

### Overview

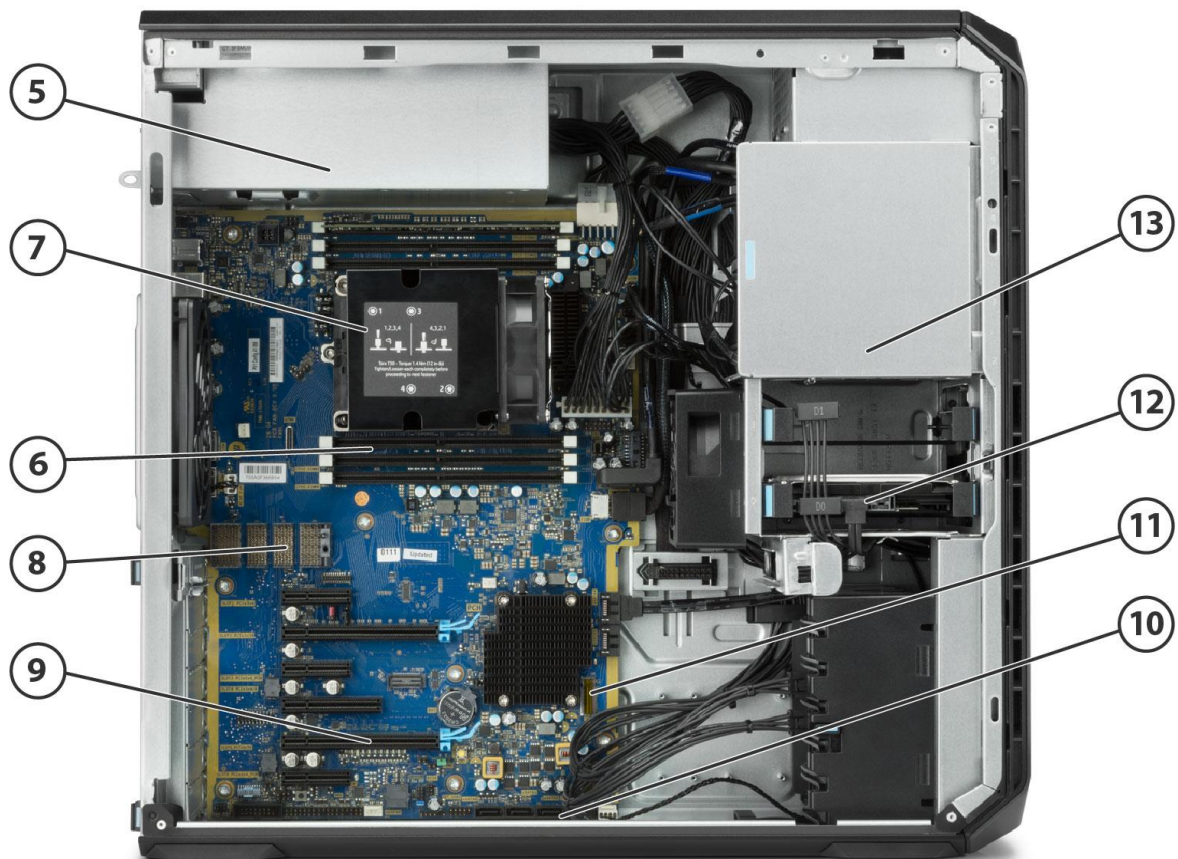
#### HP Z6 G4 Workstation



#### Front view

1. Integrated Front Handle
2. Front I/O module options
  - Premium (optional, shown here): power button, 2 USB 3.1 G1 Type-A, 2 USB 3.1 G2 Type-C™ (Left-most Type A port has charging capability), Headset/Mic, Media Card Reader (optional).
  - Standard: power button, 4 USB 3.1 G1 Type-A (left-most Type A port has charging capability), Headset/Mic, Media Card Reader (optional).
3. 2 x 5.25" external bays
4. 1 Slim ODD bay

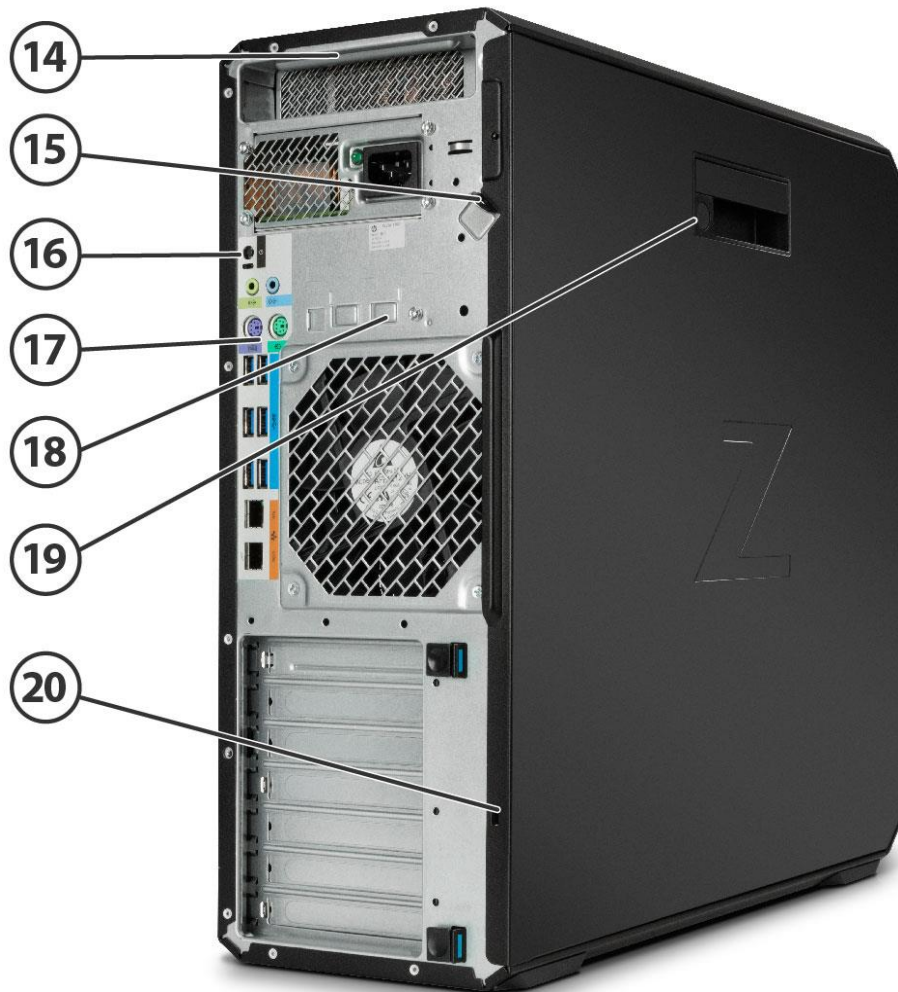
### Overview



### Internal view

- |   |                                       |
|---|---------------------------------------|
| 5. Power supply: 1000W 90% efficient with 2 graphics power adapters                                 | 10. 6 x 6Gb/s SATA ports              |
| 6. 6 DIMM slots: DDR4-2666 Registered RAM   | 11. 2 PCIe G3 x4 M.2 for SSDs         |
| 7. Intel® Xeon® processor Scalable family   | 12. 2 x 2.5"/3.5" internal drive bays |
| 8. 2 <sup>nd</sup> CPU & memory riser connector: adds 2 <sup>nd</sup> CPU socket and (6) DIMM slots | 13. 2 x 5.25" external drive bays     |
| 9. PCIe slots: 2 PCIe G3 x16, 3 PCIe G3 x4, 1 PCIe G3 x8  |                                       |

### Overview



### Rear view

- |     |   |     |   |
|-----|---|-----|---|
| 14. | Rear handle   | 18. | HP Dual Port 10GBase-T NIC module slot (optional) |
| 15. | Padlock loop  | 19. | Side panel barrel keylock (optional)              |
| 16. | Rear power button   | 20. | Kensington lock slot                              |
| 17. | Rear I/O (top to bottom):<br>audio in/out, keyboard/mouse PS/2,<br>6 USB 3.1 G1 Type-A,<br>2 x 1GbE LAN ports |     |   |

### Overview

### Overview

#### Form Factor Operating Systems

#### Tower

#### Preinstalled:

- Windows 10 Pro 64 for Workstations<sup>1</sup>
- HP Linux-ready (minimal OS ready for customer OS installation)
- Red Hat® Enterprise Linux® Desktop Workstation (Paper license with 1 year support; no preinstalled OS)

#### Supported:

- Windows 7 Professional 64-bit<sup>2</sup>
- Red Hat Enterprise Linux Desktop 7.4<sup>3</sup>
- SUSE Linux Enterprise Desktop 12 SP3<sup>3</sup>
- Ubuntu 16.04 LTS<sup>3</sup>

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

<sup>2</sup>For detailed Windows 7 OS hardware support information see <http://h10032.www1.hp.com/ctg/Manual/c05857891.pdf>.

Intel Xeon® SP Processors: Platinum 8100, Gold 6100, Gold 5100, Silver 4100, & Bronze 3100 Family support Microsoft Windows 7 Professional 64-bit.

<sup>3</sup>**Notes:** For detailed Linux® OS/hardware support information, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

### Available Processors

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Intel® Turbo Boost Technology <sup>1</sup>	Supports Intel® DCPMM Technology <sup>2</sup>	TDP (W)
<b>Intel® Xeon® W Processors</b>								
Intel® Xeon® W-3245 processor	16	3.2 GHz	22	2933	YES	4.4, 4.6	NO	205
Intel® Xeon® W-3235 processor	12	3.3 GHz	19.25	2933	YES	4.4, 4.5	NO	180
Intel® Xeon® W-3225 processor	8	3.7 GHz	16.5	2666	YES	4.3, 4.4	NO	160
Intel® Xeon® W-3223 processor	8	3.5 GHz	16.5	2666	YES	4, 4.2	NO	160
<b>Intel® Xeon® Scalable Processors</b>								
Intel® Xeon® Platinum 8280 processor	28	2.7	38.50	2933	YES	3.3, 4.0	YES	205
Intel® Xeon® Platinum 8260 processor	24	2.4	35.75	2933	YES	3.1, 3.9	YES	165
Intel® Xeon® Platinum 8180 processor	28	2.5	38.50	2666	YES	3.2, 3.8	NO	205
Intel® Xeon® Platinum 8160 processor	24	2.1	33.00	2666	YES	2.8, 3.7	NO	150

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Intel® Xeon® Gold 6254 processor	18	3.1	24.75	2933	YES	3.9, 4.0	YES	200
Intel® Xeon® Gold 6252 processor	24	2.1	35.75	2933	YES	2.8, 3.7	YES	150
Intel® Xeon® Gold 6248 processor	20	2.5	27.50	2933	YES	3.2, 3.9	YES	150
Intel® Xeon® Gold 6244 processor	8	3.6	24.75	2933	YES	4.3, 4.4	YES	150
Intel® Xeon® Gold 6242 processor	16	2.6	22	2933	YES	3.5, 3.9	YES	150
Intel® Xeon® Gold 6240Y processor	18	2.6	24.75	2933	YES	3.3, 3.9	YES	150
Intel® Xeon® Gold 6240 processor	18	2.6	24.75	2933	YES	3.3, 3.9	YES	150
Intel® Xeon® Gold 6230 processor	20	2.1	27.50	2933	YES	2.8, 3.9	YES	125
Intel® Xeon® Gold 6152 processor	22	2.1	30.25	2666	YES	2.8, 3.7	NO	140
Intel® Xeon® Gold 6154 processor	18	3.0	24.75	2666	YES	3.7, 3.7	NO	200
Intel® Xeon® Gold 6148 processor	20	2.4	27.50	2666	YES	3.1, 3.7	NO	150
Intel® Xeon® Gold 6146 processor	12	3.2	24.75	2666	YES	3.9, 4.2	NO	165
Intel® Xeon® Gold 6144 processor	8	3.5	24.75	2666	YES	4.1, 4.2	NO	150
Intel® Xeon® Gold 6142 processor	16	2.6	22.00	2666	YES	3.3, 3.7	NO	150
Intel® Xeon® Gold 6140 processor	18	2.3	24.75	2666	YES	3.0, 3.7	NO	140
Intel® Xeon® Gold 6138 processor	20	2.0	27.5	2666	YES	2.7, 3.7	NO	125
Intel® Xeon® Gold 6136 processor	12	3.0	24.75	2666	YES	3.6, 3.7	NO	150
Intel® Xeon® Gold 6134 processor	8	3.2	24.75	2666	YES	3.7, 3.7	NO	130
Intel® Xeon® Gold 6132 processor	14	2.6	19.25	2666	YES	3.3, 3.7	NO	140
Intel® Xeon® Gold 6130 processor	16	2.1	22.00	2666	YES	2.8, 3.7	NO	125
Intel® Xeon® Gold 6128 processor	6	3.4	19.25	2666	YES	3.7, 3.7	NO	115
Intel® Xeon® Gold 5222 processor	4	3.8	16.5	2666	YES	3.9, 3.9	YES	105
Intel® Xeon® Gold 5220 processor	18	2.2	24.75	2666	YES	2.7, 3.9	YES	105
Intel® Xeon® Gold 5218 processor	16	2.3	22	2666	YES	2.8, 3.9	YES	125
Intel® Xeon® Gold 5215 processor	10	2.5	13.75	2666	YES	3.0, 3.4	YES	85
Intel® Xeon® Gold 5120 processor	14	2.2	19.25	2400	YES	2.6, 3.2	NO	105
Intel® Xeon® Gold 5118 processor	12	2.3	16.50	2400	YES	2.7, 3.2	NO	105
Intel® Xeon® Gold 5115 processor	10	2.4	13.75	2400	YES	2.8, 3.2	NO	85



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Intel® Xeon® Gold 5122 processor	4	3.6	16.50	2666	YES	3.7, 3.7	NO	105
Intel® Xeon® Silver 4216 processor	16	2.1	22	2400	YES	2.7, 3.2	NO	100
Intel® Xeon® Silver 4215 processor	8	2.5	11	2400	YES	3.0, 3.5	YES	85
Intel® Xeon® Silver 4214Y processor	12	2.2	16.5	2400	YES	2.7, 3.2	NO	85
Intel® Xeon® Silver 4214 processor	12	2.2	16.5	2400	YES	2.7, 3.2	NO	85
Intel® Xeon® Silver 4210 processor <sup>3</sup>	10	2.2	13.75	2400	YES	2.7, 3.2	NO	85
Intel® Xeon® Silver 4208 processor <sup>3</sup>	8	2.1	11	2400	YES	2.5, 3.2	NO	85
Intel® Xeon® Silver 4116 processor	12	2.1	16.50	2400	YES	2.4, 3.0	NO	85
Intel® Xeon® Silver 4114 processor	10	2.2	13.75	2400	YES	2.5, 3.0	NO	85
Intel® Xeon® Silver 4112 processor	4	2.6	8.25	2400	YES	2.9, 3.0	NO	85
Intel® Xeon® Silver 4110 processor	8	2.1	11.00	2400	YES	2.4, 3.0	NO	85
Intel® Xeon® Silver 4108 processor	8	1.8	11.00	2400	YES	2.1, 3.0	NO	85
Intel® Xeon® Bronze 3204 processor <sup>3</sup>	6	1.9 GHz	8.25	2133	YES	N/A	NO	85
Intel® Xeon® Bronze 3106 processor	8	1.7	11.00	2133	NO	N/A	NO	85
Intel® Xeon® Bronze 3104 processor	6	1.7	8.25	2133	NO	N/A	NO	85
<p>All Z6G4 Intel® Xeon® CPUs Feature Intel® vPro™ Technology.</p> <p><sup>1</sup>The specifications shown in this column represent the following: (all core maximum turbo frequency, one core maximum turbo frequency). Processors that do not have turbo functionality are denoted as N/A.</p> <p><sup>2</sup>Intel® Data Center Persistent Memory Modules availability will be announced at a future date.</p> <p><sup>3</sup> Available May 2019</p>								

### Available Processors

#### Disclaimers

When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families.

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.

#### Color

Black

#### Convertibility

No

### Overview

#### Expansion Slots (see system board section for more details)

##### Slot 0:

Mechanical-only, for use with devices that require only rear bulkhead mounting or when 2<sup>nd</sup> CPU riser is installed

##### Slot 1:

PCI Express Gen3 x4 - CPU with open-ended connector\*

##### Slot 2:

PCI Express Gen3 x16 - CPU

##### Slot 3:

PCI Express Gen3 x4 - PCH with open-ended connector\*

##### Slot 4:

PCI Express Gen3 x8 - CPU with open-ended connector (slot converts to x4 electrical when SSD is installed in 2nd M.2 slot)\*

##### Slot 5:

PCI Express Gen3 x16 - CPU

##### Slot 6:

PCI Express Gen3 x4 - PCH with open-ended connector\*

##### M.2 Slot 1:

M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices

##### M.2 Slot 2:

M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices

\* Open-ended connector allows a greater bandwidth (e.g. x16) card to be installed physically into a lower bandwidth connector/slot.

#### Expansion Bays (see storage section for more details)

2 internal 3.5" bays (with acoustic dampening rail assemblies pre-installed)

2 external 5.25" bays

- 3rd and 4th 3.5" HDD each occupy one external bay
- 3rd and 4th 2.5" HDD/SSD occupy a single external bay within a 2:1 carrier)

1 dedicated 9.5mm slim optical disk drive bay

#### Front I/O

- Base: Power button, 1 Headset audio port, 4 USB 3.1 G1 Type A (1 charging)
- Premium (optional): Power button, 1 Headset audio port, 2 USB 3.1 G2 Type C™, 2 USB 3.1 G1 Type A (1 charging)
- Optional: SD reader

#### Internal I/O

1 USB 3.1 G1 (aka USB 3.0) single-port header, 1 USB 2.0 single-port header and 1 USB 2.0 dual-port header

#### Rear I/O

6 USB 3.1 G1 (aka USB 3.0) Type A ports, 2 1Gbe LAN ports (1x supporting Intel® AMT), Audio: 1 Line out, 1 Line in (Line in can be retasked as microphone), 1 PS/2 mouse port, 1 PS/2 keyboard port, 1 Rear power button

Optional: 1 serial port (cable up to rear bulkhead)

#### Interfaces Supported

SD card reader (optional)

6-channel SATA interface (6 @ 6.0 Gb/s)

6 channels are eSATA configurable for use with eSATA CTO/AMO Kit (No hot plug / hot swap supported)

### Overview

USB 2.0, USB 3.1 G1 (aka USB 3.0), USB 3.1 G2 (optional)

**On-board RAID Support** SATA RAID 0 Striped Array  
SATA RAID 1 Mirrored Array  
SATA RAID 5 Striped/Parity  
SATA RAID 10 Striped/Mirrored

**Chassis Dimensions (H x W x D)** H: 17.5" (445mm)  
W: 6.65" (169mm)  
D: 18.3" (465mm)

**Packaged Dimensions** H: 24" (610mm)  
W: 12.3" (313mm)  
D: 23.3" (593mm)

**Rack Dimensions** 4U

**Weight** Exact weights depend upon configuration (System weight only).  
Minimum: 13.1 kg (29 lbs.)  
Standard: 13.6 kg (30.1 lbs.)  
Maximum: 23.9 kg (52.7 lbs.)

**Temperature** Operating: 5° to 35°C (40° to 95°F)  
Non-operating: -40° to 60°C (-40° to 140°F)

**Note:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase

**Humidity** Operating: 10% to 85% relative humidity, non-condensing, 35° C maximum wet bulb  
Non-operating: 10% to 90% relative humidity, non-condensing, 35° C maximum wet bulb

**Maximum Altitude (non-pressurized)** Operating: 3,048m (10,000ft)  
Non-operating: 9,144m (30,000ft)

**Note:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase

**Power Supply** 1000 watts wide-ranging, active Power Factor Correction, 90% Efficient, with 2X 6-pin graphics power cables (graphics power cables are 6/8-pin convertible)

The Z6 G4 1000W power supply efficiency report can be found at this link:  
[https://plugloadsolutions.com/psu\\_reports/HP\\_D15-1K0P1A\\_1000W\\_ECOS%204838\\_Report.pdf](https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf)

**Workstation ISV Certifications** See the latest list of certifications at  
<http://www8.hp.com/us/en/campaigns/workstations/industries-and-partners.html>



### Supported Components

#### Processors

	Factory Configured	Option Kit	Option Kit Part Number <sup>1</sup>	Support Notes
<b>Intel® Xeon® W-3200 Series CPU</b>				
Intel® Xeon® W-3245 3.2 2933 16C processor	Y	N		
Intel® Xeon® W-3235 3.3 2933 12C processor	Y	N		
Intel® Xeon® W-3225 3.7 2666 8C processor	Y	N		
Intel® Xeon® W-3223 3.5 2666 8C processor	Y	N		
<b>Intel® Xeon® Scalable CPU</b>				
Intel® Xeon® Platinum 8280 processor	Y	N		1
Intel® Xeon® Platinum 8260 processor	Y	N		1
Intel® Xeon® Platinum 8180 processor	Y	N		
Intel® Xeon® Platinum 8160 processor	Y	Y	1XM35AA	
Intel® Xeon® Gold 6254 processor	Y	N		1
Intel® Xeon® Gold 6252 processor	Y	Y	5YT07AA	1
Intel® Xeon® Gold 6248 processor	Y	Y	5YT06AA	1
Intel® Xeon® Gold 6244 processor	Y	Y	5YT05AA	1
Intel® Xeon® Gold 6242 processor	Y	Y	5YT04AA	1
Intel® Xeon® Gold 6240Y processor	Y		5YT03AA	1
Intel® Xeon® Gold 6240 processor	Y	Y	5YT02AA	1
Intel® Xeon® Gold 6230 processor	Y	Y	5YS99AA	1
Intel® Xeon® Gold 6152 processor	Y	Y	1XM36AA	
Intel® Xeon® Gold 6154 processor	Y	N		
Intel® Xeon® Gold 6148 processor	Y	Y	1XM37AA	
Intel® Xeon® Gold 6146 processor	Y	N		
Intel® Xeon® Gold 6144 processor	Y	Y	3BA12AA	
Intel® Xeon® Gold 6142 processor	Y	Y	1XM38AA	
Intel® Xeon® Gold 6140 processor	Y	Y	1XM40AA	
Intel® Xeon® Gold 6138 processor	Y	Y	3GG95AA	
Intel® Xeon® Gold 6136 processor	Y	Y	1XM39AA	
Intel® Xeon® Gold 6134 processor	Y	Y	1XM41AA	
Intel® Xeon® Gold 6132 processor	Y	Y	1XM42AA	
Intel® Xeon® Gold 6130 processor	Y	Y	1XM43AA	
Intel® Xeon® Gold 6128 processor	Y	Y	1XM44AA	
Intel® Xeon® Gold 5222 processor	Y	Y	5YS97AA	1
Intel® Xeon® Gold 5220 processor	Y	Y	5YS96AA	1
Intel® Xeon® Gold 5218 processor	Y	Y	5YS95AA	1
Intel® Xeon® Gold 5215 processor	Y	Y	5YS94AA	1
Intel® Xeon® Gold 5120 processor	Y	Y	1XM47AA	
Intel® Xeon® Gold 5118 processor	Y	Y	1XM45AA	
Intel® Xeon® Gold 5115 processor	Y	Y	1XM46AA	
Intel® Xeon® Gold 5122 processor	Y	Y	4MB89AA	
Intel® Xeon® Gold 4216 processor	Y	Y	5YS93AA	
Intel® Xeon® Gold 4215 processor	Y	Y	5YS92AA	1
Intel® Xeon® Gold 4214Y processor	Y	Y	5ZB33AA	

### Supported Components

Intel® Xeon® Gold 4214 processor	Y	Y	5YS91AA	
Intel® Xeon® Gold 4210 processor	Y	Y	5YS90AA	2
Intel® Xeon® Gold 4208 processor	Y	Y	5YS89AA	2
Intel® Xeon® Silver 4116 processor	Y	Y	1XM48AA	
Intel® Xeon® Silver 4114 processor	Y	Y	1XM49AA	
Intel® Xeon® Silver 4112 processor	Y	Y	1XM50AA	
Intel® Xeon® Silver 4110 processor	Y	Y	3GG94AA	
Intel® Xeon® Silver 4108 processor	Y	Y	1XM51AA	
Intel® Xeon® Gold 3204 processor	Y	Y	5YS88AA	2
Intel® Xeon® Bronze 3106 processor	Y	Y	1XM52AA	
Intel® Xeon® Bronze 3104 processor	Y	Y	1XM53AA	

<sup>1</sup> Options kits available for second processor upgrade.

**Disclaimers:** When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families.

**Note 1:** Intel® DCPMM® (Data Center Persistent Memory) Supported. Availability will be announced at a future date.

**Note 2:** Available May 2019

### Monitors / Displays

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z Display Z22n G2		Y	1JS05AA	
HP Z Display Z23n G2		Y	1JS06AA	
HP Z Display Z24i G2		Y	1JS08AA	
HP Z Display Z24n G2		Y	1JS09AA	
HP Z Display Z24nf G2		Y	1JS07AA	
HP Z Display Z27n G2		Y	1JS10AA	
HP Z Display Z27s (4K display)		Y	J3G07AA	

Supported by all operating systems available from HP  
Screen size measured diagonally

### Storage / Hard Drives

#### SAS Hard Drives

SAS Hard Drives for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 300GB 15k SAS SFF	Y	Y	L5B74AA	
<b>NOTE:</b> SAS controller add-in card required				

### Supported Components

#### SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>SATA (Serial ATA) Hard Drives for HP Workstations</b>				
500GB SATA 7200RPM 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
500GB SATA 7200RPM 6Gb/s OPAL2 SFF 3.5" HDD	Y	Y	D8N29AA	
1TB SATA 7200RPM 3.5" HDD	Y	Y	LQ037AA	
1TB SATA 7200RPM Ent 3.5" HDD	Y	Y	W0R10AA	
2TB SATA 7200RPM HDD	Y	Y	QB576AA	
4TB SATA 7200RPM Ent 3.5" HDD	Y	Y	K4T76AA	
6TB SATA 7200RPM Ent 3.5" HDD	Y	Y	3DH90AA	

#### NOTES:

Up to (4) 3.5-inch 7200 rpm SATA drives: 500 GB, 1.0, 2.0, 4.0 TB; maximum system HDD storage: 16.0TB

### Supported Components

#### SATA Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>HP Solid State Drives (SSDs) for Workstations</b>				
HP 256GB SATA SSD	Y	Y	A3D26AA	
HP 512GB SATA SSD	Y	Y	D8F30AA	
HP 1TB SATA SSD	Y	Y	F3C96AA	
HP 2TB SATA SSD	Y	Y	Y6P08AA/AT	
HP 256GB SATA SED OPAL2 SSD	Y	Y	G7U67AA	
HP 512GB SATA SED OPAL2 SSD	Y	Y	N8T26AA	
HP 240GB SATA Enterprise SSD	Y	Y	T3U07AA	
HP 480GB SATA Enterprise SSD	Y	Y	T3U08AA	

#### PCIe Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>PCIe SSDs for HP Workstations</b>				
HP Z Turbo Drive 256GB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD56AA	
HP Z Turbo Drive 512GB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD57AA/AT	
HP Z Turbo Drive 1TB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD58AA	
HP Z Turbo Drive 256GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD59AA/AT	
HP Z Turbo Drive 512GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD60AA	
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD61AA	
HP Z Turbo Drive 2TB TLC Z4/Z6 G4 SSD Kit	Y	Y	3KP39AA	
HP Z Turbo Drive 256GB Z4/Z6 G4 SED Kit	Y	Y	2SA31AA	
HP Z Turbo Drive 512GB Z4/Z6 G4 SED Kit	Y	Y	2SA32AA	
HP Z Turbo Drive 1TB Z4/Z6 G4 SED Kit	Y	Y	6YT76AA	
HP Z Turbo Drive 1TB Z4/Z6 G4 SED Module	Y	Y	6YT79AA	
<b>HP Z Turbo Drive Dual Pro</b>				
HP Z Turbo Drive Dual Pro 256GB TLC SSD	Y	Y	4YF60AA	3
HP Z Turbo Drive Dual Pro 512GB TLC SSD	Y	Y	4YF61AA	3
HP Z Turbo Drive Dual Pro 1TB TLC SSD	Y	Y	4YF62AA	3
HP Z Turbo Drive Dual Pro 2TB TLC SSD	Y	Y	4YF63AA	3
<b>HP Z Turbo Drive Quad Pro</b>				
HP Z Turbo Drive Quad Pro 2x256GB PCIe TLC SSD	Y	Y	4YZ38AA	1
HP Z Turbo Drive Quad Pro 2x512GB PCIe TLC SSD	Y	Y	4YZ39AA	1
HP Z Turbo Drive Quad Pro 2x1TB PCIe TLC SSD	Y	Y	4YZ40AA	1
HP Z Turbo Drive Quad Pro 2x2TB PCIe TLC SSD	Y	Y	3KP42AA	
HP Z Turbo Drive Quad Pro 256GB SSD module	N	Y	N2N00AA	2
HP Z Turbo Drive Quad Pro 512GB SSD module	N	Y	N2N01AA	2
HP Z Turbo Drive Quad Pro 1TB SSD module	N	Y	T9J00AA	2

### Supported Components

HP Z Turbo Drive Quad Pro 2TB SSD module	N	Y	3KP43AA
<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
Intel® Optane SSD 905p 380GB M.2 SSD Module	Y	Y	6LA66AA

**Note 1:** Dual M.2 SSD modules plus carrier

**Note 2:** M.2 SSD module only, designed to be installed into Quad Pro carrier

**Note 3:** Single M.2 SSD module plus dual carrier

\*\* PCIe card installed in standard PCIe x4 slot

### Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>SAS Controller</b>				
MicroSemi SmartHBA2100-4i4e SAS Controller	Y	Y	1FV90AA	

### Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards
<b>Graphics Cable Adapters</b>					
HP DisplayPort to VGA Adapter	Y	Y	AS615AA		
HP DisplayPort to HDMI Adapter	Y	Y	K2K92AA		
HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA		1
HP DisplayPort to DVI-D Adapter	Y	Y	FH973AA		1
HP DisplayPort to DVI-D Adapter (2-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (4-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (6-pack)	Y	N			1
NVIDIA® SLI 3-slot Graphics Connector	Y	Y	2YY85AA		1
<b>Entry 3D</b>					
NVIDIA® Quadro® P400 2GB Graphics	Y	Y	1ME43AA		2
NVIDIA® Quadro® P620 2GB Graphics	Y	Y	3ME25AA		2
AMD FirePro™ W2100 2GB Graphics	Y	Y	J3G91AA		2
<b>Mid-range 3D</b>					
NVIDIA® Quadro® P1000 4GB Graphics	Y	Y	1ME01AA		3
NVIDIA® Quadro® P2000 5GB Graphics	Y	Y	1ME41AA		2
NVIDIA® Quadro® P2200 5GB Graphics	Y	Y	6YT67AA		2
AMD Radeon™ Pro WX 3100 4GB Graphics	Y	Y	2TF08AA		2
AMD Radeon™ Pro WX 3200 4GB Graphics	Y	Y	6YT68AA		2
AMD Radeon™ Pro WX 4100 4GB Graphics	Y	Y	Z0B15AA		2
<b>High End 3D</b>					
NVIDIA® Quadro® P4000 8GB Graphics	Y	Y	1ME40AA		2
NVIDIA® Quadro RTX 4000 8GB Graphics	Y	Y	5JV89AA		2

### Supported Components

AMD Radeon™ Pro WX 7100 8GB Graphics	Y	Y	Z0B14AA	2
<b>Ultra High-End 3D</b>				
NVIDIA® Quadro® GP100 16GB Graphics	Y		1ZE81AA	1
NVIDIA® Quadro® P5000 16GB Graphics	Y	Y	Z0B13AA	2
NVIDIA® Quadro® P6000 24GB Graphics	Y	Y	Z0B12AA	1
NVIDIA® Quadro RTX 5000 16GB Graphics	Y	Y	5JH81AA	1
NVIDIA® Quadro RTX 6000 24GB Graphics	Y	Y	5JH80AA	1
NVIDIA® Quadro RTX 8000 48GB Graphics	Y	Y	6NB51AA	1
AMD Radeon™ Pro WX 9100 16GB Graphics	Y	Y	2TF01AA	1
NVIDIA® Quadro® Sync II	Y	Y	1WT20AA	

Memory	CTO	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>DDR4-2666 ECC Registered DIMMs</b>					
8GB (1x8GB) DDR4-2666 ECC Reg Memory		Y	Y	1XD84AA	1
16GB (1x16GB) DDR4-2666 ECC Reg Memory		N	Y	1XD85AA	1
32GB (1x32GB) DDR4-2666 ECC Reg Memory		N	Y	1XD86AA	1
<b>DDR4-2933 ECC Registered DIMMs</b>					
8GB (1x8GB) DDR4-2933 ECC Reg Memory		Y	Y	5YZ56AA	1
16GB (1x16GB) DDR4-2933 ECC Reg Memory		N	Y	5YZ54AA	1
32GB (1x32GB) DDR4-2933 ECC Reg Memory		N	Y	5YZ55AA	1
64GB (1x64GB) DDR4-2399 ECC Reg Memory		N	Y	5YZ57AA	1

**NOTE 1:** For details on the supported memory configurations on the HP Z6 G4 Workstation, please refer to the System Technical Specifications - System Board section of this document.

Each processor supports up to 6 channels of DDR4 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

With single-processor configurations, 6 DIMM slots are available. 6 additional DIMM slots are available with the 2nd CPU & Memory Module.

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

The Z6 G4 is designed to work ONLY with DDR4 memory. The system will not work with DDR3 memory.

**NOTE 2:** Z6 G4 configurations that include a 2<sup>nd</sup> CPU require the HP Z6 Memory Cooling Solution, which is available both CTO (2JA81AV) and AMO (2HW44AA). Z6 G4 configurations that include greater than 32GB total system memory require the HP Z6 Memory Cooling Solution, which is available both CTO (2JA81AV) and AMO (2HW44AA).

**NOTE:** Factory-configured CTO (xxxxxAV) and aftermarket AMO (xxxxxAA, xxxxxAT) HP memory part numbers designated as "2666" will be transitioned to use "2933" speed memory components. This does not affect HP part number availability nor does it affect system performance or operation. All hardware configurations currently supporting HP memory part numbers designated as "2666" have been tested to work with "2933" memory and are fully-supported by HP under standard support terms.



### Supported Components

#### NVDIMM Memory

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Intel® Optane™ DC Persistent Memory (DCPMM)</b>				
128GB (1x128GB) DC Persistent Memory Module	Y	N		1,2
256GB (2x128GB) DC Persistent Memory Configuration	Y	N		1
512GB (4x128GB) DC Persistent Memory Configuration	Y	N		1,3

**NOTE 1:** Supported only with Xeon 82xx, 62xx, 52xx and 4215 processors.

- a. Available as factory configured in Memory Mode or Storage Mode.
  - i. Microsoft Configured Memory Mode will be available in CQ1 2020
- b. Systems configured with DCPMM memory will operate the memory subsystem at 2666 MT/s.
- c. Operating System Support:
  - i. Windows 10 Pro 64 for Workstations v1903 or later with all updates applied.
  - ii. Linux OS support may be found in the [Linux Hardware Support Matrix](#).
- d. Detailed setup, security and support information may be found in the [Intel® Optane™ DC Persistent Memory: Configuration and Setup on HP Z6 G4 and Z8 G4 Workstation](#) white paper.
- e. DCPMM solutions require additional DRAM memory to be included in the solution:
  - i. Systems configured with DCPMM in Memory Mode will include DRAM memory to be used as cache. The amount of included DRAM memory is based on an 8:1 DCPMM to DRAM capacity ratio.
  - ii. Systems configured with DCPMM in Storage Mode will require DRAM System Memory to be ordered separately.
  - iii. DCPMM Memory will report approximately 2% less than advertised capacity .
- f. Total Memory (DCPMM + DRAM) per processor must be <= 1TB or 2TB per dual processor system.
  - i. Z8 G4 Note: “M” processors support a total memory limit < =2TB per processors or 4TB per dual processor system

**NOTE 2:** Option Kit available in CQ1-2020.

**NOTE 3:** Requires 2<sup>nd</sup> processor option.

### Multimedia and Audio Devices

### Supported Components

#### Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Realtek HD ALC221 Audio	Y	N		

#### Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>HP SlimTray Optical Drives</b>				
HP 9.5mm Slim Blu Ray Disc Writer	Y	Y	K3R65AA	
HP 9.5mm Slim DVD ROM	Y	Y	K3R63AA	
HP 9.5mm Slim DVD Writer	Y	Y	K3R64AA	
<b>HP Half Height Optical Drives</b>				
HP HH DVD Writer (16X RW DVD-R)	N	Y	4AR67AA	
<b>HP SD Card Reader</b>				
HP SD 4 Card Reader	Y	Y	Y0L99AA	
<b>HDD Frame/Carriers</b>				
HP DX175 Removable HDD Carrier	N	Y	1ZX72AA	
HP DX175 Removable HDD Frame/Carrier	N	Y	1ZX71AA	
<b>NVMe Frame/Carrier</b>				
HP QX310 Removable NVMe Frame/Carrier w/PCIe card	N	Y	8GQ89AA/AT	

Actual speeds may vary. No support for DVD-RAM (DVD Writer). 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.

#### Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP i350-T2 PCIe Dual Port Gigabit NIC	Y	Y	V4A91AA	
Intel® i350-T4 PCIe 4-Port Gigabit NIC	N	Y	W8X25AA	
Intel® Ethernet I210-T1 PCIe x1 Gb NIC	Y	Y	E0X95AA	
Aquantia® NBASE-T 5GbE PCIe NIC	N	Y	1PM63AA	
HP Dual Port 10GBase-T NIC Module	Y	Y	1QL49AA	
Intel® 8265 802.11 a/b/g/n/ac + BT PCIe WLAN	N	Y	1QL48AA	
Intel® X550-T2 10GbE Dual Port NIC	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	Y	Y	1QL47AA	1

## Supported Components

HP 10GbE SFP+ SR Transceiver	Y	Y	C3N53AA	
Intel® Wi-Fi 6 AX200 & BT PCIe	N	Y	7CE01AA	1

**Note 1:** Windows 7 is NOT supported

## Racking and Physical Security

### Supported Components

#### Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z4/Z6 Side Panel Barrel Keylock	Y	N		
HP Solenoid Lock / Hood Sensor	Y	N		
HP Z4/Z6 Depth Adjustable Fixed Rail Rack Kit	N	Y	2HW42AA	
HP Keyed Cable Lock 10mm	N	Y	T1A62AA	

#### Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Wireless Business Slim Keyboard and Mouse	Y	Y	N3R88AA	
Business Slim PS/2 Wired Keyboard	Y	Y	N3R86AA	
USB Business Slim Wired Keyboard	Y	Y	N3R87AA	
USB Premium Wired Keyboard	Y	Y	Z9N40AA	
USB Wired SmartCard CCID Keyboard	Y	Y	E6D77AA	
3Dconnexion CADMouse	Y	Y	M5C35AA	
HP Optical USB Mouse	Y	Y	QY777AA	
HP PS/2 Mouse	Y	Y	QY775AA	
HP USB Hardened Mouse	Y	Y	P1N77AA	

#### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP ENERGY STAR® Certified Configuration	Y			
HP Z Premium Front I/O 2xUSB-A 2xUSB-C	Y	Y	1XM32AA	
HP Z6 G4 Memory Cooling Solution	Y	Y	2HW44AA	Note 1
HP Internal USB Port Kit	N	Y	EM165AA	Note 2
HP eSATA 2 port PCI Bulkhead Kit	Y	Y	GM110AA	
HP Serial Port Adapter	Y	Y	PA716A	
HP Workstation Mouse Pad	Y			

**Note 1:** Z6 G4 configurations that include a 2nd CPU require the HP Z6 Memory Cooling Solution, which is available both CTO (2JA81AV) and AMO (2HW44AA). Z6 G4 configurations that include greater than 32GB total system memory require the HP Z6 Memory Cooling Solution, which is available both CTO (2JA81AV) and AMO (2HW44AA).

**Note 2:** The HP Internal USB Port kit has a single USB 2.0 type A connector.

#### Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Sobey Video Editing SW	Y	N		

Supported Components

SW HP RGS for Z	Y	N
HP Sure Start Gen3	Y	N
HP Performance Advisor	Y	N

### Supported Components

#### Operating Systems

#### Support Notes

Windows 10 Pro 64

Windows 7 Professional 64-bit

Windows 10 Downgrade to Windows 7

HP Linux® Installer Kit

Note 2

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

Note 1

**NOTE 1:** This second OS must be ordered with the HP Linux® Installer Kit as the first OS.

**NOTE 2:** includes drivers for 64-bit OS versions of RHEL 6 & 7, SUSE Linux® Enterprise Desktop 11 and Ubuntu 14.04. For detailed Linux® OS/hardware support information, see:

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

For detailed Windows 7 OS hardware support information see

<http://h10032.www1.hp.com/ctg/Manual/c05857891.pdf>.

Intel Xeon® SP Processors: Platinum 8100, Gold 6100, Gold 5100, Silver 4100, & Bronze 3100 Family support Microsoft Windows 7 Professional 64-bit.



### System Technical Specifications

#### System Board

##### System Board Form Factor

Main System Board:  
24 x 31 cm  
9.6 x 12.2 inches

2nd CPU/Memory Board (optional):  
14.9 x 29.2 cm  
5.85 x 11.50 inches

##### Processor Socket

FCLGA3647 (Socket P)  
1st CPU on system board  
2nd CPU on optional 2nd CPU/Memory Module  
UPI: Up to 10.4GT/second, depending on processor

##### CPU Bus Speed

##### Chipset

Intel® C622 Chipset

##### Super I/O Controller

Nuvoton SIO15

##### Memory Expansion Slots

6 on system board (CPU0) + 6 on optional 2nd CPU/Memory Module (CPU1)

##### Memory Type Supported

DDR4 R-DIMM (Registered), ECC: 8GB, 16GB, 32GB, and 64GB

##### Memory Modes

NUMA (Non-Uniform Memory Architecture), Memory Node Interleave

##### Memory Speed Supported

2133MT/s, 2400MHz, 2666MT/s, and 2933MT/s

#### Available Memory Configurations:

Single Processor							
CPU 0							
Capacity	Top Slots			Bottom Slots			Perf Rating
	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	
8 GB	8 GB						Fair
16 GB	8 GB					8 GB	Good
24 GB	8 GB	8 GB	8 GB				Better
32 GB	8 GB		8 GB	8 GB		8 GB	Better
	16 GB					16 GB	Good
48 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	Best
	16 GB	16 GB	16 GB				Better
64 GB	16 GB		16 GB	16 GB		16 GB	Better
	32 GB					32 GB	Good
96 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	Best
	32 GB	32 GB	32 GB				Better
128 GB	32 GB		32 GB	32 GB		32 GB	Better
192 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	Best
256 GB	64 GB		64 GB	64 GB		64 GB	Better
384 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	Best

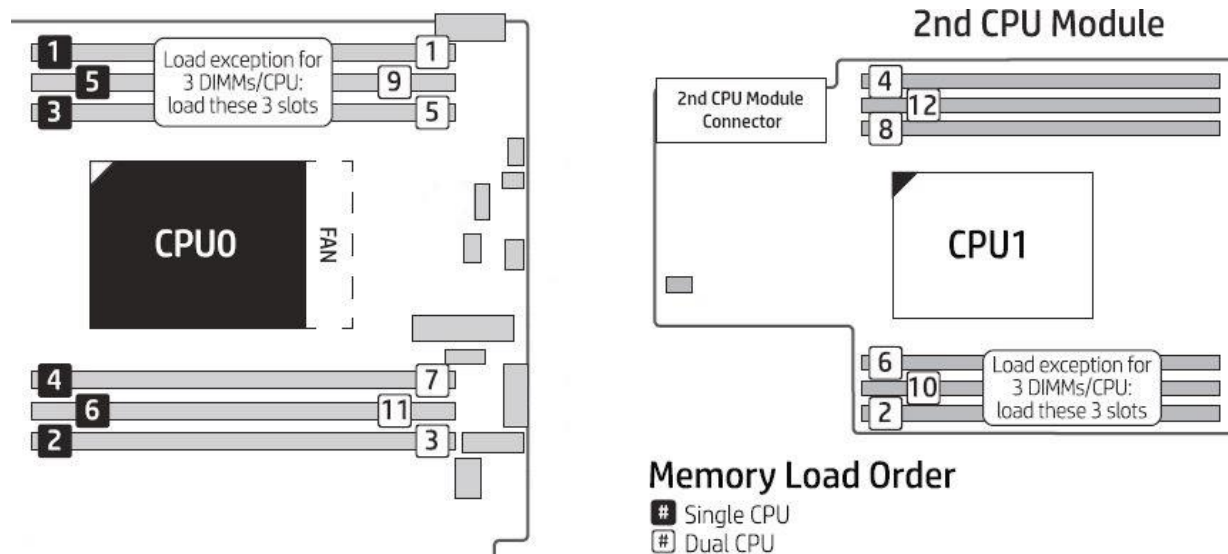
### System Technical Specifications

Dual Processor													
CPU 0							CPU 1						
Top Slots			Bottom Slots				Top Slots			Bottom Slots			
Capacity	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	Rating
16 GB	8 GB						8 GB						Fair
32 GB	8 GB					8 GB	8 GB					8 GB	Good
48 GB	8 GB	8 GB	8 GB				8 GB	8 GB	8 GB				Better
64 GB	8 GB		8 GB	8 GB		8 GB	8 GB		8 GB	8 GB		8 GB	Better
	16 GB					16 GB	16 GB					16 GB	Good
96 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	8 GB	Best
	16 GB	16 GB	16 GB				16 GB	16 GB	16 GB				Better
128 GB	16 GB		16 GB	16 GB		16 GB	16 GB		16 GB	16 GB		16 GB	Better
	32 GB					32 GB	32 GB					32 GB	Good
192 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	16 GB	Best
	32 GB	32 GB	32 GB				32 GB	32 GB	32 GB				Better
256 GB	32 GB		32 GB	32 GB		32 GB	32 GB		32 GB	32 GB		32 GB	Better
	64 GB					64 GB	64 GB					64 GB	Best
384 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	32 GB	Better
	64 GB	64 GB	64 GB				64 GB	64 GB	64 GB				Best
512 GB	64 GB		64 GB	64 GB		64 GB	64 GB		64 GB	64 GB		64 GB	Fair
768 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	64 GB	Good

### System Technical Specifications

#### Memory Loading Order:

#### Load Order for Single and Dual Processor Configuration



#### Maximum Memory

Supports up to 768 GB DDR4-2933 ECC RAM\* (transfer rates up to 2933MT/s) and 384 GB DDR4-2666 ECC RAM (transfer rates up to 2666MT/s).

#### Memory Configuration (Supported)

- Only Registered ECC DIMMs are supported.
- Do not install memory modules into memory slots if corresponding processor is not installed.
- Dual processor configurations with memory modules installed for only one processor is not supported.

#### Notes

For systems installed with Microsoft Windows 7 (Ultimate, Enterprise or Pro), the maximum accessible system memory is 192GB

\*768 GB configuration requires 2 CPUs configuration.

#### NVDIMM Memory

Intel® Optane™ DC Persistent Memory is available factory configured in the following capacities:

- 128GB (1x128GB) Single Processor Configuration
- 256GB (2x128GB) Single Processor Configuration
- 512GB (4x128GB) Dual Processor Configuration

#### NOTES:

- Supported only with Xeon 82xx, 62xx, 52xx and 4215 processors.
  - Available as factory configured in Memory Mode or Storage Mode.
    - Microsoft Configured Memory Mode will be available in CQ1 2020
  - Systems configured with DCPMM memory will operate the memory subsystem at 2666 MT/s.
  - Operating System Support:
    - Windows 10 Pro 64 for Workstations v1903 or later with all updates applied.
    - Linux OS support may be found in the [Linux Hardware Support Matrix](#).
  - Detailed setup, security and support information may be found in the [Intel® Optane™ DC Persistent Memory: Configuration and Setup on HP Z6 G4 and Z8 G4 Workstation white paper](#).
  - DCPMM solutions require additional DRAM memory to be included in the solution:

### System Technical Specifications

- i. Systems configured with DCPMM in Memory Mode will include DRAM memory to be used as cache. The amount of included DRAM memory is based on an 8:1 DCPMM to DRAM capacity ratio.
  - ii. Systems configured with DCPMM in Storage Mode will require DRAM System Memory to be ordered separately.
  - iii. DCPMM Memory will report approximately 2% less than advertised capacity .
- f. Total Memory (DCPMM + DRAM) per processor must be <= 1TB or 2TB per dual processor system.
  - i. Z8 G4 Note: “M” processors support a total memory limit < =2TB per processors or 4TB per dual processor system
- 2. Option Kit available in CQ1-2020.
- 3. Requires 2<sup>nd</sup> processor option.

#### PCI Express Connectors Slot 0:

Mechanical-only, for use with devices that require only rear bulkhead mounting or when 2<sup>nd</sup> CPU riser is installed

#### Slot 1:

PCI Express Gen3 x4 - CPU with open-ended connector\*

#### Slot 2:

PCI Express Gen3 x16 - CPU

#### Slot 3:

PCI Express Gen3 x4 - PCH with open-ended connector\*

#### Slot 4:

PCI Express Gen3 x8 – CPU with open-ended connector (slot converts to x4 electrical when SSD is installed in 2nd M.2 slot)\*

#### Slot 5:

PCI Express Gen3 x16 - CPU

#### Slot 6:

PCI Express Gen3 x4 - PCH with open-ended connector\*

#### M.2 Slot 1:

M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices

#### M.2 Slot 2:

M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices

\* Open-ended connector allows a greater bandwidth (e.g. x16) card to be installed physically into a lower bandwidth connector/slot.

#### Supported Drive Interfaces

**SATA** 6 SATA @6Gb/s, supports RAID 0, 1, 5, & 10

**Serial Attached SCSI** Requires Optional PCIe card

**Factory Configured RAID** SATA RAID 0 Striped Array  
SATA RAID 1 Mirrored Array  
SATA RAID 10 Striped/Mirrored

#### Notes:

Factory integrated Intel® SATA RAID is Microsoft Windows only.

### System Technical Specifications

	<b>External SATA (eSATA)</b>	Supported on all SATA ports configurable with optional eSATA* cable kit * hot plug / hot swap not supported with eSATA
<b>Network Controller</b>	<b>Integrated Intel® I219LM GbE LAN</b>	Supports the following management functionalities: Intel® AMT11.2, TXT, DASH 1.1, WOL, VLAN, and PXE 2.1
	<b>Integrated Intel X722 for 1GbE</b>	Data rates supported: 1000 Mb/s Compliance IEEE 802.1as/1588v2, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3x Up to 16 UDP/TCP programmable filters Bus architecture: PCIe 3.0 UEFI and PXE Boot ROM support Intel iWARP Support (RDMA) Network transfer rates: 1000BASE-T (full-duplex) 2000 Mb/s Management capabilities: WOL (Excluding Max Power Savings), auto MDI crossover, PXE, Quad Hash filtering, RSS, Advanced cable diagnostics
<b>USB Connector(s)</b>	<b>Front</b>	Front I/O Entry: 4 USB 3.1 Gen1 (Left-most Port has Charging Capability) Front I/O Premium: 2x USB 3.1 Gen1, 2x USB 3.1 Gen2 Type-C™ (Left-most Port has Charging Capability) <ul style="list-style-type: none"> <li>Charging Ports provide 1.5 Amps @ 5 Volts</li> <li>Standard USB Type A Ports provide 900mA @ 5 Volts</li> <li>USB Type C Ports provide 3 Amps @ 5 Volts and adhere to the Power Delivery 3.0 specification.</li> </ul>
	<b>Rear</b>	6 USB 3.1 G1 Type A
	<b>Internal</b>	1 USB 3.1 G1 single-port header 1 USB 2.0 single-port header 1x USB 2.0 dual-port header
<b>Integrated Graphics</b>	No	
<b>HD Integrated Audio</b>	Realtek ALC221	
<b>Flash ROM</b>	Yes	
<b>CPU Fan Header</b>	One for each CPU socket	
<b>Rear Chassis Fan Header</b>	Yes	
<b>Front PCI Fan Header</b>	Yes	
<b>CMOS Battery Holder - Lithium</b>	Yes	
<b>Integrated Trusted Platform Module</b>	Common Criteria EAL4+ Certified FIPS 140-2 Certified TPM Certified products list: <a href="https://trustedcomputinggroup.org/membership/certification/tpm-certifiedproducts/">https://trustedcomputinggroup.org/membership/certification/tpm-certifiedproducts/</a>	
<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>Serial Port</b>	1 internal header	
<b>Parallel Port</b>	No	
<b>Keyboard/Mouse</b>	USB or PS/2	

### System Technical Specifications

<b>Hood Lock Header</b>	Yes
<b>Hood Sensor Header</b>	Yes
<b>Memory Fan</b>	1 Memory Fan Header per CPU
<b>AUX IN (audio)</b>	No

### Z6 Required Power Supply Info

<b>Power Supply</b>	1000W 90% Efficient, Custom PSU (Wide Ranging, Active PFC)	
<b>Operating Voltage Range</b>	90–269 VAC	
<b>Rated Voltage Range</b>	100-127 VAC 200-240 VAC	118 VAC
<b>Rated Line Frequency</b>	50-60 Hz	400 Hz
<b>Operating Line Frequency Range</b>	47-66 Hz	393-407 Hz
<b>Rated Input Current</b>	12 A @ 100-127 VAC 6.3 A @ 200-240 VAC	12A @ 118 VAC
<b>Heat Dissipation</b> (Configuration and software dependent)	Typical = 2467 btu/hr Maximum = 4112 btu/hr	
<b>Power Supply Fan</b>	80x25 mm variable speed	
<b>ENERGY STAR® Qualified</b> (Configuration dependent)	Yes	

<b>80 PLUS® Compliant</b>	Yes, 90% Efficient The Z6 G4 1000W power supply efficiency report can be found at this link: <a href="https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf">https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf</a>
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<b>FEMP Standby Power Compliant @115V</b> (<1W in S5 – Power Off)	Yes
<b>EuP Compliant @ 230V</b> (<0.5 W in S5 – Power Off)	Yes
<b>CECP Compliant @ 220V</b> (<4W in S3 – Suspend to RAM)	Yes; Configuration dependent
<b>Power Consumption in sleep mode</b> (as defined by ENERGY STAR®) – Suspend to RAM (S3) (Instantly Available PC)	<= 20W
<b>Built-in Self Test LED</b>	Yes
<b>Surge Tolerant Full Ranging Power Supply</b> (withstands power surges up to 2000V)	Yes

<b>Sensor Header</b>	Integrated in Front User Interface (Power Switch, Power LED, HDD LED, Speaker) Cable
<b>Integrated Gigabit Ethernet</b>	Integrated Intel® I219LM GbE LAN
<b>Clear CMOS Button</b>	Yes



### System Technical Specifications

### System Configuration

<b>Example Z6 G4 Configuration #1</b>	Processor	1x Intel Xeon 3104 (Six-core)					
	Memory	1x 8GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA Quadro P400					
	Disks / Optical	1x 500GB SATA 7200 ; 1x Slim DVD-ROM SATA					
	Power Supply	1000W 90% custom PSU					
	Other	NA					
		115 VAC		230 VAC		100 VAC	
<b>Energy Consumption</b>		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	54.109		54.586		54.906	
	Windows Busy Typ(S0)	94.256		94.275		94.043	
	Windows Busy Max (S0)	95.992		95.268		95.643	
	Sleep (S3)	6.219	6.205	6.319	6.306	6.334	6.239
	Off (S5)	3.354	3.343	3.521	3.341	3.350	3.342
	Zero Power Mode (ErP)	0.209		0.388		0.195	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	184.619		186.247		187.339	
	Windows Busy Typ(S0)	321.601		321.666		320.875	
	Windows Busy Max (S0)	327.524		325.054		326.334	
	Sleep (S3)	21.219	21.171	21.561	21.516	21.611	21.287
	Off (S5)	11.444	11.406	12.014	11.399	11.430	11.403
	Zero Power Mode (ErP)	0.713		1.323		0.665	

<b>Example Z6 G4 Configuration #2</b>	Processor	1x Intel Xeon 4108 (Eight-core)					
	Memory	4x 8GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA Quadro P2000					
	Disks / Optical	2x 1TB SATA 7200 ; 1x Slim DVDRW SATA					
	Power Supply	1000W 90% custom PSU					
	Other	NA					
		115 VAC		230 VAC		100 VAC	
<b>Energy Consumption (Watts)</b>		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	61.661		61.531		61.354	
	Windows Busy Typ(S0)	168.665		167.375		166.535	
	Windows Busy Max (S0)	166.097		163.682		169.674	
	Sleep (S3)	7.231	7.177	7.229	7.217	7.324	7.248
	Off (S5)	3.376	3.366	3.527	3.512	3.354	3.350
	Zero Power Mode (ErP)	0.211		0.386		0.195	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	210.387		209.944		209.340	

### System Technical Specifications

Windows Busy Typ(S0)	575.485		571.084		568.217	
Windows Busy Max (S0)	576.959		575.543		578.928	
Sleep (S3)	24.672	24.488	24.665	24.624	24.989	24.730
Off (S5)	11.519	11.484	12.034	11.983	11.443	11.430
Zero Power Mode (ErP)	0.720		1.317		0.665	

<b>Example Z6 G4 Configuration #3</b> ENERGY STAR QUALIFIED	Processor	1x Intel Xeon 6136 (Twelve-core)				
	Memory	6x 8GB DDR4-2666 (Registered DIMM)				
	Graphics	1x NVIDIA QuadroP4000				
	Disks/Optical	2x 1TB SATA 7200 ; 1x Slim DVDRW SATA				
	Power Supply	1000W 90% custom PSU				
	Other	NA				

<b>Energy Consumption</b> (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	79.074		79.109		79.938	
	Windows Busy Typ(S0)	324.975		317.991		327.451	
	Windows Busy Max (S0)	328.268		320.296		329.668	
	Sleep (S3)	7.847	7.756	7.878	7.826	7.931	7.852
	Off (S5)	3.353	3.348	3.535	3.489	3.373	3.355
	Zero Power Mode (ErP)	0.206		0.386		0.196	

<b>Heat Dissipation</b> (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	269.801		269.920		272.748	
	Windows Busy Typ(S0)	1108.815		1084.985		1117.262	
	Windows Busy Max (S0)	1120.051		1092.850		1124.827	
	Sleep (S3)	26.774	26.463	26.880	26.702	27.061	26.791
	Off (S5)	11.441	11.426	12.061	11.904	11.509	11.447
	Zero Power Mode (ErP)	0.703		1.317		0.669	

<b>Example Z6 G4 Configuration #4</b>	Processor	2x Intel Xeon 8160 (Dual 24-core)				
	Memory	12x 32GB DDR4-2666 (Registered DIMM)				
	Graphics	2x NVIDIA Quadro P5000				
	Disks / Optical	4x 2TB SATA 7200 ; 1x Slim DVDRW SATA				
	Power Supply	1000W 90% custom PSU				
	Other	NA				

<b>Energy Consumption</b> (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	112.388		115.635		112.102	
	Windows Busy Typ(S0)	512.368		490.165		526.905	
	Windows Busy Max (S0)	698.548		673.465		706.461	
	Sleep (S3)	14.208	13.833	14.698	14.487	15.176	13.886

### System Technical Specifications

	Off (S5)	3.511	3.418	3.575	3.570	3.509	3.412
	Zero Power Mode (ErP)	0.287		0.387		0.272	
<b>Heat Dissipation</b> (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	383.469		394.547		382.492	
	Windows Busy Typ(S0)	1748.120		1672.443		1797.800	
	Windows Busy Max (S0)	2383.446		2297.863		2410.445	
	Sleep (S3)	48.478	47.198	50.150	49.430	51.781	47.379
	Off (S5)	11.980	11.662	12.198	12.181	11.973	11.642
	Zero Power Mode (ErP)	0.979		1.321		0.928	

**NOTE:** Power consumption measurements do not take advantage of the Intel Turbo Boost Technology. As a result, power consumption measurements may be higher.

### DECLARED NOISE EMISSIONS

<b>System Configuration</b> (Entry level)	<b>Processor Info</b>	Intel® Xeon® Gold 6130 processor 2.1GHz 12C CPU					
	<b>Memory Info</b>	24GB (3x8GB) DDR4-2666 ECC Memory RDIMMs					
	<b>Graphics Info</b>	1-NVIDIA® Quadro® P400 2GB					
	<b>Disks/Optical</b>	1-500GB SATA 7200RPM 3.5" HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer					
	<b>Power Supply</b>	1000 W					

<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>	3.3	15
	<b>Hard drive Operating</b> (random reads)	3.5	18

<b>System Configuration</b> (Mid-range)	<b>Processor Info</b>	Intel® Xeon® Platinum 8168 processor 2.7GHz 24C CPU					
	<b>Memory Info</b>	96GB (6x16GB) DDR4-2666 ECC Memory RDIMMs					
	<b>Graphics Info</b>	1-NVIDIA® Quadro® P6000 24GB					
	<b>Disks/Optical</b>	2-4TB 6Gb/s 7200RPM SATA HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer					
	<b>Power Supply</b>	1000 W					

<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>	3.8	23
	<b>Hard drive Operating</b> (random reads)	3.9	23

### System Technical Specifications

<b>System Configuration (High end)</b>	<b>Processor Info</b>	2-Intel® Xeon® Gold 6136 processor 3.0GHz 12C CPU
	<b>Memory Info</b>	192GB (12x16GB) DDR4-2666 ECC Memory RDIMMs
	<b>Graphics Info</b>	1-NVIDIA® Quadro® P6000 24GB
	<b>Disks/Optical</b>	2-4TB 6Gb/s 7200RPM SATA HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer
	<b>Power Supply</b>	1000 W

<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>	3.8	23
	<b>Hard drive Operating</b> (random reads)	3.9	24

### ENVIRONMENTAL DATA

<b>Environmental Requirements</b>	<b>Temperature</b>	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F)
	<b>Humidity</b>	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
	<b>Maximum Altitude</b>	Operating: 3,048 m (10,000 feet)  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: 9,144 m (30,000 feet)
	<b>Shock (non-repetitive)</b>	Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g
	<b>Vibration</b>	Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz

### Physical Security and Serviceability

<b>Access Panel</b>	Tool-less Includes system board and memory information.
<b>Optical Drive</b>	Tool-less, no carrier or rails required
<b>Hard Drives</b>	Tool-less Optional 5.25" external bay carriers
<b>Expansion Cards</b>	Tool-less
<b>Processor Socket</b>	1st socket on main system board. 2nd socket on optional 2nd CPU/Memory Module.
<b>Blue User Touch Points</b>	Yes, on primary serviceable components.
<b>Color-coordinated Cables and Connectors</b>	Yes

### System Technical Specifications

<b>Memory</b>	Tool-less
<b>System Board</b>	Torx T15 screws 2nd CPU/Memory Module: Tool-less
<b>Front of Computer LEDs</b>	Dual Color Power/Failure LED = Yes HDD Activity LED = Yes
<b>Configuration Record SW</b>	Yes
<b>Over-Temp Warning on Screen</b>	Yes, at POST screen on reboot
<b>Restore CD/DVD Set</b>	Yes, restores the computer to its original factory shipping image; can be obtained via HP Support.
<b>Dual Function Front Power Switch</b>	Yes, also acts as a reset switch when held for 4 seconds.
<b>Padlock Support</b>	Yes
<b>Cable Lock Support</b>	Kensington Cable Lock (optional): Prevents entire system theft and system access. 3mm x 7mm slot at rear of system
<b>Universal Chassis Clamp Lock Support</b>	No
<b>Solenoid Lock and Hood Sensor</b>	Access Panel Solenoid Lock: Yes (optional). Activated remotely to prevent system entry. Access Panel Intrusion Sensor: Yes (optional).
<b>Removable Media Write/Boot Control</b>	Yes, user can prevent the workstation from writing to or booting from removable media.
<b>Power-On Password Setup Password</b>	Yes, prevents an unauthorized person from booting up the workstation
<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>	CPU heatsink removal requires a T-30 Torx screwdriver.
<b>Power Supply Diagnostic LED</b>	Yes
<b>Front Power Button</b>	Yes
<b>Rear Power Button</b>	Yes
<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 on device
<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>	1 - 80 mm x 80 mm x 25 mm (non-serviceable)
<b>CPU Heatsink Fan</b>	1st CPU: 1 - 80mm Optional 2nd CPU: 1 - 60mm x 25mm
<b>Memory Fan</b>	Front memory fan: 1 - 80mm x 25mm Memory duct blower: 1 - 90mm x 25mm 2nd CPU/Memory Module: 1 - 60mm x 25mm

### System Technical Specifications

<b>Chassis Fans</b>	Front chassis fan : 1 - 120mm x 25mm Rear chassis fan: 1 - 120mm x 25mm
<b>HP Vision Diagnostics Offline Edition</b>	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing ESC then F2 upon the PC reboot, and is available as a download from HP Support.
<b>Access Panel Key Lock</b>	Yes, side panel barrel keylock (optional from the factory only)
<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>Trusted Platform Module Chip</b>	Integrated Infineon TPM 2.0. TCG and FIPS 140-2 Certified
<b>Integrated Chassis Handles</b>	Yes, Front handle and dedicated rear recess
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>PCIe Card Retention</b>	Yes, tool-less Rear (all) Middle (full-height cards) 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
<b>BIOS</b>	
<b>BIOS 32-bit Services</b>	Standard BIOS 32-bit Service Directory Proposal v0.4
<b>PCI 3.0 Support</b>	Full BIOS support for PCI Express through industry standard interfaces.
<b>ATAPI</b>	ATAPI Removable Media Device BIOS Specification Version 1.0.
<b>BBS</b>	BIOS Boot Specification v1.01.
<b>WMI Support</b>	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
<b>BIOS Boot Spec 1.01+</b>	Provides more control over how and from what devices the workstation will boot.
<b>BIOS Power On</b>	Users can define a specific date and time for the system to power on.
<b>ROM Based Computer Setup Utility (F10)</b>	Review and customize system configuration settings controlled by the BIOS.
<b>System/Emergency ROM Flash Recovery with Video</b>	Recovers system BIOS in corrupted Flash ROM.
<b>Replicated Setup</b>	Saves BIOS settings to USB flash device in human readable file (HpSetup.txt). BiosConfigurationUtility.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
<b>SMBIOS</b>	System Management BIOS 2.8, for system management information.
<b>Boot Control</b>	Disables the ability to boot from removable media on supported devices.
<b>Memory Change Alert</b>	Alerts management console if memory is removed or changed.



### System Technical Specifications

<b>Thermal Alert</b>	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>• NORMAL - normal temperature ranges.</li> <li>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.</li> <li>• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.</li> </ul>
<b>Remote ROM Flash</b>	Provides secure, fail-safe ROM image management from a central network console.
<b>ACPI (Advanced Configuration and Power Management Interface)</b>	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 5.0 for full compatibility with 64-bit operating systems.
<b>Ownership Tag</b>	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
<b>Remote Wakeup/Remote Shutdown</b>	System administrators can power on, restart, and power off a client computer from a remote location.
<b>Instantly Available PC (Suspend to RAM - ACPI sleep state S3)</b>	Allows for very low power consumption with quick resume time.
<b>Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)</b>	Allows a new or existing system to boot over the network and download software, including the operating system.
<b>ROM revision levels</b>	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS and WMI) so that management SW applications can use and report this information.
<b>System board revision level</b>	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
<b>Start-up Diagnostics (Power-on Self-Test)</b>	Assesses system health at boot time with selectable levels of testing.
<b>Auto Setup when new hardware installed</b>	System automatically detects addition of new hardware.
<b>Keyboard-less Operation</b>	The system can be booted without a keyboard.
<b>Localized ROM Setup</b>	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 14 languages with local keyboard mappings.
<b>Asset Tag</b>	The user or MIS to set a unique tag string in non-volatile memory.
<b>Per-slot Control</b>	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
<b>Adaptive Cooling</b>	Control parameters are set according to detected hardware configuration for optimal acoustics.
<b>Pre-boot Diagnostics</b>	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
<b>Industry Standard Specification Support</b>	
<b>Industry Standard UEFI Specification Revision</b>	Revision Supported by the BIOS 2.5
<b>ACPI</b>	Advanced Configuration and Power Management Interface, Version 5.0
<b>ATA (IDE)</b>	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
<b>CD Boot</b>	"El Torito" Bootable CD-ROM Format Specification Version 1.0
<b>EDD</b>	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
<b>EHCI</b>	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
<b>PCI</b>	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7

### System Technical Specifications

<b>PCI Express</b>	PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0
<b>PMM</b>	POST Memory Manager Specification, Version 1.01
<b>SATA</b>	Serial ATA Specification, Revision 1.0a Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5 Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0
<b>SPD</b>	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
<b>TPM</b>	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified FIPS 140-2 Certification TCG TPM Certified products list: <a href="http://www.trustedcomputinggroup.org/certification/tpm-certified-products/">http://www.trustedcomputinggroup.org/certification/tpm-certified-products/</a>
<b>UHCI</b>	Universal Host Controller Interface Design Guide, Revision 1.1
<b>USB</b>	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.1 Specification
<b>SMBIOS</b>	System Management BIOS Reference Specification, Version 2.8

External BIOS simulator found at: <http://csrsmc.itcs.hp.com/>

### Social and Environmental Responsibility

**Eco-Label Certifications & Declarations** This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- ENERGY STAR® (energy-saving features available on selected configurations-Windows only)
- US Federal Energy Management Program (FEMP)
- China Energy Conservation Program
- The ECO declaration (TED)

The Z6 G4 is registered EPEAT® Gold in the US and Canada. EPEAT® registration varies by country. See <http://www.epeat.net> for registration status by country. Search keyword generator on HP's 3<sup>rd</sup> party option store for solar generator accessories at <http://www.hp.com/go/options>

#### Batteries

The battery in this product complies with EU Directive 2006/66/EC

Battery mass: 3g

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.

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

#### Low Halogen Statement

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

### System Technical Specifications

**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:  
[Sustainability Report](#)

Eco-label certifications:

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificate:

<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. [Product Disassembly Instructions](#)
- Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

#### Packaging

HP Workstation product packaging meets the [HP's General Specification for the Environment](#)

- 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
- A multi-unit eco packaging option is available to institutional customers that uses less packaging material or has a lower volume footprint than conventional single-unit packaging. Please contact your sales representative for additional details.

#### Packaging Materials

##### Internal

Cushions and plastic bags made of low density polyethylene (LDPE).

##### External

Outer carton, accessories carton, and insert made of corrugated paper board.

### Manageability

#### Industry Standard Specifications

This product meets the following industry standard specifications for manageability functionality:

- DASH 1.1 (via Intel® LAN on motherboard)

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

An advanced set of remote management features and functionality providing IT 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 11.2x includes the following advanced management functions:

- Power Management (on, off, reset, graceful shutdown, sleep and hibernate)
  - Support in Max Power Savings (Shutdown and Hibernate Modes)
- Hardware Inventory (includes BIOS and firmware revisions)
- Hardware Alerting

### System Technical Specifications

- Agent Presence
- System Defense Filters
- Serial Over LAN (SOL)
- USB Redirect (Media Redirection)
- ME Wake-on-LAN (WOL), even with Maximum Power Savings Enabled
- DASH 1.1 compliance
- IPv6 Support
- Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection
- Remote Scheduled Maintenance - pre-schedule when the system connects to the IT or service provider console for maintenance.
- Remote Alerts - automatically alert IT or service provider if issues arise
- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock
- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Local Time Sync to UTC
- Remote Memory Dump Command – Creates memory dump for debug

**Intel® vPro™ Technology** The HP Z6 G4 Workstation supports Intel® vPro™ technology when configured as outlined below:

- Intel® Xeon® processor Scalable Family
- Intel® C622 chipset
- Intel® I219LM GbE LAN

### Remote Manageability Software Solutions

The HP Z6 G4 Workstation is supported on the following remote manageability software consoles:

- LANDesk Management Suite (HP recommended solution)
- Microsoft System Center Configuration Manager
- HP Client Automation Enterprise

For questions or support for manageability needs, please visit

<http://www.hp.com/go/clientmanagement>

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

### System Software Manager

### Service, Support, and Warranty

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

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply.

**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

**NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.

HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. Additional HP Care Pack Services information by product is available at: <http://www.hp.com/hps/carepack>. Service levels and response times for HP Care Packs may vary depending on your geographic location.

### System Technical Specifications

#### **Product Change Notification**

- Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories 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.
  - Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.
-

### Stable & Consistent Offerings

#### Global Series SKUs

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.

#### Stable & Consistent Offerings

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

#### Processors

Product #	Offering
2DL32AV	Intel® Xeon® Gold 6128 processor
2DL32AV, 1XM44AA	Intel® Xeon® Gold 6128 2 <sup>nd</sup> processor
2DL22AV	Intel® Xeon® Silver 4114 processor
2DL22AV, 1XM49AA	Intel® Xeon® Silver 4114 2nd processor
2DL18AV	Intel® Xeon® Silver 4108 processor
2DL18AV, 1XM51AA	Intel® Xeon® Silver 4108 2 <sup>nd</sup> processor

#### Hard Drives

Product #	Offering
Z5H22AV, LQ037AA	1TB SATA 7200 RPM 3.5" HDD

#### Graphics

Product #	Offering
2TF08AA	AMD Radeon™ Pro WX 3100 4GB Graphics

#### Memory

Product #	Offering
TBD	TBD

#### Optical and Removable Storage

Product #	Offering
TBD	TBD

### Technical Specifications - Processors

#### **Intel® Xeon® W-3200 Series CPU**

Intel® Xeon® W-3245 3.2 2933 16C processor

Intel® Xeon® W-3235 3.3 2933 12C processor

Intel® Xeon® W-3225 3.7 2666 8C processor

Intel® Xeon® W-3223 3.5 2666 8C processor

#### **Intel® Xeon® Scalable CPU**

Intel® Xeon® Platinum 8280 processor

Intel® Xeon® Platinum 8260 processor

Intel® Xeon® Platinum 8180 processor

Intel® Xeon® Platinum 8160 processor

Intel® Xeon® Gold 6254 processor

Intel® Xeon® Gold 6252 processor

Intel® Xeon® Gold 6248 processor

Intel® Xeon® Gold 6244 processor

Intel® Xeon® Gold 6242 processor

Intel® Xeon® Gold 6240Y processor

Intel® Xeon® Gold 6240 processor

Intel® Xeon® Gold 6230 processor

Intel® Xeon® Gold 6152 processor

Intel® Xeon® Gold 6154 processor

Intel® Xeon® Gold 6148 processor

Intel® Xeon® Gold 6146 processor

Intel® Xeon® Gold 6144 processor

Intel® Xeon® Gold 6142 processor

Intel® Xeon® Gold 6140 processor

Intel® Xeon® Gold 6138 processor

Intel® Xeon® Gold 6136 processor

Intel® Xeon® Gold 6134 processor

Intel® Xeon® Gold 6132 processor

Intel® Xeon® Gold 6130 processor

Intel® Xeon® Gold 6128 processor

Intel® Xeon® Gold 5222 processor

Intel® Xeon® Gold 5220 processor

Intel® Xeon® Gold 5218 processor

Intel® Xeon® Gold 5215 processor

Intel® Xeon® Gold 5120 processor

Intel® Xeon® Gold 5118 processor

Intel® Xeon® Gold 5115 processor

Intel® Xeon® Gold 5122 processor

Intel® Xeon® Gold 4216 processor

Intel® Xeon® Gold 4215 processor

Intel® Xeon® Gold 4214Y processor

Intel® Xeon® Gold 4214 processor

Intel® Xeon® Gold 4210 processor<sup>1</sup>

## Technical Specifications - Processors

Intel® Xeon® Gold 4208 processor<sup>1</sup>

Intel® Xeon® Silver 4116 processor

Intel® Xeon® Silver 4114 processor

Intel® Xeon® Silver 4112 processor

Intel® Xeon® Silver 4110 processor

Intel® Xeon® Silver 4108 processor

Intel® Xeon® Gold 3204 processor<sup>1</sup>

Intel® Xeon® Bronze 3106 processor

Intel® Xeon® Bronze 3104 processor

<sup>1</sup> Available May 2019

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### Technical Specifications - Hard Drives

#### STORAGE/HARD DRIVES

**HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations**

**HP 300GB SAS 15K SFF HDD**

<b>Capacity</b>	300GB
<b>Height</b>	5.9 in; 15 cm
<b>Width</b>	<b>Media Diameter</b> 3.5 in; 8.9 cm
<b>Interface</b>	12Gb/s SAS
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 1200 MB/s (SAS single port)*
<b>Buffer</b>	128MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Average</b> 2.0ms *
<b>Rotational Speed</b>	15K rpm
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

\*Actual performance may vary.

**HP 1.2TB SAS 15K SFF HDD**

<b>Capacity</b>	1.2TB
<b>Height</b>	0.6 in; 1.53 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>	SAS 6Gb/s
<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> 0.18ms (max)*
	<b>Average</b> 3.5ms*
	<b>Full Stroke</b> 7.17ms*

\*Actual performance may vary.

### Technical Specifications - Hard Drives

#### SATA (Serial ATA) 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>	16MB
<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>	1TB
<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>Cache</b>	Adaptive
<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>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>	2.0TB
<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 600 MB/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

## Technical Specifications - Hard Drives

3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	<b>Logical Blocks</b>		3,907,029,168
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
	<i>*Actual performance may vary.</i>		
	<b>Capacity</b>	3.0TB	
	<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>	4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 6.0 Gb/s*	
	<b>Buffer</b>	64MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.6 ms*
		<b>Average</b>	11 ms*
		<b>Full Stroke</b>	Not Specified*
<b>Rotational Speed</b>	7,200 rpm		
<b>Operating Temperature</b>	41° to 140° F (5° to 60° C)		
<i>*Actual performance may vary.</i>			

### Technical Specifications - Hard Drives

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

<b>Capacity</b>	1TB	
<b>Protocol</b>	SATA	
<b>Form Factor</b>	3.5"	
<b>Controller</b>	AHCI	
<b>Reliability (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*
<b>Enterprise Class Features</b>	High Reliability	

\*Actual performance may vary.

### Technical Specifications - Hard Drives

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

<b>Capacity</b>	4TB
<b>Height</b>	0.275 in; 0.7 cm
<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
	<b>Physical Size</b> 2.75 in; 6.99 cm
<b>Interface</b>	Serial ATA (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> 0.7ms*
	<b>Average</b> 8.5ms*
	<b>Full Stroke</b> 15.7ms*
<b>Rotational Speed</b>	7,200 rpm
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)

\*Actual performance may vary.

#### 500GB SATA 7.2K SED SFF HDD

<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>	Serial ATA (6Gb/s)
<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> 1ms*
	<b>Average</b> 4.2ms*
	<b>Full Stroke</b> 25ms (typical)*
<b>Rotational Speed</b>	7,200 rpm
<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)

\*Actual performance may vary.

### Technical Specifications - Hard Drives

#### SATA SSDs for HP Workstations

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

<b>Capacity</b>	256GB
<b>Protocol</b>	SATA
<b>Form Factor</b>	2.5"
<b>Controller</b>	AHCI
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	192TBW (TB Written)
<b>Reliability (MTTF)</b>	1.5M hours
<b>Physical Size (Height)</b>	0.28 in; 0.7 cm
<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 600MB/s*
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	<b>Sequential Read</b> 530MB/s (max)* <b>Sequential Write</b> 500MB/s (max)* <b>Random Read</b> 95K IOPS (max)* <b>Random Write</b> 83K IOPS (max)*

\*Actual performance may vary.

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

<b>Capacity</b>	256GB
<b>Protocol</b>	SATA
<b>Form Factor</b>	2.5"
<b>Controller</b>	AHCI
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	192TBW (TB Written)
<b>Reliability (MTTF)</b>	1.5M hours
<b>Physical Size (Height)</b>	0.28 in; 0.7 cm
<b>Physical Size (Width)</b>	2.5 in; 6.36 cm
<b>Interface</b>	6Gb/s SATA
<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> 530MB/s* <b>Sequential Write</b> 500 MB/s* <b>Random Read</b> 95K IOPS* <b>Random Write</b> 83K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL 2

\*Actual performance may vary.

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

<b>Capacity</b>	512GB
<b>Protocol</b>	SATA
<b>Form Factor</b>	2.5"
<b>Controller</b>	AHCI
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	388TBW (TB Written)

### Technical Specifications - Hard Drives

<b>Reliability (MTTF)</b>	1.5M hours
<b>Physical Size (Height)</b>	0.28 in; 0.7 cm
<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> 95K IOPS* <b>Random Write</b> 83K IOPS*

\*Actual performance may vary.

<b>HP 512GB SATA SED SSD</b>	<b>Capacity</b> 512GB <b>Protocol</b> SATA <b>Form Factor</b> 2.5" <b>Controller</b> AHCI <b>NAND Type</b> 3D TLC <b>Endurance</b> 388TBW (TB Written) <b>Reliability (MTTF)</b> 1.5M hours <b>Physical Size (Height)</b> 0.28 in; 0.7 cm <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 600MB/s* <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> 95K IOPS* <b>Random Write</b> 83K IOPS* <b>Self-Encrypting Drive Support</b> OPAL 1 and 2
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\*Actual performance may vary.

<b>HP 1TB SATA 6Gb/s SSD</b>	<b>Capacity</b> 1TB <b>Protocol</b> SATA <b>Form Factor</b> 2.5" <b>Controller</b> AHCI <b>NAND Type</b> 3D TLC <b>Endurance</b> 400TBW (TB Written) <b>Reliability (MTTF)</b> 1.5M hours <b>Physical Size (Height)</b> 0.28 in; 0.7 cm <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)
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### Technical Specifications - Hard Drives

	<b>Performance</b>	<b>Sequential Read</b>	530 MB/s*
		<b>Sequential Write</b>	500 MB/s*
		<b>Random Read</b>	95K IOPS*
		<b>Random Write</b>	83K IOPS*
	*Actual performance may vary.		
<b>HP 2TB SATA 6Gb/s SSD</b>	<b>Capacity</b>	2TB	
	<b>Protocol</b>	SATA	
	<b>Form Factor</b>	2.5"	
	<b>Controller</b>	AHCI	
	<b>NAND Type</b>	3D TLC	
	<b>Endurance</b>	400TBW (TB Written)	
	<b>Reliability (MTTF)</b>	1.5M hours	
	<b>Physical Size (Height)</b>	0.28 in; 0.7 cm	
	<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>	95K IOPS*
		<b>Random Write</b>	83K IOPS*
	*Actual performance may vary.		
<b>HP Enterprise Class 240GB SATA SSD</b>	<b>Capacity</b>	240GB	
	<b>Protocol</b>	SATA	
	<b>Form Factor</b>	2.5"	
	<b>Controller</b>	AHCI	
	<b>NAND Type</b>	3D TLC	
	<b>Endurance</b>	2,200TBW (TB Written)	
	<b>Reliability (MTTF)</b>	2.0M hours	
	<b>Physical Size (Height)</b>	0.28 in; 0.7 cm	
	<b>Physical Size (Width)</b>	2.5 in; 6.36 cm	
	<b>Interface</b>	6Gb/s SATA	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s*	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	540 MB/s*
		<b>Sequential Write</b>	310 MB/s*
		<b>Random Read</b>	93K IOPS*
		<b>Random Write</b>	48K IOPS*
	*Actual performance may vary.		
	<b>Enterprise Class Features</b>	High Endurance NAND	
		Power Loss Protection	
		End-to-End Data Protection	



### Technical Specifications - Hard Drives

#### HP Enterprise Class 480GB SATA SSD

<b>Capacity</b>	480GB	
<b>Protocol</b>	SATA	
<b>Form Factor</b>	2.5"	
<b>Controller</b>	AHCI	
<b>NAND Type</b>	3D TLC	
<b>Endurance</b>	4,400TBW (TB Written)	
<b>Reliability</b> (MTTF)	2.0M hours	
<b>Physical Size</b> (Height)	0.28 in; 0.7 cm	
<b>Physical Size</b> (Width)	2.5 in; 6.36 cm	
<b>Interface</b>	6Gb/s SATA	
<b>Synchronous Transfer Rate</b> (Maximum)	Up to 600MB/s*	
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>Performance</b>	<b>Sequential Read</b>	540 MB/s*
	<b>Sequential Write</b>	460 MB/s*
	<b>Random Read</b>	93K IOPS*
	<b>Random Write</b>	74K IOPS*
<b>Enterprise Class Features</b>	High Endurance NAND	
	Power Loss Protection	
	End-to-End Data Protection	

\*Actual performance may vary.

#### PCIe SSDs for HP Workstations

#### HP Z Turbo Drive G2 256GB SSD

Capacity	256GB	
Protocol	PCIe	
Form Factor	M.2	
Controller	NVMe	
NAND Type	MLC	
Endurance	150TB	
Reliability (MTBF)	1.5M hours	
Interface	PCI Express 3.0 x4 electrical x4 physical	
Operating Temperature	32° to 158° F (0° to 70° C)	
Performance	Sequential Read	2800 MB/s *
	Sequential Write	1100 MB/s *
	Random Read	250K IOPS *
	Random Write	180K IOPS *

\*Actual performance may vary.

#### HP Z Turbo Drive G2 512GB SSD

<b>Capacity</b>	512GB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D MLC
<b>Endurance</b>	300TB
<b>Reliability (MTBF)</b>	1.5M hours
<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical

Technical Specifications - Hard Drives

<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>	1600 MB/s*
	<b>Random Read</b>	260K IOPS*
	<b>Random Write</b>	260K IOPS*

\*Actual performance may vary.

<b>HP Z Turbo Drive G2 1TB SSD</b>	<b>Capacity</b>	1TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D MLC	
	<b>Endurance</b>	600TB	
	<b>Reliability (MTTF)</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>	1700 MB/s*
		<b>Random Read</b>	360K IOPS*
		<b>Random Write</b>	330K IOPS*

\*Actual performance may vary.

### Technical Specifications - Hard Drives

<b>HP Z Turbo Drive Dual Pro 256GB PCIe SSD</b>	<b>Capacity</b>	256GB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C)

<b>HP Z Turbo Drive Dual Pro 512GB PCIe SSD</b>	<b>Capacity</b>	512GB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C)

<b>HP Z Turbo Drive Dual Pro 1TB PCIe SSD</b>	<b>Capacity</b>	1TB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C)

<b>HP Z Turbo Drive Dual Pro 2TB PCIe SSD</b>	<b>Capacity</b>	2TB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
	<b>Operating Temperature</b>	32° to 158°F (0° to 70°C)

<b>HP Z Turbo Drive Quad Pro 2x256GB PCIe SSD</b>	<b>Capacity</b>	512GB
	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	PCIe Card, Full Height PCIe Slot
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	MLC
	<b>Endurance</b>	150TB
	<b>Reliability (MTBF)</b>	1.5M hours
	<b>Interface</b>	PCIe Gen3 x4 architecture
	<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> 1100 MB/s*
		<b>Random Read</b> 250K IOPS*
		<b>Random Write</b> 180K IOPS*

\*Actual performance may vary.

<b>HP Z Turbo Drive Quad Pro 2x512GB PCIe SSD</b>	<b>Capacity</b>	1TB
	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	PCIe Card, Full Height PCIe Slot
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D MLC
	<b>Endurance</b>	300TB
	<b>Reliability (MTBF)</b>	1.5M hours
	<b>Interface</b>	PCIe Gen3 x4 architecture
	<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> 1600 MB/s*
		<b>Random Read</b> 260 K IOPS*

### Technical Specifications - Hard Drives

		<b>Random Write</b>	260K IOPS*
		*Actual performance may vary.	
<b>HP Z Turbo Drive Quad Pro 2x1TB PCIe SSD</b>	<b>Capacity</b>	2TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	PCIe Card, Full Height PCIe Slot	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D MLC	
	<b>Endurance</b>	600TB	
	<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>	1700 MB/s*
		<b>Random Read</b>	360 K IOPS*
		<b>Random Write</b>	330K IOPS*
		*Actual performance may vary.	
<b>HP Z Turbo Drive G2 256GB SED SSD</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<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>	1100 MB/s*
		<b>Random Read</b>	250K IOPS*
		<b>Random Write</b>	180K IOPS*
	<b>Self-Encrypting Drive Support</b>	OPAL 2	
		*Actual performance may vary.	
<b>HP Z Turbo Drive G2 512GB SED SSD</b>	<b>Capacity</b>	512GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<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>	2800 MB/s*

### Technical Specifications - Hard Drives

		<b>Sequential Write</b>	1600 MB/s*
		<b>Random Read</b>	260K IOPS*
		<b>Random Write</b>	260K IOPS*
	<b>Self-Encrypting Drive Support</b>	OPAL 2	
	*Actual performance may vary.		
<b>HP Z Turbo Drive Quad Pro 2x1TB PCIe SSD</b>	<b>Capacity</b>	2TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	PCIe Card, Full Height PCIe Slot	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D MLC	
	<b>Endurance</b>	600TB	
	<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>	1700 MB/s*
		<b>Random Read</b>	360K IOPS*
		<b>Random Write</b>	330K IOPS*
	*Actual performance may vary.		
<b>HP Z Turbo Drive G2 256GB TLC SSD</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<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>	3000 MB/s*
		<b>Sequential Write</b>	320 MB/s (1300 MB/s max/Turbo)*
		<b>Random Read</b>	250K IOPS*
		<b>Random Write</b>	180K IOPS*
	*Actual performance may vary.		
<b>HP Z Turbo Drive G2 512GB TLC SSD</b>	<b>Capacity</b>	512GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<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>	3000 MB/s*
	*Actual performance may vary.		

### Technical Specifications - Hard Drives

		<b>Sequential Write</b>	660 MB/s (1800 MB/s max/Turbo)*
		<b>Random Read</b>	270K IOPS*
		<b>Random Write</b>	420K IOPS*
	*Actual performance may vary.		
<b>HP Z Turbo Drive G2 1TB TLC SSD</b>	<b>Capacity</b>	1TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2	
	<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 Drive G2 2TB TLC SSD</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>HP Z Turbo Drive Quad Pro 256GB SSD module</b>	<b>Capacity</b>	256GB (one M.2 PCIe NVMe module)	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
<b>HP Z Turbo Drive Quad Pro 512GB SSD module</b>	<b>Capacity</b>	512GB (one M.2 PCIe NVMe module)	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	

### Technical Specifications - Hard Drives

<b>HP Z Turbo Drive Quad Pro 1TB SSD module</b>	<b>Capacity</b>	1TB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
<b>HP Z Turbo Drive Quad Pro 2TB SSD module</b>	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Capacity</b>	2TB (one M.2 PCIe NVMe module)
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)

<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>Intel® 905p Series AIC 480GB PCIe SSD</b>	<b>Capacity</b>	480GB
		<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> 2710 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.

<b>Intel® Optane™ DC Persistent Memory</b>	<b>Intel® Optane™ DC Persistent Memory 128GB Module</b>	<b>Capacity</b>	128GB
		<b>Protocol</b>	DDR-T
		<b>Form Factor</b>	DDR4
		<b>Controller</b>	NVMe
		<b>NVM Type</b>	3DXPoint
		<b>Endurance</b>	292 PBW (256B Sequential Write)

Technical Specifications - Hard Drives

	91 PBW (64B Sequential Write)	
<b>Reliability (MTBF)</b>	2M hours	
<b>Operating Temperature</b>	32° to 185° F (0° to 85° C)	
<b>Performance</b>	<b>Sequential Read</b>	6800 MB/s*
	<b>Sequential Write</b>	1850 MB/s*

\*Actual performance may vary.



### Technical Specifications - Hard Drive Controllers

#### HARD DRIVE CONTROLLERS

<b>Microsemi SmartHBA2100-4i4e SAS Controller</b>	<b>PCI Bus</b>	8 lanes, PCI Express 3.0	
	<b>RAID Levels</b>	Offers Integrated RAID (0, 1, and 10)	
	<b>PCI Data Burst Transfer Rate</b>	Half Duplex x8, PCIe, 8000 MB/s	
	<b>SAS Bandwidth</b>	<b>Half Duplex</b>	1200 MB/s per lane
	<b>PCI Card Type</b>	3.3V Add-in Card	
	<b>PCI Voltage</b>	12 V ± 10%	
	<b>PCI Power</b>	9.8W typical, Airflow min 200 LFM	
	<b>Bracket</b>	Full height and low profile	
	<b>Certification Level</b>	PCI Express 3.0 compliant	
	<b>SAS Processor</b>	Microsemi SmartIO 2100 SAS IO Controller	
	<b>Internal Connectors</b>	One x4 internal mini-SASHD (SFF-8643)	
	<b>External Connectors</b>	One x4 external mini-SASHD (SFF-8644)	
	<b>Maximum Number of SCSI Devices</b>	256 Non-RAID SAS/SATA devices	
	<b>LED Indicators</b>	Connector for Drive Activity Light	

### Technical Specifications - Graphics

#### GRAPHICS

<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 GPU: 256 NVIDIA® 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 DirectX® 12 Vulkan™ 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL™
	<b>Available Graphics Drivers</b>	Microsoft Windows 10 Microsoft Windows 7 Professional 64-bit Linux®
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

#### Notes

<b>NVIDIA® Quadro® P620 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® P620 Graphics Card GPU: 512 CUDA cores Max Power: 40 Watts
	<b>Bus Type</b> <b>Memory</b>	PCI Express 3.0 x16 Size: 2 GB GDDR5, 2000 MHz Memory Interface: 128-bit Memory Bandwidth: 64 GB/s

### Technical Specifications - Graphics

<b>Connectors</b>	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>	Windows10 (64-bit) Windows 7 Professional 64-bit  Linux®  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>	*P620 only have mini-DisplayPort™ (mDP) video ports.  Factory Configured (Z4 G4/ Z6 G4/ Z8 G4 Workstations): No adapters included After market option kit:Two mDP-to-DP Adapters included  Additional mDP-to-DP Adapters are available as Factory Configuration or Option Kit accessories: <ul style="list-style-type: none"> <li>- 2MY05AA - HP miniDP-to-DP Adapter Cables</li> <li>- 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables</li> </ul>

#### AMD FirePro™ W2100 2GB Graphics

<b>Form Factor</b>	Low Profile, half length (full-height bracket included)
<b>Graphics Controller</b>	AMD FirePro™ W2100 professional graphics based on Oland GPU. GPU: 320 Stream Processors organized into 5 Compute Units GPU Frequency: 630Mhz Power: 26W Cooling: Active
<b>Bus Type</b>	PCI Express® x8, Generation 3.0
<b>Memory</b>	2GB DDR3 memory Memory Bandwidth: up to 28.8 GB/s Memory Width: 128 bit
<b>Connectors</b>	2x Display Port™ 1.2 connectors  Factory Configured: No video cable adapter included After market option kit: No video cable adapter included

### Technical Specifications - Graphics

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

<b>Maximum Resolution</b>	<p>DisplayPort™ 1.2:</p> <ul style="list-style-type: none"> <li>- up to 4096x2160 x 24 bpp @ 60Hz</li> </ul> <p>Dual Link DVI(I) (requires adapter cable):</p> <ul style="list-style-type: none"> <li>- up to 2560 x 1600 x 32 bpp @ 60Hz</li> </ul> <p>Single Link-DVI(I)(requires adapter cable):</p> <ul style="list-style-type: none"> <li>- up to 1920 x 1200 x 32 bpp @ 60Hz</li> </ul> <p>VGA (requires adapter cable):</p> <ul style="list-style-type: none"> <li>- up to 1920 x 1200 x 32 bpp @ 60Hz</li> </ul>
<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>	<p>2 x DisplayPort™ 1.2a</p> <p>Maximum number of displays: 2</p>
<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	<p>OpenCL™ 1.2, DirectX® 11.2/12, OpenGL® 4.4</p> <p>OpenGL® 4.4 support with driver release 14.301.xxx</p> <p>OpenCL™ 1.2 conformance expected with drive release 14.301.xxx</p>
<b>Available Graphics Drivers</b>	<p>Windows10 (64-bit)</p> <p>Windows 7 Professional 64-bit</p> <p>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>	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 <a href="http://www.amd.com/FirePro">www.amd.com/FirePro</a> ™ for details.

#### NVIDIA® Quadro® P1000 4GB Graphics

<b>Form Factor</b>	<p>Dimensions: 2.713" H x 5.7" L</p> <p>Single Slot, Low Profile</p> <p>Cooling: Active</p> <p>Weight: 129 grams</p>
<b>Graphics Controller</b>	<p>NVIDIA® Quadro® P1000 Graphics Card</p> <p>GPU: 640 NVIDIA® CUDA® cores</p> <p>Max Power: 47 Watts</p>
<b>Bus Type</b>	PCI Express 3.0 x16
<b>Memory</b>	<p>Size: 4 GB GDDR5, 2500 MHz</p> <p>Memory Interface: 128-bit memory interface</p>

### Technical Specifications - Graphics

<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 7 Professional 64-bit 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>

<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
	<b>Maximum Resolution</b>	Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories. 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

### Technical Specifications - Graphics

<b>Image Quality Features</b>	HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz
	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)
<b>Display Output</b>	Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
	Maximum number of displays - 4 direct attached monitors
<b>Shading Architecture</b> <b>Supported Graphics APIs</b>	Maximum number of monitors across all available Quadro P2000 outputs is 4.
	Shader Model 5.1 OpenGL® 4.5 DirectX® 12
<b>Available Graphics Drivers</b>	API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran software
	Microsoft Windows 10 Microsoft Windows 7 Professional 64bit Linux® - Full OpenGL® implementation, complete with NVIDIA® and ARB extensions
<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>

#### NVIDIA® Quadro® P2200 5GB Graphics

<b>Form Factor</b>	Dimensions: 4.4"H x 7.9"L Single Slot, Full Height Weight: 260 grams
<b>Graphics Controller</b>	NVIDIA® Quadro® P2200 Graphics Card GPU: 1280 CUDA cores Power: 75 Watts Cooling: Active
<b>Bus Type</b> <b>Memory</b>	PCI Express 3.0 x16 Size: 5GB GDDR5X Memory Bandwidth: 200 GB/s Memory Width: 160-bit
<b>Connectors</b>	4x DisplayPort™ 1.4
<b>Maximum Resolution</b>	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. DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz

### Technical Specifications - Graphics

- 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

#### Image Quality Features

12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)

#### Display Output

Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.

Maximum number of displays

- 4 direct attached monitors

Maximum number of monitors across all available NVIDIA® Quadro® P2200 outputs is 4.

#### Shading Architecture

Shader Model 5.1

#### Supported Graphics APIs

OpenGL® 4.5

DirectX® 12

API support includes:

CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran software

#### Available Graphics Drivers

Microsoft Windows 10

Microsoft Windows 7 Professional 64bit

Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions

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

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

#### Notes

1. Quadro P2200 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately.
2. Quadro P2200 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

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

#### Form Factor

Low-Profile Single Slot (6.6" Length)

#### Graphics Controller

Polaris12 GL

GPU: 512 Stream Processors organized into 8 Compute Units

Power: 50 Watts

Cooling: Active

#### Memory

4GB GDDR5 memory

Memory Bandwidth: 6 Gbps / 96 GB/s

Memory Width: 128 bit

### Technical Specifications - Graphics

<b>Connectors</b>	<p>2x Mini DisplayPort™ 1.4 plus 1x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.</p> <p>Factory Configured: No adapters included After market option kit: One mDP-to-DP cable adapters included</p> <p>Additional Mini DisplayPort™-to-DisplayPort™, DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.</p>
<b>Maximum Resolution</b>	<p>5K support @ 60Hz</p> <ul style="list-style-type: none"> <li>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</li> </ul> <p>3x 4K support @ 60Hz</p>
<b>Image Quality Features</b>	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
<b>Display Output</b>	3 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
<b>GPU Architecture</b>	Polaris
<b>Supported Graphics APIs</b>	<p>DirectX® 12</p> <p>OpenGL® 4.5</p> <p>OpenCL™ 2.0</p> <p>Vulkan™ 1.0</p>
<b>Available Graphics Drivers</b>	<p>Windows 10 64-bit</p> <p>(Windows® 7 64-bit available from AMD)</p> <p>Linux® 64-bit (selected Enterprise distributions)</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>	<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>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>

**AMD Radeon™ Pro WX  
3200 4GB Graphics**

**Form Factor**  
**Graphics Controller**

Low-Profile Single Slot (2.75 "H x 6.6" L)  
Radeon™ Pro WX 3100 Graphics Card  
GPU: 640 Stream Processors organized into 8 Compute Units



### Technical Specifications - Graphics

	Power: 56 Watts Cooling: Active
<b>Memory</b>	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
<b>Connectors</b>	2x Mini DisplayPort™ 1.4 plus 1x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.  Factory Configured: No adapters included After market option kit: One mDP-to-DP cable adapters included  Additional Mini DisplayPort™-to-DisplayPort™, DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
<b>Maximum Resolution</b>	5K support @ 60Hz <ul style="list-style-type: none"> <li>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</li> </ul> 3x 4K support @ 60Hz
<b>Image Quality Features</b>	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
<b>Display Output</b>	3 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
<b>GPU Architecture</b>	Polaris
<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 (Windows® 7 64-bit available from AMD) Linux® 64-bit (selected Enterprise distributions)

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

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

#### Notes

- 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.
- 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.
- 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

### Technical Specifications - Graphics

in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.

<b>Radeon™ Pro WX 4100 4GB Graphics</b>	<b>Form Factor</b>	Low-Profile Single Slot (6.6" Length)
	<b>Graphics Controller</b>	Polaris 11 Baffin GL XT GPU: 1024 Stream Processors organized into 16 Compute Units Power: 50 Watts Cooling: Active
	<b>Memory</b>	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
	<b>Connectors</b>	4x Mini DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.  Factory Configured: Four mDP-to-DP cable adapters included After market option kit: Four mDP-to-DP cable adapters included
	<b>Maximum Resolution</b>	Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories. 5K support @ 60Hz <ul style="list-style-type: none"> <li>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</li> </ul> 4x 4K support @ 60Hz
	<b>Image Quality Features</b>	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	<b>Display Output</b>	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	<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 Windows® 7 64-bit Linux® 64-bit (selected Enterprise distributions)
HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>		
<b>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>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> </ol>	

### Technical Specifications - Graphics

9. 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. Windows mode content requires operating system support.

<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: 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 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
	<b>Maximum Resolution</b>	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.
	<b>Image Quality Features</b>	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort, DVI, and HDMI connectors

### Technical Specifications - Graphics

NVIDIA 3D Vision™ and other 3D stereo technologies  
NVIDIA Mosaic and nView

#### Display Output

Maximum number of displays  
- 4 direct attached monitors

#### Shading Architecture

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

#### Supported Graphics APIs

Shader Model 5.1

OpenGL 4.5  
DirectX 12  
Vulkan 1.0

#### Available Graphics Drivers

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

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

#### Notes

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

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® GP100 16GB Graphics

#### Form Factor

Dual Slot (4.4" Height x 10.5" Length)  
Weight: 989 grams +72 grams extender

#### Graphics Controller

NVIDIA® QUADRO® GP100  
GPU: 3584 NVIDIA CUDA® Parallel Processing Cores  
Power: 235 Watts  
Cooling: Active

#### Memory

16GB HBM2  
Memory Bandwidth: Up to 717 GB/s  
Memory Width: 4096-bit  
ECC Memory (disabled by default)

#### Connectors

DP (x4) with HDR support  
DL-DVI(D)  
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 connectors

### Technical Specifications - Graphics

Factory configured option: 8-pin power adapter included with card.  
After market option Kit: 8-pin power adapter included with card.

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

<b>Maximum Resolution</b>	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
<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™, DVI, and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
<b>Display Outputs</b>	4x DP1.4 MST & HDR2 outputs (up to 5120 x 2880 @ 60Hz) 1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz) 1x Single-link DVI-D output (up to 1920 x 1200 @ 60 Hz) HDMI™ 2.0b (up to 5120 x 2880 @ 60Hz)*  *requires DP to HDMI adapter
<b>GPU Architecture</b>	NVIDIA Pascal™
<b>Supported Graphics APIs</b>	DirectX®12 , OpenGL® 4.5, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
<b>Available Graphics Drivers</b>	Windows® 10 Windows® 7 Professional 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>

Factory Configured (Z4 G4/ Z6 G4/ Z8 G4 Workstations): No adapters included

After market option kit: No adapters included

**NVIDIA® Quadro®  
P5000 16GB Graphics**

**Form Factor**

Full-Height Dual Slot (4.4" Height x 10.5" Length)  
Weight: 815 grams / 1.80 lbs

### Technical Specifications - Graphics

<b>Graphics Controller</b>	<p>Quadro™ P5000 graphics</p> <p>GPU: 2560 NVIDIA® CUDA® Parallel Processing Cores</p> <p>Power: 180 Watts</p> <p>Cooling: Active</p>
<b>Memory</b>	<p>16GB GDDR5X memory</p> <p>Memory Bandwidth: Up to 288 GB/s</p> <p>Memory Width: 256 bit</p> <p>ECC Memory (disabled by default)</p>
<b>Connectors</b>	<p>DP (x4) with HDR support</p> <p>DL-DVI(D)</p> <p>3-pin mini-DIN connector</p> <p>SLI connector</p> <p>Quadro Sync connector (compatible with Quadro II Sync)</p> <p>One 8-pin auxiliary power connector</p> <p>Factory configured option: No video cable adapter included with card.</p> <p>After market option Kit: No video cable adaptor included with card.</p> <p>DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.</p>
<b>Maximum Resolution</b>	<p>5K support @ 60Hz</p> <p>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</p>
<b>Image Quality Features</b>	<p>Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.</p> <p>HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors</p> <p>NVIDIA 3D Vision™ and other 3D stereo technologies</p> <p>NVIDIA® Mosaic and nView Desktop Management</p>
<b>Display Outputs<sup>1</sup></b>	<p>4x DP1.4 HDR outputs (up to 3840x2160 UHD @ 120Hz refresh, or up to 8K at 30Hz)</p> <p>1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz and 1920x1200 @ 120 Hz)</p>
<b>GPU Architecture</b>	NVIDIA® Pascal™
<b>Supported Graphics APIs</b>	<p>DirectX®12 , OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0</p> <p>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran</p>

### Technical Specifications - Graphics

#### Available Graphics Drivers

Windows® 10 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>

#### Notes

- 1- Supports up to a total of 4 displays

#### NVIDIA® Quadro® P6000 24GB Graphics

##### Form Factor

Full-Height Dual Slot (4.4" Height x 10.5" Length)  
Weight: 967 grams / 2.14 lbs

##### Graphics Controller

NVIDIA® Quadro® P6000 graphics  
GPU: 3840 NVIDIA® CUDA® Parallel Processing Cores  
Power: 250 Watts  
Cooling: Active

##### Memory

24GB GDDR5X memory  
Memory Bandwidth: Up to 432 GB/s  
Memory Width: 384 bit  
ECC Memory (disabled by default)

##### Connectors

DP (x4) with HDR support  
DL-DVI(D)  
3-pin mini-DIN connector  
SLI connector  
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

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

### Technical Specifications - Graphics

NVIDIA® Mosaic and nView

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

4x DP1.4 HDR outputs (up to 3840x2160 UHD @ 120Hz refresh, or up to 8K at 30Hz)  
1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz and 1920x1200 @ 120 Hz)

#### GPU Architecture

NVIDIA® Pascal™

#### 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® 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

### 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  
GPU: 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.



### Technical Specifications - Graphics

<b>Maximum Resolution</b>	7680x4320 @ 60Hz
<b>Image Quality Features</b>	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
<b>Display Outputs<sup>1</sup></b>	3x DP 1.4a and VirtualLink (7680x4320 @ 60Hz)
<b>Supported Graphics APIs</b>	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
<b>Available Graphics Drivers</b>	Windows® 10 64-bit Windows® 7 64-bit Linux® 64-bit
<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> 1- Supports up to a total of 4 displays

<b>NVIDIA® Quadro® RTX 5000 16GB Graphics</b>	<b>Form Factor</b>	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 1050 grams / 2.31 lbs
	<b>Graphics Controller</b>	NVIDIA® Quadro® RTX 5000 Graphics GPU: 3072 NVIDIA® CUDA® Parallel Processing Cores Power: 265 Watts Cooling: Active
	<b>Memory</b>	16GB GDDR6 memory Memory Bandwidth: Up to 448 GB/s Memory Width: 384 bit
	<b>Connectors</b>	4x DP 1.4a and VirtualLink Quadro Sync connector (compatible with Quadro II Sync) One 8-pin + 6-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.

### Technical Specifications - Graphics

**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 Outputs¹** 4x DP 1.4a and VirtualLink (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  
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>

**Notes** 1- Supports up to a total of 4 displays

#### NVIDIA® Quadro® RTX 6000 24GB Graphics

**Form Factor** Full-Height Dual Slot (4.4" Height x 10.5" Length)  
Weight: 1070 grams / 2.35 lbs

**Graphics Controller** NVIDIA® Quadro® RTX 6000 Graphics  
GPU: 4608 NVIDIA® CUDA® Parallel Processing Cores  
Power: 295 Watts  
Cooling: Active

**Memory** 24GB GDDR6 memory  
Memory Bandwidth: Up to 672 GB/s  
Memory Width: 384 bit

### Technical Specifications - Graphics

<b>Connectors</b>	<p>4x DP 1.4a and VirtualLink</p> <p>Quadro Sync connector (compatible with Quadro II Sync)</p> <p>One 8-pin + 6-pin auxiliary power connector</p> <p>Factory configured option: No video cable adapter included with card.</p> <p>After market option Kit: No video cable adaptor included with card.</p> <p>DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.</p>
<b>Maximum Resolution</b>	7680x4320 @ 60Hz
<b>Image Quality Features</b>	<p>Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.</p> <p>HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors</p> <p>NVIDIA® 3D Vision™ and other 3D stereo technologies</p> <p>NVIDIA® Mosaic and nView</p>
<b>Display Outputs<sup>1</sup></b>	4x DP 1.4a and VirtualLink (7680x4320 @ 60Hz)
<b>Supported Graphics APIs</b>	<p>DirectX® 12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0</p> <p>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran</p>
<b>Available Graphics Drivers</b>	<p>Windows® 10 64-bit</p> <p>Windows® 7 64-bit</p> <p>Linux® 64-bit</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site:</p> <p><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>	1- Supports up to a total of 4 displays

#### NVIDIA® Quadro® RTX 8000 48GB Graphics

<b>Form Factor</b>	<p>Full-Height Dual Slot (4.4" Height x 10.5" Length)</p> <p>Weight: 1070 grams / 2.35 lbs</p>
<b>Graphics Controller</b>	<p>NVIDIA® Quadro® RTX 8000 Graphics</p> <p>GPU: 4608 NVIDIA® CUDA® Parallel Processing Cores</p> <p>Power: 295 Watts</p> <p>Cooling: Active</p>
<b>Memory</b>	<p>48GB GDDR6 memory</p> <p>Memory Bandwidth: Up to 672 GB/s</p> <p>Memory Width: 384 bit</p>

### Technical Specifications - Graphics

<b>Connectors</b>	<p>4x DP 1.4a and VirtualLink</p> <p>Quadro Sync connector (compatible with Quadro II Sync)</p> <p>One 8-pin + 6-pin auxiliary power connector</p> <p>Factory configured option: No video cable adapter included with card.</p> <p>After market option Kit: No video cable adaptor included with card.</p> <p>DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.</p>
<b>Maximum Resolution</b>	7680x4320 @ 60Hz
<b>Image Quality Features</b>	<p>Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.</p> <p>HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors</p> <p>NVIDIA® 3D Vision™ and other 3D stereo technologies</p> <p>NVIDIA® Mosaic and nView</p>
<b>Display Outputs<sup>1</sup></b>	4x DP 1.4a and VirtualLink (7680x4320 @ 60Hz)
<b>Supported Graphics APIs</b>	<p>DirectX®12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0</p> <p>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran</p>
<b>Available Graphics Drivers</b>	<p>Windows® 10 64-bit</p> <p>Linux® 64-bit</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site:</p> <p><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>1- Supports up to a total of 4 displays</p> <p>2- VirtualLink's USB-C™ (data) cannot be disabled at a hardware level</p>

#### Radeon™ Pro WX 7100 8GB Graphics

<b>Form Factor</b>	Full-Height Single Slot (9.5" Length )
<b>Graphics Controller</b>	<p>Radeon™ Pro WX 7100 graphics</p> <p>GPU: 2304 Stream Processors organized into 36 Compute Units</p> <p>Power: 130 Watts</p> <p>Cooling: Active</p>
<b>Memory</b>	<p>8GB GDDR5 memory</p> <p>Memory Bandwidth: 7 Gbps / 224 GB/s</p> <p>Memory Width: 256 bit</p>
<b>Connectors</b>	<p>4x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.</p> <p>Factory Configured: No video cable adapter included</p> <p>After market option kit: No video cable adapter included</p>

### Technical Specifications - Graphics

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

<b>Maximum Resolution</b>	5K support @ 60Hz <ul style="list-style-type: none"> <li>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</li> </ul>
<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 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
<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 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>

#### Notes

10. 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.
11. 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.
12. 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.
13. 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.

### Technical Specifications - Graphics

<b>AMD Radeon™ Pro WX 9100 16GB Graphics</b>	<b>Form Factor</b>	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 1100 grams / 2.42 lbs
	<b>Graphics Controller</b>	AMD Radeon™ Pro WX 9100 Vega architecture GPU GPU: 4096 NVIDIA® CUDA® Parallel Processing Cores Power: 250 Watts Cooling: Active
	<b>Memory</b>	16GB HBM2 memory Memory Bandwidth: Up to 483 GB/s Memory Width: 384 bit
	<b>Connectors</b>	6x mDP 1.4 Quadro Sync connector (compatible with Quadro II Sync) One 8-pin + 6-pin auxiliary power connector  Factory configured option: No video cable adapter included with card. After market option Kit: 2x mini-DP to DP.  DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	<b>Maximum Resolution</b>	7680 × 4320 resolution @ 60Hz 6x DP 1.3 4K @60Hz or 3x 5K @60Hz or 1x 8K @60Hz
	<b>Image Quality Features</b>	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
	<b>Display Outputs<sup>1</sup></b>	6x mDP 1.4 (7680x4320 @ 60Hz)
	<b>Supported Graphics APIs</b>	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
	<b>Available Graphics Drivers</b>	Windows® 10 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>

#### Notes

- 1- Supports up to a total of 6 displays

<b>NVIDIA® Quadro® Sync II</b>	<b>Part number</b>	1WT20AA
	<b>Dimensions (HxD)</b>	6.0 inches × 4.2 inches
	<b>Devices Supported</b>	NVIDIA® Quadro® P4000 NVIDIA® Quadro® P5000 NVIDIA® Quadro® P6000
	<b>Bus Type</b>	Requires one free mechanical PCIe bus slot. 6-pin PCI or SATA power connector
	<b>PCI Form Factor</b>	Full Height, half length, single slot
	<b>Ports</b>	2 RJ45 connectors for carrying frame lock signals over CAT5 cables. BNC Connector for external house synchronization.
	<b>Internal Connectors</b>	6 NVIDIA SLI® style edge fingers for connection to compatible GPUs <ul style="list-style-type: none"> <li>• Included with the board are 4 12-Inch Short Sync Cables to connect to GPU's</li> <li>• Included with the board are 2 24-Inch Long Sync Cables to connect to GPU's</li> </ul>
	<b>System Requirements</b>	Requires one free mechanical PCIe bus slot. 6-pin PCI or SATA power connector Must be used with NVIDIA Quadro P4000, P5000 or P6000 graphics cards. Requires Quadro driver version R375 or later.
	<b>Temperature - Operating</b>	0° to 55° C
	<b>Temperature - Storage</b>	-40° to 60° C
	<b>Relative Humidity - Operating</b>	10% to 80%
	<b>Power Requirements</b>	Board power dissipation: <15W
	<b>Operating Systems Supported</b>	Windows 10 64-bit Windows 7 64-bit Linux® 64-bit
	<b>Kit Contents</b>	Contains: <ul style="list-style-type: none"> <li>• Quadro Sync II Card</li> <li>• 4 x 12-Inch Short Sync Cables</li> <li>• 2 x 24-Inch Long Sync Cables (Two)</li> <li>• Quick Start Guide</li> </ul>

### Technical Specifications – Optical and Removable Storage

#### 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>	DVD-ROM 8.5 GB DL or 4.7 GB standard Full Stroke DVD < 200 ms (seek) Full Stroke CD < 200 ms (seek)
	<b>Maximum Data Transfer Rates</b>	CD ROM Read CD-ROM, CD-R Up to 24X CD-RW Up to 24X  DVD ROM Read DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	<b>Power</b>	Source SATA DC power receptacle DC Power Requirements 5 VDC ± 5%-100 mV ripple p-p DC Current 5 VDC -< 800 mA typical, <1600 mA maximum
	<b>Operating Environmental (all conditions non-condensing)</b>	Temperature 41° to 122° F (5° to 50° C) Relative Humidity 10% to 80% Maximum Wet Bulb Temperature 84° F (29° C)
	<b>Operating Systems Supported</b>	Windows 10, Windows 7 Professional 64-bit, Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11
	<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>	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
<b>Access Times</b>	DVD-ROM Single Layer	< 110 ms (typical)
	CD-ROM Mode 1	< 110 ms (typical)
	Full Stroke DVD	< 230 ms (typical)
	Full Stroke CD	< 220 ms (typical)
<b>Power</b>	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC $\pm$ 5%-100 mV ripple p-p
	DC Current	5 VDC – <800mA typical, < 1600 mA maximum
<b>Operating Environmental (all conditions non-condensing)</b>	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
<b>Operating Systems Supported</b>	Windows 10, Windows 7 Professional 64-bit Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11	
	No driver is required for this device. Native support is provided by the operating system.	
<b>Kit Contents</b>	9.5mm Slim DVD-ROM Drive, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide	

#### HP HH DVD Writer (16X RW DVD-R)

<b>Description</b>	HP Half Height DVD Writer	
<b>Mounting Orientation</b>	Either Horizontal or vertical	
<b>Interface Type</b>	SATA	
<b>Dimensions (WxHxD)</b>	146x42x165mm	
<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>	DVD-ROM	8.5 GB DL or 4.7 GB standard
	Full Stroke DVD	145ms (seek)
	Full Stroke CD	120ms (seek)
<b>Maximum Data Transfer Rates</b>	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	DVD ROM Read	DVD+RW Up to 13X DVD-RW Up to 13X DVD+R DL Up to 12X DVD-R DL Up to 12X DVD-ROM Up to 12X DVD-ROM DL Up to 12X

### Technical Specifications – Optical and Removable Storage

<b>Power</b>	Source	DVD+R Up to 16X DVD-R Up to 16X
	DC Power Requirements	SATA DC power receptacle 5 VDC $\pm$ 5% -100 mV ripple p-p 12 VDC $\pm$ 10% -200 mV ripple p-p
	DC Current	5 VDC -<1500mA typical, <2000 mA maximum.
<b>Operating Environmental (all conditions non-condensing)</b>	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 90% (Non-Condensing)
<b>Operating Systems Supported</b>	Windows 10, Windows 7 Professional 64-bit. Red Hat Enterprise Linux WS4**,5,6 Desktop/Workstation.	
	No driver is required for this device, Native support is provided by operating system.	
<b>Kit Contents</b>	HP SATA DVD Writer drive, Installation guide.	

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

<b>Description</b>	9.5mm height, tray-load	
<b>Mounting Orientation</b>	Either horizontal or vertical	
<b>Interface Type</b>	SATA/ATAPI	
<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm	
<b>Supported Media Types</b>	BD-ROM	
	BD-R	
	BD-RE	
	DVD+R	
	DVD+RW	
	DVD+R DL	
	DVD-R DL	
	DVD-R	
	DVD-RW	
	CD-R	
	CD-RW	
<b>Disc Capacity</b>	DVD-ROM	8.5 GB DL or 4.7 GB standard
	Blu-ray	25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
	Full Stroke DVD	< 230 ms (seek)
	Full Stroke CD	< 220 ms (seek)
	Blu-ray	< 230 ms (seek) (Full Stroke Blu-ray)
	Startup Time	(Time to drive ready from tray loading) BD-ROM (SL/DL) 25S / 28S BD-R (SL/DL) 25S / 28S BD-RE (SL/DL) 25S / 28S DVD-ROM (SL/DL) 18S / 18S DVD-R (SL/DL) 25S / 25S DVD-RW 25S DVD+R (SL/DL) 25S / 25S DVD+RW 25S

### Technical Specifications – Optical and Removable Storage

		CD-ROM	15S
<b>Maximum Data Transfer Rates</b>	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X	
	DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X	
	Blu-ray	BD-ROM Up to 6X BD-ROM DL Up to 6X BD-R Up to 6X BD-R DL Up to 6X BD-R Up to 6X BD-RE SL/DL Up to 6X	
<b>Power</b>	Source	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p	
	DC Current	5 VDC -900 mA typical, 2000mA maximum	
<b>Operating Environmental (all conditions non-condensing)</b>	Temperature	41° to 122° F (5° to 50° C)	
	Relative Humidity	10% to 80%	
	Maximum Wet Bulb Temperature	84° F (29° C)	
<b>Operating Systems Supported</b>	Windows 10, Windows 7 Professional 64-bit Red Hat® Enterprise Linux® (RHEL) 6, 7 Desktop/Workstation SUSE Linux® Enterprise Desktop 12		
	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		
	As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.		

<b>HP SD Card Reader</b>	<b>Description</b>	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports SD 4-bit parallel transfer mode
	<b>Interface Type</b>	USB 3.1 GEN 1 High-speed interface
	<b>Dimensions (WxHxD)</b>	1.15 x .9 x .15 in (29.00 x 23.6 x 3.15 mm) Fits conveniently in the Front IO Bay
	<b>Supported Media Types</b>	Secure Digital Card (SD) Secure Digital High Capacity (SDHC) SD Extended Capacity Memory Card (SDXC)

Technical Specifications – Optical and Removable Storage

SD Ultra High Speed II(SD UHSII)

These additional media types are supported with a card adapter.

Memory Stick Micro (M2)

miniSD

miniSD High Capacity

Micro SD Memory Card (MicroSD)

Micro SD High Capacity Memory Card (MicroSDHC)

Test Parameters/Conditions - Power applied, unit operating on system  
±5%

Operating Systems  
Supported

Windows 10

No driver is required for this device. Native support is provided by the operating system.

Kit Contents  
Approvals

Media card reader

USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0,  
Compliant Intel® Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT

Weight

0.35 lbs. (0.16 kg)

### Technical Specifications - Controller Cards

#### CONTROLLER CARDS

<b>HP Thunderbolt-3 Dual Port2 PCIe 1-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™, Thunderbolt™ 2 and Thunderbolt™ 3 certified for Windows devices
	<b>Bus Type</b>	PCIe card, full height PCIe slots
	<b>Ports</b>	Two Thunderbolt™ 3 external USB type-C output connectors (Rear) Two full size DisplayPort input connectors (Rear)
	<b>Internal Connectors</b>	One 2x5-Pin header connector
	<b>System Requirements</b>	Windows 10 Professional 64-bit, available dedicated PCH 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 Professional 64-bit.
	<b>Kit Contents</b>	HP Thunderbolt™ 3 Dual Port PCIe I/O Card, 2- DisplayPort cables, GPIO (General-Purpose Input/Output) cables, Installation documentation and warranty card.

\*Maximum speed requires DisplayPort™ and PCIe aggregation.

### Technical Specifications - Networking and Communications

#### NETWORKING AND COMMUNICATIONS

<b>Integrated Intel® I219LM</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Intel® I219LM
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Boot ROM Support</b>	PXE, UEFI
	<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>Off = No link</li> <li>Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>Off = 10Mbps</li> <li>Amber = 100Mbps</li> <li>Green = 1000Mbps</li> </ul>
	<b>Management Capabilities</b>	Intel® Active Management Technology™ 11

<b>Integrated Intel® X722 for 1GbE</b>	<b>Connector</b>	1 RJ-45
	<b>Controller</b>	Intel® X722 for 1GbE
	<b>Data Rates Supported</b>	1000 Mbps
	<b>Boot ROM Support</b>	PXE, UEFI
	<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>Off = No link</li> <li>Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>Off = No Link</li> <li>Green = 1000Mbps</li> </ul>
	<b>Management Capabilities</b>	Wake-On-LAN

<b>HP Z Dual 10GbE Network Module</b>	<b>Networking Interface</b>	2 RJ-45
	<b>System Interface</b>	Cabled from Dedicated Rear I/O Slot
	<b>Networking Speeds Supported</b>	1Gbps, 10Gbps
	<b>Cabling (up to 100m)</b>	Cat5e (or higher) for 1Gbps Cat6a (or higher) for 10Gbps
	<b>Power Consumption (active-typical)</b>	5.5W at 1Gbps 11.2W at 10Gbps
	<b>Physical Dimensions</b>	0.875 in x 3 in x 2.75 in
	<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>Off = No link</li> <li>Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>Amber = 1Gbps</li> <li>Green = 10Gbps</li> </ul>
	<b>Operating Temperature</b>	0 °C to 55 °C (32 °F to 131 °F)

<b>Intel® I210-T1</b>	<b>Networking Interface</b>	1 RJ-45
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### Technical Specifications - Networking and Communications

<b>System Interface</b>	PCI Express 2.1 x1
<b>Networking Speeds Supported</b>	10Mbps, 100Mbps, 1Gbps
<b>Cabling (up to 100m)</b>	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
<b>Power Consumption (active-typical)</b>	0.81W
<b>Physical Dimensions</b>	Length: 6.7cm (2.64 inches) (Bracket) Width: 1.8cm (0.709 inches) Full-height end bracket: 12.07cm (4.755 inches) Low-profile end bracket: 8cm (3.15 inches)
<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>• Off = No link</li> <li>• Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>• Off = 10Mbps</li> <li>• Green = 100Mbps</li> <li>• Amber = 1Gbps</li> </ul>
<b>Operating Temperature</b>	0 °C to 55 °C (32 °F to 131 °F)
<b>Hardware Certifications</b>	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

<b>Intel® I350-T2</b>	<b>Networking Interface</b>	2 RJ-45
	<b>System Interface</b>	PCI Express 2.1 x4
	<b>Networking Speeds Supported</b>	10Mbps, 100Mbps, 1Gbps
	<b>Cabling (up to 100m)</b>	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	<b>Power Consumption (active-typical)</b>	4.4W
	<b>Physical Dimensions</b>	Length: 13.54cm (5.33 inches) Width: 6.89 (2.71 inches) Full-height end bracket: 12.0cm (4.725 inches) Low-profile end bracket: 7.92cm (3.117 inches)
	<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>• Off = No link</li> <li>• Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>• Off = 10Mbps</li> <li>• Green = 100Mbps</li> <li>• Amber = 1Gbps</li> </ul>
	<b>Operating Temperature</b>	0 °C to 55 °C (32 °F to 131 °F)

### Technical Specifications - Networking and Communications

<b>Hardware Certifications</b>	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
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<b>Intel® I350-T4</b>	<b>Networking Interface</b>	4 RJ-45
	<b>System Interface</b>	PCI Express 2.1 x4
	<b>Networking Speeds Supported</b>	10Mbps, 100Mbps, 1Gbps
	<b>Cabling (up to 100m)</b>	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	<b>Power Consumption (active-typical)</b>	5W
	<b>Physical Dimensions</b>	Length: 13.54cm (5.33 inches) Width: 6.89 (2.71 inches) Full-height end bracket: 12.0cm (4.725 inches) Low-profile end bracket: 7.92cm (3.117 inches)
	<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>• Off = No link</li> <li>• Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>• Off = 10Mbps</li> <li>• Green = 100Mbps</li> <li>• Amber = 1Gbps</li> </ul>
	<b>Operating Temperature</b>	0 °C to 55 °C (32 °F to 131 °F)
	<b>Hardware Certifications</b>	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

<b>Aquantia® AQN-108</b>	<b>Networking Interface</b>	RJ-45
	<b>System Interface</b>	PCI Express 3 x1
	<b>Networking Speeds Supported</b>	100Mbps, 1Gbps, 2.5Gbps, 5Gbps
	<b>Cabling (up to 100m)</b>	Cat5e (or higher) for all speeds
	<b>Power Consumption (active-typical)</b>	3.5W at 5Gbps, 3.0W at 2.5Gbps
	<b>Physical Dimensions</b>	3.72 in x 3.18 in (without bracket)



### Technical Specifications - Networking and Communications

#### Connect Speed LED Indicators

##### Link/Activity LED

- Off = No link
- Blinking = Activity

##### Speed LED

- Off = No link
- Amber = <5Gbps
- Green = 5Gbps

#### Operating Temperature

0 °C to 55 °C (32 °F to 131 °F)

#### Hardware Certifications

USA: FCC B,  
EU: UL CE,  
Japan: VCCI,  
Taiwan: BSMI,  
Australia/New Zealand: CTICK,  
Korea: KCC,  
Canada: ICES-003/NMB-003

#### Intel® X550-T2

##### Networking Interface

2 x RJ-45

##### System Interface

PCI Express 3 x4

##### Networking Speeds Supported

100Mbps, 1Gbps, 2.5Gbps, 5Gbps, 10Gbps

##### Cabling (up to 100m)

Cat5 (or higher) for 100Mbps  
Cat5e (or higher) for 1Gbps, 2.5Gbps, or 5Gbps  
Cat6a (or higher) for 10Gbps

##### Power Consumption (active-typical)

3.9W at 100Mbps  
5.5W at 1Gbps  
11.2W at 10Gbps

##### Physical Dimensions

5.2 in x 2.7 in (without bracket)

#### Connect Speed LED Indicators

##### Link/Activity LED

- Off = No link
- Blinking = Activity

##### Speed LED

- Off = No link
- Amber = <10Gbps
- Green = 10Gbps

#### Operating Temperature

0 °C to 55 °C (32 °F to 131 °F)

#### Hardware Certifications

USA: FCC B,  
EU: UL CE,  
Japan: VCCI,  
Taiwan: BSMI,  
Australia/New Zealand: CTICK,  
Korea: KCC,  
Canada: ICES-003/NMB-003

#### Intel® X710-DA2

#### 10GBASE-SR Converged Network Adapter

##### Networking Interface

2 SFP+ Ports for LC SFP+ Transceivers

##### System Interface

PCI Express 3.0 x8

##### Networking Speeds Supported

1Gbps, 10Gbps

### Technical Specifications - Networking and Communications

<b>Cabling</b>	LC fiber optic cabling with LC SFP+ Transceivers
<b>Power Consumption (active-typical)</b>	4.3W
<b>Physical Dimensions</b>	6.578 in x 2.703 in
<b>Connect Speed LED Indicators</b>	Link/Activity LED <ul style="list-style-type: none"> <li>• Off = No link</li> <li>• Blinking = Activity</li> </ul> Speed LED <ul style="list-style-type: none"> <li>• Off = 10Mbps</li> <li>• Green = 100Mbps</li> <li>• Amber = 1Gbps</li> </ul>
<b>Operating Temperature</b>	0 °C to 55 °C (32 °F to 131 °F)
<b>Hardware Certifications</b>	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

**Note:** Windows 7 is NOT supported

#### 10GbE SFP+ SR Transceiver

<b>Connector Type</b>	LC
<b>Cable Type</b>	62.5/125um or 50/125um (core/cladding), graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively.
<b>Cable Length</b>	2-300m
<b>Wavelength</b>	850nm
<b>Form Factor</b>	SFP+
<b>Physical Dimensions</b>	0.47(h) x 0.54(w) x 2.19(d) inches (1.19 x 1.38 x 5.57 cm)
<b>Operating Temperature</b>	0C to 45C (32F to 113F)
<b>Operating Humidity</b>	0% to 85%, noncondensing

#### Intel® 8265 WLAN

<b>Networking Speeds</b>	802.11ac MU-MIMO (up to 867 Mbps) Bluetooth 4.2
<b>IEEE WLAN Standard</b>	IEEE 802.11a/b/g/n/ac, 802.11d, 802.11e, 802.11h, 802.11i, 802.11w; 802.11r, 802.11k, 802.11v pending
<b>Bluetooth</b>	4.2
<b>System Interface</b>	PCI Express 2.1 x1
<b>Antenna</b>	2x2

### Summary of Changes

#### SUMMARY OF CHANGES

Date of change:	Version History:		Description of change:
November 1, 2017	From v1 to v2	Added	HP DisplayPort to HDMI Adapter, HP DisplayPort to VGA Adapter, NVIDIA SLI 3-slot Graphics Connector and NVIDIA Quadro Sync II to Graphics section and Microsemi 3152-8i SAS ROC RAID Controller
		Changed	Graphics, Storage / Hard Drives and Memory sections, changed Front and internal view info on the Overview section, changed Operating Systems section, changed System Board section, Physical Security and Serviceability sections
November 29, 2017	From v2 to v3	Added	Processors, hard drives and graphics to offerings, added Declared Noise Emissions information
January 30, 2018	From v3 to v4	Removed	NVIDIA SLI Graphics Connectors from Graphics Cable Adapters section
March 27, 2018	From v4 to v5	Added	Intel Xeon processors added
April 16, 2018	From v5 to v6	Removed	RAID 5
August 13, 2018	From v6 to v7	Added	Footnote to Networking and Communications section
		Changed	Processors section and Operating Systems section
September 4, 2018	From v7 to v8	Removed	HP IEEE 1394b FireWire PCIe Card
September 6, 2018	From v8 to v9	Removed	Microsemi 3152-8i SAS ROC RAID Controller
September 21, 2018	From v9 to v10	Added	Intel Optane SSD 905p AiC 280GB & 480GB
September 26, 2018	From v10 to v11	Changed	NVIDIA Quadro P6000 Graphics specs
April 8, 2019	From v11 to v12	Added	New Intel Xeon Processors and graphics, added HP DX175 Removable HDD Carrier into the HDD Frame/Carriers section
		Changed	Storage / Hard Drives, Memory sections and format changes
May 15, 2019	From v12 to v13	Added	NVIDIA Quadro RTX 8000 48GB Graphics
		Changed	External BIOS simulator link on Physical Security and Serviceability section
		Removed	Intel 9260 WLAN
June 12, 2019	From v13 to v14	Changed	Storage section
July 7, 2019	From v14 to v15	Added	Intel Xeon W Processors
July 15, 2019	From v15 to v16	Changed	Corrected Intel 905p Series AiC 480GB PCIe SSD
August 1, 2019	From v16 to v17	Changed	Processors Matrix
September 1, 2019	From v17 to v18	Added	Footnote to Memory section, Added Optane 905P 380GB M.2 SSD Module, HP Z Turbo Drive 1TB SED TLC Z4/Z6 G4 SSD Kit & module to Storage section, Added Intel® Wi-Fi 6 AX200 & BT PCIe to Networking section
October 26, 2019	From v18 to v19	Changed	Graphics section
November 1, 2019	From v19 to v20	Added	NVDIMM Memory sections, Added HP QX310 Removable NVMe Frame/Carrier w/PCIe card to Optical and Removable Storage section

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