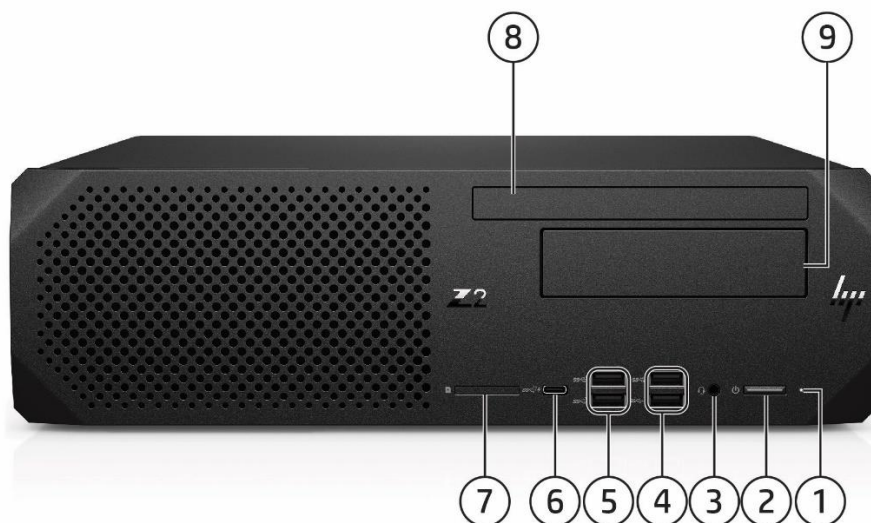


### Overview

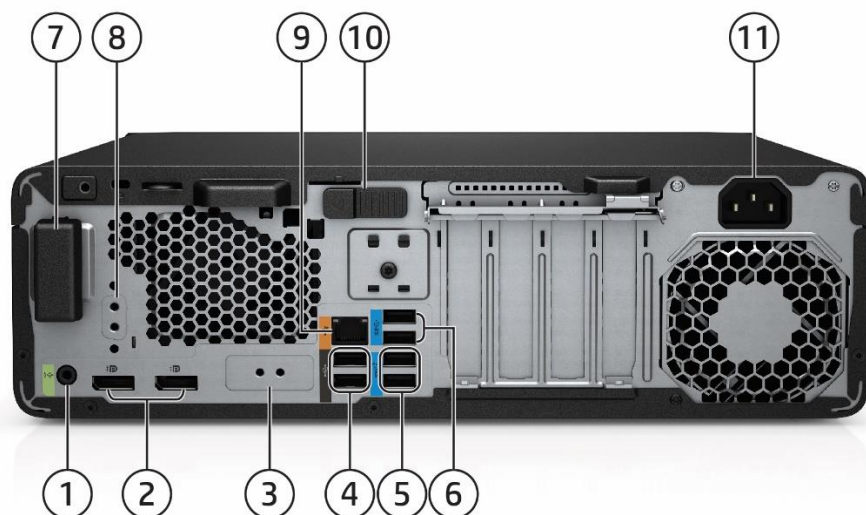
### HP Z2 Small Form Factor G5 Workstation



#### 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<sup>1</sup>
3. Flex I/O module: choose one from the following:  
VGA, HDMI 2.0b, DisplayPort™ 1.4<sup>1</sup>, 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

<sup>1</sup> All DisplayPort™ support DP1.4/HBR2 when video output is via Intel Graphics.

### Overview

#### Form Factor

Small Form Factor

#### Operating Systems

Preinstalled:

- Windows 10 Pro 64<sup>1</sup>
- Windows 10 Pro for Workstations 64<sup>1</sup>
- Windows 10 Home 64<sup>1</sup>
- Linux®-ready<sup>2</sup>

Web-supported only:

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

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>.

<sup>1</sup>Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>

**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® 7<sup>th</sup> 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>

<sup>2</sup> For detailed Linux® OS/hardware support information, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](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® 7<sup>th</sup> Generation and forward processors.

### Processors\*

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Intel® Turbo Boost Technology <sup>3</sup>	Featuring Intel® vPro™ Technology <sup>4</sup>	16GB Intel® Optane™ memory <sup>2</sup>	TDP (W)
Intel® Core™ i9-10900K Processor	10	3.7	20	2933	Y	Intel® UHD Graphics 630	5.2	Y	Y	125
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 <sup>5</sup>	10	2.8	20	2933	Y	N/A	5.1	N/A	Y	65
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 <sup>5</sup>	6	2.9	12	2666	Y	N/A	4.3	N/A	Y	65

### Overview

Intel® Core™ i3-10320 processor <sup>5</sup>	4	3.8	8	2666	Y	Intel® UHD Graphics 630	4.6	N/A	Y	65
Intel® Core™ i3-10300 processor <sup>5</sup>	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 <sup>5</sup>	10	3.2	20	2933	Y	Intel® UHD Graphics P630	5.1	Y	Y	80
Intel® Xeon® W-1270P processor <sup>5</sup>	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

<sup>1</sup> 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.

<sup>2</sup> Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system.

<sup>3</sup> 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.

<sup>4</sup> 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>

<sup>5</sup> Available in Q4, 2020

<b>Color</b>	Black
<b>Convertibility</b>	The SFF can either be placed flat on the desktop or made to stand on the desk with the optional tower stand.
<b>Expansion Slots</b> (see system board section for more details) <sup>1</sup>	PCIe Gen3 x16 PCIe Gen3 x1 <sup>1</sup> PCIe Gen3 x1 <sup>1</sup> 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.

### Overview

	<sup>1</sup> The PCIe x1 connectors above are open ended, allowing a PCIe x16 card to be seated in the slot.
<b>Expansion Bays</b> (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
<b>Front I/O</b>	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
<b>Internal I/O</b>	1 Hi-Speed USB 480Mbps signaling rate port
<b>Rear I/O</b>	2 DisplayPort™ 1.4 <sup>1</sup> , 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 (40Gbps signaling rate port, cabled to PCIe AIC)), 1 serial and PS/2 combo(optional).
<b>Interfaces Supported</b>	<b>NOTE: All DisplayPort™ support DP1.4/HBR2 when video output is via Intel Graphics.</b> SD card reader (optional)
<b>On-board RAID Support</b>	RAID 0 RAID 1
<b>Chassis Dimensions (H x W x D)</b>	H: 3.95" [100mm] W: 13.3" [338mm] D: 12.1" [308mm] (Standard desktop orientation)
<b>Packaged Dimensions</b>	H: 8.98" (228mm) W: 15.71" (399mm) D: 19.65" (499mm)
<b>Weight</b>	Exact weights depend upon configuration (System weight only). Starting at 5.4kg (11.9lbs.)
<b>Temperature</b>	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
<b>Humidity</b>	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
<b>Maximum Altitude (non-pressurized)</b>	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.
<b>Power Supply</b>	450W wide-ranging, active Power Factor Correction, 90% Efficiency. 260W wide-ranging, active Power Factor Correction, 92% Efficiency. <b>NOTE: The Power Supply Efficiency Report for the 450W 90% Efficiency and 260W 92% Efficiency Power Supply may be found at the following links:</b>

450W PSU:

<https://www.pluginloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2>

260W PSU:

<https://www.pluginloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2>

### Overview

**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

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### Supported Components

Processors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>10th Generation Intel Core Processors<sup>1</sup></b>				
Intel® Core™ i9 10900K Processor	Y	N		
Intel® Core™ i9 10900 Processor	Y	N		
Intel® Core™ i9 10900F Processor	Y	N		1
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		
<b>Intel Xeon W Processors</b>				
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		
<sup>1</sup> These processors support only non-ECC memory				
<b>NOTE 1:</b> No integrated graphics. A discrete graphics card must be purchased at the same time. Available in Q4, 2020				
<b>NOTE 2:</b> Available in Q4, 2020				

Storage / Hard Drives	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>SATA Hard Drives</b>				
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	
<b>SATA Solid State Drives</b>				
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	
HP 2TB SATA 6Gb/s SSD	Y	Y	Y6P08AA/AT	

### Supported Components

HP 256GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	G7U67AA
HP 512GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	N8T26AA
<b>PCIe Solid State Drives</b>			
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

**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.

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
<b>Integrated SATA Controller (Z2 G5)</b>		
Integrated SATA Controller, RAID 0,1 supported: 4x 6 Gb/s ports	Y	
<b>Factory integrated RAID on motherboard for SATA drives</b>		
RAID 0 Data Configuration	Y	
RAID 1 Data Configuration	Y	
<b>Factory integrated RAID on motherboard for Z Turbo Drive</b>		
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
<b>Graphics Cable Adapters</b>					
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		
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		



### Supported Components

#### Entry 3D

NVIDIA® Quadro® P400 2GB Graphics Kit, w/2 mDP-to-DP Adapters Included	Y	Y	1ME43AA/AT	2
NVIDIA® Quadro® P620 2GB Graphics Kit, w/2 mDP-to-DP Adapters Included	Y	Y	3ME25AA/AT	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® 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

#### AM0

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

### Supported Components

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	2ZK26AA
HP DP25 Removable 2.5" HDD Frame/Carrier	Y	Y	W3J84AA
HP 9.5mm Slim BDXL Blu-Ray Writer	Y	Y	K3R65AA
HP 9.5mm Slim DVD-ROM Drive	Y	Y	K3R63AA

**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.

### 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	

**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

### Supported Components

#### 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
3Dconnexion CADMouse	N	Y	M5C35AA
HP Promo PS/2 Mouse	N	Y	QY775AT
HP Wired Desktop 320MK Mouse and Keyboard	N	Y	9SR36AA

#### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number
HP Thunderbolt 3 PCIe Card	Y	Y	141M7AA
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	Y	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

#### 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	
ZCentral Remote Boost	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	

### Supported Components

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

**NOTE 2:** Windows OS only

#### Operating Systems

Windows® 10 Pro 64

Windows® 10 Pro for Workstations 64

Windows® 10 Home 64

Linux Ready

**NOTE:** For detailed QS/hardware support information for Linux, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](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.
- 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)

### Supported Components

-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.

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## SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

### BIOS

HP BIOSphere Gen6<sup>10</sup>

BIOS Update via Network

HP Secure Erase<sup>11</sup>

Absolute Persistence Module<sup>12</sup>

Pre-boot Authentication

HP Wake on WLAN

HP DriveLock & Automatic DriveLock<sup>13</sup>

### 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<sup>15</sup>

ZCentral Remote Boost<sup>16</sup>

### Manageability Features

HP Driver Packs<sup>1</sup>

HP System Software Manager (SSM)

HP BIOS Config Utility (BCU)

HP Manageability Integration Kit Gen4<sup>2</sup>

### Client Security Software

HP Client Security Manager Gen6<sup>3</sup> including:

(including Credential Manager, HP Password Manager<sup>4</sup>, HP Spare Key)

HP Sure Run Gen3<sup>7</sup>

HP Power On Authentication

### Supported Components

Microsoft Defender<sup>5</sup>

#### Security Management

HP Sure Click<sup>9</sup>

HP Sure Start Gen6

HP Sure Sense<sup>17</sup>

HP Sure Recover Gen3<sup>8</sup>

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 Pro or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](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 Z Central Remote Boost Software does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase. 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 requires Windows, RHEL (7 or 8), UBUNTU 18.04 LTS, or HP ThinPro 7 operating systems. MacOS (10.13 or newer) operating system is only supported on the receiver side. Requires network access. The software is available for download at [hp.com/ZCentralRemoteBoost](http://hp.com/ZCentralRemoteBoost).
17. HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.

### System Technical Specifications

#### System Board

<b>System Board Form Factor</b>	Customized PCB 30.124 x 24.38 mm (11.86 x 9.6 inches)	
<b>Processor Socket</b>	Single LGA-1200	
<b>CPU Bus Speed</b>	DMI	
<b>Chipset</b>	Intel® PCH W480	
<b>Super I/O Controller</b>	Nuvoton SIO18	
<b>Memory Expansion Slots</b>	4 DDR4 memory slots	
<b>Memory Type Supported</b>	DDR4, UDIMM (Unbuffered), ECC& non-ECC	
<b>Memory Modes</b>	Non-Interleaved for single channel. Interleaved when both channels are populated.	
<b>Memory Speed Supported</b>	2933MT/s DDR4	
<b>Memory Protection</b>	ECC available on data	
<b>Maximum Memory</b>	128GB	
<b>Memory Configuration (Supported)</b>	4GB, 8GB 16GB and 32GB non-ECC/8GB, 16GB and 32GB ECC unbuffered DIMMs are supported. <b>NOTE:</b> 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.	
<b>PCI Express Connectors</b>	<ul style="list-style-type: none"> <li>• 1 PCI Express Gen3 slot x16 mechanical/ x16 electrical (LP, half-length)</li> <li>• 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half-length)</li> <li>• 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half-length)</li> <li>• 1 PCI Express Gen3 slot x16 mechanical/ x4 electrical (LP, half-length)</li> <li>• 2 M.2 2280 Storage (PCIe Gen3 x4)</li> <li>• 1 M.2 2230 WLAN (PCIe Gen3 x1+ Intel CNVi)</li> </ul> <p>In the PCIe Gen3 (x16 electrical/x16 mechanical) slot, it intent to supported HP certified added in card. <b>NOTE:</b> M.2 storage supports compatible devices up to 80mm</p>	
<b>Supported Drive Interfaces</b>	<b>SATA</b>	Integrated (4) Serial ATA interfaces (6Gb/s SATA).
	<b>Serial Attached SCSI</b>	None
	<b>Integrated Graphics</b>	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
	<b>Network Controller</b>	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 12
	<b>External SATA (eSATA) IDE connector</b>	None
	<b>Floppy connector</b>	None
	<b>Serial</b>	Yes- requires optional Serial Port Adapter Kit
	<b>2nd Serial</b>	Yes- requires optional Serial Port Adapter Kit
	<b>HD Integrated Audio</b>	Yes
<b>USB Connector(s)</b>	<b>Front</b>	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)
	<b>Rear</b>	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)
	<b>Internal</b>	1 High-speed USB 480Mbps signaling rate port
<b>HD Integrated Audio</b>	Yes	
<b>Flash ROM</b>	Yes	
<b>CPU Fan Header</b>	Yes	
<b>Memory Fan Header</b>	None	
<b>Chassis Fan Header</b>	1 Rear System Chassis Fan Header, 1 Graphic chassis Fan Header.	
<b>Front PCI Fan Header</b>	None	
<b>Front Control Panel/Speaker Header</b>	Yes	
<b>CMOS Battery Holder - Lithium</b>	Yes	
<b>Integrated Trusted Platform Module</b>	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.	
<b>Power Supply Headers</b>	Yes	
<b>Power Switch, Power LED &amp; Hard Drive LED Header</b>	Yes	
<b>Clear Password Jumper</b>	None	
<b>Keyboard/Mouse</b>	USB or PS/2 Mouse (option)	
<b>Power Supply</b>	260W EPA92 and 450W EPA90	
<b>Operating Voltage Range</b>	90–269 VAC	
<b>Rated Voltage Range</b>	100–240 VAC	
<b>Rated Line Frequency</b>	50–60 Hz	
<b>Operating Line Frequency Range</b>	47–66 Hz	
<b>Rated Input Current</b>	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

<i>Z2 Small Form Factor G5 Configuration #1</i>	Processor Info	CPU Intel® Core™ i5-10400 2.9GHz 6C 65W
	Memory Info	8GB (1x 8GB) 2666 MHz DDR4 non-ECC
<b>ENERGY STAR CERTIFIED</b>	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

<b>Z2 Small Form Factor G5 Configuration #2</b>	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	

<b>Z2 Small Form Factor G5 Configuration #3</b>	Processor Info	CPU Intel® Core™ i9-10900K 3.7GHz 10C 125W
<b>ENERGY STAR CERTIFIED</b>	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

<b>Z2 Small Form Factor G5 Configuration #4</b>	Processor Info	CPU Intel® Xeon® W-1270P 3.8GHz 8C 125W
	Memory Info	64GB (2x32GB) 2666 MHz DDR4 ECC
<b>ENERGY STAR CERTIFIED</b>	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	

<b>Z2 Small Form Factor G5 Configuration #5</b>	Processor Info	CPU Intel® Xeon® W-1250 3.3GHz 6C 80W
	Memory Info	16GB (2x8GB) 2666 MHz DDR4 ECC
<b>ENERGY STAR CERTIFIED</b>	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
<b>NOTE:</b> The Power Supply Efficiency report may be found at the following links: <a href="https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&amp;type=2">https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&amp;type=2</a>			

### Declared Noise Emissions

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

### System Technical Specifications

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

<b>Environmental Requirements</b>	<b>Temperature</b>	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
	<b>Humidity</b>	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
	<b>Maximum Altitude</b>	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.
	<b>Dynamic</b>	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
	<b>Cooling</b>	Vibration Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g <sup>2</sup> /Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g <sup>2</sup> /Hz 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

<b>Access Panel</b>	Tool-less Includes system board and memory information
<b>Optical Drive</b>	Tool-less, except for Screw-In carrier
<b>Hard Drives</b>	Tool-less, except for internal/external and 2.5" bay
<b>Expansion Cards</b>	Tool-less
<b>Processor Socket</b>	Tool-less, except for the processor heatsink
<b>Blue User Touch Points</b>	Yes, on tool-less internal chassis mechanisms
<b>Color-coordinated Cables and Connectors</b>	Yes
<b>Memory</b>	Tool-less
<b>System Board</b>	Screw-In
<b>Padlock Support</b>	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
<b>Cable Lock Support</b>	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
<b>Universal Chassis Clamp Lock Support</b>	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
<b>Solenoid Lock and Hood Sensor</b>	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.
<b>Keyboard/Mouse/Video Cable Lock</b>	Yes, locks rear IO cables to prevent cable theft
<b>CPUs and Heatsinks</b>	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
<b>Internal Speaker</b>	Yes
<b>Power Supply Fans</b>	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
<b>Access Panel Key Lock</b>	No
<b>Integrated Chassis Handles</b>	No
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>PCI Card Retention</b>	Yes, rear (all), middle (none), front (none)

### System Technical Specifications

#### 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

#### 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](http://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](http://www.hp.com/hpinfo/globalcitizenship/society/gen_specifications.html)

### System Technical Specifications

- 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.

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### System Technical Specifications

#### 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

##### System Software Manager

Visit: <http://ftp.hp.com/pub/caps-softpaq/cmit/HPIA.html>

For questions or support for SSM, please visit: <http://www.hp.com/go/ssm>

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### 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.

<b>Processors</b>	<b>Product #</b>	<b>Offering</b>
		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

<b>Hard Drives</b>	<b>Product #</b>	<b>Offering</b>
		1TB 7200RPM SATA 3.5in HDD

<b>Graphics</b>	<b>Product #</b>	<b>Offering</b>
		AMD Radeon™ Pro WX 3200 4GB

### Technical Specifications - Processors

#### **10<sup>th</sup> Generation Intel® Core™ Processors**

Intel® Core™ i9-10900K Processor

Intel® Core™ i9-10900 Processor

Intel® Core™ i9-10900F Processor<sup>1,2</sup>

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<sup>1,2</sup>

Intel® Core™ i3-10320 processor<sup>1</sup>

Intel® Core™ i3-10300 processor<sup>1</sup>

Intel® Core™ i3-10100 processor

#### **Intel® Xeon® W Processors**

Intel® Xeon® W-1290P processor

Intel® Xeon® W-1290 processor<sup>1</sup>

Intel® Xeon® W-1270P processor<sup>1</sup>

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.

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### Technical Specifications - Hard Drives

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

\*Actual performance may vary.

	<b>1TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	1TB
		<b>Protocol</b>	SATA
		<b>Form Factor</b>	3.5"
		<b>Controller</b>	AHCI
		<b>Height</b>	1 in; 2.54 cm
		<b>Width</b>	<b>Media Diameter</b> 3.5 in; 8.9 cm
			<b>Physical Size</b> 4 in; 10.17 cm
		<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s *
		<b>Buffer</b>	64MB
		<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<b>Single Track</b> 2 ms *
			<b>Average</b> 11 ms *
			<b>Full Stroke</b> 21 ms *
		<b>Rotational Speed</b>	7,200 rpm
	<b>Logical Blocks</b>	1,953,525,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

\*Actual performance may vary.

	<b>2TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	2TB
		<b>Protocol</b>	SATA
		<b>Form Factor</b>	3.5"
		<b>Controller</b>	AHCI
		<b>NAND Type</b>	3D TLC

### Technical Specifications - Hard Drives

<b>Endurance</b>	400TBW (TB Written)	
<b>Reliability</b>	2.0M hours	
<b>Rated Power On Hours</b>	8760/yr	
<b>Annualized Failure Rate (based on Rated POH)</b>	<0.62%	
<b>Rated for 24/7/365 operation</b>	YES	
<b>Height</b>	1 in; 2.54 cm	
<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
	<b>Physical Size</b>	4 in; 10.17 cm
<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled	
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s *	
<b>Buffer</b>	64MB	
<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<b>Single Track</b>	2 ms *
	<b>Average</b>	11 ms *
	<b>Full Stroke</b>	21 ms *
<b>Rotational Speed</b>	7,200 rpm	
<b>Logical Blocks</b>	3,907,029,168	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

\*Actual performance may vary.

#### 1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)

<b>Capacity</b>	1TB	
<b>Protocol</b>	SATA	
<b>Form Factor</b>	3.5"	
<b>Controller</b>	AHCI	
<b>Reliability</b>	2.0M hours	
<b>Rated Power On Hours</b>	8760/yr	
<b>Annualized Failure Rate (based on Rated POH)</b>	<0.62%	
<b>Height</b>	1 in; 2.54 cm	
<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
	<b>Physical Size</b>	4 in; 10.17 cm
<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled	
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s *	
<b>Buffer</b>	128 MB	
<b>Cache</b>	Adaptive	
<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<b>Single Track</b>	0.32ms*
	<b>Average</b>	7.45ms*
	<b>Full Stroke</b>	14.2ms*
<b>Rotational Speed</b>	7,200 rpm	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>Performance</b>	<b>Sequential Read</b>	up to 226MB/s*
	<b>Sequential Write</b>	up to 226MB/s*

### Technical Specifications - Hard Drives

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

### Technical Specifications - Hard Drives

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

### Technical Specifications - Hard Drives

<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<b>Average Full Stroke</b>	4.2ms*
<b>Rotational Speed</b>		7,200 rpm
<b>Operating Temperature</b>		32° to 131° F (0° to 60° C)
<b>Self-Encrypting Drive Support</b>		Yes

\*Actual performance may vary.

<b>HP 256GB SATA 6Gb/s SSD</b>	<b>Capacity</b>	256GB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Height</b>	0.275 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 131° F (0° to 60° C)

<b>HP 512GB SATA 6Gb/s SSD</b>	<b>Capacity</b>	512GB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Height</b>	0.28 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)

<b>HP 1TB SATA 6Gb/s SSD</b>	<b>Capacity</b>	1TB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Height</b>	0.28 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)

<b>HP 2TB SATA 6Gb/s SSD</b>	<b>Capacity</b>	2TB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Height</b>	0.28 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)



### Technical Specifications - Hard Drives

<b>HP 256GB SATA 6Gb/s SED Opal 2 SSD</b>	<b>Capacity</b>	256GB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Height</b>	0.28 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Self-Encrypting Drive Support</b>	OPAL2

\*Actual performance may vary.

<b>HP 512GB SATA 6Gb/s SED Opal 2 SSD</b>	<b>Capacity</b>	512GB
	<b>Protocol</b>	SATA
	<b>Form Factor</b>	2.5"
	<b>Endurance</b>	400TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Height</b>	0.28 in; 0.7 cm
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)*
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Self-Encrypting Drive Support</b>	OPAL2	

\*Actual performance may vary.

<b>HP Z Turbo Drv 256GB TLC PCIe SSD (Z2G5)</b>	<b>Capacity</b>	256GB							
	<b>Protocol</b>	PCIe							
	<b>Form Factor</b>	M.2 in native Slot on motherboard							
	<b>Controller</b>	NVMe							
	<b>NAND Type</b>	3D TLC							
	<b>Endurance</b>	75TBW (TB Written)							
	<b>Reliability (MTBF)</b>	1.5M Hours							
	<b>Interface</b>	PCI Express 3.0 x4 electrical							
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)							
	<b>Performance</b>	<table> <tr> <td><b>Sequential Read</b></td> <td>2800MB/s*</td> </tr> <tr> <td><b>Sequential Write</b></td> <td>1100MB/s*</td> </tr> <tr> <td><b>Random Read</b></td> <td>250K IOPS*</td> </tr> <tr> <td><b>Random Write</b></td> <td>180K IOPS*</td> </tr> </table>	<b>Sequential Read</b>	2800MB/s*	<b>Sequential Write</b>	1100MB/s*	<b>Random Read</b>	250K IOPS*	<b>Random Write</b>
<b>Sequential Read</b>	2800MB/s*								
<b>Sequential Write</b>	1100MB/s*								
<b>Random Read</b>	250K IOPS*								
<b>Random Write</b>	180K IOPS*								

\*Actual performance may vary.

<b>HP Z Turbo Drv 512GB TLC PCIe SSD (Z2G5)</b>	<b>Capacity</b>	512GB
	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
<b>Endurance</b>	150TBW (TB Written)	

### Technical Specifications - Hard Drives

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

\*Actual performance may vary.

#### HP Z Turbo Drv 1TB TLC PCIe SSD (Z2G5)

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

\*Actual performance may vary.

#### HP Z Turbo Drv 2TB TLC PCIe SSD (Z2G5)

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

\*Actual performance may vary.

#### HP Z Turbo Drv 256GB TLC PCIe SED OPAL2 (Z2G5)

<b>Capacity</b>	256GB	
<b>Protocol</b>	PCIe	
<b>Form Factor</b>	M.2 in native Slot on motherboard	
<b>Controller</b>	NVMe	
<b>NAND Type</b>	3D TLC	
<b>Endurance</b>	75TBW (TB Written)	

### Technical Specifications - Hard Drives

<b>Reliability (MTBF)</b>	1.5M Hours	
<b>Interface</b>	PCI Express 3.0 x4 electrical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	2800MB/s*
	<b>Sequential Write</b>	1100MB/s*
	<b>Random Read</b>	250K IOPS*
	<b>Random Write</b>	180K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2	

\*Actual performance may vary.

#### HP Z Turbo Drv 512GB TLC PCIe SED OPAL2 (Z2G5)

<b>Capacity</b>	512GB	
<b>Protocol</b>	PCIe	
<b>Form Factor</b>	M.2 in native Slot on motherboard	
<b>Controller</b>	NVMe	
<b>NAND Type</b>	3D TLC	
<b>Endurance</b>	150TBW (TB Written)	
<b>Reliability (MTBF)</b>	1.5M Hours	
<b>Interface</b>	PCI Express 3.0 x4 electrical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	2800MB/s*
	<b>Sequential Write</b>	1600MB/s*
	<b>Random Read</b>	260K IOPS*
	<b>Random Write</b>	260K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2	

\*Actual performance may vary.

#### HP Z Turbo Drv 1TB TLC PCIe SED OPAL2 (Z2G5)

<b>Capacity</b>	1TB	
<b>Protocol</b>	PCIe	
<b>Form Factor</b>	M.2 in native Slot on motherboard	
<b>Controller</b>	NVMe	
<b>NAND Type</b>	3D TLC	
<b>Endurance</b>	300TBW (TB Written)	
<b>Reliability (MTBF)</b>	1.5M Hours	
<b>Interface</b>	PCI Express 3.0 x4 electrical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	3000MB/s*
	<b>Sequential Write</b>	1700MB/s*
	<b>Random Read</b>	360K IOPS*
	<b>Random Write</b>	330K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2	

\*Actual performance may vary.

### Technical Specifications - Hard Drives

**HP Z Turbo Drv 2TB  
TLC PCIe SED OPAL2  
(Z2G5)**

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

\*Actual performance may vary.

### Technical Specifications - Graphics

<b>Integrated Intel® UHD Graphics (Z2 G5)</b>	<b>Form Factor</b>	Integrated in select Intel® Xeon® W, Intel® Core™ i7, and Intel® Core™ i5 processors.
		Check specific platform specifications for selections.
	<b>Graphics Controller</b>	Intel® UHD Graphics
	<b>Memory</b>	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® DVM 5.0), to provide an optimal balance between graphics and system memory use.
	<b>Connectors</b>	Check system platform specifications where Intel® UHD Graphics are available.
	<b>Maximum Resolution</b>	Display Port™: 4096 x 2160 HDMI: 4096 x 2160 DVI: 1920x1200 VGA: 2048x1536
		<b>NOTE:</b> For HDMI, DVI and VGA outputs, separate adapters may be required.
	<b>Shading Architecture</b>	Shader Model 6 compiler support
	<b>Supported Graphics APIs</b>	OpenGL 4.54 DirectX 12
	<b>Available Graphics Drivers</b>	Windows 10
<b>AMD Radeon™ Pro WX 3200 4GB Graphics</b>	<b>Form Factor</b>	Low-Profile Single Slot
	<b>Graphics Controller</b>	Radeon™ Pro WX 3200 Power: 56 Watts Cooling Solution: Active fan heatsink
	<b>Memory</b>	4GB GDDR5 memory
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 4x 4096 x 2160 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	<b>Shading Architecture</b>	Full Microsoft DirectX 12 Shader Model 5.1
	<b>Display Outputs</b>	4 mDP (Mini DisplayPort™) 1.4 Connectors
	<b>Supported Graphics APIs</b>	DirectX® 12 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
<b>Available Graphics Drivers</b>	Windows 10 64-bit (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: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>	

### Technical Specifications - Graphics

<b>NVIDIA® Quadro® P620 2GB Graphics</b>	<b>Form Factor</b>	Single slot, Low Profile
	<b>Graphics Controller</b>	NVIDIA® Quadro® P620 Max. Power: 40W Cooling Solution: Active fan heatsink
	<b>Bus Type</b>	PCI Express x16
	<b>Memory</b>	Size: 2GB DDR5
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	<b>Shading Architecture</b>	Full Microsoft DirectX 12 Shader Model 5.1
	<b>Display Outputs</b>	4 mDP (Mini DisplayPort™) 1.4 Connectors
	<b>Supported Graphics APIs</b>	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	<b>Available Graphics Drivers</b>	Microsoft Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

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<b>NVIDIA® Quadro® P1000 4GB Graphics</b>	<b>Form Factor</b>	Single Slot, Low Profile Cooling: Active
	<b>Graphics Controller</b>	NVIDIA® Quadro® P1000 47 Watts Cooling Solution: Active Fan Heatsink
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	<b>Display Output</b>	4 mDP 1.4 Connectors
	<b>Shading Architecture</b>	Full Microsoft DirectX 12 Shader Model 5.1
	<b>Supported Graphics APIs</b>	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	<b>Available Graphics Drivers</b>	Microsoft Windows 10 Linux® 64-bit (selected Enterprise distributions)  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

**Form Factor** Single Slot, Low Profile

### Technical Specifications - Graphics

<b>Nvidia® Quadro® T2000 4GB Graphics</b>	<b>Power</b>	60W
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	4GB GDDR6
	<b>Connectors</b>	3x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.
	<b>Maximum Resolution</b>	5120 x 3200 @ 60Hz
	<b>Supported Graphics APIs</b>	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	<b>Available Graphics Drivers</b>	Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

<b>Nvidia® Quadro® RTX 3000 6GB Graphics</b>	<b>Form Factor</b>	Single Slot, Low Profile
	<b>Power</b>	60W
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	6GB GDDR6
	<b>Connectors</b>	3x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.
	<b>Maximum Resolution</b>	5120 x 3200 @ 60Hz
	<b>Supported Graphics APIs</b>	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	<b>Available Graphics Drivers</b>	Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

- 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:
      - 2KW86A6 - HP (Bulk 4) miniDP-to-DP Adapter Cables
      - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

### Technical Specifications - Optical and Removable Storage

#### HP 9.5mm Slim DVD Writer

<b>Description</b>	9.5mm height, tray-load	
<b>Mounting Orientation</b>	Either horizontal or vertical	
<b>Interface Type</b>	SATA/ATAPI	
<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm	
<b>Supported Media Types</b>	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
<b>Disc Capacity</b>	<b>DVD-ROM</b>	8.5 GB DL or 4.7 GB standard
<b>Access Times</b>	<b>Full Stroke DVD</b>	< 200 ms (seek)
	<b>Full Stroke CD</b>	< 200 ms (seek)
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	<b>DVD ROM Read</b>	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
<b>Power</b>	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirements</b>	5 VDC ± 5%-100 mV ripple p-p
	<b>DC Current</b>	5 VDC -< 800 mA typical, <1600 mA maximum
<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b>	10% to 80%
	<b>Maximum Wet Bulb Temperature</b>	84° F (29° C)
<b>Operating Systems Supported</b>	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.	
<b>Kit Contents</b>	HP SATA DVD Writer drive, installation guide.	
<b>Approvals</b>	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

<b>HP 9.5mm Slim DVD-ROM Drive</b>	<b>Description</b>	9.5mm height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA / ATAPI
	<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm
	<b>Disc Capacity</b>	<b>DVD-ROM</b> Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	<b>Access Times</b>	<b>DVD-ROM Single Layer</b> < 110 ms (typical) <b>CD-ROM Mode 1</b> < 110 ms (typical) <b>Full Stroke DVD</b> < 230 ms (typical) <b>Full Stroke CD</b> < 220 ms (typical)
	<b>Power</b>	<b>Source</b> SATA DC power receptacle <b>DC Power Requirements</b> 5 VDC ± 5%-100 mV ripple p-p <b>DC Current</b> 5 VDC – <800mA typical, < 1600 mA maximum
	<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> 10% to 80% <b>Maximum Wet Bulb Temperature</b> 84° F (29° C)
	<b>Operating Systems Supported</b>	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®
	<b>Kit Contents</b>	No driver is required for this device. Native support is provided by the operating system. 9.5mm Slim DVD-ROM Drive, slim SATA data/power cable, installation guide
	<b>Approvals</b>	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

<b>HP 9.5mm Slim BDXL Blu-Ray Writer</b>	<b>Description</b>	9.5mm height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA/ATAPI
	<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm
	<b>Supported Media Types</b>	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

<b>Disc Capacity</b>	<b>DVD-ROM</b> <b>Blu-ray</b>	8.5 GB DL or 4.7 GB standard 25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
<b>Access Times</b>	<b>Full Stroke DVD</b> <b>Full Stroke CD</b> <b>Blu-ray</b> <b>Startup Time</b>	< 230 ms (seek) < 220 ms (seek) < 230 ms (seek) (Full Stroke Blu-ray) (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
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>  <b>DVD ROM Read</b>  <b>Blu-ray</b>	CD-ROM, CD-R Up to 24X CD-RW Up to 24X  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  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
<b>Power</b>	<b>Source</b> <b>DC Power Requirements</b> <b>DC Current</b>	SATA DC power receptacle 5 VDC ± 5%-100 mV ripple p-p 5 VDC -900 mA typical, 2000mA maximum
<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b> <b>Relative Humidity</b> <b>Maximum Wet Bulb Temperature</b>	41° to 122° F (5° to 50° C) 10% to 80% 84° F (29° C)
<b>Operating Systems Supported</b>	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.

<b>Kit Contents</b>	9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide
<b>Approvals</b>	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
<b>NOTES</b>	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.

<b>HP SD Media Card Reader</b>	<b>Description</b>	USB3.0-SD4.0 NOTE: actual throughput is USB2.0.
	<b>Interface Type</b>	<ul style="list-style-type: none"> <li>• Support USB 2.0 LPM function</li> <li>• Support USB 3.0 U1/U2/U3 Power saving mode</li> <li>• Support USB 3.0 LTM function.</li> </ul>
	<b>Dimensions (WxHxD)</b>	Dedicated slot in front bezel (orderable option)
	<b>Supported Media Types</b>	<ol style="list-style-type: none"> <li>i. Secure Digital Card (SD)</li> <li>ii. Secure Digital Support up to 2TB</li> <li>iii. Secure Digital HC (SDHC)</li> <li>iv. Secure Digital XC (SDXC)</li> <li>v. Support SD UHS50 mode</li> <li>vi. miniSD *1</li> <li>vii. miniSDHC*1</li> <li>viii. MicroSD*1</li> <li>ix. MicroSDHC*1</li> <li>x. MicroSDXC*1</li> </ol> <p style="text-align: right;">Note: “*1” means Adapter Needed</p>
	<b>Operating Systems Supported</b>	<p>No driver is required for this device. Native support is provided by the operating system.</p> <p>Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows 10 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <a href="http://www.microsoft.com">http://www.microsoft.com</a>.</p> <p>See <a href="http://www.microsoft.com/windows/windows-7/">http://www.microsoft.com/windows/windows-7/</a> for details.</p>

### Technical Specifications - Networking and Communications

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

<b>Intel® X710-DA2 2-Port SFP+ 10GbE NIC</b>	<b>Connector</b>	2 SFP+ Ports
	<b>Cabling</b>	Twin Axial Cabling up to 10m
	<b>Controller</b>	Intel® Ethernet Controller X710-AM2
	<b>Network Transfer Rates Supported</b>	10GbE (with supported 10GBASE-SR transceivers)
	<b>Data Path Width</b>	PCIe Gen3x8 (compatible with x4)
	<b>Power Requirement</b>	4.3W (typical) (with supported 10GBASE-SR transceivers)
	<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
	<b>Dimensions (HxW)</b>	2.703 x 6.578 inches
	<b>Operating System Driver Support</b>	Windows 10 64-bit Linux®
	<b>Kit Contents</b>	<ul style="list-style-type: none"> <li>• Intel® X710-DA2 2-Port SFP+ 10GbE NIC with standard height bracket attached</li> <li>• Low-profile bracket</li> </ul> Product Literature

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

### Technical Specifications - Networking and Communications

<b>Intel® X550-T2 2-Port 10GbE NIC</b>	<b>Connector</b>	2 RJ-45
	<b>Cabling</b>	10GbE: Cat6a (or better) up to 100m 5GbE and below: Cat5e (or better) up to 100m
	<b>Controller</b>	Intel® Ethernet Controller X550
	<b>Network Transfer Rates Supported</b>	10GbE, 5GbE, 2.5GbE, 1GbE, 100MbE
	<b>Data Path Width</b>	PCIe Gen3x4
	<b>Power Requirement</b>	11.2W (typical)
	<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
	<b>Dimensions (HxW)</b>	5.1 x 2.7 in (without brackets)
	<b>Operating System Driver Support</b>	Windows 10 64-bit Linux®
	<b>Kit Contents</b>	<ul style="list-style-type: none"> <li>• Intel® X550-T2 2-Port 10GbE NIC with standard height bracket attached</li> <li>• Low-profile bracket</li> <li>• Product Literature</li> </ul>
	<b>Aquantia® AQN-108 1-Port 5GbE NIC</b>	<b>Connector</b>
<b>Cabling</b>		Cat5e (or better) up to 100m
<b>Controller</b>		Aquantia® AQC108
<b>Network Transfer Rates Supported</b>		5GbE, 2.5GbE, 1GbE, 100MbE
<b>Data Path Width</b>		PCIe Gen3x1
<b>Power Requirement</b>		3.5W (typical)
<b>Operating Temperature</b>		32° to 131° F (0° to 55° C)
<b>Dimensions (HxW)</b>		3.72 x 3.18 inches (without brackets)
<b>Operating System Driver Support</b>		Windows 7 64-bit; Windows 10 64-bit; Linux®
<b>Kit Contents</b>		<ul style="list-style-type: none"> <li>• Aquantia AQN-108 1-Port 5GbE NIC with standard height bracket attached</li> <li>• Low-profile bracket</li> <li>• Product Literature</li> </ul>
<b>Intel® I350-T2 2-Port 1GbE NIC</b>		<b>Connector</b>
	<b>Cabling</b>	Cat5e (or better) up to 100m
	<b>Controller</b>	Intel® Ethernet I350 Controller
	<b>Network Transfer Rates Supported</b>	1GbE, 100MbE, 10MbE
	<b>Data Path Width</b>	PCIe Gen2.1x4
	<b>Power Requirement</b>	4.4W (typical)
	<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
	<b>Dimensions (HxW)</b>	2.75 x 5.5 inches (without brackets)
	<b>Operating System Driver Support</b>	Windows 7 64-bit; Windows 10 64-bit; Linux®
	<b>Kit Contents</b>	<ul style="list-style-type: none"> <li>• Intel® I350-T2 2-Port 1GbE NIC with standard height bracket attached</li> <li>• Low-profile bracket</li> </ul>

### Technical Specifications - Networking and Communications

- [Product Literature](#)

<b>Intel® I350-T4 4-Port 1GbE NIC</b>	<b>Connector</b>	4 RJ-45
	<b>Cabling</b>	Cat5e (or better) up to 100m
	<b>Controller</b>	Intel® Ethernet I350 Controller
	<b>Network Transfer Rates Supported</b>	1GbE, 100MbE, 10MbE
	<b>Data Path Width</b>	PCIe Gen2.1x4
	<b>Power Requirement</b>	5W (typical)
	<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
	<b>Dimensions (HxW)</b>	2.75 x 5.5 inches (without brackets)
	<b>Operating System Driver Support</b>	Windows 7 64-bit; Windows 10 64-bit; Linux®
	<b>Kit Contents</b>	<ul style="list-style-type: none"> <li>• Intel® I350-T4 4-Port 1GbE NIC with standard height bracket attached</li> <li>• Low-profile bracket</li> <li>• Product Literature</li> </ul>

<b>Intel® AX201 802.11 a/b/g/n/ac/ax WLAN + Bluetooth 5.0 M.2</b>	<b>WLAN Standards</b>	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 802.11 ac and up to 4x capacity in congested environments than 802.11 ac
	<b>Antenna</b>	2x2 Dual-Band
	<b>Bluetooth Standards</b>	5
	<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
	<b>Interface</b>	M.2 CNVio
	<b>Dimensions</b>	M.2 2230
	<b>Kit Contents</b>	Not Available
	<b>NOTE:</b> 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
- 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 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 Software
- 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:
	From v1 to v2		

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