD)

Intel® X710-DA2 2-Port SFP+ 10GbE NIC	**Connector**	2 SFP+ Ports
	Cabling	Twin Axial Cabling up to 10m
	Controller	Intel® Ethernet Controller X710-AM2
	Network Transfer Rates Supported	10GbE (with supported 10GBASE-SR transceivers)
	Data Path Width	PCIe Gen3x8 (compatible with x4)
	Power Requirement	4.3W (typical) (with supported 10GBASE-SR transceivers)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	2.703 x 6.578 inches
	Operating System Driver Support	Windows 11 Windows 10 Linux®
	Kit Contents	• Intel® X710-DA2 2-Port SFP+ 10GbE NIC with standard height bracket attached • Low-profile bracket Product Literature

HP 10GbE SFP+ SR Transceiver	**Operating Temperature**	32°F to 113°F (0°C to 45°C)
	Operating Humidity	0% to 85%, noncondensing
	Dimensions (HxWxD)	0.47 x 0.54 x 2.19 inches
	Kit Contents	HP 10GbE SFP+ SR Transceiver

Technical Specifications - Networking and Communications

Intel® X550-T2 2-Port 10GbE NIC	**Connector**	2 RJ-45
	Cabling	10GbE: Cat6a (or better) up to 100m 5GbE and below: Cat5e (or better) up to 100m
	Controller	Intel® Ethernet Controller X550
	Network Transfer Rates Supported	10GbE, 5GbE, 2.5GbE, 1GbE, 100MbE
	Data Path Width	PCIe Gen3x4
	Power Requirement	11.2W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	5.1 x 2.7 in (without brackets)
	Operating System Driver Support	Windows 11 Windows 10 Linux®
	Kit Contents	• Intel® X550-T2 2-Port 10GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Aquantia® AQN-108 1-Port 5GbE NIC	**Connector**	1 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Aquantia® AQC108
	Network Transfer Rates Supported	5Gbe, 2.5GbE, 1GbE, 100MbE
	Data Path Width	PCIe Gen3x1
	Power Requirement	3.5W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	3.72 x 3.18 inches (without brackets)
	Operating System Driver Support	Windows 7 64-bit; Windows 10; Windows 11 Linux®
	Kit Contents	• Aquantia AQN-108 1-Port 5GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Intel® I350-T2 2-Port 1GbE NIC	**Connector**	2 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Intel® Ethernet I350 Controller
	Network Transfer Rates Supported	1GbE, 100MbE, 10MbE
	Data Path Width	PCIe Gen2.1x4
	Power Requirement	4.4W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	2.75 x 5.5 inches (without brackets)
	Operating System Driver Support	Windows 7 64-bit; Windows 10; Windows 11 Linux®

Technical Specifications - Networking and Communications

	Kit Contents	• Intel® I350-T2 2-Port 1GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature

Intel® I350-T4 4-Port 1GbE NIC	**Connector**	4 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Intel® Ethernet I350 Controller
	Network Transfer Rates Supported	1GbE, 100MbE, 10MbE
	Data Path Width	PCIe Gen2.1x4
	Power Requirement	5W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	2.75 x 5.5 inches (without brackets)
	Operating System Driver Support	Windows 7 64-bit; Windows 10; Windows 11 Linux®
	Kit Contents	• Intel® I350-T4 4-Port 1GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature

Intel® AX201 802.11 a/b/g/n/ac/ax WLAN + Bluetooth 5.0 M.2	**WLAN Standards**	802.11a/b/g/n/ac/ax Wave 6, Dual band 2x2 with up to 2.4Gbps speed (theoretical maximum); Up to 3x faster than 802.11ac and up to 4x capacity in congested environments than 802.11ac
	Antenna	2x2 Dual-Band
	Bluetooth Standards	5
	Operating Temperature	32° to 131° F (0° to 55° C)
	Interface	M.2 CNVio
	Dimensions	M.2 2230
	Kit Contents	Not Available
	NOTE: Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ax) is backwards compatible with prior 802.11 specs	

Technical Specifications – 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.
- Intel® Wired for Management support; industry wide initiative to make Intel® architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Power LED will blink red 2 to 5 times, then blink white 2 or more times, then repeat (with beep tones for each blink initially):
    - 2 red + 2 white User must provide file for BIOS recovery (USB storage typically) + 2 white User must provide file for BIOS recovery (USB storage typically) + 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 + 3 white User must enter a key sequence to proceed with recovery by policy + 3 white User must enter a key sequence to proceed with recovery by policy
    - 2 red + 4 white BIOS recovery is in progress + 4 white BIOS recovery is in progress + 4 white BIOS recovery is in progress
    - 3 red + 2 white Memory could not be initialized + 2 white Memory could not be initialized + 2 white Memory could not be initialized
    - 3 red + 3 white Graphics adaptor could not be found + 3 white Graphics adaptor could not be found + 3 white Graphics adaptor could not be found
    - 3 red + 4 white Power supply failure / not connected + 4 white Power supply failure / not connected + 4 white Power supply failure / not connected
    - 3 red + 5 white Processor not installed + 5 white Processor not installed + 5 white Processor not installed
    - 3 red + 6 white Current processor does not support an enabled feature + 6 white Current processor does not support an enabled feature + 6 white Current processor does not support an enabled feature
    - 4 red + 2 white Processor has exceeded its temperature threshold / system thermal shutdown + 2 white Processor has exceeded its temperature threshold / system thermal shutdown + 2 white Processor has exceeded its temperature threshold / system thermal shutdown
    - 4 red + 3 white System internal temperature has exceeded its threshold + 3 white System internal temperature has exceeded its threshold + 3 white System internal temperature has exceeded its threshold
    - 5 red + 2 white System controller firmware is not valid
    - 5 red + 3 white System controller detected BIOS is not executing
    - 5 red + 4 white BIOS could not complete initialization / PCA failure
    - 5 red + 5 white System controller rebooted the system after a health or recovery timer triggered rebooted the system after a health or recovery timer triggered 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 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)

Technical Specifications – Miscellaneous Features

- Clear Password Jumper
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Blue Pull Tabs, and Quick Release Latches for easy Identification

Summary of Changes

Date of change:	Version History:		Description of change:
December 16, 2020	From v1 to v2	**Changed**	Storage / Hard Drives, Networking and Communications, and Input Devices sections
December 18, 2020	From v2 to v3	**Changed**	Processors, Other Hardware and HP Bios sections
February 1, 2021	From v3 to v4	**Changed**	Operating Systems section
April 13, 2021	From v4 to v5	**Changed**	Graphics and Optical and Removable Storage sections
May 1, 2021	From v5 to v6	**Added**	Service, Support, and Warranty section
		Changed	Graphics section
May 31, 2021	From v6 to v7	**Added**	HP Smart Support and footnote
July 1, 2021	From v7 to v8	**Changed**	Graphics and Power Supply sections
September 1, 2021	From v8 to v9	**Changed**	Input Devices, Optical and Removable Storage section
December 1, 2021	From v9 to v10	**Changed**	Operating Systems, Storage / Hard Drives, Optical and Removable Storage, Graphics and Input Devices sections
December 3, 2021	From v10 to v11	**Changed**	SOFTWARE AND SECURITY section
December 15, 2021	From v11 to v12	**Changed**	OPERATING SYSTEM and Social and Environmental Responsibility sections
January 1, 2022	From v12 to v13	**Changed**	Networking and Communications, OPERATING SYSTEM and Application Software sections
July 1, 2022	From v13 to v14	**Changed**	Graphics section
August 1, 2022	From v14 to v15	**Changed**	Optical and Removable Storage section

© 2022 HP Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Intel, Intel Core, Pentium, Thunderbolt, vPro and Xeon are trademarks of Intel Corporation in the U.S. and other countries. Microsoft and Windows are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. ENERGY STAR® is a registered trademark owned by the U.S. Environmental Protection Agency. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries. NVIDIA®, Quadro and the NVIDIA logo are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and other countries. Red Hat® is a registered trademark of Red Hat, Inc. in the United States and other countries. Bluetooth is a trademark of its proprietor used by HP Inc. under license. DisplayPort™ and the DisplayPort™ logo are trademarks owned by the Video Electronics Standards Association (VESA®) in the United States and other countries.