

### Overview

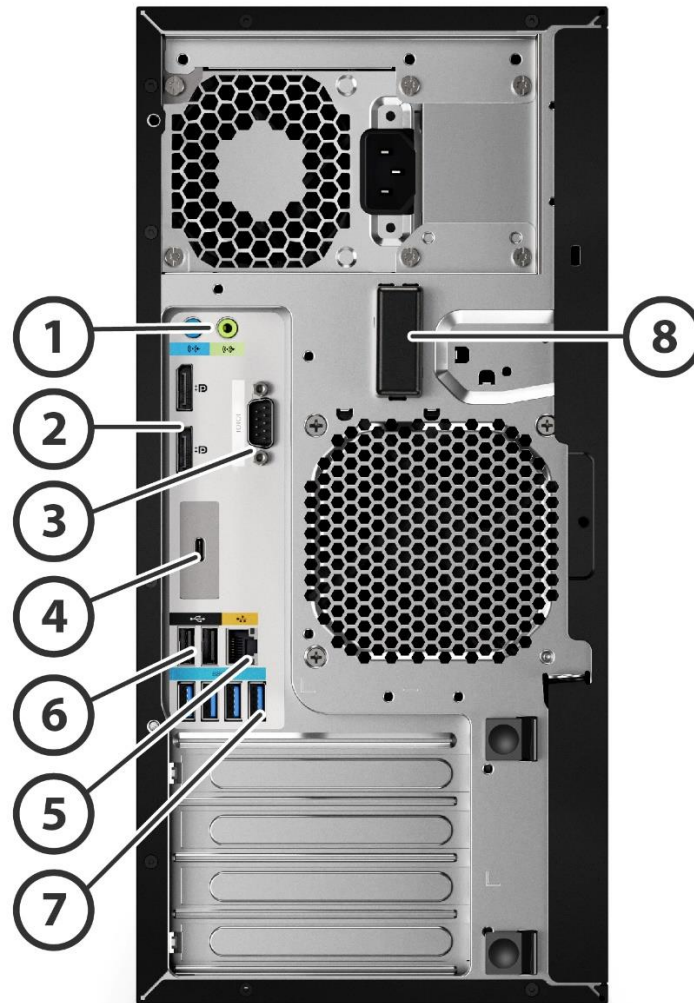
#### HP Z2 Tower G4 Workstation



1. Power Button
2. Headphone/Microphone
3. 1 USB 3.0 port
4. 1 USB 3.0 Battery Charging Port
5. (Optional) 1 USB 3.1 Gen2 Type-C™ Battery Charging Port

6. Optional SD Card Reader
7. External 5.25" bay

### Overview



1. 1 Audio Line In, 1 Audio Line Out,
2. 2 DisplayPort™ (DP 1.2) output from Intel® UHD graphics (available on selected processors only)
3. Optional Serial Port
4. 1 flex IO module for 2<sup>nd</sup> LAN/VGA/HDMI/DP/ USB-C 3.1 Gen2 Charging Port with Alt mode /Thunderbolt™ 3.0 (Thunderbolt™ requires x4 PCIe Add in card)
5. RJ-45 to integrated GBe
6. 2 USB 2.0
7. 4 USB 3.0
8. Optional WLAN/BT Antenna

### Overview

**Form Factor** Minitower

### Operating Systems

Preinstalled:

- Windows 10 Home 64\*
- Windows 10 Pro 64\*
- Windows 10 Pro (National Academic License)\*
- Windows 10 Pro for Workstations – HP recommends Windows 10 Pro \*
- HP Linux®-ready

Supported:

- Red Hat® Enterprise Linux® Workstation (1 year paper license available; Preinstall not available)

\* 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.microsoft.com>.

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

### Processors

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology <sup>3</sup>	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Featuring Intel® vPro™ Technology <sup>4</sup>	16GB Intel® Optane™ memory <sup>2</sup>	TDP (W)
Intel® Xeon® processor E-2286G <sup>1</sup>	6	4.0	4.9	12	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2278G <sup>1</sup>	8	3.4	5.0	16	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2276G <sup>1</sup>	6	3.8	4.9	12	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2274G <sup>1</sup>	4	4.0	4.9	8	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2244G <sup>1</sup>	4	3.8	4.8	8	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2236 <sup>1</sup>	6	3.4	4.8	12	2666	Y	N/A	Y	N	80W
Intel® Xeon® processor E-2226G <sup>1</sup>	6	3.4	4.7	12	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2224G <sup>1</sup>	4	3.4	4.6	8	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2176G <sup>1</sup>	6	3.7	4.7	12	2666	Y	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2174G <sup>1</sup>	4	3.8	4.7	8	2666	Y	Intel® UHD Graphics P630	Y	N	71W
Intel® Xeon® processor E-2144G <sup>1</sup>	4	3.6	4.5	8	2666	Y	Intel® UHD Graphics P630	Y	N	71W
Intel® Xeon® processor E-2136 <sup>1</sup>	6	3.3	4.5	12	2666	Y	N/A	Y	N	80W

### Overview

Intel® Xeon® processor E-2126G <sup>1</sup>	6	3.3	4.5	12	2666	N	Intel® UHD Graphics P630	Y	N	80W
Intel® Xeon® processor E-2124G <sup>1</sup>	4	3.4	4.3	8	2666	N	Intel® UHD Graphics P630	Y	N	71W
Intel® Xeon® processor E-2104G <sup>1</sup>	4	3.2	N/A	8	2666	N	Intel® UHD Graphics P630	Y	N	65W
Intel® Core™ i9-9900K processor <sup>1,2</sup>	8	3.6	5.0	16	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i9-9900 processor <sup>1,2</sup>	8	3.1	5.0	16	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i7-9700K processor <sup>1,2</sup>	8	3.6	4.9	12	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i7-9700 processor <sup>1,2</sup>	8	3.0	4.7	12	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i5-9600 processor <sup>1,2</sup>	6	3.1	4.6	9	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i5-9500 processor <sup>1,2</sup>	6	3.0	4.4	9	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i3-9100 processor <sup>1</sup>	4	3.6	4.2	8	2666	Y	Intel® UHD Graphics 630	Y	N	95W
Intel® Core™ i7-8700K processor <sup>1,2</sup>	6	3.7	4.7	12	2666	Y	Intel® UHD Graphics 630	Y	Y	95W
Intel® Core™ i7-8700 processor <sup>1,2</sup>	6	3.2	4.6	12	2666	Y	Intel® UHD Graphics 630	Y	Y	65W
Intel® Core™ i5-8600 processor <sup>1,2</sup>	6	3.1	4.2	9	2666	N	Intel® UHD Graphics 630	Y	Y	65W
Intel® Core™ i5-8500 processor <sup>1,2</sup>	6	3.0	4.0	9	2666	N	Intel® UHD Graphics 630	Y	Y	65W
Intel® Core™ i3-8100 processor <sup>1</sup>	4	3.6	N/A	6	2400	N	Intel® UHD Graphics 630	N	N	65W
Intel® Pentium™ G5400 processor <sup>1</sup>	2	3.7	N/A	4	2400	Y	Intel® UHD Graphics 610	N	N	54W

<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>vPro. Some functionality of this technology, such as Intel® Active management technology and Intel® Virtualization technology, requires additional 3rd party software in order to run. Availability of future “virtual appliances” applications for Intel vPro technology is dependent on third-party software providers. Compatibility of this generation of Intel vPro technology-based hardware with future “virtual appliances” is yet to be determined.

### Overview

<b>NOTES</b>	<p>Integrated Intel® UHD graphics P630 is supported on the select Intel® Xeon E processors.</p> <p>Intel® Xeon® E, Intel® Core™ i3 and Intel® Pentium processors can support either ECC or non-ECC memory; Intel® Core i5/i7 processors only support non-ECC memory.</p> <p>Processor numbers differentiate features within each processor family, not across different processor families. See: <a href="http://www.intel.com/products/processor_number/">http://www.intel.com/products/processor_number/</a> for details.</p> <p><b>NOTE:</b> In accordance with Microsoft's support policy, HP does not support the Windows 8 or Windows 7 operating system on products configured with Intel and AMD 7th generation and forward processors or provide any Windows 8 or Windows 7 drivers on <a href="http://www.support.hp.com">http://www.support.hp.com</a>.</p>
<b>Color</b>	Black
<b>Expansion Slots</b> (see system board section for more details)	<p>1 PCIe Gen3 x16 slot</p> <p>1 PCIe Gen3 x4 slot /x16 connector</p> <p>1 PCIe Gen3 x1 slot/x4 connector</p> <p>1 PCIe Gen3 x1 slot/x4 connector</p> <p>2 M.2 storage (PCIe Gen3 x4)*</p> <p>1 M.2 Wlan (PCIe Gen3 x1+ intel CNVI)*</p> <p><b>NOTE:</b> 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.</p> <p>* M.2 storage supports compatible devices up to 110mm</p>
<b>Expansion Bays</b> (see storage section for more details)	<p>2 external Half Height 5.25" Bays</p> <p>2 internal 3.5" Drive Bays</p>
<b>Front I/O</b>	1 USB 3.0, 1 USB 3.0 Charging Data Port, 1 Headphone/Microphone. 1 USB3.1 Gen2 Type-C Charging Data Port (Optional), 1 SD Card Reader (Optional).
<b>Internal I/O</b>	1 USB 3.0 and 2 USB 2.0 ports available as 2 separate 2x6 (3.0 x1, 2.0 x1) and 1x6 (2.0 x1) header: supports one HP Internal USB 2.0 Port Kit and one USB 3.0 Media Card Reader.
<b>Rear I/O</b>	2 DisplayPort™ (DP 1.2) outputs from Intel® UHD Graphics (available on specific processors only); 4 USB 3.0 ports, 2 USB 2.0 ports, 1 serial port (optional), 1 parallel port (optional), 2 PS/2 (optional), RJ-45 (LOM), 1 Flex IO port (3 <sup>rd</sup> DisplayPort™/HDMI/VGA/2 <sup>nd</sup> 1GbE LAN/ USB-C 3.1 Gen2 Charging Port with Alt mode/Thunderbolt™ 3.0-Thunderbolt™ 3.0 PCIe card utilizes Flex IO option), (1 Audio Line-in, and 1 Audio Line-out.
<b>Interfaces Supported</b>	SD Media Card Reader (optional) USB-C 3.1 Gen2 Charging Port (optional)
<b>Chassis Dimensions (H x W x D)</b>	Standard minitower orientation: 356 mm x 169 mm x 435 mm (14.0 x 6.7 x 17.1 in)
<b>Weight</b>	<p>Exact weights depend upon configuration:</p> <p>Minimum: 7.0 kg (15.43 lb)</p> <p>Typical*: 8.2 kg (18.03 lb)</p> <p>Maximum: 11.4 kg (25.18 lb)</p> <p>Supported Weight (desktop orientation): 35 kg (77 lb)</p> <p>Packaging (H x W x D): 599 x499 x 295 mm(23.58 x 19.65 x 11.6 in)</p>

### Overview

Shipping Weight: 11.47 kg(25.26 lb)

\* Typical weight when configured with 1 3.5" hard drives, 1 optical drive, 2 DIMMs and 1 NVIDIA® Quadro® P1000 graphics card

#### Power Supply

650W internal power adapter, up to 90% efficiency, active PFC  
500W wide-ranging, active Power Factor Correction, 90 Efficient  
250W 92% Efficiency wide-ranging, active PFC Power Supply option.

**NOTE:** The Power Supply Efficiency Report for the 500W 90% Efficiency and 250W 92% Efficiency Power Supply may be found at the following link:

[https://plugloadsolutions.com/psu\\_reports/HP%20INC\\_PA-4501-1\\_500W\\_SOCE%205175\\_Report.pdf](https://plugloadsolutions.com/psu_reports/HP%20INC_PA-4501-1_500W_SOCE%205175_Report.pdf)  
[https://plugloadsolutions.com/psu\\_reports/ACBEL%20POLYTECH%20INC.\\_PCH022\\_250W\\_SOCE%205174\\_Report.pdf](https://plugloadsolutions.com/psu_reports/ACBEL%20POLYTECH%20INC._PCH022_250W_SOCE%205174_Report.pdf)

#### 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® C246 chipset

#### Memory

4 DIMM slots, supporting up to 128GB ECC/non-ECC, DDR4 2666 MT/s speed depending on the CPU selection.

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### Supported Components

#### Processors

	Factory Configured	Option Kit
<b>Intel® Xeon® processor E-2100 family<sup>2</sup></b>		
Intel® Xeon® processor E-2286G	Y	N
Intel® Xeon® processor E-2278G	Y	N
Intel® Xeon® processor E-2276G	Y	N
Intel® Xeon® processor E-2274G	Y	N
Intel® Xeon® processor E-2244G	Y	N
Intel® Xeon® processor E-2236	Y	N
Intel® Xeon® processor E-2226G	Y	N
Intel® Xeon® processor E-2224G	Y	N
Intel® Xeon® processor E-2176G	Y	N
Intel® Xeon® processor E-2174G	Y	N
Intel® Xeon® processor E-2144G	Y	N
Intel® Xeon® processor E-2136	Y	N
Intel® Xeon® processor E-2126G	Y	N
Intel® Xeon® processor E-2124G	Y	N
Intel® Xeon® processor E-2104G	Y	N
<b>9th generation Intel® Core™ processor family</b>		
Intel® Core™ i9-9900K 3.6 2666 8C CPU	Y	N
Intel® Core™ i9-9900 3.1 2666 8C CPU	Y	N
Intel® Core™ i7-9700K 3.6 2666 8C CPU	Y	N
Intel® Core™ i7-9700 3.0 2666 8C CPU	Y	N
Intel® Core™ i5-9600 3.1 2666 6C CPU	Y	N
Intel® Core™ i5-9500 3.0 2666 6C CPU	Y	N
Intel® Core™ i3-9100 3.6 2666 4C CPU	Y	N
<b>8th generation Intel® Core™ processor family<sup>3</sup></b>		
Intel® Core™ i7-8700K 3.7 2666 6C CPU	Y	N
Intel® Core™ i7-8700 3.2 2666 6C CPU	Y	N
Intel® Core™ i5-8600 3.1 2666 6C CPU	Y	N
Intel® Core™ i5-8500 3.0 2666 6C CPU	Y	N
<b>8th generation Intel® Core™ i3/Pentium processor family<sup>2</sup></b>		
Intel® Core™ i3-8100 3.6 2400 4C CPU	Y	N
Intel® Pentium® G5400 3.7 2400 2C CPU	Y	N

**NOTE 1:** Intel® Integrated P630 Graphics for select Xeon E processors supports workstation-specific graphics drivers for improved compatibility and performance on select professional applications, compared to Intel® UHD Graphics 630.

**NOTE 2:** These processors support either ECC or non-ECC memory

**NOTE 3:** These processors support only non-ECC memory

**NOTE 4:** Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system.

#### Monitors / Displays

Factory Configured	Option Kit	Option Kit Part Number
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### Supported Components

HP Z Display Z27n G2 27-inch IPS LED Backlit Monitor	Y	1J510AA
HP Z Display Z24n G2 24-inch IPS LED Backlit Monitor	Y	1J509AA
HP Z Display Z24nf G2 23.8-inch IPS Backlit Monitor	Y	1J507AA
HP Z Display Z23n G2 23-inch IPS LED Backlit Monitor	Y	1J506AA
HP Z Display Z22n G2 21.5-inch IPS LED Backlit Monitor	Y	1J505AA

Supported by all Operating Systems available from HP  
Screen Size Diagonally Measured

### SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA
1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA
2TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QB576AA
4TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	K4T76AA
6TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	3DH90AA
500GB SATA 7.2K SED SFF HDD	Y	N	(N/A as AMO)
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	WOR10AA

### SATA Solid State Drives

HP 256GB SATA 6Gb/s SSD	Y	Y	A3D26AA
HP 512GB SATA 6Gb/s SSD	Y	Y	D8F30AA
HP 1TB SATA 6Gb/s SSD	Y	Y	F3C96AA
HP 2TB SATA 6Gb/s SSD	Y	Y	Y6P08AA
HP 256GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	G7U67AA
HP Enterprise Class 240GB SATA SSD	Y	Y	T3U07AA
HP Enterprise Class 480GB SATA SSD	Y	Y	T3U08AA

#### Storage Acceleration

16GB Intel® Optane™ memory*	Y	Y	2EB68AA
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\*Intel® Optane™ memory (cache) is sold separately. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z2 Tower/SFF/Mini G4, ZBook Studio, 15 and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel® Core™ processor or Intel® Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel® Optane™ supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMe™ Spec 1.1, and an Intel® Rapid Storage Technology (Intel® RST) 16.5 driver.

### PCIe SSDs

#### PCIe SSDs for HP Workstations

HP Z Turbo Drv G2 1TB TLC PCIe SSD **	Y	Y	Y1T53AA
HP Z Turbo Drv G2 2TB TLC PCIe SSD **	Y	Y	
HP Z Turbo Drv G2 256GB TLC PCIe SSD **	Y	Y	Note 1
HP Z Turbo Drv G2 512GB TLC PCIe SSD **	Y	Y	Note 1
<b>Intel® 905p Series SSD (Optane SSD)</b>			
Intel® Optane SSD 905p 280GB AiC*	Y	Y	2SC47AA
Intel® Optane SSD 905p 480GB AiC*,***	Y	Y	2SC48AA



### Supported Components

\* PCIe card installed in standard PCIe x4 slot

\*\* Installed in native M.2 storage slot Z2 G4

**NOTE:** 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.

**NOTE:** The HP Z2 Tower G4 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.

### Hard Drive Controllers

	Factory Configured	Option Kit
<b>Integrated SATA Controller (Z2 G4)</b>		
Integrated SATA Controller, RAID 0,1 supported: 4x 6 Gb/s ports	Y	N
<b>Factory integrated RAID on motherboard for SATA drives</b>		
RAID 0 Data Configuration	Y	N
RAID 1 Data Configuration	Y	N
<b>Factory integrated RAID on motherboard for Z Turbo Drive</b>		
RAID 0 Boot or Data Configuration	Y	N
RAID 1 Boot or Data Configuration	Y	N

**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

**NOTE 1:** Requires identical drives (speeds, capacity, and interface).

### Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Supported # of cards
<b>Integrated Intel® UHD Graphics Media Accelerators (Z2 G4)</b>				
Intel® UHD Graphics P630	Y	N		1
Intel® UHD Graphics 630	Y	N		1
Intel® UHD Graphics 610	Y	N		1
<b>Graphics Cable Adapters</b>				
HP DisplayPort™ to Dual Link DVI Adapter	N	Y	NR078AA	1
HP DisplayPort™ To DVI-D Adapter (4-Pack)	N	N		1
HP DisplayPort™ To DVI-D Adapter (2-Pack)	Y	N		1
HP DisplayPort™ To DVI-D Adapter	Y	Y	FH973AA	1
HP DisplayPort™ To VGA Adapter	N	Y	AS615AA	1
HP Display to HDMI Adapter	N	Y		
HP miniDP to DP Adapter	N	Y		

### Supported Components

HP USB-C to VGA Adapter	N	Y		
HP USB-C to HDMI Adapter	N	Y		
HP USB-C to DP Adapter	N	Y		
<b>Entry 3D</b>				
AMD Radeon™ Pro WX 3100 4GB Graphics	Y	Y	2TF08AA	2
NVIDIA® Quadro® P400 2GB Graphics	Y	Y	1ME43AA	2
NVIDIA® Quadro® P620 2GB Graphics	Y	Y	3ME25AA	1
<b>Mid-range 3D</b>				
AMD Radeon™ Pro WX 4100 4GB Graphics	N	Y	Z0B15AA	1
NVIDIA® Quadro® P1000 4GB Graphics	Y	Y	1ME01AA	2
NVIDIA® Quadro® P2000 5GB Graphics	Y	Y	1ME41AA	1
<b>High End 3D</b>				
AMD Radeon™ Pro WX 7100 8GB Graphics*	Y	Y	Z0B14AA	1
NVIDIA® Quadro® P4000 8GB Graphics*	Y	Y	1ME40AA	1
NVIDIA® Quadro® P5000 16GB Graphics*	Y	Y	1ME40AA	1
NVIDIA® Quadro® RTX 4000 8GB Graphics*	Y	Y	5JV89AA	1
NVIDIA® Quadro® RTX 5000 16GB Graphics*	Y	Y	5JH81AA	1
NVIDIA® Quadro® RTX6000 24GB Graphics**	Y	Y	5JH80AA	1

\* Requires 500W PSU. Not supported with 250W PSU.

\*\*Requires 650W. Not supported with 250W or 500W PSU

**NOTE 1:** Intermixing integrated Intel® UHD graphics and discrete graphics cards in order to drive more than three displays can be enabled using the Computer (F10) Setup Utility. However, HP recommends using only discrete graphics when four or more displays are required to be supported.

### Memory

#### DDR4-2666 ECC Unbuffered DIMMs - CTO

- 8GB DDR4-2666 ECC (1x8GB) RAM
- 16GB DDR4-2666 ECC (2x8GB) RAM
- 32GB DDR4-2666 ECC (4x8GB) RAM
- 32GB DDR4-2666 ECC (2x16GB) RAM
- 64GB DDR4-2666 ECC (4x16GB) RAM

### Supported Components

64GB DDR4-2666 ECC (2x32GB) RAM  
 128GB DDR4-2666 ECC (4x32GB) RAM

#### DDR4-2666 non-ECC Unbuffered DIMMs – CTO

4GB DDR4-2666 nECC (1x4GB) RAM  
 8GB DDR4-2666 nECC (2x4GB) RAM  
 8GB DDR4-2666 nECC (1x8GB) RAM  
 16GB DDR4-2666 nECC (2x8GB) RAM  
 32GB DDR4-2666 nECC (2x16GB) RAM  
 32GB DDR4-2666 nECC (4x8GB) RAM  
 64GB DDR4-2666 nECC (4x16GB) RAM  
 64GB DDR4-2666 nECC (2x32GB) RAM  
 128GB DDR4-2666 nECC (4x32GB) RAM

#### NOTES:

Intel® Xeon E, Intel® Core™ i3 and Intel® Pentium processors can support either ECC or non-ECC memory; Intel® Core™ i5/i7 processors only support non-ECC memory.

Two channels of DDR4 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.

Max transfer rates up to 2666 MT/s

#### AMO

#### Option Kit Part Number

#### DDR4-2666 ECC Unbuffered DIMMs – AMO

HP 8GB (1x8GB) DDR4-2666 ECC Unbuffered RAM	3TQ39AA
HP 16GB (1x16GB) DDR4-2666 ECC Unbuffered RAM	3TQ40AA
HP 32GB (1x32GB) DDR4-2666 ECC Unbuffered RAM	6FR92AA

#### DDR4-2666 non-ECC Unbuffered DIMMs – AMO

HP 4GB (1x4GB) DDR4-2666 nECC Unbuffered RAM	3TQ31AA
HP 8GB (1x8GB) DDR4-2666 nECC Unbuffered RAM	3PL81AA
HP 16GB (1x16GB) DDR4-2666 nECC Unbuffered RAM	3PL82AA
HP 32GB (1x32GB) DDR4-2666 nECC Unbuffered RAM	6FR91AA

**NOTE:** Only unbuffered DDR4 DIMMs are supported.

The CPUs determine the speed at which the memory is clocked. If a 2400 MHz capable CPU is used in the system, the maximum speed the memory will run at is 2400 MHz regardless of the specified speed of the memory.

#### Multimedia and Audio Devices

Integrated Conexant CX20632 5.1 HDA codec

Factory Configured	Option Kit
Y	N

#### Option Kit Part Number

#### Optical and Removable Storage

Factory Configured	Option Kit

#### Option Kit Part Number



### Supported Components

HP 9.5mm Slim DVD Writer	Y	Y	K3R64AA
HP 9.5mm Slim DVD-ROM Drive	Y	Y	K3R63AA
HP 9.5mm Slim BDXL Blu-Ray Writer	Y	Y	K3R65AA
HP SD Media Card Reader	Y	Y	
<b>HDD Frame/Carriers</b>			
HP DX175 Removable HDD Carrier	N	Y	1ZX72AA
HP DX175 Removable HDD Frame/Carrier	N	Y	1ZX71AA

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. 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.

### Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number
HP Thunderbolt™ 3 PCIe 3-port I/O Card	Y	Y	4CX35AA

**NOTE 1:** Utilizes Flex IO port connection for flex port  
**NOTE:** HP Thunderbolt™ 3 PCIe I/O Card is not available until September 2018

### 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	
Intel® X710-DA2 2-Port 10GbE SFP+ NIC	Y	Y	1QL47AA
HP 10GbE SFP+ SR Transceiver	Y	Y	C3N53AA
Intel® X550-T2 2-Port 10GbE NIC	Y	Y	1QL46AA
Intel® 9560 802.11 a/b/g/n/ac with Bluetooth® 5 M.2	Y	N	
Intel® I350-T2 2-Port 1GbE <sup>(3)</sup> NIC	Y	Y	V4A91AA
Intel® I350-T4 4-Port 1GbE <sup>(3)</sup> NIC	N	Y	W8X25AA
Aquantia AQN-108 1-Port 5GbE NIC	Y	Y	1PM63AA

**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
Kensington Lock	N	Y	
HP Z4/6 Depth Adjustable Fixed Rail Rack Kit	N	Y	2HW42AA
HP Solenoid Lock and Hood (TWR) Sensor	Y	Y	E0X96AA

### Supported Components

HP Business PC Security Lock Kit	N	Y	PV606AA
HP UltraSlim Cable Lock Kit	N	Y	T1A62AA

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### Supported Components

#### Input Devices

	<b>Factory Configured</b>	<b>Option Kit</b>	<b>Option Kit Part Number</b>
HP USB Optical Mouse	Y	Y	QY777AA
HP PS/2 Mouse	N	Y	QY775AA
HP USB Hardened Mouse	Y	Y	P1N77AA
HP USB Premium Mouse	Y	Y	
HP Premium Wireless Mouse	Y	Y	
SpaceMouse Pro USB 3D Input Device	N	Y	
3Dconnexion CADMouse	N	Y	M5C35AA
HP USB Business Slim CCID SmartCard Keyboard	Y	Y	
HP USB Business Slim Keyboard	Y	Y	N3R87AA
HP PS/2 Business Slim Keyboard	N	Y	
HP USB Premium Keyboard	Y	Y	N3R86AA
HP Premium Wireless Keyboard	Y	Y	
HP Wireless Business Slim Keyboard & Mouse	Y	Y	

#### Other Hardware

	<b>Factory Configured</b>	<b>Option Kit</b>	<b>Option Kit Part Number</b>
HP Power Cord Kit	N	Y	DM293A
HP Workstation Mouse Pad (Japan only)	Y	N	
HP Serial Port Adapter	Y	Y	3TK82AA
HP Serial + PS/2 Adapter	Y	Y	1VD82AA
HP ENERGY STAR® Certified Configuration	Y	N	
HP eSATA PCI Cable Kit	Y	Y	FH966AA
HP Z2 Tower G4 Bezel w/ Dust Filter option	N	Y	4KY89AA
HP PCIe x1 Parallel Port Card	N	Y	N1M40AA
Z2 Tower G4 Dust Filter (filter only)	N	Y	3TQ24AA
HP Z2 G4 TWR Front Card Guide Kit	Y	Y	4KY82AA

#### Flex Module (Rear IO)

	<b>Factory Configured</b>	<b>Option Kit</b>	
HP Flex IO module (VGA)	Y	Y	3TK80AA
HP Flex IO module (HDMI)	Y	Y	3TK74AA
HP Flex IO module (DP)	Y	Y	3TK72AA
HP Flex IO module (USB-C)*	Y	Y	4KY84AA
HP Flex IO module (1 Gbe LAN)	Y	Y	3TQ26AA

\*The DP alt mode will not function if the CPU does not support integrated graphics or if integrated graphics is disabled.

#### Software

	<b>Factory Configured</b>	<b>Option Kit</b>	<b>Support Notes</b>
HP Performance Advisor	Y	N	Note 1
HP Velocity	Y	N	
HP Remote Graphics Software (RGS) 7.x	Y	N	
HP PC Hardware Diagnostics UEFI	Y	N	Note 2

### Supported Components

HP Client Security Software

Y N

**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 Home 64

Windows 10 Pro 64

Windows 10 Pro (National Academic License)

Windows 10 Pro for Workstations – HP recommends Windows 10 Pro

Red Hat® Enterprise Linux® (RHEL) Workstation – Paper License (1yr)

**NOTE:** For detailed OS/hardware support information for Linux, see:

[http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

<http://www.microsoft.com/windows/windows-7/>

### Supported Components

#### 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 14 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 2.6
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Workstation computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Workstation computers, including BIOS updates from within Windows (HP Firmware Update and Recovery), HP Client Manager, and fail-safe recovery. In addition, the HP BIOS Configuration Utility enables replication of BIOS settings within Windows while the Replicated Setup feature provides the same capability within BIOS (F10) Setup. The BIOS Configuration Utility is available from the HP support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery.

#### Additional HP BIOS Features:

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

#### HP Sure Start Gen4 Start

- 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.



### Supported Components

- Audit enabled – System Audit via Sure Start Event Logs capture data such as incident, repair date and time for troubleshooting and investigating

HP Sure Start Gen4 is available on HP Workstation products equipped with Intel® 8th generation processors. HP Sure Start Gen4 is available on HP Workstation products equipped with Intel® 8th generation processors.

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### SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

#### BIOS

HP BIOSphere Gen4<sup>17</sup>  
HP DriveLock & Automatic DriveLock  
BIOS Update via Network  
Master Boot Record Security  
Power On Authentication Authentication  
Secure Erase<sup>18</sup>  
Absolute Persistence Module<sup>19</sup>  
Pre-boot Authentication  
HP Wireless Wakeup

#### Software

HP Hotkey Support  
HP Performance Advisor  
HP Velocity  
HP Remote Graphics Software (RGS) 7.x

#### Manageability Features

HP Driver Packs<sup>22</sup>  
HP System Software Manager (SSM)  
HP BIOS Config Utility (BCU)  
HP Client Catalog  
HP Manageability Integration Kit Gen2<sup>23</sup>

#### Client Security Software

HP Client Security Suite Gen4<sup>25</sup> including:  
HP Security Manager<sup>26</sup> (including Credential Manager, HP Password Manager, HP Spare Key)  
HP Device Access Manager  
HP Power On Authentication Authentication  
Microsoft Defender<sup>27</sup>

#### Security Management

Secure Erase<sup>18</sup>  
TPM 2.0 Embedded Security Chip shipped with Windows 10 (Common Criteria EAL4+ Certified)<sup>32</sup>  
SATA port disablement (viaBIOS)  
RAID configurations<sup>33</sup>  
Serial, USB enable/disable (viaBIOS)  
Power-on password (viaBIOS)  
Setup password (viaBIOS)  
Support for chassis padlocks and cable lock devices  
Integrated hood sensor  
HP Sure Click<sup>37</sup>  
HP Sure Start Gen4<sup>30</sup>  
HP Sure Run<sup>35</sup>

### Supported Components

#### HP Sure Recover<sup>36</sup>

17. HP BIOSphere Gen4 requires Intel® or AMD 8th Gen processors. Features may vary depending on the platform and configurations.
18. 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™.
19. 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. 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.
22. HP Driver Packs not preinstalled, however available for download at <http://www.hp.com/go/clientmanagement>.
23. HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>
25. HP Client Security Suite Gen 4 requires Windows and Intel® or AMD 8th generation processors.
26. 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.
27. Microsoft Defender Opt in and internet connection required for updates.
30. HP Sure Start Gen4 is available on HP Workstation products equipped with Intel® 8th generation processors
32. Firmware TPM is version 7.6. Hardware TPM is v2.0.
33. RAID configuration is optional and does require a second hard drive.
35. HP Sure Run is available on HP Workstation products equipped with 8th generation Intel® or AMD® processors.
36. HP Sure Recover is available on HP Elite PCs with 8th generation Intel® or AMD processors and requires an open, wired network connection. Not available on platforms with multiple internal storage drives, Intel® Optane™. You must back up important files, data, photos, videos, etc. before use to avoid loss of data.
38. HP Sure Click is available on most HP PCs and supports Microsoft® Internet Explorer, Google Chrome, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.

### System Technical Specifications

#### System Board

<b>System Board Form Factor</b>	ATX 24.89 x 24.38 mm (9.8 x 9.6 inches)
<b>Processor Socket</b>	Single LGA-1151
<b>CPU Bus Speed</b>	DMI
<b>Chipset</b>	Intel® PCH C246
<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>	2666MT/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. ECC and non-ECC memory DIMMs cannot be mixed on the same system.
	<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.

#### PCI Express Connectors

- 1 PCI Express Gen3 slot x16 mechanical/ x16 electrical (full height, full length)
- 1 PCI Express Gen3 slot x4 mechanical/ x1 electrical (full height, full length)
- 1 PCI Express Gen3 slot x4 mechanical/ x1 electrical (full height, full length)
- 1 PCI Express Gen3 slot x16 mechanical/ x4 electrical (full height, full length)
- 2 M.2 Storage (PCIe Gen3 x4)<sup>1</sup>
- 1 M.2 WLAN (PCIe Gen3 x1+ Intel CNVi)

In the PCIe Gen3 (x16 electrical/x16 mechanical) slot, it intent to supported HP certified added in card.

**Note1:** M.2 storage supports compatible devices up to 110mm

#### Supported Drive Interfaces

<b>SATA</b>	Integrated (4) Serial ATA interfaces (6Gb/s SATA). One port can optionally be used for eSATA. RAID 0 and 1 supported. Factory integrated RAID is Microsoft Windows only. RAID 5 is supported by Software XOR.
<b>Serial Attached SCSI</b>	None
<b>Integrated RAID</b>	<b>NOTE:</b> Requires identical hard drives (speeds, capacity, interface)
<b>Integrated Graphics</b>	Intel® UHD Graphics 630 (on Core i3/i5/i7-8xxx 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 4.4 and OpenCL 2.0 on Intel® UHD Graphics P630;

3 DP 1.2 graphics ports integrated in motherboard; Supports up to three simultaneous displays across DP & DVI-D outputs.

Max. resolution supported on DP 1.2 ports: 3840x2160 @60Hz

### System Technical Specifications

	<b>Network Controller</b>	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 12
	<b>External SATA (eSATA)</b>	1 port eSATA capable (SATA 3)
	<b>IDE connector</b>	No
	<b>Floppy connector</b>	No
	<b>Serial</b>	1 internal header (requires optional Serial Port Adapter Kit)
	<b>2nd Serial</b>	requires optional Serial Port Adapter Kit
	<b>HD Integrated Audio</b>	Yes
<b>USB Connector(s)</b>	<b>Front</b>	1 USB-A 3.0, 1 USB-A 3.0 Charging Data Port and 1 USB-C 3.1 Gen2 Charging Data Port (Optional).
	<b>Rear</b>	4 USB-A 3.0, 2 USB-A 2.0, and 1 USB-C 3.1 Gen2 Charging Port with Alt mode (Optional via Flex module).
	<b>Internal</b>	1 USB 3.0 and 2 USB 2.0 ports available as 2 separate 2x6(3.0 x1,2.0 x1) and 1x6(2.0 x1) headers: one USB 3.0 SD Card Reader.
	<b>HD Integrated Audio</b>	Yes
	<b>Flash ROM</b>	Yes
	<b>CPU Fan Header</b>	Yes
	<b>Chassis Fan Header</b>	1 Rear System Chassis Fan Header
	<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 v7.80 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>	Yes
	<b>Keyboard/Mouse</b>	USB or PS/2 (option)
	<b>Power Supply</b>	

### System Technical Specifications

System Configurations							
<b>Z2 G4 TWR Configuration #1 (TBD)</b>	<b>Processor Info</b>	1x Intel® Core™ i3-8100 3.6 6MB 65W CPU					
	<b>Memory Info</b>	8GB (1x 8GB) 2666 MHz DDR4 non-ECC					
	<b>Graphics Info</b>	Intel® UHD Integrated Graphics 630					
	<b>Disks/Optical/Floppy</b>	1x SATA 1 TB 7.2k rpm/ 1x 9.5mm Slim ODD					
	<b>PSU</b>	250W 92%					
	<b>Other</b>						
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	12.587		12.670		12.739	
	Windows short Idle (S0)	12.896		13.661		13.364	
	Windows Busy Typ (S0)	69.975		69.728		71.296	
	Windows Busy Max (S0)	80.448		90.18		91.721	
	Sleep (S3)	1.100	1.031	1.192	1.099	1.213	1.117
	Off (S5)	0.605	0.568	0.594	0.567	0.602	0.583
	Zero Power Mode (EuP)	0.273		0.277		0.276	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	42.946		43.230		43.465	
	Windows short Idle (S0)	44.001		46.611		45.598	
	Windows Busy Typ (S0)	238.755		237.912		243.262	
	Windows Busy Max (S0)	274.489		307.694		312.952	
	Sleep (S3)	3.753	3.518	4.067	3.750	4.139	3.811
	Off (S5)	2.064	1.938	1.873	1.965	2.054	1.989
	Zero Power Mode (EuP)	0.931		0.954		0.942	
<b>Z2 G4 TWR Configuration #2 (TBD) typical® CERTIFIED</b>	<b>Processor Info</b>	1x Intel® Core™ i7-8700 3.212MB 65W CPU					
	<b>Memory Info</b>	16GB (2x 8GB) 2666 MHz DDR4 non-ECC					
	<b>Graphics Info</b>	1x NVIDIA® Quadro® P1000 4GB Graphics					
	<b>Disks/Optical/Floppy</b>	1x SATA 1 TB 7.2k rpm/ 1x9.5mm Slim ODD					
	<b>PSU</b>	500W 90%					
	<b>Other</b>						
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	20.826		19.160		21.173	
	Windows short Idle (S0)	23.431		20.143		22.574	
	Windows Busy Typ (S0)	163.787		159.623		162.867	
	Windows Busy Max (S0)	177.41		173.52		180.23	
	Sleep (S3)	1.435	1.321	1.424	1.301	1.360	1.273
	Off (S5)	0.658	0.642	0.664	0.627	0.641	0.620
	Zero Power Mode (EuP)	0.303		0.325		0.303	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	71.058		65.374		72.242	

### System Technical Specifications

	Windows short Idle (S0)	79.947		68.728		77.022	
	Windows Busy Typ (S0)	558.841		544.634		555.702	
	Windows Busy Max (S0)	605.323		592.050		614.945	
	Sleep (S3)	4.896	4.507	4.589	4.439	4.640	4.343
	Off (S5)	2.245	2.191	2.266	2.139	2.187	2.115
	Zero Power Mode (EuP)	1.034		1.109		1.034	
<b>Z2 G4 TWR Configuration #3 (TBD)</b>	<b>Processor Info</b>	1x Intel® Xeon® E-2174 3.8 8MB 80W CPU					
	<b>Memory Info</b>	64GB (4x16GB) 2666 MHz DDR4 ECC					
	<b>Graphics Info</b>	1x AMD® Radeon Pro® WX 7100 8GB Graphics					
	<b>Disks/Optical/Floppy</b>	1x6 TB 7.2k rpm Enterprise SATA					
	<b>PSU</b>	500W 90%					
	<b>Other</b>						
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	25.521		26.455		25.836	
	Windows short Idle (S0)	36.013		34.175		37.089	
	Windows Busy Typ (S0)	246.80		239.417		246.027	
	Windows Busy Max (S0)	266.71		263.79		272.09	
	Sleep (S3)	1.840	1.785	1.840	1.837	1.990	1.914 W
	Off (S5)	0.689	0.614	0.749	0.633	0.746	0.622
	Zero Power Mode (EuP)	0.299		0.331		0.300	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	87.078		90.264		88.152	
	Windows short Idle (S0)	122.876		116.605		126.548	
	Windows Busy Typ (S0)	842.082		817.075		839.444	
	Windows Busy Max (S0)	910.014		900.051		928.371	
	Sleep (S3)	6.278	6.090	6.278	6.268 r	6.790	6.623
	Off (S5)	2.351	2.095	2.556	2.160	2.545	2.122
	Zero Power Mode (EuP)	1.020		1.129		1.024	
	<p>650W Wide Ranging, Active PFC, 90% Efficient;                      500W Wide Ranging, Active PFC, 90% Efficient;                      250W Wide Ranging, Active PFC, 90% Efficient;</p> <p>The HP Z2 Tower G4 Workstation 500W and 250W PSU Efficiency Report can be found at this link:  <a href="https://plugloadsolutions.com/psu_reports/HP%20INC_PA-4501-1_500W_SOCE%205175_Report.pdf">https://plugloadsolutions.com/psu_reports/HP%20INC_PA-4501-1_500W_SOCE%205175_Report.pdf</a>  <a href="https://plugloadsolutions.com/psu_reports/ACBEL%20POLYTECH%20INC_PCH022_250W_SOCE%205174_Report.pdf">https://plugloadsolutions.com/psu_reports/ACBEL%20POLYTECH%20INC_PCH022_250W_SOCE%205174_Report.pdf</a></p>						

### System Technical Specifications

<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>	6A @ 100-240V
<b>Heat Dissipation</b>	Typical: 444 btu/hr (112 kcal/hr) Maximum: 1484 btu/hr (374 kcal/hr)
<b>Power Supply Fan</b>	70mm x 70mm x 25mm 4-wire PWM
<b>ENERGY STAR® certified</b> (Config Dependent)	Yes
<b>CECP Compliant @ 220V</b>	Yes
<b>FEMP Standby Power Compliant</b>	Yes, with Wake-on-LAN disabled: <1W in S4/S5 - Power Off
<b>Built-in Self Test (BIST) LED</b>	Yes
<b>Surge Tolerant Full Ranging Power Supply</b> (withstands power surges up to 2000V)	Yes
<b>Hood Lock Header</b>	Yes
<b>ErP Lot 6- Tier 1 Compliance @ 230V</b> (<1W in S4/S5 - Power Off)	Yes
<b>ErP Lot 6- Tier 2 Compliance @ 230V</b> (<0.5W in S4/S5 - Power Off)	Yes

<b>Declared Noise Emissions</b> (Entry-level, Mid-level, and High-end configurations; tested on floor)			
<b>System Configuration (Entry level)</b>	<b>Processor Info</b>	Intel® Core™ i7-8700 3.2 26666 6C CPU	
	<b>Memory Info</b>	64GB DDR4-2666 nECC (4x16GB) RAM	
	<b>Graphics Info</b>	Intel® UHD	
	<b>Disks/Optical</b>	1 TB SATA 6Gb/s SSD / No Optical	
<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>	3.2	13
	<b>Hard drive Operating</b> (random reads)	3.3	13
<b>System Configuration (Mid-level)</b>	<b>Processor Info</b>	Intel® Xeon® processor E-2136	
	<b>Memory Info</b>	64GB DDR4-2666 nECC (4x16GB) RAM	
	<b>Graphics Info</b>	NVIDIA® Quadro® P4000 8GB	
	<b>Disks/Optical</b>	2 x 2TB SATA 7200 rpm 6Gb/s 3.5" HDD / No Optical	
<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>	3.6	18

### System Technical Specifications

	<b>Hard drive Operating</b> (random reads)	3.8	22
<b>System Configuration</b> <b>(High-end)</b>	<b>Processor Info</b>	Intel® Core™ i7-8700K 3.7 2666 6C CPU	
	<b>Memory Info</b>	64GB DDR4-2666 nECC (4x16GB) RAM	
	<b>Graphics Info</b>	NVIDIA® Quadro® P4000 8GB	
	<b>Disks/Optical</b>	2 x 2TB SATA 7200 rpm 6Gb/s 3.5" HDD / No Optical	
<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>	3.5	18
	<b>Hard drive Operating</b> (random reads)	3.7	21

### Environmental Requirements

#### Temperature

Operating: 5° to 35° C (40° to 95° F)  
Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation  
Non-operating: -40° to 60° C (-40° to 140° F)  
Maximum rate of change: 10°C/hr

#### Humidity

Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb  
Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb

#### Maximum Altitude

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.

#### Shock (non-repetitive)

Operating ½-sine: 40g, 2-3ms (~62 cm/sec)  
Non-operating ½-sine: 160 cm/s, 2-3 ms (~105 g)  
Non-operating square: 422 cm/s, 20 g

#### Vibration

Operating random: 0.5 g (rms), 5-300 Hz, up to 0.0025 g<sup>2</sup>/Hz  
Non-operating random: 2.0 g (rms), 5-500 Hz, up to 0.0150 g<sup>2</sup>/Hz

### 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
<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>Dual Color Power and HD LED on Front of Computer</b>	Yes
<b>Configuration Record SW</b>	Yes
<b>Over-Temp Warning on Screen</b>	Yes
<b>Restore CD/DVD Set</b>	Consists of an operating system DVD (OSDVD) and a driver DVD (DRDVD). OSDVD restores the original operating system. DRDVD will provide all drivers for the system. The DRDVD may also contain applications that originally shipped with the system for optional installation. Applications can also be



### System Technical Specifications

	obtained from HP.com. OSDVD and DRDVD are orderable with the system and available from HP Support.
<b>Dual Function Front Power Switch</b>	Yes, causes a fail-safe power off when held for 4 seconds
<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>Rear Port Control Cover</b>	Yes, locks rear IO cables to prevent cable theft
<b>Serial, USB, Audio, Network, Enable/Disable Port Control</b>	Yes, enables or disables serial, USB, audio, and network ports
<b>Removable Media Write/Boot Control</b>	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
<b>Power-On Password Setup Password</b>	Yes, prevents an unauthorized person from booting up the workstation Yes, prevents an unauthorized person from changing the workstation configuration
<b>3.3V Aux Power LED on System PCA</b>	Yes
<b>NIC LEDs (integrated) (Green &amp; Amber)</b>	Yes
<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>Power Supply Diagnostic LED</b>	Yes
<b>Front Power Button</b>	Yes, ACPI multi-function
<b>Front Power LED</b>	Yes, white (normal), red (fault)
<b>Front Hard Drive Activity LED</b>	Yes, white
<b>Front ODD Activity LED</b>	Yes
<b>Internal Speaker</b>	Yes
<b>System/Emergency ROM Flash Recovery</b>	Recovers corrupted system BIOS.
<b>Cooling Solutions</b>	Air cooled forced convection
<b>Power Supply Fans</b>	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
<b>CPU Heatsink Fan</b>	Mainstream (<=65W): 92 mm x 92 mm x 52.5 mm Performance (<=95W): 94mm x 100.2mm x 110mm
<b>Chassis Fan</b>	92mm x 92mm x 25mm 4-wire PWM (non-serviceable)
<b>Memory Heatsink Fan</b>	No
<b>HP PC Hardware Diagnostics UEFI</b>	HP PC Hardware Diagnostics (UEFI) 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.
<b>Access Panel Key Lock</b>	No

### System Technical Specifications

<b>ACPI-Ready Hardware</b>	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"><li>• Allows the system to wake from a low power mode.</li><li>• 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.</li></ul>
<b>Integrated Chassis Handles</b>	Rear Recessed Handle; optional Optical Bay Front Handle available.
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>PCI Card Retention</b>	Yes, rear (all), middle (optional), front (full-length cards with extender)
<b>Flash ROM</b>	Yes
<b>Diagnostic Power Switch LED on board</b>	Yes
<b>Clear Password Jumper</b>	Yes
<b>Clear CMOS Button</b>	Yes
<b>CMOS Battery Holder</b>	Yes
<b>DIMM Connectors</b>	Yes

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### 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 selected configurations-Windows only)
- US Federal Energy Management Program (FEMP)
- China Energy Conservation Program
- 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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#### Manageability

##### Intel® Active Management Technology (AMT) v12

An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 12 includes the following advanced management functions:

- Support for configuration of Intel AMT 12.0 new capabilities
- No reset after provisioning
- Support for Microsoft Windows Server 2012 R2
- Support for New Microsoft SQL Server Versions including Standard and Enterprise editions
- Support for Intel SSD Prop 2500 Series
- Support for Intel Enterprise Digital Fence
- The Platform Discovery Utility can now discover these additional Intel products:
- Intel SSD Pro 2500 Series; Enterprise Digital Fence
- Intel Identity Protection Technology with One Time Password; Public Key Infrastructure; Multi Factor Authentication
- Intel Identity Protection Technology with Intel WiGig
- New Profile Editor and Profile Editor Plugin Interface
- New Required Permissions for Solutions Framework

##### Intel® vPro™ Technology

The HP Z2 Tower G4 Workstations support Intel® vPro™ technology when purchased with a vPro™ technology capable CPU: Intel® Xeon® E-2100 processor family or 8<sup>th</sup> Generation Intel® Core™ i5/i7 processors with Intel® VT-d/VT-x and Intel® TXT technology

##### HP Image Assistant System Software Manager

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

Visit: <http://www.hp.com/go/ssm>

##### Service, Support, and Warranty

- Program to proactively communicate Product Change Notifications (PCNs) and CustomerAdvisories by email to customers, based on a user-defined profile.
- PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition.

### System Technical Specifications

- Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support
-

### 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 platform 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® Xeon® E-2124 3.4 8M GT2 4C
		Intel® Xeon® E-2144 3.6 8M GT2 4C

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<b>Hard Drives</b>	<b>Product #</b>	<b>Offering</b>
		512GB M.2 TLC 1st SSD
		1TB 7200 RPM SATA 1st HDD

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<b>Graphics</b>	<b>Product #</b>	<b>Offering</b>
		NVIDIA® Quadro® P620 2GB
		NVIDIA® Quadro® P1000 2GB
		AMD Radeon™ Pro WX 3100 2GB

### Technical Specifications - Processors

#### **Intel® Xeon® Xeon® processor E-2100 family**

Intel® Xeon® processor E-2286G

Intel® Xeon® processor E-2278G

Intel® Xeon® processor E-2276G

Intel® Xeon® processor E-2274G

Intel® Xeon® processor E-2244G

Intel® Xeon® processor E-2236

Intel® Xeon® processor E-2226G

Intel® Xeon® processor E-2224G

Intel® Xeon® E-2176G 6C 3.7/4.7 HT 80W CPU

Intel® Xeon® E-2174G 4C 3.8/4.7 HT 71W CPU

Intel® Xeon® E-2144G 4C 3.6/4.5 HT 71W CPU

Intel® Xeon® E-2136 6C 3.3/4.5 HT 80W CPU

Intel® Xeon® E-2126G 6C 3.3/4.5 nHT 80W CPU

Intel® Xeon® E-2124G 4C 3.4/4.5 nHT 71W CPU

Intel® Xeon® E-2104G 4C 3.2/3.2 nHT 65W CPU

#### **9th generation Intel® Core™ processor family**

Intel® Core™ i9-9900K 3.6 2666 8C CPU

Intel® Core™ i9-9900 3.1 2666 8C CPU

Intel® Core™ i7-9700K 3.6 2666 8C CPU

Intel® Core™ i7-9700 3.0 2666 8C CPU

Intel® Core™ i5-9600 3.1 2666 6C CPU

Intel® Core™ i5-9500 3.0 2666 6C CPU

Intel® Core™ i3-9100 3.6 2666 4C CPU

#### **8th generation Intel® Core™ processor family**

Intel® Core™ i7-8700K 3.7 2666 6C CPU

Intel® Core™ i7-8700 3.2 2666 6C CPU

Intel® Core™ i5-8600 3.1 2666 6C CPU

Intel® Core™ i5-8500 3.0 2666 6C CPU

#### **8th generation Intel® Core™ i3/Pentium processor family**

Intel® Core™ i3-8100 3.6 2400 4C CPU

Intel® Pentium® G5400 3.7 2400 2C CPU

### Technical Specifications - Hard Drives

#### SATA Hard Drives for HP Workstations

#### 500GB SATA 7200 rpm 6Gb/s 3.5" HDD

<b>Capacity</b>	500GB
<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</b> (typical reads, includes controller overhead, including settling)	<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>	976,773,168
<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

<b>Capacity</b>	1 Terabyte (1000 GB)
<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 600 MB/s *
<b>Buffer</b>	64MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<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.

#### 2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD

<b>Capacity</b>	2TB
<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 (6.0 Gb/s), NCQ Enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s *
<b>Buffer</b>	64MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 1.0 ms *
	<b>Average</b> 11 ms *
	<b>Full Stroke</b> 18 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)



### Technical Specifications - Hard Drives

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

\*Actual performance may vary.

<b>Capacity</b>	1TB
<b>Protocol</b>	SATA
<b>Form Factor</b>	3.5"
<b>Controller</b>	AHCI
<b>Reliability (MTBF)</b>	2.0M hours
<b>Rated Power On Hours</b>	8760/yr
<b>Annualized Failure Rate</b> (based on Rated POH)	<0.62%
<b>Rated for 24/7/365 operation</b>	YES
<b>Physical Size (Height)</b>	1 in; 2.54 cm
<b>Physical Size (Width)</b>	4 in; 10.17 cm
<b>Media Diameter</b>	3.5 in; 8.9 cm
<b>Interface</b>	Serial ATA (6Gb/s), NCQ enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s*
<b>Buffer</b>	128MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 0.32ms* <b>Average</b> 7.45ms* <b>Full Stroke</b> 14.2ms*
<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*

**Enterprise Class Features** High Reliability

\*Actual performance may vary.

#### 4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)

<b>Capacity</b>	4TB
<b>Protocol</b>	SATA
<b>Form Factor</b>	3.5"
<b>Controller</b>	AHCI
<b>Reliability (MTBF)</b>	2.0M hours
<b>Rated Power On Hours</b>	8760/yr
<b>Annualized Failure Rate</b> (based on Rated POH)	<0.62%
<b>Rated for 24/7/365 Operation</b>	YES
<b>Physical Size (Height)</b>	1 in; 2.54 cm
<b>Physical Size (Width)</b>	4 in; 10.17 cm
<b>Media Diameter</b>	3.5 in; 8.9 cm
<b>Interface</b>	Serial ATA (6Gb/s), NCQ enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s*
<b>Buffer</b>	128MB
	<b>Single Track</b> 0.7ms*

### Technical Specifications - Hard Drives

	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Average</b>	8.5ms*
		<b>Full Stroke</b>	15.7ms*
	<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>6TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)</b>	<b>Capacity</b>	6TB	
	<b>Protocol</b>	SATA	
	<b>Form Factor</b>	3.5"	
	<b>Controller</b>	AHCI	
	<b>Reliability (MTBF)</b>	2.0M hours	
	<b>Rated Power On Hours</b>	8760/yr	
	<b>Annualized Failure Rate</b> (based on Rated POH)	<0.44%	
	<b>Rated for 24/7/365 Operation</b>	YES	
	<b>Physical Size</b> (Height)	1 in; 2.54 cm	
	<b>Physical Size</b> (Width)	4 in; 10.17 cm	
	<b>Media Diameter</b>	3.5 in; 8.9 cm	
	<b>Interface</b>	Serial ATA (6Gb/s), NCQ enabled	
	<b>Synchronous Transfer Rate</b> (Maximum)	Up to 600MB/s*	
	<b>Buffer</b>	128MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.7ms*
		<b>Average</b>	8.5ms*
		<b>Full Stroke</b>	15.7ms*
	<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 SFF HDD</b>	<b>Capacity</b>	500GB	
	<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>	Up to 600MB/s*	
	<b>Synchronous Transfer Rate</b> (Maximum)	128MB	
	<b>Buffer</b>	64MB	
	<b>Seek Time</b> (typical reads, includes controller)	<b>Single Track</b>	1ms*
		<b>Average</b>	4.2ms*

### Technical Specifications - Hard Drives

overhead, including settling) **Full Stroke** 25ms (typical)\*  
**Rotational Speed** 7,200 rpm  
**Operating Temperature** 32° to 140° F (0° to 60° C)  
*\*Actual performance may vary.*

#### HP Solid State Drives (SSDs) for Workstations

##### HP 256GB SATA 6Gb/s SSD

**Capacity** 256GB  
**Height** 0.28 in; 0.7 cm  
**Interface** SATA 6Gb/s  
**Synchronous Transfer Rate (Maximum)** Up to 500MB/s (Sequential Read)\*  
**Operating Temperature** 32° to 158° F (0° to 70° C)  
*\*Actual performance may vary.*

##### HP 256GB SATA 6Gb/s SED Opal 2 SSD

**Capacity** 256GB  
**Height** 0.28 in; 0.7 cm  
**Width** **Physical Size**  
**Interface** 6Gb/s SATA  
**Synchronous Transfer Rate (Maximum)** Up to 550MB/s (Sequential Read)\*  
**Operating Temperature** 32° to 158° F (0° to 70° C)  
*\*Actual performance may vary.*

##### HP 512 GB SATA 6Gb/s SSD

**Capacity** 512GB  
**Height** 0.28 in; 0.7 cm  
**Width** **Physical Size** 2.5 in; 6.36 cm  
**Interface** SATA 6Gb/s  
**Synchronous Transfer Rate (Maximum)** Up to 550MB/s (Sequential Read)\*  
**Operating Temperature** 32° to 158° F (0° to 70° C)  
*\*Actual performance may vary.*

##### HP 1TB SATA 6Gb/s SSD

**Capacity** 1TB  
**Height** 0.28 in; 0.7 cm  
**Width** **Physical Size** 2.5 in; 6.36 cm  
**Interface** 6Gb/s SATA  
**Synchronous Transfer Rate (Maximum)** Up to 500MB/s (Sequential Read)\*  
**Operating Temperature** 32° to 158° F (0° to 70° C)  
*\*Actual performance may vary.*

##### HP 2TB SATA 6Gb/s SSD

**Capacity** 2TB  
**Protocol** SATA  
**Form Factor** 2.5"  
**Controller** AHCI  
**NAND Type** 3D TLC  
**Endurance** 400TBW (TB Written)  
**Reliability (MTTF)** 1.5M hours  
**Physical Size (Height)** 0.28 in; 0.7 cm

### Technical Specifications - Hard Drives

<b>Physical Size (Width)</b>	2.5 in; 6.36 cm	
<b>Interface</b>	SATA 6Gb/s	
<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>Performance</b>	<b>Sequential Read</b>	530 MB/s *
	<b>Sequential Write</b>	500 MB/s *
	<b>Random Read</b>	92K IOPS *
	<b>Random Write</b>	83K IOPS *

\*Actual performance may vary.

#### PCIe SSDs for HP Workstations

##### HP Z Turbo Drv G2 256GB TLC PCIe SSD (Z2 MB)

<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 x4 physical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	2800 MB/s*
	<b>Sequential Write</b>	320 MB/s (1100 MB/s max/Turbo)*
	<b>Random Read</b>	250K IOPS*
	<b>Random Write</b>	180K IOPS*

\*Actual performance may vary.

##### HP Z Turbo Drv G2 512GB TLC PCIe SSD (Z2 MB)

<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 x4 physical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	2800 MB/s*
	<b>Sequential Write</b>	660 MB/s (1600 MB/s max/Turbo)*
	<b>Random Read</b>	260K IOPS*
	<b>Random Write</b>	260K IOPS*

\*Actual performance may vary.

##### HP Z Turbo Drv G2 1TB TLC PCIe SSD (Z2 MB)

<b>Capacity</b>	1TB	
<b>Protocol</b>	PCIe	
<b>Form Factor</b>	M.2 in native slot on motherboard	

### Technical Specifications - Hard Drives

<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 x4 physical	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	3000 MB/s*
	<b>Sequential Write</b>	1150 MB/s (1700 MB/s max/Turbo)*
	<b>Random Read</b>	360K IOPS*
	<b>Random Write</b>	330K IOPS*

\*Actual performance may vary.

<b>HP Z Turbo Drv G2 2TB TLC PCIe SSD (Z2 MB)</b>	<b>Capacity</b>	2TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<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 x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	3000 MB/s*
		<b>Sequential Write</b>	1000 MB/s (2100 MB/s max/Turbo)*
		<b>Random Read</b>	320K IOPS*
		<b>Random Write</b>	265K IOPS*

\*Actual performance may vary.

<b>Intel® 905p Series AIC PCIe SSD</b>	<b>Intel® 905p Series AIC 280GB PCIe SSD</b>	<b>Capacity</b>	280GB	
		<b>Protocol</b>	PCIe	
		<b>Form Factor</b>	PCIe Card, Half Height	
		<b>Controller</b>	NVMe	
		<b>NVM Type</b>	3DXPoint	
		<b>Endurance</b>	5.11 PBW (PB Written)	
		<b>Reliability (MTBF)</b>	1.6M hours	
		<b>Operating Temperature</b>	32° to 185° F (0° to 85° C)	
		<b>Performance</b>	<b>Sequential Read</b>	2730 MB/s*
			<b>Sequential Write</b>	2280 MB/s*
			<b>Random Read</b>	587K IOPS*
			<b>Random Write</b>	559K IOPS*

\*Actual performance may vary.

<b>Capacity</b>	480TB
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### Technical Specifications - Hard Drives

<b>Intel® 905p Series AIC 480GB PCIe SSD</b>	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	PCIe Card, Half Height	
	<b>Controller</b>	NVMe	
	<b>NVM Type</b>	3DXPoint	
	<b>Endurance</b>	8.76 PBW (PB Written)	
	<b>Reliability (MTBF)</b>	1.6M hours	
	<b>Operating Temperature</b>	32° to 185° F (0° to 85° C)	
	<b>Performance</b>	<b>Sequential Read</b>	27100 MB/s*
		<b>Sequential Write</b>	2280 MB/s*
		<b>Random Read</b>	582K IOPS*
		<b>Random Write</b>	561K IOPS*

\*Actual performance may vary.

### Technical Specifications - Graphics

<b>Integrated Intel® UHD Graphics (Z2 G4)</b>	<b>Form Factor</b>	Integrated in select Intel® Xeon® E, 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>Shading Architecture</b>	<b>NOTE:</b> For HDMI, DVI and VGA outputs, separate adapters may be required. Shader Model 5.0 (It's under confirmation with Intel® for the latest version, TBD)
	<b>Supported Graphics APIs</b>	OpenGL 4.4 DirectX 12
	<b>Available Graphics Drivers</b>	Windows 10

<b>NVIDIA® Quadro® P400 2GB Graphics</b>	<b>Form Factor</b>	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	<b>Graphics Controller</b>	NVIDIA® Quadro® P400 Graphics Card GP107 GPU 256 CUDA cores Max Power: 30 Watts
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 64-bit Memory Bandwidth: 32 GB/s
	<b>Connectors</b>	3mDP Outputs*
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	<b>Image Quality Features</b>	10-bit internal display processing pipeline 10-bit scan-out support
	<b>Display Output</b>	3 mDP Connectors
	<b>Shading Architecture</b>	Full Microsoft DirectX 12 Shader Model 5.1
<b>Supported Graphics APIs</b>	OpenGL 4.5	

### Technical Specifications - Graphics

<b>Available Graphics Drivers</b>	<p>DirectX 12                  Vulkan 1.0                  API support includes:                  CUDA C, CUDA C++, DirectCompute , OpenCL</p> <p>Microsoft Windows 10                  Microsoft Windows 7                  Linux®</p> <p>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></p>
<b>Notes</b>	<p>*P400, P620 and P1000 only have mini-DisplayPort™ (mDP) video ports.</p> <p><b>Note 1:</b> AMO kits for P400, P1000 and Adapters</p> <ul style="list-style-type: none"> <li>• Two mDP-to-DP Adapters are included in the P400 and P1000 AMO kits.</li> <li>• If mDP-to-DP Adapters are needed, Adapters can be ordered separately:                         <ul style="list-style-type: none"> <li>- 2KW86A6 - HP (Bulk 4) miniDP-to-DP Adapter Cables</li> <li>- 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables</li> </ul> </li> </ul>

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<b>NVIDIA® Quadro® P620 2GB Graphics</b>	<p><b>Form Factor</b> Low Profile: 2.713 inches in height × 5.7 inches in length</p> <p><b>Graphics Controller</b> NVIDIA® Quadro™ P620</p> <p><b>Bus Type</b> GP107 GPU Number of Cores: 512 CUDA® cores Max. Power: 40W Cooling Solution: Active fan heatsink</p> <p><b>Memory</b> PCI Express x16 Size: 2GB DDR5 Clock: 2400Mhz Memory Bandwidth: 80GB/s</p> <p><b>Connectors</b> 4 x mDP 1.4</p> <p><b>Maximum Resolution</b> DisplayPort™ 1.4:  - up to 4x 5120 x 2880 x 24 bpp @ 60Hz  - supports Multi-Stream Transport (MST)</p> <p><b>Image Quality Features</b> 10-bit internal display processing pipeline  10-bit scan-out support</p> <p><b>Shading Architecture</b> Shader Model 5.1</p> <p><b>Supported Graphics APIs</b> DX11, OpenGL 4.3</p> <p><b>Available Graphics Drivers</b> Windows 7 Professional (64-bit and 32-bit) Linux®</p> <p>HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site:</p>
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### Technical Specifications - Graphics

<http://welcome.hp.com/country/us/en/support.html>

#### Notes

\*P400, P620 and P1000 only have mini-DisplayPort™ (mDP) video ports.

**Note 1:** 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

#### AMD Radeon™ Pro WX 3100 4GB Graphics

<b>Form Factor</b>	Low Profile, half length (full-height bracket included)
<b>Graphics Controller</b>	Architecture: Polaris 12 Lexa GL Number of Cores: 512 Stream Processors organized into 8 compute units Power: 50W Cooling Solution: Active Fan Heatsink
<b>Bus Type</b>	PCI Express® x8, Generation 3.0
<b>Memory</b>	Size: 4GB GDDR5 Bandwidth: 96 GB/s Interface: 128-bit
<b>Connectors</b>	2x Mini-DisplayPort™ 1.4 1x DisplayPort™ 1.4  Factory Configured: No video cable adapter included After market option kit: No video cable adapter included  Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
<b>Image Quality Features</b>	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling.
<b>Display Output</b>	2x Mini-DisplayPort™ 1.4 1x DisplayPort™ 1.4
<b>Shading Architecture</b>	Shader Model 6.0
<b>Supported Graphics APIs</b>	OpenCL™ 2.0, DirectX® 12.0, OpenGL 4.5
<b>Available Graphics Drivers</b>	Windows 10 64-bit Linux®  HP qualified drivers may be preloaded or available from the HP support Web site:

### Technical Specifications - Graphics

<http://welcome.hp.com/country/us/en/support.html>

#### Notes

Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See [www.amd.com/firepro](http://www.amd.com/firepro) for details.

#### AMD Radeon™ Pro WX 4100 4GB Graphics

#### Form Factor Graphics Controller

Low Profile (full-height bracket included)

Polaris 11 Baffin GL XT

GPU: 1024 Stream Processors organized into 16 Compute Units

Power: 50 Watts

Cooling Solution: Active Fan Heatsink

#### Memory

Size: 4GB GDDR5

Bandwidth: 96 GB/s

Interface: 128-bit

#### Connectors

4x Mini DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.

Factory Configured: No mDP-to-DP cable adapters included

After market option kit: No mDP-to-DP cable adapters included

Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.

#### Maximum Resolution

DisplayPort™ 1.4:

- up to 4x 5120 x 2880 x 24 bpp @ 60Hz

- supports Multi-Stream Transport (MST)

#### Image Quality Features

Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling

#### Display Output

4 Mini-DisplayPort™ 1.4 Outputs

FreeSync support

#### GPU Architecture

GCN 4th Generation

#### Supported Graphics APIs

DirectX® 12

OpenGL® 4.5

OpenCL™ 2.0

Vulkan™ 1.0

#### Available Graphics Drivers

Windows 10 64-bit

Linux®

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

#### Notes

1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.

### Technical Specifications - Graphics

2. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions.
3. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.

<b>NVIDIA® Quadro® P1000 4GB Graphics</b>	<b>Form Factor</b>	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	<b>Graphics Controller</b>	NVIDIA® Quadro® P1000 Graphics Card GP107 GPU 640 CUDA cores Max Power: 47 Watts
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	Size: 4 GB GDDR5, 2500 MHz Memory Interface: 128-bit memory interface
	<b>Connectors</b>	Memory Bandwidth: 80 GB/s memory bandwidth 4mDP Outputs*
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	<b>Image Quality Features</b>	10-bit internal display processing pipeline 10-bit scan-out support
	<b>Display Output</b>	4 mDP 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 C, CUDA C++, DirectCompute, OpenCL
	<b>Available Graphics Drivers</b>	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux®
	<b>Notes</b>	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> *P400, P620 and P1000 only have mini-DisplayPort™ (mDP) video ports. <b>Note 1:</b> AMO kits for P400, P620, P1000 and Adapters <ul style="list-style-type: none"> <li>• Two mDP-to-DP Adapters are included in the P400, P620 and P1000 AMO kits.</li> </ul>

### Technical Specifications - Graphics

- 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

<b>NVIDIA® Quadro® P2000 5GB Graphics</b>	<b>Form Factor</b>	Dimensions: 4.4”Hx7.9”L Single Slot Cooling: Active Weight: 260 grams
	<b>Graphics Controller</b>	NVIDIA® Quadro® P2000 Graphics Card Power: 75 Watts
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	Size: 5GB GDDR5 Memory Bandwidth: 140 GB/s Memory Width: 160-bit
	<b>Connectors</b>	4x DisplayPort™ 1.4  Factory Configured Option: No adapter included with card After Market Option: No video cable adapter included  Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	<b>Maximum Resolution</b>	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready.  DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz  Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz  HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz
	<b>Image Quality Features</b>	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)  Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
	<b>Display Output</b>	Maximum number of displays - 4 direct attached monitors  Maximum number of monitors across all available Quadro® P2000 outputs is 4.

### Technical Specifications - Graphics

<b>Shading Architecture</b>	Shader Model 5.1
<b>Supported Graphics APIs</b>	OpenGL® 4.5 DirectX® 12
	API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran software
<b>Available Graphics Drivers</b>	Microsoft Windows 10 Microsoft Windows 7 Professional 64bit Linux - Full OpenGL implementation, complete with NVIDIA® and ARB extensions
	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>Notes</b>	<ol style="list-style-type: none"> <li>1. Quadro P2000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately.</li> <li>2. Quadro P2000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.</li> </ol>

#### AMD Radeon™ Pro WX 7100 8GB Graphics

<b>Form Factor Graphics Controller</b>	Full-Height Single Slot (9.5" Length ) Radeon™ Pro WX 7100 graphics GPU: 2304 Stream Processors organized into 36 Compute Units Power: 130 Watts Cooling Solution: Active Fan Heatsink
<b>Memory</b>	Size: 8GB GDDR5 Bandwidth: 224 GB/s Interface: 256-bit
<b>Connectors</b>	4x Display Port™ 1.4 – HDR ready connectors with HBR3 and MST support.  Factory Configured: No video cable adapter included After market option kit: No video cable adapter included  Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
<b>Maximum Resolution</b>	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
<b>Image Quality Features</b>	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
<b>Display Output</b>	4 DisplayPort™ 1.4 Outputs FreeSync support

### Technical Specifications - Graphics

<b>GPU Architecture</b>	GCN 4th Generation
<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®

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

<b>Notes</b>	<ol style="list-style-type: none"> <li>HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.</li> <li>Radeon VR Ready Creator Products are select Radeon Pro and AMD FirePro™ GPUs that meet or exceed the Oculus Rift or HTC Vive recommended specifications for video cards/GPUs. Other hardware (including CPU) and system requirements recommended by Oculus Rift or HTC Vive should also be met in order to operate the applicable HMDs as intended. As VR technology, HMDs and other VR hardware and software evolve and/or become available, these criteria may change without notice.</li> <li>AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions.</li> <li>As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.</li> </ol>
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<b>NVIDIA® Quadro® P4000 8GB Graphics</b>	<b>Form Factor</b>	Dimensions: 4.4"H x 9.5"L Single-slot, full-height Weight: 475 grams (without extender)
	<b>Graphics Controller</b>	NVIDIA® Quadro® P4000 Graphics Card GPU: GP104 with 1792 CUDA cores Power: 120 Watts
	<b>Bus Type</b>	PCI Express 3.0 x16
	<b>Memory</b>	Size: 8GB GDDR5 Memory Bandwidth: 243 GB/s Memory Width: 256-bit
	<b>Connectors</b>	4 x DisplayPort™ 1.4

### Technical Specifications - Graphics

3-pin mini-DIN connector via optional bracket  
1 x 6-pin auxiliary power connector  
4-pin header for stereo signal  
SYNC connector for Quadro® Sync II  
2 x SLI connectors

Factory Configured Option: No video cable adapter included  
After Market Option: No video cable adapter included

Additional DisplayPort™-to-VGA, DisplayPort™-to-HDMI, or DisplayPort™-to-DVI adapters are available as accessories

#### Maximum Resolution

Dual-link internal TMDS (DVI 1.0):  
- up to 2560 x 1600 x 32 bpp @ 60 Hz

Single-link internal TMDS (DVI 1.0):  
- up to 1920 x 1200 x 32 bpp @ 60 Hz

HDMI™ 2.0b (requires DP to HDMI adapter):  
- up to 5120 x 2880 x 24 bpp @ 60Hz

DisplayPort™:  
- up to 4096 x 2160 x 30 bpp @ 60Hz  
- up to 2560 x 1600 x 30 bpp @ 120 Hz  
- supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST)

Using two DP outputs, the P4000 can drive one dual DP input display with 5120 x 2880 x 30 bpp @ 60Hz resolution.

#### Image Quality Features

Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.  
HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors  
NVIDIA® 3D Vision™ and other 3D stereo technologies  
NVIDIA® Mosaic and nView

#### Display Output

Maximum number of displays  
- 4 direct attached monitors

Maximum number of monitors across all available Quadro P4000 outputs is 4.

#### Shading Architecture

Shader Model 5.1

#### Supported Graphics APIs

OpenGL 4.5  
DirectX 12  
Vulkan 1.0

API support includes:  
CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran

#### Available Graphics Drivers

Microsoft Windows 10  
Microsoft Windows 7  
Linux - Full OpenGL implementation, complete with NVIDIA® and ARB extensions

HP qualified drivers may be preloaded or available from the HP support Web site:  
<http://welcome.hp.com/country/us/en/support.html>

### Technical Specifications - Graphics

**Notes**

1. Quadro P4000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately.
2. Quadro P4000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

**NVIDIA® Quadro® P5000  
8GB Graphics**

**Form Factor**

Dimensions: 4.4”H x 10.5”L  
Dual-slot, full-height  
Weight: 815 grams

**Graphics Controller**

NVIDIA® Quadro® P5000 Graphics Card  
GPU: GP104  
2560 NVIDIA® CUDA® cores

**Bus Type**

PCI Express 3.0 x16

**Memory**

Size: 16GB GDDR5  
Memory Bandwidth: 288 GB/s  
Memory Width: 256-bit  
ECC memory (disabled by default)

**Connectors**

4 x DisplayPort™ 1.4 (HDR support)  
DL-DVI (D)  
3-pin mini-DIN connector via optional bracket  
1 x 8-pin auxiliary power connector  
4-pin header for stereo signal  
SYNC connector for Quadro® Sync II  
2 x SLI connectors

Factory Configured Option: No video cable adapter included  
After Market Option: No video cable adapter included

Additional DisplayPort™-to-VGA, DisplayPort™-to-HDMI, or DisplayPort™-to-DVI adapters are available as accessories

**Maximum Resolution**

5K support @ 60Hz  
1x single-cable 5K monitor, or 2x dual-cable 5k monitors

**Image Quality Features**

Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.  
HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors  
NVIDIA® 3D Vision™ and other 3D stereo technologies  
NVIDIA® Mosaic and nView Desktop Management

**Supported Graphics APIs**

DirectX®12 , OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API  
support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java,  
Python, and Fortran

**Available Graphics Drivers**

Windows 10 64-bit  
Windows® 7 64-bit  
Linux®



### Technical Specifications - Graphics

HP qualified drivers may be preloaded or available from the HP support Web site: <http://welcome.hp.com/country/us/en/support.html>

#### **NVIDIA® Quadro® RTX 4000 8GB Graphics**

#### **Form Factor**

Full-Height Single Slot (4.4" Height x 9.5" Length)  
Weight: 550 grams / 1.21 lbs

#### **Graphics Controller**

NVIDIA® Quadro® RTX 4000 Graphics  
IGPU: 2304 NVIDIA® CUDA® Parallel Processing Cores  
Power: 160 Watts  
Cooling: Active

#### **Memory**

8GB GDDR6 memory  
Memory Bandwidth: Up to 416 GB/s  
Memory Width: 384 bit

#### **Connectors**

3x DP 1.4a and VirtualLink  
Quadro Sync connector (compatible with Quadro II Sync)  
One 8-pin auxiliary power connector

Factory configured option: No video cable adapter included with card.  
After market option Kit: No video cable adaptor included with card.

DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.

#### **Maximum Resolution**

7680x4320 @ 60Hz

#### **Image Quality Features**

Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.  
HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors  
NVIDIA® 3D Vision™ and other 3D stereo technologies  
NVIDIA® Mosaic and nView

#### **Display Outputs<sup>1</sup>**

3x DP 1.4a and VirtualLink<sup>2</sup> (7680x4320 @ 60Hz)

#### **Supported Graphics APIs**

DirectX® 12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0  
Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran

#### **Available Graphics Drivers**

Windows® 10 64-bit  
Linux® 64-bit

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

#### **Notes**

- 1- Supports up to a total of 4 displays
- 2- VirtualLink's USB-C™ (data) cannot be disabled at a hardware level

### Technical Specifications - Graphics

<b>NVIDIA® Quadro® RTX 5000 16GB Graphics</b>	<b>Form Factor</b>	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 975 grams + 75 grams extender
	<b>Graphics Controller</b>	NVIDIA® QUADRO® RTX 5000 GPU: 3072 CUDA cores Power: 265 Watts Cooling: Active
	<b>Memory</b>	16GB HBM2 memory Memory Bandwidth: Up to 448 GB/s ECC Memory (disabled by default)
	<b>Connectors</b>	DP (x4) with HDR support 3-pin mini-DIN connector via optional bracket 4-pin header for stereo signal Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector (2x) NVLink for RTX 5000 connectors (via optional kit)  After market option Kit: no power adapter included with card.  DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories.
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: 7680x4320 @ 60Hz
	<b>Image Quality Features</b>	HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode) HDCP 2.2 support over DisplayPort™ and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
	<b>Display Outputs</b>	4x DP1.4 HDR2 outputs (up to 7680x4320 @ 60Hz)
	<b>GPU Architecture</b>	NVIDIA® Volta™
	<b>Supported Graphics APIs</b>	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	<b>Available Graphics Drivers</b>	Windows® 10 64-bit Windows® 8 & 8.1 64-bit Windows® 7 64-bit Linux® 64-bit

### Technical Specifications - Graphics

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

Factory Configured: No adapters included

After market option kit: No adapters included

\*VirtualLink's USB-C™ (data) cannot be disabled at a hardware level

<b>NVIDIA® Quadro® RTX 6000 24GB Graphics</b>	<b>Form Factor</b>	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 995 grams + 75 grams extender
	<b>Graphics Controller</b>	NVIDIA® QUADRO® RTX 6000 GPU: 4608 CUDA cores Power: 295 Watts Cooling: Active
	<b>Memory</b>	24GB HBM2 memory Memory Bandwidth: Up to 672 GB/s ECC Memory (disabled by default)
	<b>Connectors</b>	DP (x4) with HDR support 3-pin mini-DIN connector via optional bracket 4-pin header for stereo signal Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector (2x) NVLink for RTX 5000 connectors (via optional kit)  After market option Kit: no power adapter included with card.
	<b>Maximum Resolution</b>	DisplayPort™ 1.4: 7680x4320 @ 60Hz
	<b>Image Quality Features</b>	HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode) HDCP 2.2 support over DisplayPort™ and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
	<b>Display Outputs</b>	4x DP1.4 HDR2 outputs (up to 7680x4320 @ 60Hz)

### Technical Specifications - Graphics

<b>GPU Architecture</b>	NVIDIA® Volta™
<b>Supported Graphics APIs</b>	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
<b>Available Graphics Drivers</b>	Windows® 10 64-bit Windows® 8 & 8.1 64-bit Windows® 7 64-bit Linux® 64-bit

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

Factory Configured: No adapters included

After market option kit: No adapters included

\*VirtualLink's USB-C™ (data) cannot be disabled at a hardware level

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### Technical Specifications - Optical and Removable Storage

<b>HP 9.5mm Slim DVD 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>	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 (all conditions non-condensing)</b>	<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>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

### Technical Specifications - Optical and Removable Storage

<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>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
	<b>Disc Capacity</b>	<b>DVD-ROM</b> 8.5 GB DL or 4.7 GB standard <b>Blu-ray</b> 25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
	<b>Access Times</b>	<b>Full Stroke DVD</b> < 230 ms (seek) <b>Full Stroke CD</b> < 220 ms (seek)

### Technical Specifications - Optical and Removable Storage

	<b>Blu-ray</b>	< 230 ms (seek) (Full Stroke Blu-ray)
	<b>Startup Time</b>	(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>	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	<b>DVD ROM Read</b>	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
	<b>Blu-ray</b>	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>	SATA DC power receptacle
	<b>DC Power Requirements</b>	5 VDC ± 5%-100 mV ripple p-p
	<b>DC Current</b>	5 VDC -900 mA typical, 2000mA 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 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®
		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>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

### Technical Specifications - Optical and Removable Storage

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.

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<b>HP SD Media Card Reader</b>	<b>Description</b>	e USB3.0-SD4.0
	<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>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>

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### Technical Specifications - Controller Cards

<b>HP Thunderbolt™ 3 PCIe 3-port I/O Card</b>	<b>Data Transfer Rate</b>	Supports up to 40 Gb/s 40,000 Mb/s)
	<b>Devices Supported</b>	Thunderbolt™ certified devices
	<b>Bus Type</b>	PCIe card, full or half height PCIe slots
	<b>Ports</b>	One USB 3.1 Type-C connector (Rear)
	<b>Internal Connectors</b>	One 60-pin board-to-board (FlexIO) connector
	<b>System Requirements</b>	Windows 10 RS3 64-bit, Intel® i5 series or higher processor, 4-GB RAM, 20-GB Hard Drive, available PCIe slot.
	<b>Temperature - Operating</b>	50° to 131° F (10° to 55° C)
	<b>Temperature - Storage</b>	-22° to 140° F (-30° to 60° C)
	<b>Relative Humidity - Operating</b>	20% to 80%
	<b>Compliances</b>	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	<b>Operating Systems Supported</b>	-Windows 10 RS3 64-bit.
	<b>Kit Contents</b>	HP Thunderbolt™ 3 PCIe 3-port I/O Card, full height and half height bulkhead bracket, DisplayPort™ and GPIO (General-Purpose Input/Output) cable, FlexIO adapter board, Installation documentation and warranty card.

### 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® I217LM 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> <li>• Product Literature</li> </ul>

<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

### Technical Specifications - Networking and Communications

**Kit Contents** HP 10GbE SFP+ SR Transceiver

#### Intel® X550-T2 2-Port 10GbE NIC

<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>

#### Aquantia® AQN-108 1-Port 5GbE NIC

<b>Connector</b>	1 RJ-45
<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>

#### Intel® I350-T2 2-Port 1GbE NIC

<b>Connector</b>	2 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>	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)

### Technical Specifications - Networking and Communications

<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> <li>• Product Literature</li> </ul>

<b>Intel® I350-T4 4-Port 1GbE NIC</b>	<p><b>Connector</b> 4 RJ-45</p> <p><b>Cabling</b> Cat5e (or better) up to 100m</p> <p><b>Controller</b> Intel® Ethernet I350 Controller</p> <p><b>Network Transfer Rates Supported</b> 1GbE, 100MbE, 10MbE</p> <p><b>Data Path Width</b> PCIe Gen2.1x4</p> <p><b>Power Requirement</b> 5W (typical)</p> <p><b>Operating Temperature</b> 32° to 131° F (0° to 55° C)</p> <p><b>Dimensions (HxW)</b> 2.75 x 5.5 inches (without brackets)</p> <p><b>Operating System Driver Support</b> Windows 7 64-bit; Windows 10 64-bit; Linux®</p> <p><b>Kit Contents</b></p> <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>
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<b>Intel® 9560 802.11ac, BT 5, M.2</b>	<p><b>WLAN Standards</b> 802.11a/b/g/n/ac, 802.11d, 802.11e, 802.11h, 802.11i, 802.11w, 802.11r, 802.11k, 802.11v</p> <p>802.11ac Wave 2 (up to 1.73Mbps, 160MHz Channels, MU-MIMO)</p> <p><b>Antenna</b> 2x2 Dual-Band</p> <p><b>Bluetooth Standards</b> 5</p> <p><b>Operating Temperature</b> 32° to 131° F (0° to 55° C)</p> <p><b>Interface</b> M.2 CNVio</p> <p><b>Dimensions</b> M.2 2230</p> <p><b>Kit Contents</b> Not Available</p>
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<b>HP Power Cord Kit</b>	DM293A
<b>HP Serial Port Adapter</b>	3TK82AA

<b>HP eSATA PCI Cable Kit</b>	<b>Part Number</b>	FH966AA
	<b>Features</b>	<ul style="list-style-type: none"> <li>• 1x eSATA ports</li> <li>• Bring the same ultra-fast SATA performance that you demand from your internal SATA hard drives to an external eSATA hard drive.</li> <li>• Faster transfer rates than existing external storage solutions: USB 2.0 &amp; 1394.</li> <li>• Complete motherboard to eSATA PCI bracket solution.</li> <li>• Robust and user friendly external eSATA connector.</li> </ul>

<b>Part Number</b>	4KY89AA
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### Technical Specifications - Networking and Communications

#### Z2 G4 TWR Bezel w/ Dust Filter option Overview

Workstations are deployed in a variety of different ways and in different environments, from under a desk to manufacturing floors. HP Workstations designed a dust filter option to further protect the system against the ingress of dust and other particles over the life of the system. Test have shown a reduction of dust ingress of up to 32% for the HP Z2 Tower G4 Workstation platform and is cleanable and serviceable by customers. There is also a BIOS setting that will warn customer when it is time to check and clean their filters.

#### Cleaning and servicing the dust filter

1. After removing the filter from the system bezel (dust filter can be removed without the use of tools from the front bezel), either blow it with and wash with water or use a delicate duster (feather duster) to brush off the filter then rinse it with water.
2. Allow the filter half a day to dry at room temperature (25C at 30%-50% humidity)
3. Temperature of water can be 0-70C, due to the dust filter meeting the SQTm 70C humidity test. Suggested water temperature for best user experience is 0-50C.
4. Normal tap water (and most other types of water) can be used to rinse the filter. Any type of corrosive liquid is restricted.

#### Enabling the Check Filter warning in the BIOS:

1. Customers must enable the BIOS setting once they receive their filter.
2. To enable, do the following once you see the boot screen for your system: F10 > Advanced > Built-In Device Options > Dust Filter
3. Select to enable the Dust Filter replacement reminder, which can be set for 15, 30, 60, 90, 120, or 180 days. The Reminder will show during POST after the reminder timer has expired.
- 4.

**NOTE:** customers who anticipate more dust ingress in their environments should set the reminder for a shorter window. Customers anticipating longer ingress can set the reminder for a longer window.

#### BIOS Warnings

Large enterprise customers deploying multiple systems can centrally enable/control the BIOS warning using the WMI/BCU tool remotely to set the options below:

##### Dust Filter

- Disable\*
- Enable

##### Dust Filter Reminder (Days)

15, 30, 60\*, 90, 120, and 180

#### Z2 G4 Dust Filter (Filter Only) Part Number

3TQ24AA

This is intended to be a replacement filter for the HP Z2 Tower G4 Workstation in the event that the original filter would need to be replaced.

#### HP Z2 Tower G4 Workstation Front Card Guide Kit Part Number Features

4KY82AA

This front card guide kit is required to enable added mechanical stability when configuring select graphics cards on the HP Z2 Tower G4 Workstation.

The kit enables added mechanical stability when configuring:

- 3x NVIDIA® NVS NVS 310 or NVS 315 graphics cards

### Technical Specifications - Networking and Communications

- 2x NVIDIA® NVS 510 graphics cards
  - 1x NVS 310 plus 1x NVS 510 graphics cards
  - 2x AMD W2100 graphics cards
  - 1x NVIDIA® Quadro® M4000, M5000 graphics cards
  - 1x AMD FirePro W7000 graphics card
-

### 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
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

##### Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Power LED will blink red 2 to 5 times, then blink white 2 or more times, then repeat (with beep tones for each blink initially):
    - 2 red + 2 white User must provide file for BIOS recovery (USB storage typically)
    - 2 red + 3 white User must enter a key sequence to proceed with recovery by policy
    - 2 red + 4 white BIOS recovery is in progress
    - 3 red + 2 white Memory could not be initialized
    - 3 red + 3 white Graphics adaptor could not be found
    - 3 red + 4 white Power supply failure / not connected
    - 3 red + 5 white Processor not installed
    - 3 red + 6 white Current processor does not support an enabled feature
    - 4 red + 2 white Processor has exceeded its temperature threshold / system thermal shutdown
    - 4 red + 3 white System internal temperature has exceeded its threshold
    - 5 red + 2 white System controller firmware is not valid
    - 5 red + 3 white System controller detected BIOS is not executing
    - 5 red + 4 white BIOS could not complete initialization / PCA failure
    - 5 red + 5 white System controller rebooted the system after a health or recovery timer triggered
- HP PC Hardware Diagnostics UEFI:
  - This utility enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software
- 5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- 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

<b>Date of change:</b>	<b>Version History:</b>		<b>Description of change:</b>
July 23, 2018	From v1 to v2	Added	AMD FirePro™ WX3100 2GB Graphics specs
July 30, 2018	From v2 to v3	Changed	Number of supported cards for Nvidia P620 changed to 1
September 13, 2018	From v3 to v4	Changed	Supported components, System Configurations and Technical Specifications – Graphics sections, format changes
January 17, 2019	From v4 to v5	Added	Compliance with FIPS 140-2 TPM 2.0
		Removed	HP DX115 Removable Drive Enclosure
March 11, 2019	From v5 to v6	Update	Internal I/O
April 3, 2019	From v6 to v7	Update	Rear image corrected
May 28, 2019	From v7 to v8	Added	Processors Refresh and added new NVIDIA Quadro RTX Graphics
June 12, 2019	From v8 to v9	Changed	Storage section



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